A National Study Exploring Knowledge, Beliefs and Implementation of Evidence-Based Practice among Nurses, Midwives, Lecturers and Students in the Republic of Ireland

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I hereby certify that this material, which I now submit for assessment on the programme of study leading to the award of Doctor of Philosophy is entirely my own work, and that I have exercised reasonable care to ensure that the work is original, and does not to the best of my knowledge breach any law of copyright, and has not been taken from the work of others save and to the extent that such work has been cited and acknowledged within the text of my work.

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Dedication

This year, 2020, has been designated by the World Health Organisation as the "Year of the Nurse and Midwife".

I wish to dedicate this work to all of my nursing and midwifery colleagues in Ireland and around the world. In particular, I want to thank and applaud them for their passionate dedication to their patients, their enduring commitment to their professions, and their resilient and outstanding contribution to society at large. Never have they shone more brightly than in their on-going crusade against the COVID-19 crisis that has beset the world. They have given and continue to give everything; their knowledge, expertise, compassion, time, energy, and, sadly in too many cases, even their lives. Words simply cannot express the debt the world owes to these heroines and heroes.

Thank you all and keep shining.

"For us who Nurse, our Nursing is a thing, which, unless in it we are making progress every year, every month, every week, take my word for it we are going back."

Florence Nightingale, May 1872.
(Letter to her Nurses)

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List of Abbreviations

ABA	An Bord Altranais
ADOM	Assistant Director of Midwifery
ADON	Assistant Director of Nursing
AMP	Advanced Midwife Practitioner
ANP	Advanced Nurse Practitioner
BNGN	Bachelor of Science in Nursing (General)
BNPY	Bachelor of Science in Nursing (Psychiatric)
BNID	Bachelor of Science in Nursing (Intellectual Disability)
CEBM	Centre for Evidence-Based Medicine (University of Oxford)
CPC	Clinical Placement Coordinator
CMM 1	Clinical Midwife Manager 1 (reports to CMM2)
CMM 2	Clinical Midwife Manager 2 (in charge of a ward)
CMM 3	Clinical Midwife Manager 3 (in charge of a department)
CNM 1	Clinical Nurse Manager 1(reports to CNM2)
CNM 2	Clinical Nurse Manager 2 (in charge of a ward)
CNM 3	Clinical Nurse Manager 3 (in charge of a department)
CMS	Clinical Midwife Specialist
CNS	Clinical Nurse Specialist
DOM	Director of Midwifery
DON	Director of Nursing
EBM	Evidence-based Medicine
EBP	Evidence-based Practice
EBPB	Evidence-based Practice Beliefs Scale
EBPB-E	Evidence-based Practice Beliefs Scale – Educators
EBPI	Evidence-based Practice Implementation Scale
EBPI-E	Evidence-based Practice Implementation Scale - Educators
OCRSIEP	Organisational Culture and Readiness for System-wide Integration of EBP
OCRSIEP-E	Organisational Culture and Readiness for School-wide Integration of EBP - Educators
OCRSIEP-ES	Organisational Culture and Readiness for School-wide Integration of EBP - Students
HEI	Higher Education Institutions
HIQA	The Health Information and Quality Authority
HSE	Health Service Executive

IOM	Institute of Medicine (U.S.A.) – now National Academy of Medicine
NCEC	National Clinical Effectiveness Committee
NICE	National Institute for Clinical Excellence
NMBI	Nursing and Midwifery Board of Ireland
NMC	Nursing and Midwifery Council (U.K.)
NMPDU	Nursing and Midwifery Practice Development Unit
PICOT	Patient, Intervention, Comparison, Outcome, Time
RCT	Randomised control trial
RCN	Registered Children's Nurse
RGN	Registered General Nurse
RM	Registered Midwife
RNID	Registered Intellectual Disability Nurse
RPN	Registered Psychiatric Nurse
SPICE	Setting, Perspective, Intervention, Comparison, Evaluation
TPB	Theory of planned behaviour
WHO	World Health Organization

Abstract

A National Study Exploring Knowledge, Beliefs and Implementation of Evidence-Based Practice among Nurses, Midwives, Lecturers and Students in the Republic of Ireland

Joanne Cleary-Holdforth

Background: Evidence-based practice (EBP) is a problem-solving approach to healthcare that combines the use of best available evidence, healthcare professionals' expertise, and patient preferences/values (Melnyk and Fineout-Overholt, 2019). It yields proven benefits for patients, healthcare professionals and organisations alike. However, EBP implementation remains inconsistent among nurses and midwives. Understanding the factors involved here is key to facilitating system-wide integration of EBP.

Aim: This study aimed to establish the EBP beliefs, knowledge, and implementation of nurses and midwives, and the organizational culture of their workplaces.

Methods: Seven validated EBP questionnaires and one open question were provided to nursing/midwifery lecturers (n=71) and students (n=222) in nine randomly sampled Higher Education Institutions, and clinical nurses and midwives (n=292) in affiliated general hospitals in the Republic of Ireland. Response rates were 22.3%, 19.4% and 7% respectively. Descriptive, inferential and correlational statistics were used to analyse the demographic characteristics, group mean scores and distribution of each cohort on the seven scales, and identify relationships between EBP beliefs, implementation and organisational culture and readiness for EBP. Content analysis was used to analyse participants' responses to the open question on the survey.

Results: Overall findings revealed a substantial dearth of EBP knowledge in all cohorts. Participants generally demonstrated positive beliefs about EBP (Lecturers M=87.72 SD=10.91 on a scale of 22-110; Students M=55.18 SD10.29; and Clinical M=59.98 8.68, both on a scale of 16-80. Higher scores indicate higher beliefs). However, beliefs regarding their own ability to implement EBP were lower. EBP implementation proved low across the three cohorts (Lecturers M=31.09 SD=16.54; Students M=16.59 SD12.11; Clinical M=12.85 SD=14, on a scale of 0-72. Higher scores indicate higher implementation). Participants' perceptions of their organisations' support and readiness for EBP varied (Lecturers M=86.43 SD=15.01; Students M=93.21 SD=16.21; Clinical M=74.07 SD=19.65, on a scale of 25-125. Higher scores indicate greater organisational culture and readiness for EBP).

Discussion: Nurses and midwives are one of the largest groups of healthcare professionals in the healthcare system and therefore potentially an opportune means by which to facilitate system-wide integration of EBP. However, they must be equipped with appropriate knowledge and skills, and supported by their organisations to do so. Strengths, opportunities and challenges were uncovered that can be used to craft an organisational culture and environment that supports and encourages an EBP approach to nursing and midwifery education as well as to patient care.

Conclusion: Recommendations aimed at improving EBP knowledge, beliefs and implementation include effective integration of EBP into nursing and midwifery programme curricula, EBP training for nurses and midwives in practice, preparation of lecturers to teach EBP, and provision of the necessary resources/supports for a sustainable culture of EBP in the clinical and educational organisations. A collaborative approach to evidence-based patient care maximizing the pooled EBP knowledge and skills of clinicians and lecturers is strongly advocated. It is hoped that these approaches will engender EBP implementation in daily nursing and midwifery practice, and lead to improved outcomes for patients in Ireland for generations to come.

Chapter 1: Introduction to the Study

Introduction

This PhD work is a unique exploration of the perceived beliefs, knowledge, and implementation of evidence-based practice (EBP) in the professions of nursing and midwifery in the Republic of Ireland. There are numerous definitions of EBP cited in the literature but in broad terms EBP is a system of healthcare planning and delivery involving the integration of the best available evidence with patients' preferences, and clinical expertise. EBP acknowledges the essential contribution that evidence, patient involvement, and clinical expertise make to healthcare decision-making in their own right, and how their synergy produces optimal patient outcomes and satisfaction, enhanced clinician empowerment and morale, and improved organisational effectiveness and efficiency. The operational definition of EBP that underpins this study is that proposed by Melnyk and Fineout-Overholt (2019, p. 8, emphasis in original). They defined EBP as:

> "a lifelong problem-solving approach to clinical practice that integrates the following:
> - A systematic search for and **critical appraisal** of the most relevant and best research (i.e., **external evidence**) to answer a burning clinical question;
> - One's own clinical expertise, including use of **internal evidence** generated from **outcomes management** or **evidence-based quality improvement projects**, a thorough patient assessment, and evaluation and use of available resources necessary to achieve desired patient outcomes;
> - Patient/family preferences and values."

Embracing EBP represents a shift from care based on tradition or expert preference, to care that is based on scientific evidence, embraces patient involvement, and values clinical expertise.

Problem Statement

EBP has commanded increasing attention among healthcare professionals since the 1990s. A multitude of evidence exists that attests to the substantial benefits of EBP with respect to patients, healthcare professionals, and healthcare organisations alike (Heater, Becker and Olson, 1988; Thomas *et al.*, 1999; Wallen *et al.*, 2010; Doran *et al.*, 2014; Kim *et al.*, 2016, 2017; Macias *et al.*, 2017; Cheng *et al.*, 2018). Moreover, EBP as an approach to healthcare is strongly advocated by professional governing and expert bodies around the world (Institute of Medicine, 2001; Dawes *et al.*, 2005; Department of Health, 2017; Jylhä *et al.*, 2017; Lehane *et al.*, 2019). However, despite this, its integration in healthcare practice, including nursing and midwifery, remains a significant challenge globally (Ubbink, Guyatt and Vermeulen, 2013; Malik, McKenna and Plummer, 2015; Azmoude *et al.*, 2017). If EBP yields improved patient outcomes, reduced geographical variation in healthcare and reduced healthcare costs, then practice that is not evidence-based could, arguably, result in varying standards of care delivery and uncertain patient outcomes (Cleary-Holdforth, 2017). While this challenge exists across multiple healthcare professions, this thesis focused specifically on

the nursing and midwifery professions. The purpose of the study was to establish nurses' and midwives' knowledge, beliefs and implementation of EBP in the Republic of Ireland, and the culture and readiness for EBP of the organisations in which they work and learn. Nursing and midwifery education in Ireland has undergone immense change over a relatively short period of time, moving these professions from what were apprenticeship-prepared up until 1995 to all-graduate professions in the 21st century (O'Dwyer, 2007; Begley, 2008). In tandem with this, career pathways for nurses and midwives have developed. Roles such as clinical nurse or midwife specialists and advanced nurse or midwife practitioners have become increasingly commonplace (O'Shea, 2012), expanding the scope and nature, as well as the science and art of nursing and midwifery practice. Nonetheless, it is essential that, no matter the stage of a nurse's or midwife's career, the patient care that he/she delivers should be evidence-based. Nurses and midwives in clinical practice who deliver patient care, and nurse and midwifery lecturers in higher education institutions (HEIs) who prepare student nurses and midwives to become the practitioners of the future have a key role to play in the achievement of this goal. In order to successfully deliver and/or teach evidence-based nursing and midwifery care, nurses and midwives in clinical practice, and lecturers on nurse and midwifery programmes of education, must possess the EBP knowledge and skills necessary to do so (Cleary-Holdforth and Leufer, 2008). However, this is not always the case. Despite their positive beliefs about EBP, nurses' and midwives' EBP knowledge, skills and implementation are generally poor (Stichler *et al.*, 2011; Melnyk *et al.*, 2012; Ubbink, Guyatt and Vermeulen, 2013; Malik, McKenna and Plummer, 2015; Melnyk *et al.*, 2016; Saunders and Vehviläinen-Julkunen, 2016b; Azmoude *et al.*, 2017; Melnyk *et al.*, 2018). Nurses' and midwives' EBP knowledge, skills and implementation have not been studied explicitly in the Irish context.

Nursing and midwifery education in Ireland is regulated by the Nursing and Midwifery Board of Ireland (NMBI) and delivered jointly by the HEIs and their affiliated clinical partner services, which are responsible for the theoretical and clinical instruction of students respectively. In their guiding documents that stipulate the standards and requirements for undergraduate nurse and midwifery education, the NMBI (2015, 2016) provide limited reference to EBP, do not offer a conceptual definition of EBP, nor provide any guidance on the extent or means by which it should be included in the curricula or delivered in the programmes. Consequently, the degree to which it is promoted or taught on these programmes is variable (Lehane *et al.*, 2017). In many cases, the traditional focus on research and research methods prevails, often to the detriment of EBP learning (Melnyk *et al.*, 2008, 2012; Orta *et al.*, 2016). This exclusive focus on the conduct of research stymies EBP implementation in practice because it fails to address the three core components (best available evidence, patient values/preferences, clinical expertise) and the process of EBP. In so doing, the integration of

evidence in practice is overlooked. This represents a missed opportunity, not only for nurses and midwives, but for the healthcare system at large because, given their vast numbers and presence across a multitude of healthcare settings, nurses and midwives could be instrumental in the advancement of system-wide EBP.

Impetus for the Study

Nurses and midwives comprise one of the largest professional groups in most healthcare systems worldwide (O'Shea, 2012; Health Service Executive, 2013; Correa-De-Araujo, 2016; Saunders and Vehviläinen-Julkunen, 2016b; Friesen *et al.*, 2017). Furthermore they care for a wide diversity of patients across the lifespan with varying levels of dependence or vulnerabilities, and a myriad of physical, emotional, psychological, mental and spiritual needs. Nurses and midwives are present at the most joyous moments of life, such as the birth of a baby, the awakening of a patient from a coma, or the rehabilitation of a patient following a cardiac event or a stroke. They are also present at the most difficult and heart-wrenching events, such as when a patient receives a devastating diagnosis, when resuscitation of a collapsed patient proves futile, or during the dying days (and nights) of a terminally ill patient's life. Such close, responsive involvement with patients and their families, and with members of the wider multi-disciplinary team, places nurses and midwives at the centre and forefront of patient care delivery, and the healthcare service generally. Jones, Hamilton and Murry (2015, p. 1122) posited that given their roles as gatekeepers, planners, coordinators and evaluators of care, "few care processes reach patients without first passing through the hands of nurses" or midwives, I would add. As such, they are optimally placed to escalate EBP integration across the healthcare system but they must be prepared to do so. To support this integration, nurses and midwives must be adequately equipped with the appropriate EBP knowledge and skills, and must be sufficiently supported by organisational management and resources that embrace and encourage EBP. The first step, to this end, is to ascertain nurses' and midwives' beliefs, knowledge and implementation of EBP, as well as the EBP culture and readiness of the organisations in which they practice, teach and learn. To date, this has not been undertaken in the Irish context. This study set out to achieve this. Sample recruitment included clinical nurses and midwives, nurse and midwifery lecturers, and students as they comprise the key stakeholders of nurse and midwifery education. The findings of this national study can establish the extent and nature of EBP knowledge and implementation in these professions, as well as organisational factors that may facilitate or challenge the advancement of EBP. This will identify the strengths that these professions can bring to bear in the advancement of EBP in healthcare, as well as the areas where they may require additional education, support and development to achieve this.

Personal Background

As a Registered Nurse and Midwife, I have always been committed to optimising patient care and safety. In my transition from clinical practice to my role as an Assistant Professor in Nursing, my focus on patient care and safety has not altered. In 2006, when the opportunity to participate in an EBP mentorship immersion programme at the Centre for the Advancement of EBP at Arizona State University under the auspices of Drs. Bernadette Melnyk and Ellen Fineout-Overholt, I embraced it enthusiastically. This ignited my passion for and pursuit of EBP, which led in 2014 to my beginning this PhD research. Since then I have been actively involved in EBP teaching and research at DCU and was sponsored by the Naji Foundation to undertake a Teaching Evidence Based Medicine course at Oxford University in September 2018. Having completed this training, I now contribute to teaching EBP to transdisciplinary healthcare professions nationally with colleagues from the National Cancer Care Programme and the Department of Health. In March 2019, this group established a national EBP group, 'EBP Ireland', of which I am a steering committee member. Our focus is to promote EBP at a national level and provide EBP education to healthcare professionals in order to increase the capacity for EBP. Coming from a nursing and midwifery background, and working in nurse education, nurses and midwives are my primary focus.

Purpose of the Study

The purpose of the current study was to establish nurses' and midwives' beliefs, knowledge and implementation of EBP as well as the EBP culture and readiness of the organisations in which they practice, teach and learn in the Republic of Ireland. This was achieved using a cross-sectional, national quantitative survey of nurse and midwifery lecturers and students from nine HEIs and clinical nurses and midwives from affiliated partner services. In addition to basic demographic information, data were collected on the variables of interest using scales that measure EBP beliefs, implementation, and organisational culture and readiness for EBP. One open-ended question was included on the survey, which invited participants to describe what they believed EBP to be in their own words. The findings yielded by this study will establish the current state of EBP beliefs, knowledge and implementation of nurses and midwives in clinical and education settings in the Irish context and provide insight into their organisations' culture and readiness for EBP. This information will provide a comprehensive overview of the strengths, opportunities and challenges that exist within these contexts for the integration of EBP and will serve as a springboard for the onward development of the necessary knowledge, skills, resources and supports for system-wide integration of evidence-based nursing and midwifery practice. This study offers real potential for the development of a context-specific EBP implementation strategy for nursing and midwifery in Ireland.

Summary of Subsequent Chapters

Chapter 2 – Literature review
This chapter provides a comprehensive overview of current, relevant literature on EBP. It reflects on its origins and definitions, offers insight into the impetus for and impacts of EBP, and considers some of the main criticisms of EBP. The state of EBP in nursing and midwifery is discussed, along with factors influencing EBP implementation in these contexts. The context of nursing and midwifery education in Ireland is reviewed and the theory underpinning this study explained.

Chapter 3 – Methodology
In this chapter the aims and objectives of the current study are presented. The research methods selected to conduct the study are outlined and the underpinning rationale for their selection is discussed. Details of sample and site selection, participants, data collection tools, data management and analysis are furnished. Ethical procedures and considerations are proffered.

Chapter 4 – Presentation of Findings
The findings of the study are presented in this chapter. The findings are predominantly quantitative in nature but also include qualitative findings yielded by the inclusion of one open-ended question on the otherwise quantitative survey.

Chapter 5 – Discussion of Findings
This chapter presents a detailed discussion of the findings produced by this study. The discussion is structured according to the variables studied, EBP knowledge, beliefs, implementation, and organisational culture and readiness for system-wide integration of EBP. The results are considered on their own merit in the first instance, as well as in the context of the existing body of knowledge concerning these aspects of EBP. Their meaning and implications are discussed.

Chapter 6 – Conclusions and Recommendations
A summary of key findings from the study are iterated. Recommendations for clinical nurses and midwives, nursing and midwifery lecturers, and nursing and midwifery students are proffered in terms of education, practice and policy. Recommendations are also made in relation to further research that would be beneficial. The limitations of the study are also discussed in this chapter.

Chapter 2: Literature Review

Literature Review

A literature review is an integral part of a research project. It comprises a thorough, wide-ranging summation and appraisal of literature relevant to the research question, and enables the identification of what is known, how it has been studied, where gaps in knowledge exist, as well as some direction in terms of how to approach the research question being asked (Fawcett, 2013; Oliver, 2014; Ward-Smith, 2016; Williamson and Whittaker, 2017; Aveyard, 2019). Literature reviews can be conducted in a number of ways, depending on their role within the research project. They can, in themselves, be the research project, as in the case of a systematic review. A systematic review is a rigorous research synthesis typically conducted by a number of expert reviewers to answer a narrowly focused question, following a strict protocol in terms of searching, finding, selecting, rejecting and evaluating high-level research studies (Ward-Smith, 2016; Peterson *et al.*, 2017; Munn *et al.*, 2018; Aveyard, 2019). The variables in the current study, nurses' and midwives' knowledge, beliefs and implementation of EBP and the culture and readiness of the organisations in which they work and study, were very broad and multi-factorial in nature. Consequently, they did not lend themselves to being studied by a systematic review. In fact, it would have taken several systematic reviews to achieve this. This, coupled with time and resource constraints of a PhD study, rendered a systematic review inappropriate for this study. Another approach that can be taken to reviewing literature is the scoping review. This is a systematic approach involving a number of defined steps or procedures which can facilitate a broader, more diverse exploration of relevant literature than a systematic review (Peterson *et al.*, 2017). However, a challenge of scoping reviews is their time-consuming nature, which, when well executed, can take almost two years to conduct (Daudt, van Mossel and Scott, 2013; Pham *et al.*, 2014). As part of a larger piece of work, such as a PhD study, this challenge can render a scoping review difficult. Furthermore, the breadth of the current study would have meant the several scoping reviews would have been necessary, related to the various components of EBP that were of relevance.

In order to achieve the goals of this study, an extensive literature review that would determine what is known about the variables of interest; observe how and where these variables have been studied; identify any gaps in the research; and establish the best methodological approach to the current study, was warranted. Ward-Smith (2016, p. 254) described this type of literature review as a "generic or critical literature review". It facilitates a broad, substantial, comprehensive knowledge and understanding of the topic, the research activity in the field, and related contemporary issues. A

systematic approach was adopted in relation to searching for relevant literature, considering the variables of interest in those studies, the methodological approaches, the key findings, conclusions, recommendations and the contribution to the knowledge base in the field.

Search methods

Over the course of the study several approaches and sources were employed to search for relevant literature. Dates searched ranged from 1985 onwards to capture the initial and on-going emergence of evidence-based medicine (EBM) or EBP commentary and writings. Search terms included evidence-based practice, EBP, evidence-based medicine, EBM, evidence-based nursing, evidence-based philosophy, history, origins, evidence-based practice beliefs, education, teaching, lecturers, educators, academics, research, utilisation, implementation, behaviour, context, culture, and organisation.

Both online and hand searches at the DCU library were useful for sourcing textbooks on the subject area of the study, research methods, and theories relevant to the study. Online databases including the Cumulative Index of Nursing and Allied Health Literature (CINAHL), Ovid, Science Direct, Pubmed, Medline (via EBSCO), and Doras (DCU) Index to Theses were searched. Examples of the search strategies used can be viewed in Appendix 10. Searching also extended to national (including the Nursing and Midwifery Board of Ireland, Health Service Executive, Department of Health, Health Information and Quality Authority) and international (including the World Health Organisation, Agency for Healthcare and Research Authority in the USA, Centre for Evidence-based Medicine in the UK, and The Fuld Institute for Evidence-based Practice in the USA) expert and governing body publications of relevance and other grey material that would have presented itself at various stages along the way. Reference lists from original journal articles procured were searched for further sources of information. All sources were considered from the perspective of their relevance and level of evidence with the aid of the hierarchy of evidence advocated by O'Mathúna and Fineout-Overholt (2019). Evidence from levels 1 (systematic reviews), 2 (randomised control trials), 3 (non-randomised control trials), 6 (qualitative and descriptive studies), and 7 (expert opinion) was included.

Evidence-Based Practice

Origins and History

Evidence-based practice (EBP) rose to prominence in medicine during the 1970s with Archie Cochrane, David Sackett and Gordon Guyatt credited with pioneering and advancing the principles and practice of evidence-based medicine (EBM) (Scott and McSherry, 2009; Sur and Dahm, 2011; Beyea and Slattery, 2013). However, early proponents of EBM can be traced back to ancient civilisations such as Egypt, Greece and Arabia, with some of the most notable figures including Hippocrates, Aristotle and Galen (Sallam, 2010; Dillard, 2017). Practices by ancient scholars included observations of the physical state, documentation of these observations, the replacement of religious or superstitious reasons with logical explanations for events and health status, and the use of control and treatment groups to test interventions, all of which have evolved for many centuries. From a nursing perspective, EBP is said to have originated with Florence Nightingale, described as "the pioneer of evidence-based practice within the discipline of nursing" (Mackey and Bassendowski, 2017, p. 52). Nightingale adopted an evidence-based approach to her battle against infection during the Crimean War. She significantly reduced infection rates and, in turn, mortality rates at that time, greatly improving the care of, and outcomes for her patients (Aravind and Chung, 2010; Mackey and Bassendowski, 2017).

More recently, a Scottish epidemiologist, Dr. Archie Cochrane, became acutely aware of the challenges of delivering patient care with extremely scarce resources, when he found himself appointed to the position of Chief Medical Officer as a prisoner of war in the 1940s. In an attempt to determine the better of two treatments for his fellow prisoners, who were suffering from pitting oedema to above their knees, probably due to vitamin B deficiency, he successfully performed a randomised control trial (RCT). That RCT clearly demonstrated that yeast alleviated the pitting oedema more effectively than vitamin C , which lead to a successful demand for the provision of a supply of yeast. As his career progressed, he became frustrated with his medical compatriots' heavy reliance on their experience and preferences rather than science to underpin their practice decisions (Sallam, 2010) leading to a wide variation of practices for the same condition (Mackey and Bassendowski, 2017). Cochrane strongly advocated the use of RCTs and systematic reviews in an attempt to eliminate bias and increase the use of treatments that had been shown to be effective (Dillard, 2017). His remarkable contribution to EBM was recognised in the establishment of The Cochrane Centre, now simply called Cochrane, in Oxford in 1992 (Sallam, 2010; Melnyk and Fineout-Overholt, 2019). During the 1990s, in their inaugural work, David Sackett and Gordon Guyatt at McMaster University in Canada promoted what they referred to originally as 'scientific medicine' and turned the spotlight on critical appraisal of scientific evidence (Sur and Dahm, 2011). Gordon

Guyatt termed this approach to medicine 'evidence-based medicine' (Guyatt, 1991). Continuing their work to promote and disseminate the use of EBM, David Sackett, William Rosenberg, Muir Gray, Brian Haynes, and Scott Richardson (Sackett *et al.*, 1996) formerly defined the concept of EBM. As the principles of EBM were increasingly adopted by healthcare professions beyond medicine, Dawes *et al.* (2005) proposed in the Sicily statement on EBP that EBM be expanded to EBP to incorporate multidisciplinary approaches.

EBP Defined

Numerous definitions of EBP exist. While they can vary, the core components comprise clinical expertise, best available evidence and patient preferences/values. It is generally accepted that Sackett *et al.* (1996, p. 71) paved the way in this regard, defining EBM as "the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients." Sackett and colleagues go on to clarify that the practice of EBM comprises the integration of clinical expertise with the best available evidence from systematic research. This definition clearly establishes clinical expertise and best available evidence as crucial pillars of EBM, with less explicit emphasis on patient participation. While patients are not excluded from this definition, their inclusion reflects a passive rather than an active role in the process, with the health professionals making informed decisions for them, rather than with them (Cleary-Holdforth and Leufer, 2009). Sackett *et al.* referred to patients' rights and preferences but in the context of clinical expertise, with the experienced clinician incorporating these aspects when deciding upon a plan of care for the patient. This distinction is important from a nursing and midwifery perspective, and one that perhaps differentiates EBM from EBP to some degree. In its definition of nursing, the World Health Organisation (1996, p. 4) asserts that "nursing promotes the active involvement of the individual and his/her family, friends, social group and community, as appropriate, in all aspects of health care". In outlining their standards for midwifery practice, the Nursing and Midwifery Board of Ireland (2015, p. 13) stated that midwifery practice is "grounded in an understanding of the social, emotional, cultural, spiritual, psychological and physical experiences of women and based upon the best available evidence". Nurses and midwives, therefore, commonly use information derived from patients to influence their practice (Rolfe, Segrott and Jordan, 2008; Marshall, West and Aitken, 2011), conveying the value that they bestow on the patient perspective and input. Healthcare professionals should provide patients with key information regarding their diagnosis and treatment options so they can participate actively in informed decision-making about their care (Cleary-Holdforth, 2017). Consequently, a definition of EBP in which the patient is clearly central would arguably be a better fit for nursing and midwifery.

In their definition of EBM, Sackett *et al.* (1996, p. 71) highlighted "systematic research" as the best available source of clinical evidence. A propensity for RCTs and systematic reviews of RCTs as the gold standard or most valid forms of evidence has become strongly associated with EBM and, by extension, EBP (Rycroft-Malone *et al.*, 2004; Rolfe and Gardner, 2006; Mantzoukas, 2008; Beebe, Adams and El-Mallakh, 2011; Kvernbekk, 2011; Ivarsson and Andersen, 2016). These approaches allow robust conclusions to be drawn regarding relationships between treatment efficacy and patient outcomes (Mantzoukas, 2008), and are justified in relation to many quantitative clinical questions. Sackett *et al.* (1996), writing from a medical perspective, predominantly referred to treatments and diagnosis, for which RCTs and systematic reviews of RCTs are particularly relevant. However, the holistic nature of nursing and midwifery also concerns other aspects of patient care including their personal, spiritual, emotional and psychological experiences and care (Henderson, 1964, 2006; World Health Organisation, 1996; Craig and Smyth, 2011) and draws upon multiple ways of knowing and sources of information (Carper, 1978; Spenceley *et al.*, 2008; Marshall, West and Aitken, 2011; Al-Ghabeesh *et al.*, 2013; Kilicli *et al.*, 2019). This focus produces clinical questions that do not solely concern cause-and-effect relationships, and therefore require a broader range of evidence to answer these questions than can be afforded by the established gold standard that is RCTs and systematic reviews of RCTs. The penchant for RCTs and systematic reviews of RCTs as the gold standard can undermine and diminish the importance and contribution of other forms of evidence (Rycroft-Malone *et al.*, 2004). Depending on the clinical question being asked, cohort studies, case-control studies, descriptive studies, and qualitative studies, along with the opinion of expert authorities may be the most relevant and valuable forms of evidence to answer that question. They may also be the only available evidence, as we see with an emerging condition like COVID-19 (Borges do Nascimento *et al.*, 2020). In particular, qualitative studies are critical when endeavouring to answer human experience clinical questions. Numerous studies have demonstrated that nurses and midwives tend to favour interpersonal, pragmatic sources of evidence over the more formalised sources (Rolfe, Segrott and Jordan, 2008; Marshall, West and Aitken, 2011; Ebenezer, 2015). They typically call upon forms of evidence such as local policy, their own education and clinical experience, patients' preferences, and colleagues' advice or opinions to influence their practice, with RCTs and systematic reviews of RCTs being consulted far less frequently (Estabrooks, 1999; Rolfe, Segrott and Jordan, 2008; O'Leary and Ní Mhaolrúnaigh, 2012; Fairbrother *et al.*, 2016; Kilicli *et al.*, 2019). However, Sackett *et al.* (1996) cautioned that such forms of evidence are based on opinion and tradition rather than on a comprehensive critically appraised review, and therefore may be biased. Consequently, a definition of EBP that values the role and relevance of systematic research as well as alternative forms of evidence would be more constructive in the context of

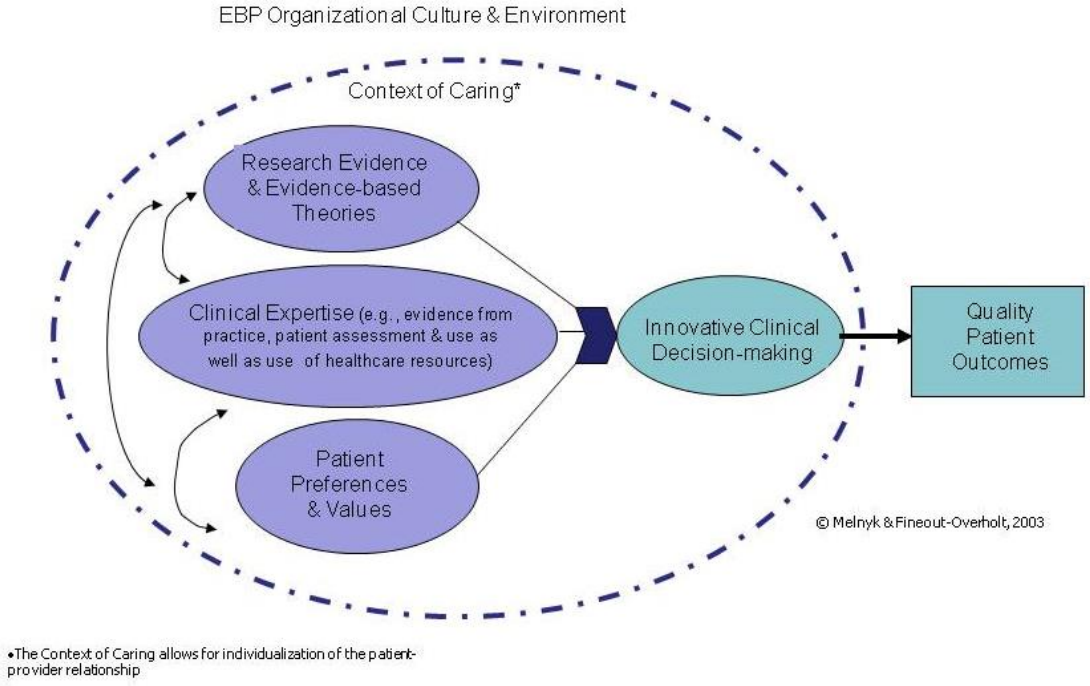
nursing and midwifery.

Building on the foundation established by Sackett *et al.* (1996), (Melnyk and Fineout-Overholt, 2019, p. 8) presented a definition of EBP (originally in 2005) that addressed these issues and is therefore a good fit for nursing and midwifery. They define EBP as,

> "a lifelong problem-solving approach to clinical practice that integrates the following:
>
> - A systematic search for and **critical appraisal** of the most relevant and best research (i.e., **external evidence**) to answer a burning clinical question;
> - One's own clinical expertise, including use of **internal evidence** generated from **outcomes management** or **evidence-based quality improvement projects**, a thorough patient assessment, and evaluation and use of available resources necessary to achieve desired patient outcomes;
> - Patient/family preferences and values." (Melnyk and Fineout-Overholt, 2019, p. 8, emphasis in original)

This definition presents EBP as a life-long and problem-solving approach to patient care, illustrating its timeless, versatile and dynamic nature. It unequivocally promotes the three distinct core components: 1) the best available evidence, 2) clinical expertise and the internal evidence generated and collected by such expertise, and 3) patient/family preferences and values. This recognises the important contribution of each component to the achievement of EBP and infers more active participation by the patient and his/her family by explicitly ascertaining their preferences and values. This definition also suggests several actions required to actualise EBP, which will be outlined presently. Crucially, this definition states that the purpose of EBP is "to achieve desired patient outcomes". As such, it is clear that EBP is a partnership approach to care between healthcare professionals and patients, using the best available evidence to inform decisions and optimise patient care and outcomes, as conceptualised by Melnyk and Fineout-Overholt (2003) in Figure 1.

Figure 1: The Conceptual Framework of EBP (Melnyk & Fineout-Overholt (2003)



This reflects what Cleary-Holdforth and Leufer (2009) described as "an holistic approach to care delivery that places the individual patient at its core". For these reasons, Melnyk and Fineout-Overholt's (2019) definition of EBP was adopted as the operational definition for the current study.

The Process of Evidence-Based Practice

EBP is a concept, with a dynamic, evolving process that can be applied in clinical practice to ensure the implementation of current, best healthcare practices, as well as de-implementing those that are outdated, ineffective or unsupported by the literature (Jolley, 2013; Prasad and Ioannidis, 2014). The process of EBP should also be applied and taught in the classroom for the purpose of role-modelling and fostering EBP knowledge and skills in future generations of healthcare professionals (Fineout-Overholt *et al.*, 2019). It consists of several consecutive steps that must be undertaken if EBP in healthcare is to be achieved. Successfully engaging each step is critical to the overall process (Gambrill, 2018), which affords clinicians a roadmap that will incrementally direct their path from the inception of their clinical questions through to the implementation, evaluation and dissemination of the most appropriate, evidence-based decisions for their patients and clients (Leufer and Cleary-Holdforth, 2013). The number of steps involved will vary depending on the framework followed. Rosenberg and Donald (1995) proposed a four-step EBP process involving 1) the generation of a clinical question, 2) searching for evidence, 3) critical appraisal of the evidence, and 4) its implementation into clinical practice. While these steps remain integral to the EBP process, most approaches now include at least a fifth step which provides for the evaluation of the effects of the implemented findings (Cook, Jaeschke and Guyatt, 1992; Rosswurm and Larrabee, 1999; University of Saint Mary, 2015; Strauss *et al.*, 2018; *Evidence-Based Behavioral Practice*, 2018;

Melnyk and Fineout-Overholt, 2019; Simonson, 2020). EBP processes that include a sixth step incorporate the dissemination of the practice outcomes (University of Saint Mary, 2015; Melnyk and Fineout-Overholt, 2019; Simonson, 2020). Melnyk and Fineout-Overholt (2019) included seven steps in their EBP Process (Table 1). Their step zero precedes all other steps and concerns the cultivation of a spirit of enquiry as the very foundation of EBP. These steps have been identified as core competencies of EBP (Melnyk *et al.*, 2014; Albarqouni *et al.*, 2018). The process of EBP utilised in this study is the seven-step process developed by Melnyk and Fineout-Overholt (2019).

Table 1: The Steps of the Evidence-Based Practice Process (Melnyk and Fineout-Overholt, 2019, p. 17)

STEP	ACTIVITY
0	Cultivate a spirit of enquiry within an evidence-based practice (EBP) culture and environment.
1	Ask the burning clinical question in PICOT format.
2	Search for and collect the most relevant best evidence.
3	Critically appraise the evidence (i.e., rapid critical appraisal, evaluation, and synthesis).
4	Integrate the best evidence with one's clinical expertise and patient/family preferences and values in making a practice decision or change.
5	Evaluate outcomes of the practice decision or change based on evidence.
6	Disseminate the outcomes of the EBP decision or change.

The Seven Steps of the Evidence-Based Practice Process

Step 0 - Cultivate a spirit of enquiry within an evidence-based practice culture and environment.

This step is the foundation of EBP implementation that will be successful and sustainable. An organisational culture and environment in which clinicians are actively encouraged and suitably supported to vocalise and pursue their clinical queries, secure in the knowledge that it is not only acceptable to do so, but that it is, in fact, integral to safe and effective patient care, will be much more likely to realise system-wide integration of EBP (Melnyk, 2016b; Melnyk and Fineout-Overholt, 2019). Organisational management and senior staff who embrace a healthy scepticism and curiosity about practice in their staff will generate an enthusiasm among staff to ask questions, find answers, enhance patient care delivery and organically grow the organisation's spirit of enquiry and implementation of EBP.

Step 1 – Ask the burning question in PICOT format.

Clinical questions such as, “why do we do this?”, “is there a better way/time to do this?”, “what’s the best approach in this situation?”, “which dressing?” arise all the time among clinicians. They stem from a variety of sources or situations, such as an identified individual patient need or challenge, an incident, knowledge of a new intervention, reflection on practice, or just routine practices the rationale for which may be unclear or unknown. To solve these clinical conundrums, they must firstly be transformed into answerable questions (Melnyk and Fineout-Overholt, 2019). A number of models exist to assist with the development of a clear, focused question (Beecroft, Booth and Rees, 2015; Aveyard and Sharp, 2017) including SPICE (Setting; Perspective; Intervention; Comparison; Evaluation) and PICOT (Patient/Population; Intervention/Issue; Comparison/Context; Outcome; Time). Such models require the clinician to carefully consider each of their component parts with respect to the question they are asking, enabling them to refine their question so as to correctly guide their search for the most relevant information. The PICOT model is most commonly used in healthcare (Beecroft, Booth and Rees, 2015). An example of a PICOT question is: In primagravida mothers with postnatal depression (P) how does breast-feeding (I) compared to bottle-feeding (C) affect their level of depression (O) in the first six months post-delivery (T)?

Step 2 – Search for and collect the most relevant best evidence.

Having formulated a clear PICOT question, evidence that will provide the most useful information to inform the clinical decision must be found. The nature of the question directs the nature of the evidence sought. For example, if the question concerns the effectiveness of an intervention, the ideal evidence would be a systematic review of randomised control trials. To answer a meaning/human experience type question, qualitative studies would be more relevant. Evidence can be found in several places including books, professional journals, electronic databases, the library, unpublished (grey) literature, government guidelines/reports, and professional organisations such as the World Health Organisation (Beecroft, Booth and Rees, 2015; Aveyard and Sharp, 2017; Melnyk and Fineout-Overholt, 2019). However, the indexed databases within healthcare are the most easily accessible sources of peer-reviewed evidence. An invaluable resource at this stage of the process is the organisation’s subject librarian, who can offer advice and guidance on how to enhance the search and its results (Tod *et al.*, 2007; Maatta and Wallmyr, 2010; Lalor, Clarke and Sheaf, 2012; Dunne and Lee, 2019).

Step 3 – Critically appraise the evidence.

Once evidence has been gathered, critical appraisal enables the identification of the evidence that is most relevant, valid, reliable, and applicable to answer the question asked (Fineout-Overholt *et al.*, 2017). To assist with this, levelling or ranking systems known as hierarchies are available but it is important to ensure that an appropriate hierarchy for that type of question is used. If the question relates to an intervention's effectiveness, then a hierarchy for quantitative evidence is needed. On the other hand, a qualitative hierarchy of evidence would be appropriate if the question concerned patient experience. Once the best available evidence, as determined by the appropriate hierarchy, has been obtained from the search, its quality must be established. In doing so, clinicians can determine the value of the evidence to their patient or practice thereby facilitating them to reach an informed and evidence-based decision. This process can be aided by any of the numerous freely available, design-specific critical appraisal tools that are available, such as the CASP (Critical Appraisal Skills Programme) tools, and the tools that are available on the Centre for Evidence-Based Medicine's (University of Oxford), and the Joanna Brigg's Institute's websites.

Step 4 - Integrate the best evidence with one's clinical expertise and patient/family preferences.

Once the answer to the question has been ascertained a decision will be made to either change or continue current practice, according to the evidence. This decision may relate to an individual patient, a particular setting or a population. It is critical that the evidence is considered in the context of the patient preferences/values and the clinician's expertise. Implementing a change in practice is often challenging and sometimes even problematic (Gallagher-Ford, 2017). A collaborative approach involving those affected by the decision, incorporating measures to inform and educate key stakeholders as necessary, can contribute to a more straight-forward adoption of the recommended practice (Leufer and Cleary-Holdforth, 2013).

Step 5 – Evaluate outcomes of the practice decision or change based on evidence.

The implemented practice (whether a change from or continuation of current practice) should be evaluated to determine whether it produced the anticipated outcomes as well as how the implementation went. Such outcome and project process measurement and documentation verifies for clinicians the success or otherwise of the practice change, enabling them to decide to maintain the practice or to consider alternatives (Melnyk and Morrison-Beedy, 2018). This ensures that patients either, 1) receive appropriate treatment, 2) do not continue to receive treatment that is ineffective or harmful, or 3) progress onto an alternative treatment that may afford better results for

them.

Step 6 – Disseminate the outcomes of the EBP decision or change.

Sharing the successes of EBP changes, be it locally, regionally, nationally or internationally, maximises the learning achieved (Leufer and Cleary-Holdforth, 2013), and allows other clinicians and patients to gain from the experience of those disseminating their results (Melnyk, 2017). Sharing outcomes that were not particularly positive or impactful can also be beneficial in that it can help other clinicians avoid duplication and potential time- and/or resource-wasting. Dissemination can be facilitated through ward-based presentations, hospital study days, oral or poster presentations at conferences, or publication in professional journals.

In summary, the process of EBP concerns the manner in which health-related decisions are made by clinicians and their patients (Gambrill, 2018). It encourages clinicians to ask their important clinical questions and search for the answers (best available evidence) in a systematic manner and in the appropriate places. It drives them to critically appraise the evidence found rather than uncritically accepting the findings and to consider this evidence in the context of their patients' values/preferences along with their own expertise. This enables clinicians to arrive at informed clinical decisions with and for their patients. Furthermore, the EBP process compels clinicians to evaluate and disseminate the outcomes of their EBP decisions, which in turn generates evidence from practice that can inform and benefit future patient care. By implementing this process in their daily practice clinicians can produce optimal patient outcomes, which in turn can yield positive outcomes for clinicians themselves and the organisations in which they practice.

Impetus for Evidence-Based Practice

Twenty years ago in the United States, the Institute of Medicine (2000) highlighted the extent and devastating consequences of medical error, attesting that somewhere between 44,000 and 98,000 Americans die annually as a result. Consequently, the Institute of Medicine (2001) published the "Quality Chasm" report as a way forward for healthcare. This strategy advanced patient-centeredness and involvement, evidence-based decision-making and active collaboration between healthcare professionals and organisations as the key components of the recommended course of action. These components mirror those of EBP, which is integral to the provision of high quality, safe, patient-centred healthcare. The Triple Aim of the US healthcare system, proposed by Berwick, Nolan and Whittington (2008) of the Institute for Healthcare Improvement espoused the following goals;

- Improvement of the individual's experience of care
- Improvement of the health of populations
- Reduction of the per capita costs of care for populations.

These goals addressed challenges in healthcare delivery for individual patients and populations, in addition to the financial challenges experienced by the healthcare systems and organisations. However, a key group that would be instrumental to the successful achievement of these goals but not included in them was that of the healthcare professionals who provided care to the patients and populations in question. Extensive research addresses healthcare professionals' burnout and its consequences for patient care and healthcare organisations (McHugh *et al.*, 2011; Leonardi *et al.*, 2013; Font, Corti and Berger, 2015; Howlett *et al.*, 2015; Năstasă and Fărcaş, 2015), and so the Triple Aim was amended to include a fourth goal, improving the experience of providing care, culminating in the Quadruple Aim (Bodenheimer and Sinsky, 2014; Sikka, Morath and Leape, 2015). EBP, with its capacity to produce improvements in the safety and quality of healthcare and patient outcomes, empowerment of healthcare professionals, and lower healthcare costs, will play a vital role in the attainment of the Quadruple Aim (Bodenheimer and Sinsky, 2014; Beckett and Melnyk, 2018; Melnyk and Fineout-Overholt, 2019).

In Ireland, the Department of Health (2008, p. 150) described EBP as "a critical element of a health system which aims to deliver safe and high quality care" and established a number of recommendations to operationalise evidence-based guidance in Irish healthcare services in both primary and secondary healthcare settings. One such recommendation was the establishment of a leadership role for the analysis of international evidence and the production of evidence-based guidelines and information, the introduction of evidence-based integrated care pathways for major health conditions in public health and the development of evidence-based national standards. To this end, the National Clinical Effectiveness Committee (NCEC) was established in 2010. Its primary goal is to provide a framework for national approval of clinical guidelines and audit to ensure that healthcare practice is underpinned by the best available evidence in order to maximise patient outcomes (Department of Health, 2008, 2018a). This represented the first initiative for Irish healthcare establishing a formal system to ensure quality-assured evidence-based clinical guidelines at a national level. Since its inception, the NCEC has developed a growing repertoire of clinical guidelines, along with a framework for developing policies, procedures, protocols and guidelines (Health Service Executive, 2016a). It has inaugurated a framework for public involvement in clinical effectiveness processes (Department of Health, 2018b), introduced an implementation guide and toolkit for clinical guidelines (Department of Health, 2018c), a competency framework for clinical effectiveness education (Lehane *et al.*, 2018), and provided training for guideline developers.

More recently, in its ten year programme to transform health and social care services in Ireland, Sláintecare, the Department of Health (2017) pledged to:

- Improve patient and service user experience
- Improve clinician experience
- Lower costs
- Achieve better outcomes.

These aims also are the benefits that EBP, when implemented, has been shown to yield (Bodenheimer and Sinsky, 2014; Beckett and Melnyk, 2018; Melnyk and Fineout-Overholt, 2019) and they mirror those of the Quadruple Aim espoused in the United States (Sikka, Morath and Leape, 2015). For nurses and midwives, professional codes of practice impose an inherent responsibility to deliver care that is underpinned by the best available evidence (Nursing and Midwifery Board of Ireland, 2014; Nursing and Midwifery Council, 2015). Furthermore, several reports concerning poor practice and its implications for patients, both in the UK and the Republic of Ireland (Department of Health, 2008; Department of Health UK, 2008; Health Information and Quality Authority, 2012; Francis, 2013; Health Informtion and Quality Authority, 2013; Health Service Executive, 2016b) reinforce the impetus to achieve a skilled workforce competent in the provision of high quality, safe evidence-based patient care. The goals of Sláintecare and the initiatives of the NCEC are much needed and very welcome for the advancement of EBP. However, these initiatives address EBP Implementation more at governmental and policy level. While this is very important and helps to provide direction, it is imperative that EBP implementation is addressed at organisational and individual practitioner levels if it is to be successful and sustainable (Friesen *et al.*, 2017; Melnyk *et al.*, 2017). The afore-mentioned initiatives do not necessarily address EBP implementation at the individual practitioner level. In other words, they do not address the knowledge and skill that the practitioner at the bedside must possess to operationalise EBP locally. Yet, this is integral to the success of any EBP initiative. EBP is more than practitioners simply following strategically devised guidelines; it is about practitioners engaging with and participating in evidence-based decision-making and care giving at the bedside with and for their patients in an efficient, effective and meaningful manner. This is how EBP yields its greatest impact.

Impact of Evidence-Based Practice

EBP significantly improves patient care and outcomes, reduces healthcare expenditure, standardises practice and enhances practitioner job satisfaction and empowerment (Doran *et al.*, 2014; Macias *et al.*, 2017; Cheng *et al.*, 2018; Wu *et al.*, 2018; Melnyk and Fineout-Overholt, 2019). Care that is based on the best available evidence yields significant improvements in patient care and optimal patient outcomes (Heater, Becker and Olson, 1988; Thomas *et al.*, 1999; Wilkinson, 2010; Bucknall, 2011; Goeschel, 2011; Underhill *et al.*, 2012). The impact of EBP was clearly illustrated in a review of 84

studies which demonstrated significant improvements (≥ 28%) in patient outcomes when nurses based their practice on evidence compared with patients who received routine nursing care (Heater, Becker and Olson, 1988). Similarly, in a systematic review by Thomas *et al.* (1999) involving eighteen studies with more than 467 health care professionals (largely nurses), significantly improved outcomes were observed in the treatment of hypertension, low back pain and hyperlipidaemia when care was underpinned by EBP guidelines. EBP, where implemented, continues to make an impact in nursing and midwifery care, and to patient outcomes, in both hospital and community settings across a wide variety of clinical areas. These areas include pain management (Allen *et al.*, 2018), pressure ulcer care (Kim *et al.*, 2019), falls prevention (Godlock, 2016; Lee and Kim, 2017; Tucker *et al.*, 2019), cardiology (Al-Mallah *et al.*, 2015; Schumacher *et al.*, 2019), oncology (Alexander and Allen, 2011; Becze, 2018), infection prevention and control (Orth, 2018), readmission reduction (Dizon and Reinking, 2017), diabetes management (Yu *et al.*, 2016; Cheng *et al.*, 2017; Lin, Lee and Wang, 2019), prevention of stillbirths (King *et al.*, 2014), nutrition of low birth weight infants (Yu *et al.*, 2019) and readiness for postnatal discharge (Malagon-Maldonado, Connelly and Bush, 2017), to mention a few. As well as ensuring the implementation of best practice, EBP can also facilitate identification and de-implementation of unsupported or ineffective practices which can be harmful, waste time and resources, and, by virtue of their on-going implementation, prevent other beneficial practices from being considered (Prasad and Ioannidis, 2014; Upvall and Bourgault, 2018; Bourgault and Upvall, 2019). Two of the goals of Sláintecare concern improved patient/service user experience and improved outcomes. EBP is the best means to achieve these goals, representing the standard that patients deserve and should expect, and offering the potential to improve clinical decision-making and maximise patient outcomes. Furthermore, EBP can achieve these ends in a manner that increases both efficiency and cost-effectiveness of healthcare delivery (Neubauer *et al.*, 2010; Rycroft-Malone, 2010; Cheng *et al.*, 2018; Spring, 2019), affording real advantages to healthcare organisations as well as their patients, meeting yet a third goal of Sláintecare.

Patients and healthcare organisations are not the sole beneficiaries of EBP. Healthcare professionals also reap the rewards of adopting an evidence-based approach to their practice. Against a backdrop of overburdened healthcare systems, staff shortages, long working hours, and substantial workloads, the literature abounds with reports of job dissatisfaction and burn-out among healthcare professionals globally (Melnyk *et al.*, 2010; McHugh *et al.*, 2011; O'Mahony, 2011; Heinen *et al.*, 2013; Kirwan, Matthews and Scott, 2013; Khamisa *et al.*, 2016; Chernoff *et al.*, 2019; Lu, Zhao and While, 2019). In the last decade in particular, financial austerity has resulted in healthcare spending reductions, employment embargoes, diminishing nursing staff numbers, and an increasing workload for fewer nurses (Willis *et al.*, 2017; OECD, 2019). The impact of such measures is most palpable at

the coalface of patient care delivery, where patients encounter nurses and midwives, often in challenging circumstances, which potentially portrays nursing and midwifery practice in a less than favourable light (Cleary-Holdforth, 2019). This can lead to escalating job dissatisfaction and burn-out, the consequences of which can include difficult working relationships, disinterest in patients, medical errors, physical and mental ill-health (Adriaenssens, De Gucht and Maes, 2015; Kumar, 2016), in addition to increased staff turnover and increased intent to leave the profession (Masum *et al.*, 2016; Lu, Zhao and While, 2019). In turn, these outcomes can carry serious implications for the quality and safety of patient care, and for the operation, finances, and reputation of healthcare organisations. Yet, studies have shown that EBP adoption leads to staff empowerment, enhanced job satisfaction, and lower intention to leave (Melnyk *et al.*, 2010; Wallen *et al.*, 2010; Kelly, McHugh and Aiken, 2011; Kim *et al.*, 2016, 2017). EBP implementation can be a key contributor to resolving some of these contemporary issues for nurses and midwives, which are potentially damaging to the quality of their practice, their physical, emotional and mental well-being, and the safety of the patients in their care. The rewards of adopting an EBP approach to healthcare are far-reaching and will be experienced not only by healthcare professionals, but by the healthcare organisations in which they practice, and, most importantly, by the patients in their care (Belden *et al.*, 2012; Bodenheimer and Sinsky, 2014; Sikka, Morath and Leape, 2015; Cleary-Holdforth, 2019; Melnyk and Fineout-Overholt, 2019). In an era of escalating healthcare expenditure, significant staff shortages and turnover, increasing litigation and repeated calls for improvements in the standard of patient care delivery (Francis, 2013; Health Information and Quality Authority, 2013; Health Service Executive, 2016b), EBP could not be more relevant or timely. Despite these convincing and established benefits of the adoption of an EBP approach to healthcare, EBP has, nevertheless, received its share of criticism and controversy.

Criticisms of EBP

The most common areas of contention concerning EBP involve the nature of evidence, accusations of EBP as advocating a cookbook approach, and its undervaluing of clinical expertise and patient involvement (Evidence-Based Medicine Working Group, 1992; Sackett *et al.*, 1996; Kitson, 2002; Rycroft-Malone *et al.*, 2004; Rolfe and Gardner, 2006; Rolfe, Segrott and Jordan, 2008; Keller, 2012; Melnyk *et al.*, 2017; Linsley and Barker, 2019). The partiality for quantitative research evidence such as RCTs and systematic reviews of RCTs by EBM proponents has attracted much criticism and debate (Rycroft-Malone *et al.*, 2004; Rolfe and Gardner, 2006; Jordan and Segrott, 2008; Rolfe, Segrott and Jordan, 2008; Fisher and Happell, 2009; McGowan, 2010). In particular, in professions such as nursing and midwifery, which have been shown to draw on multiple and varied sources of evidence to underpin their practice, the pinpointing of RCTs and systematic reviews of RCTs as the gold

standard with which to inform practice is not always useful. Very often clinical questions from these professions and contexts concern experience, meaning and perceptions, which do not lend themselves to being studied quantitatively (Rycroft-Malone *et al.*, 2004; Fisher and Happell, 2009; Kirmayer, 2012; Roe and Lysaker, 2012). Meaning questions require qualitative evidence. Melnyk and Fineout-Overholt (2019, p. 9) defined evidence as, "a collection of facts that are believed to be true". The context of healthcare and EBP clearly indicates that the knowledge or information that is used to underpin practice must have undergone rigorous scrutiny in order to attest to its quality and applicability for practice, a position articulated by Rycroft-Malone *et al.* (2004). McGowan (2010) posited that the move from usual practice to EBP, in which healthcare is directed by robust outcome-focused research, is one that is to the advantage of patients, healthcare professionals, and healthcare management alike. As Rycroft-Malone (2008) intimated, who would not want to achieve such goals? However, McGowan (2010) questioned the wisdom of driving the EBP movement on the strength of RCTs in light of the diverse and individual nature of the patients in real life compared with the randomised sample of research participants who met the stringent eligibility criteria of an RCT. Similarly, Mantzoukas (2008, p. 221) urged caution regarding prioritising RCTs when he eloquently stated that their value "is severely curtailed by the practical limitations they pose, by the epistemological diversity and plurality of practice that RCTs cannot accommodate for and by the political and ideological implications of devaluing and limiting practitioners' autonomy and initiative". Melnyk and Fineout-Overholt (2019) advocated that evidence from qualitative and descriptive research should be included in clinical decision-making, acknowledging that the best evidence to answer a clinical question is determined by the nature of the question itself. For example, questions concerning intervention effectiveness, cost or risk assessment require quantitative evidence to obtain answers, while meaning questions require qualitative evidence for their answers. As previously discussed, Melnyk and Fineout-Overholt's definition of EBP accommodates a broader body of evidence than that generated by research alone. This approach is more pragmatic and appropriate for healthcare professions, not least of all nurses and midwives.

A cookbook approach to practice refers to practice that is prescriptive and must be followed without consideration of the clinician's expertise or the individual patient's preferences (Linsley and Barker, 2019), an allegation that is often proffered in relation to EBP (Kitson, 2002; Mullen and Streiner, 2006; Keller, 2012; Linsley and Barker, 2019; Melnyk and Fineout-Overholt, 2019). Sackett *et al.* (1996) vehemently refuted this allegation in an editorial in which they outlined what EBP is and what it is not. They described EBM as the integration of the best available evidence with clinician expertise and the patient's preferences. Similarly, in their definition of EBP, Melnyk and Fineout-Overholt (2019) outlined unequivocally the integration of both the clinician's expertise, and the

patient/family preferences and values with the best available evidence in the delivery of healthcare. Moreover, these proponents advocate strongly for a questioning attitude and critical appraisal of practice, which is the opposite of just following a recipe handed down by others. Therefore, to claim that EBP is a cookbook approach demonstrates a misunderstanding if not misrepresentation of EBP.

Arguably, these criticisms that EBP falls victim to, may emerge from a lack of appreciation for what EBP actually is, and/or the pervasive conflation that exists between EBP and research utilisation, both of which can result in clinicians believing, incorrectly, that their care is evidence-based, and in the delivery of cookbook medicine. EBP acknowledges and embraces a wide repertoire of evidence, values and incorporates clinical expertise, and patient preferences. As such, EBP is inherently opposed to these commonly cited criticisms of EBP. EBP is an holistic approach to healthcare that places the patient at the core by combining the best available evidence with clinicians' expertise and patients' preferences/values, to effect the best possible patient outcomes (Sackett *et al.*, 1996; Cleary-Holdforth and Leufer, 2009; Melnyk and Fineout-Overholt, 2019).

EBP in Nursing and Midwifery

Despite the tangible and known benefits of EBP, there is variable implementation of EBP in nursing and midwifery, from students to new graduates to senior manager level (Leufer and Cleary-Holdforth, 2007; Melnyk *et al.*, 2012, 2016; O'Leary and Ní Mhaolrúnaigh, 2012; Rudman *et al.*, 2012; Ubbink, Guyatt and Vermeulen, 2013; Vlada *et al.*, 2013; Heydari *et al.*, 2014; Stokke *et al.*, 2014; Leufer, 2015; Malik, McKenna and Plummer, 2015; Azmoude *et al.*, 2017; Voldbjerg *et al.*, 2017). The studies cited show this is a global challenge as they represent nurses and midwives from 17 different countries including European, Middle Eastern, Asian, and Scandinavian countries, the United States, Australia and New Zealand. Although nurses and midwives are generally positively pre-disposed to EBP, they frequently report that their implementation of it is low. Saunders and Vehviläinen-Julkunen (2017) revealed that nurses in their Finnish study reported that more than 50% of clinical nursing practice and their own practice is not evidence-based. Similarly, in a Polish study, only 28% of midwives reported that they had recently read research findings and 39% reported that their engagement with EBP was not expected by their employers (Belowska *et al.*, 2015). This is despite the robust evidence demonstrating benefits for mothers and babies from EBP in midwifery (Bick, 2011). Belief in EBP has been shown to correlate positively with implementation of EBP (Melnyk, Fineout-Overholt and Mays, 2008; Estrada, 2009; Melnyk *et al.*, 2010; Wallen *et al.*, 2010; Stokke *et al.*, 2014; Skela-Savič, Pesjak and Lobe, 2016; Milner, Bradley and Lampley, 2018; Ramis, Chang and Nissen, 2019). However, while nurses and midwives believe in the positive impact of EBP, their beliefs in their ability to apply it in practice are often much lower, as is their actual implementation of it (Ubbink, Guyatt and Vermeulen, 2013; Heydari *et al.*, 2014; Melnyk *et al.*, 2016;

Saunders and Vehviläinen-Julkunen, 2016b; Azmoude *et al.*, 2017).

Nurse and midwifery lecturers across a variety of jurisdictions similarly believe more in the benefits of EBP than in their ability to implement or teach it, resulting in inconsistent EBP implementation in nurse and midwifery curricula and education (Melnyk *et al.*, 2008; Stichler *et al.*, 2011; Malik, McKenna and Plummer, 2015; Upton *et al.*, 2015; Orta *et al.*, 2016; Malik, McKenna and Griffiths, 2017; Milner, Bradley and Lampley, 2018). In light of poor EBP knowledge and implementation by clinical nurses and midwives as well as nurse and midwifery lecturers, it stands to reason that students' knowledge of and engagement with EBP has been shown to be correspondingly low (Rudman *et al.*, 2012; Malik, McKenna and Plummer, 2015). If nurses and midwives generally do not implement EBP, it is both reasonable and relevant to question what sources of knowledge underpin their practice. Voldbjerg *et al.* (2017, p. 1314) defined knowledge source as "any articulated source of information or knowledge that nurses incorporate and translate into clinical decisions related to patient care". Nurses and midwives appear to favour more casual, interpersonal, and pragmatic sources of evidence over the more formal sources (Rolfe, Segrott and Jordan, 2008; Marshall, West and Aitken, 2011; Dalheim *et al.*, 2012; Ebenezer, 2015; Fairbrother *et al.*, 2016). They typically rely on knowledge sources such as practice guidelines, local policy, their own education and clinical experience, patients' preferences, and colleagues' advice or opinions to influence their practice, with RCTs and systematic reviews of RCTs being consulted far less frequently (Estabrooks, 1999; Estabrooks *et al.*, 2005; Rolfe, Segrott and Jordan, 2008; Spenceley *et al.*, 2008; O'Leary and Ní Mhaolrúnaigh, 2012; Fairbrother *et al.*, 2016; Voldbjerg *et al.*, 2017; Kilicli *et al.*, 2019). These multiple sources of information may reflect the diversity and holism of nurses' and midwives' practice. In the Irish context, the use of evidence other than RCTs and systematic reviews of RCTs by nurses and midwives can perhaps also be explained to some extent by the journey that nurse and midwifery education has taken in a relatively short period of time. It is important to consider this along with other factors that contribute to the low implementation of EBP among nurses and midwives.

Nurse and Midwifery Education in Ireland

Nursing and midwifery in Ireland has experienced substantial transformation over the last two to three decades (Begley, 2008). Until 1995, nurse and midwifery education was based on the apprenticeship model, a three-year programme delivered in hospital-based schools of nursing where 'learning on the job' trumped academic learning (O'Dwyer, 2007; O'Shea, 2012; Fallon *et al.*, 2018; Leufer and Cleary-Holdforth, 2020) in what Fealy and McNamara (2007, p. 1188) described as the "binary opposition between the manual and the mental". The practice of nursing, unquestioningly delivering care prescribed by the doctor was the main focus of the nurse's role under this model

with theoretical learning perceived as supplementary (Condell, 1998; McKenna *et al.*, 2006; Fealy and McNamara, 2007). Skills of critical analysis, reflection, decision-making and leadership were not considered integral to nursing, which was largely controlled by medical doctors and hospital management (McKenna *et al.*, 2006; O'Dwyer, 2007). The contribution of potential nurse leaders was neither sought nor valued (McKenna *et al.*, 2006; O'Dwyer, 2007). This mind-set fuelled considerable resistance for a prolonged time to the attempts to transition nursing and midwifery education into academia that had been muted over time (Department of Health, 1980; An Bord Altranais, 1994; Government of Ireland, 1998). Links were finally forged with higher educational institutions (HEIs) in 1995 following a number of landmark recommendations endorsing university education for nurses and midwives (Department of Health, 1980; Advisory Committee on Training in Nursing, 1990; An Bord Altranais, 1994). This resulted initially in the move from the certificate level to diploma level education in nursing and midwifery in 1995 (O'Dwyer, 2007; Begley, 2008), and to degree level in 2002 (nursing) and 2006 (midwifery), following recommendations in the Report of the Commission on Nursing (Government of Ireland, 1998). Nurse and midwifery education was fully integrated into higher education, culminating in a four-year degree programme leading to graduate status for nurses and midwives. The planning and delivery of nursing and midwifery education in the Republic of Ireland is the shared remit of the Nurse and Midwifery Board of Ireland (NMBI), who are the regulatory body for nursing and midwifery, and the thirteen Higher Education Institutions (HEIs) that provide nursing and/or midwifery education. The move to an all-graduate programme resulted in greater emphasis being attributed to the importance and role of research in nursing and midwifery practice. To this end, inclusion of research knowledge and skills became an integral part of these programmes.

Nurse and midwifery education programmes provide the foundation for professions that are safe, effective and patient-centred (Cleary-Holdforth and Leufer, 2020). The ultimate goal of the degree in nursing programme is "to ensure that the graduate acquires the competencies for critical analysis, problem-solving, decision-making, collaborative team-working, leadership, professional scholarship, effective interpersonal communication and reflection that are essential to the art and science of nursing" (Nursing and Midwifery Board of Ireland, 2016a). From a midwifery perspective, the degree in midwifery programme aims to "prepare future midwives to provide safe, effective and evidence-based practice to women, their babies, and their families in a holistic and compassionate manner" (Nursing and Midwifery Board of Ireland, 2016b). Such expectations of today's nursing and midwifery graduates represent a significant departure from the expectations of the apprentice-trained nurses and midwives of the recent past, and are entirely unconducive to a cookbook approach to practice. The focus has shifted from 'doing' to 'thinking', with a greater emphasis on the

role of scientific knowledge and grounding practice in evidence, while remaining patient-centred and valuing the experiences and expertise of nurses and midwives. Given the relatively short period of time over which such monumental change has occurred, it may be reasonable to suggest that the apprenticeship mind-set still exists to some degree and that the traditional psyche or culture of nursing and midwifery in Ireland is still trying to catch up. It is therefore more crucial than ever to ensure that the role of nurses and midwives as critically thinking, problem-solving, evidence-based practitioners in the healthcare team, is promoted and actualised.

The current standards and requirements set forth by the Nursing and Midwifery Board of Ireland (2015b, 2016a) continue to emphasise the research aspect of the programme content. EBP has been included in these guidance documents more recently; however, there remains an emphasis on research generation. Nurse and midwifery programme standards documents (Nursing and Midwifery Board of Ireland, 2015a, 2016), which guide the development of the undergraduate nursing and midwifery curricula nationally, both espouse the principles of EBP with regular references made to patient-centredness, practicing from an evidence base, and appraisal of research. However, in the nursing standards document there is little explicit reference to, or definition or explication of EBP, which may lead to confusion. In relation to undergraduate midwifery programmes, the Nursing and Midwifery Board of Ireland (2016a, p. 18) stated that "on completion of their programme, midwifery students provide safe, effective, evidence-based and compassionate midwifery care to women and their babies before and during pregnancy, in labour and at birth and postnatally". This is an important inclusion because it denotes an expectation of EBP in registered midwifery practice. The dearth of an explicitly dedicated focus on EBP, as opposed to the occasional, inexplicit references that are made to EBP, within these guiding documents is potentially problematic. These documents guide and inform the nursing and midwifery curricula and, therefore, future practice. If EBP is not seen as a priority within these documents, it is unlikely to be seen as a priority within the programme curricula, or in future practice. The focus of nurse and midwifery lecturers is strongly in favour of research generation. This focuses the respective curricula, resulting in the delivery of research-heavy content, including principles and methods of quantitative and qualitative research, research design, and research process, appraisal and application, to the exclusion of the importance and impact of EBP. This research content is not unimportant; however, how it is taught sets the context for its understanding and use as necessary for EBP. The seemingly exclusive attention research receives completely over-shadows the more holistic concept of EBP, therefore minimising the value and importance of the integral EBP aspects of evidence synthesis, clinicians' expertise, and patients' values/preferences for students. Numerous other factors reputed to influence the implementation of EBP in nursing and midwifery have been cited in the literature over the last two

decades. Level of knowledge and skills, beliefs about EBP, misperceptions of EBP, degree of professional authority and autonomy, organisational culture and environment, are among those frequently mentioned (Glacken and Chaney, 2004; Melnyk *et al.*, 2012; Powell Kennedy *et al.*, 2012; Timmins, McCabe and McSherry, 2012; Yadav and Fealy, 2012; Doolan-Grimes, 2013; Warren *et al.*, 2016a; Melnyk *et al.*, 2017). These factors will now be considered.

Factors Influencing EBP Implementation

EBP Knowledge and Skills

Many healthcare practitioners possess inadequate knowledge and skill to implement EBP in their patient care delivery (Glacken and Chaney, 2004; Leufer and Cleary-Holdforth, 2007; Melnyk *et al.*, 2012; Timmins, McCabe and McSherry, 2012; Ubbink, Guyatt and Vermeulen, 2013; Saunders and Vehviläinen-Julkunen, 2016b; Melnyk *et al.*, 2018). Ubbink, Guyatt and Vermeulen (2013) conducted a systematic scoping review of policy recommendations for the implementation of EBP to describe health professionals' views on EBP. The review of 31 studies from 17 countries with a total of 10,798 participants across studies, demonstrated that 64% of nurses and doctors considered their EBP knowledge insufficient and that 70% of them considered their EBP skills insufficient. Maaskant et al. (2013) revealed that 52% of nurses in their study did not know relevant sources of information (evidence), and 62% did not know common EBP terms. Saunders and Vehviläinen-Julkunen (2016) found in their integrative review of nurses' readiness for EBP, comprising 18,355 nurses from 21 different countries across 37 studies that while nurses generally viewed EBP favourably, believing that it improves patient care, their familiarity with EBP varied, as did their understanding of EBP concepts. Head nurses, administrative nurses and educators reported greater familiarity with EBP than clinical nurses. Despite their favourable attitude towards EBP, the findings indicated that nurses rarely engaged in EBP, predominantly because their EBP knowledge and skills were inadequate. Similar findings have been reported from other studies involving midwives (Heydari *et al.*, 2014; Belowska *et al.*, 2015; Azmoude *et al.*, 2017). Nurses and midwives make up the largest group of healthcare employees in most healthcare systems (O'Shea, 2012; Health Service Executive, 2013; Correa-De-Araujo, 2016; Saunders and Vehviläinen-Julkunen, 2016b; Friesen *et al.*, 2017) so these findings are particularly pertinent in the drive to enhance system-wide integration of EBP. It is prudent therefore to consider the EBP knowledge and skills of the educators of nurses and midwives.

Lecturers' EBP Knowledge and Skills

Nurse and midwifery lecturers are responsible for preparing their students for registered professional practice. Until relatively recently, knowledge and skills in principles, methodologies and process of research, were all that was required to teach EBP in nursing and midwifery, which does

not guarantee adequate knowledge and skills for teaching the principles, process and skills of EBP (Melnyk *et al.*, 2008; Stichler *et al.*, 2011; Hussein and Hussein, 2014). However, with growing international focus on, and drive for the integration of EBP into healthcare delivery (Institute of Medicine, 2001; Department of Health, 2008, 2017; Department of Health UK, 2008), it is expected that upon graduation nurses and midwives will "use evidence-based knowledge and apply best practice standards in their work" (Nursing and Midwifery Council, 2015, p. 20). Lecturers must, through a combination of teaching and role-modelling of EBP, foster in their students the attitude and ability to navigate the steps of the EBP process, beginning with questioning current practice and moving to accessing the best evidence to underpin future practice (Melnyk *et al.*, 2008; Stichler *et al.*, 2011; Malik, McKenna and Plummer, 2015; Lehane *et al.*, 2017). To achieve this, lecturers themselves must engender the values of life-long learning to remain knowledgeable and competent in EBP and use this knowledge in their teaching practice.

To date research measuring nurse and midwifery lecturers' knowledge and implementation of EBP remains somewhat limited compared to that undertaken in the clinical setting. Like their clinical colleagues, nurse and midwifery lecturers perceive EBP favourably, but their knowledge and implementation of it do not always measure up as well as their beliefs about it (Stichler *et al.*, 2011; Mehrdad *et al.*, 2012; Malik, McKenna and Plummer, 2015; Mthiyane and Habedi, 2018). Melnyk *et al.* (2008) reported reasonably high knowledge levels of EBP among nurse educators on the self-report measure utilised in their study but responses to open-ended questions indicated gaps in their knowledge. These reasonably high levels of EBP knowledge contrast with the average knowledge levels reported by nursing faculty in a study conducted by Mehrdad *et al.* (2012). Felicilda-Reynaldo and Utley (2015) conducted a U.S.-wide mixed methods study to explore nurse educators' inclusion of EBP in their teaching philosophy statements. They found that only 16% specifically mentioned EBP, while a further 39% mentioned components of EBP. This paucity of inclusion of EBP in philosophy statements potentially indicates lower awareness of and/or value for EBP among this sample of nurse lecturers than might be expected in light of the growing global emphasis on EBP. In their grounded theory study exploring how nurse academics value and engage with EBP, Malik, McKenna and Griffiths (2016) found a variety of understandings of EBP among their participants. These ranged from research utilisation to appreciation of the three core components of EBP, indicating a potential conflation of these two concepts. Inconsistency of EBP knowledge and understanding among nurse and midwifery lecturers prompts concerns around what is being taught as EBP and how they teach EBP to students.

What is taught as EBP?

Waters *et al.* (2009) suggested that what is taught about EBP to students is a function of lecturers' interest and experience in EBP. Furthermore, Orta *et al.* (2016) attested that few nurses receive the necessary education to enable them to implement EBP in patient care. In many cases, nursing and midwifery education around EBP continues to focus on research methods, process and the use of findings from single studies to inform practice rather than looking for best available evidence, synthesising findings, and integrating them with patient preferences, and clinicians' expertise to effect a clinical decision (Melnyk *et al.*, 2008, 2012; Orta *et al.*, 2016). Of particular relevance to the Irish context, is a national study that was conducted to determine the nature of EBP education in third level healthcare professional education in Ireland (Lehane *et al.*, 2017). One phase of this research study comprised a national EBP teaching survey involving 14 HEIs, representing 11 healthcare professions. This survey demonstrated that EBP education has been delivered by academics in the Republic of Ireland for at least 10 years, albeit in a somewhat variable manner. The findings also suggested that content pertaining to the steps of the EBP process is included in health professions curricula, with emphasis on searching for and appraising the evidence. This mirrors findings from a systematic review of 39 papers exploring pedagogical approaches to teach bachelor students EBP internationally (Aglen, 2016), which revealed that the focus of EBP teaching has been information literacy and that its delivery has followed the steps of the EBP process. Both of these studies also attested that teaching EBP tends to concentrate on the first three steps of the EBP process, with much less emphasis attributed to the integration and evaluation of EBP in practice. This finding is replicated in a systematic review of EBP educational intervention studies (Albarqouni, Hoffmann and Glasziou, 2018) that demonstrated that only 12% of educational interventions taught all steps of the EBP process. Dawes *et al.* (2005) stressed the importance of including all steps of the EBP process in the curriculum when establishing the minimum standards for educating clinicians about EBP. To focus largely on the early steps of the EBP process has the potential to limit students' understanding of EBP's relevance to clinical practice (Aglen, 2016; Orta *et al.*, 2016). Others agree that, when teaching EBP, all steps of the EBP process should be included and explicated fully (Melnyk *et al.*, 2014; Lehane *et al.*, 2017, 2019; Albarqouni *et al.*, 2018).

Many of the studies examining nurse and midwifery lecturers' teaching of EBP did not include a measure of their EBP knowledge or understanding. This makes it difficult to ascertain their clarity around the concept of EBP itself, or the knowledge base from which they are teaching EBP. With the reported confusion concerning EBP, it would be prudent to begin any study into EBP by ascertaining participants' understanding of the concept prior to probing their experience or implementation of it. The reported inconsistency in understanding, or degree of misunderstanding, among those charged

with teaching EBP would reasonably lead to confusion among those learning from them, which has the potential to hamper EBP implementation by nurses and midwives of the future. Such confusion around EBP transcends settings and is evident among clinical nurses and midwives (Saunders and Vehviläinen-Julkunen, 2016b). Definitional clarity of the concept of EBP is pivotal to its successful integration in healthcare and healthcare education.

Misunderstandings of EBP

Several studies discussed heretofore revealed various degrees of confusion regarding EBP among nurses and midwives in both clinical and academic settings. Saunders and Vehviläinen-Julkunen (2016) demonstrated through their integrative review of nurses' readiness for EBP, widespread confusion around the concept of EBP among nurses. Estabrooks (1999) argued that the term 'evidence-based practice' made its way somewhat covertly into the nursing vernacular and was being used without due consideration of its origins or meaning, a view that was shared by Rolfe, Segrott and Jordan (2008). Leufer and Cleary-Holdforth (2009) asserted that a degree of lip-service has been paid to the term EBP, which while used widely, is often misconstrued as research utilisation, disregarding the three core components that comprise EBP. Despite evidence of poor EBP knowledge, skills and implementation in nursing and midwifery practice (Melnyk *et al.*, 2012; Heydari *et al.*, 2014; Stokke *et al.*, 2014; Belowska *et al.*, 2015; Saunders and Vehviläinen-Julkunen, 2016b; Skela-Savič, Pesjak and Lobe, 2016; Azmoude *et al.*, 2017; Melnyk *et al.*, 2018), EBP is nonetheless spoken of as a core value or standard of practice in nursing and midwifery circles because they believe that it will improve their practice and their patients' outcomes (Estabrooks, 1999). However, studies suggest that although nurses and midwives are talking about EBP and appear to value it, they do not seem to be particularly knowledgeable about it, nor are they implementing it to any great degree (Melnyk *et al.*, 2012; Heydari *et al.*, 2014; Stokke *et al.*, 2014; Belowska *et al.*, 2015; Saunders and Vehviläinen-Julkunen, 2016b; Skela-Savič, Pesjak and Lobe, 2016; Azmoude *et al.*, 2017; Melnyk *et al.*, 2018). Perhaps EBP has become so commonly cited in nursing circles that there is an assumption, inaccurate though it may be, that everyone knows what it is and shares the same interpretation of it. EBP may have fallen foul of its over-use in the nursing vernacular and become a 'buzzword' that is used without due consideration of its origins or meaning, as proposed by Estabrooks (1999). Ingersoll (2000, p. 151) asserted that "evidence-based practice seems to be the up-and–coming buzzword for the decade". Similarly, in the field of social work Shlonsky and Gibbs (2004, p. 137) cautioned that EBP was "in danger of becoming a catchphrase". Two decades later EBP seems to have become the buzzword that Ingersoll cautioned it would be. It is important that the potential implications of that phenomenon be explored.

A buzzword is defined as "a word or expression from a particular subject area that has become

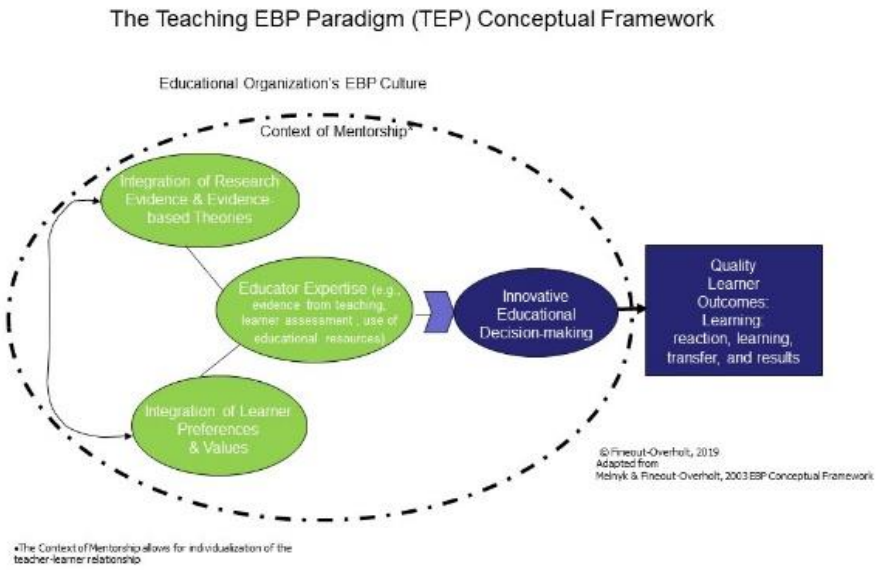
fashionable by being used a lot, especially on television and in the newspapers" (Cambridge English Dictionary, 2019), with the Oxford English Dictionary (2019) also referring to it as "an item of jargon". Certainly the phrase evidence-based practice, or EBP, is much used in nursing and midwifery discourse, and is written about extensively in the professional literature, satisfying that criterion of the definition of a buzzword. Hansén (2009), in his consideration of the effects of buzzwords on experiential learning, submitted that the ambiguity of a buzzword facilitates its widespread dissemination and produces an array of interpretations, which, arguably, appears to be the case with EBP. Marmor (2004, p. 1) in his writings on jargon and fads in medical care policy and politics, described a fad as "enthusiasm for particular ideas or practices". Given the prevalence of EBP in the nursing and midwifery discourse, coupled with the positive beliefs about EBP demonstrated in numerous studies (Melnyk *et al.*, 2012; Heydari *et al.*, 2014; Belowska *et al.*, 2015; Skela-Savič, Pesjak and Lobe, 2016), it could certainly be suggested that there is enthusiasm for EBP in nursing and midwifery circles. This raises the question, however, of how authentic this enthusiasm for EBP may be with the demonstrated absence of knowledge and understanding of the concept. Perhaps the reported low implementation of EBP among nurses and midwives is a function of this lack of knowledge and skills. The danger of buzzwords is that they can avert critical consideration of the concept in question and they usually contribute little in terms of explanation or learning (Hansén, 2009). Twenty years ago, when considering the implications of EBP for nursing practice, Estabrooks (1999, p. 279) challenged nurses to consider, "what do we actually mean by it?" Perhaps Estabrooks' challenge is as relevant today as it was then. Sustainable EBP implementation in nursing and midwifery practice will be severely hampered as long as confusion about it persists. The implications of such confusion are important for both nurses and midwives and those charged with their education and preparation for professional practice. Furthermore, it shines the spotlight on the importance of considering the most effective approach for teaching EBP in undergraduate, pre-registration nursing and midwifery programmes.

Teaching EBP

For the last two decades, the emphasis on and call for evidence-based healthcare have been escalating exponentially. However, direction around how to integrate EBP into the curricula and teaching of healthcare registration programmes including nursing and midwifery has been less clear (Albarqouni *et al.*, 2018). Stevens (1999, p. 3) cited in Kalb *et al.* (2015) defined evidence-based teaching as "the conscientious, explicit, and judicious use of current best evidence in making decisions about the education of professional nurses". This definition simulates the definition of EBP by Sackett *et al.* (1996) and as such implies that a similarly methodical approach should be taken in the teaching of EBP as in the delivery of EBP. Teaching EBP involves more than simply adding EBP to

the philosophy and content of a programme. The EBP content, how and where it is inserted, and the teaching and assessment strategies used in its delivery, should all be given careful consideration. Teaching EBP should therefore involve the integration of the best available evidence, the educator's expertise, and the learner's values/preferences, and it should employ the steps of the EBP process in order to adopt a dynamic, responsive, life-long, problem-solving approach to EBP education. This reflects the Teaching EBP Paradigm (TEP) conceptual framework proposed by Fineout-Overholt (2019) (Figure 2). In recent years more guidance has been offered in relation to how this can be achieved.

Figure 2: The Teaching EBP Paradigm Conceptual Framework (Fineout-Overholt, 2019)



Renowned experts in EBP from the U.K., Canada, Australia and New Zealand were interviewed by Lehane et al. (2017) to ascertain and learn from their EBP teaching experiences and practices. This culminated in a veritable roadmap for educating healthcare professionals about EBP, offering valuable advice concerning issues around integrating EBP into programme curricula, strategies for teaching EBP, and engaging key personnel to teach EBP. Fundamental messages comprised basing EBP teaching on clinical care, training educators to teach EBP, the establishment of EBP role models, developing a national policy for EBP education, investment in necessary resources, and facilitating patient involvement with evidence. These recommendations can be found throughout the literature concerning effective strategies for teaching EBP (Aglen, 2016; Albarqouni, Hoffmann and Glasziou, 2018; Horntvedt *et al.*, 2018; Larsen *et al.*, 2019). While these recommendations hold merit and largely transcend healthcare professions, it is nonetheless worth noting that all five experts were of medical and/or epidemiology background, with no other healthcare professions represented.

Additionally, EBP experts from North America or Europe, outside of the U.K., were not included. Considering the body of work on EBP that has amassed over the last two to three decades in the U.S.A., it would have been interesting to have drawn from that pool of expertise.

The use of EBP competency frameworks in teaching EBP is gaining increasing attention globally (Melnyk *et al.*, 2014; Albarqouni *et al.*, 2018; Lehane *et al.*, 2018). Melnyk *et al.* (2014, p. 7) define competencies as "holistic entities that are carried out within clinical contexts and are composed of multiple attributes including knowledge, psychomotor skills, and affective skills". Healthcare professionals require a combination of specific EBP knowledge, skills and mind-set to effect care that is high quality and safe. Competency frameworks offer guidance to regulatory bodies and education providers of professional healthcare programmes regarding the inculcation of EBP teaching into the curricula and delivery strategies of their programmes (Lehane *et al.*, 2018). They also provide direction regarding the learning outcomes, attributes and skills that graduates of these programmes need to attain to deliver safe, high quality, effective patient care. This facilitates a standardised and consistent approach to the curriculum content and teaching of EBP across professional healthcare programmes. A number of EBP competency frameworks that set out the minimum standard of EBP knowledge and skills required by healthcare professionals exist. Melnyk *et al.* (2014) established 13 EBP competencies for registered nurses and 11 additional competencies for advanced nurse practitioners, providing a mechanism to ensure the provision of high quality, safe patient care. Healthcare organisations can use this framework to articulate their expectations regarding nurses' engagement with EBP at different levels (Melnyk *et al.*, 2014). Albarqouni *et al.* (2018) developed a framework of 68 competencies for use across all healthcare professions. Educators can incrementally incorporate EBP into different programme curricula and at different levels, using this framework. It can be adapted to suit the needs of the organisation or profession(s) in question. EBP is a key catalyst to enhance clinical effectiveness overall and its competencies are intended for use by all health and social care professionals and can be tailored to local context or need. Furthermore, Lehane *et al.* (2018), drawing on Albarqouni *et al.* (2018), constructed EBP competencies as part of the development of a larger competency framework for clinical effectiveness in the Republic of Ireland.

Organisational Context for EBP

Tantamount to the successful execution of change in practice, through implementation of EBP, is the consideration of wider issues such as the culture and environment in which the change is required (Melnyk and Fineout-Overholt, 2019; Shuman *et al.*, 2019). Assessing an organisation's culture and readiness for EBP is a critical step if EBP implementation is to be afforded any chance of success. Readiness for EBP is "the state of being fully prepared to deliver evidence-based practice when,

where and how it is needed" (Schaefer and Welton, 2018, p. 628). Integral to this is a supportive organisational culture and environment, and strong, visionary leadership.

Organisational Culture

An unsupportive environment and culture are regularly cited as significant barriers to EBP implementation globally (Glacken and Chaney, 2004; Gerrish *et al.*, 2012; Powell Kennedy *et al.*, 2012; Timmins, McCabe and McSherry, 2012; Yadav and Fealy, 2012; Williams, Perillo and Brown, 2015; Melnyk, 2016b; Warren *et al.*, 2016a; Williams *et al.*, 2017; Li *et al.*, 2018). Melnyk (2016, p. 99) described culture as "the beliefs, behaviours and values of people within an organization" and states it often is "the prevailing factor that determines whether an organization will be successful at achieving its vision and strategic goals". In their scoping review of organisational barriers to EBP, Williams, Perillo and Brown (2015) identified five major inhibiting factors: workload, lack of support from management and other staff, lack of resources, lack of authority/autonomy to effect change, and workplace culture. These echo findings from elsewhere (Dalheim *et al.*, 2012; Shifaza, Evans and Bradley, 2014; Melnyk *et al.*, 2016; Labrague, McEnroe-Petitte, *et al.*, 2019; Melnyk and Fineout-Overholt, 2019). Left unchanged and unchallenged, such factors will continue to perpetuate under-implementation of EBP in healthcare settings. Nurses and midwives work across a vast spectrum of healthcare settings including acute care settings, long-term care facilities, day centres, community and general practice settings. These settings can vary significantly in terms of their organisational structure, culture, approach to care, systems of work, leadership styles, patient numbers and profiles, patient care goals, funding, and perceptions of roles and responsibilities. Some settings will be more fluid and will more readily embrace change than others and all have the potential to shape the clinician's experience and practice, and patient outcomes either positively or negatively (Gerrish *et al.*, 2012; Williams, Perillo and Brown, 2015; Warren *et al.*, 2016a; Melnyk *et al.*, 2017; Williams *et al.*, 2017; Melnyk and Fineout-Overholt, 2019). The organisational culture in which one practices, including what is seen to be valued or not, the social norms and beliefs, has been shown to impact on individuals' professional autonomy and behaviours (Ajzen, 1985; Hartnell, Ou and Kinicki, 2011; McCormack *et al.*, 2013; Williams *et al.*, 2017). Williams *et al.* (2017) conducted a four year RCT to test the effects of organisational culture, individual clinician's intentions, and job-related barriers to EBP adoption. They demonstrated that organisational culture and clinicians' intentions play an integral part in EBP implementation. Similarly, a study of evidence-based midwifery practice established that influential colleagues, fiscal support and resources, as well as the cultural perception of midwifery, presented real challenges to midwives' ability to implement EBP (Powell Kennedy *et al.*, 2012). When assessing clinicians' EBP beliefs and implementation, the culture and context of the environment in which they practice should also be assessed. This assessment will

assist in identifying the facilitators of and barriers to the implementation of EBP in organisations and therefore may provide the key to understanding the EBP beliefs and implementation of the clinicians who practice there. More importantly, this assessment affords the opportunity to identify and plan the way forward, overcoming the barriers and capitalising on the facilitators, to cultivate a culture and environment in which EBP can flourish and become the standard approach to patient care.

Leadership

The critical role of the nurse leader in the successful inculcation of EBP in an organisation cannot be underestimated (Newhouse, 2007; Hauck, Winsett and Kuric, 2013; Gallagher-Ford, 2014; Stetler *et al.*, 2014; Reichenpfader, Carlfjord and Nilsen, 2015; Caramanica and Spiva, 2018). In a systematic review of the role of leadership in EBP (Reichenpfader, Carlfjord and Nilsen, 2015), all seventeen studies acknowledged the importance of leadership as an influencer of implementation, emulating findings from another systematic review that examined organisational features that influenced EBP implementation (Li *et al.*, 2018). In their examination of behaviours used by EBP-supportive leaders, Stetler *et al.* (2014) established that such behaviours fell into strategic, functional or cross-cutting categories. Strategic behaviours were those that would embed EBP in the organisational DNA and included the introduction of EBP language, policies, activities and expectations into the conversations, the business, and the documentation of the organisation. They also included tackling organisational factors that hamper EBP advancement and promoting those that accelerate it, such as the introduction of journal clubs and EBP champions. Functional behaviours comprised those that actively encourage the adoption of EBP by individual clinicians, such as working alongside staff and providing hands-on support in the performance of EBP activities, leading by example and role-modelling EBP, educating staff, providing feedback, and facilitating EBP performance reviews. Cross-cutting behaviours of leaders were those that transcended strategic and functional behaviours. These behaviours influenced the embedding of EBP into the fabric of the organisation through strategic planning around making the EBP vision a reality, and considered communication, both verbal and documented, to cultivate an EBP supportive climate. Behaviours that were found to facilitate these goals include inculcation of EBP language, EBP activities and supportive structures, role-modelling EBP, and educating and mentoring staff in the knowledge and skills of EBP. These behaviours and activities are reflected in the findings of other studies exploring nurse leaders' and managers' support of EBP (Hauck, Winsett and Kuric, 2013; Melnyk *et al.*, 2016; Saunders and Vehviläinen-Julkunen, 2017; Caramanica and Spiva, 2018; Li *et al.*, 2018). Leaders who can secure the resources necessary for EBP implementation inspire, encourage and support their staff to develop the necessary knowledge and skills, foster a culture that embraces and expects EBP, and provide the landscape necessary to enable their staff to feel competent and confident to deliver

patient care that is evidence-based, will be instrumental in forging system-wide integration of EBP.

Professional Autonomy

Implementation of EBP at the bedside requires practitioners who are not only knowledgeable and skilled in EBP but who are also sufficiently empowered and autonomous in their practice (Melnyk *et al.*, 2012). Autonomy, frequently discussed in nursing literature, is a complex and multi-faceted concept (Skår, 2010; Varjus, Leino-Kilpi and Suominen, 2011; Greaney, O'Mathúna and Scott, 2012; Rao, Kumar and McHugh, 2017; Oshodi *et al.*, 2019). It is commonly understood to be "the right or condition of self-government" and "freedom from external control and influence" (Lexico Dictionaries, 2019). This implies ability and confidence to determine one's own actions without undue influence from or control by external sources. It assumes that autonomy suggests that individuals exist and function in isolation and it disregards the potential implications of one's 'autonomous' actions on others. However, nurses and midwives do not function in isolation. They work largely as part of a wider multi-disciplinary team and are confined to greater or lesser degrees by the legislation, professional regulations, scope of practice and local policy and procedures of the jurisdiction wherein they practice. The Nursing and Midwifery Board of Ireland (2014) attested to this in their code of professional conduct and ethics for nurses and midwives, affirming that "nurses and midwives share responsibility with colleagues for providing safe, quality healthcare. They work together to achieve the best possible outcomes for patients". A more contemporary, pragmatic understanding of autonomy in the context of nursing and midwifery, therefore, is that of relational autonomy, which Wade (1999, p. 310) defined as "belief in the centrality of the client when making responsible discretionary decisions, both independently and interdependently, that reflect advocacy for the client". Relational autonomy "captures the interdependent nature of our lives where decisions affect not only us but those around us" (Greaney, O'Mathúna and Scott, 2012, p. 9362) and, as such, acknowledges the influence and role of collaboration, context and the significance of the patient in nursing and midwifery care, mirroring two of the core components of EBP, patient preferences and clinicians' expertise.

Professional autonomy can also be viewed as a reflection of the extent and nature of decision-making authority that a profession enjoys (Rao, Kumar and McHugh, 2017). Distinctions in decision-making authority are identified in the literature between clinical, professional and operational (Kramer, Maguire and Schmalenberg, 2006; Varjus, Leino-Kilpi and Suominen, 2011; Rao, Kumar and McHugh, 2017). Studies indicate that nurses feel more autonomous in relation to clinical decision-making than operational decision-making (Mrayyan, 2004, 2005; Varjus, Leino-Kilpi and Suominen, 2011; Houser *et al.*, 2012) but would prefer greater involvement in decision-making than they

experience (Blegen *et al.*, 1993; Scherb *et al.*, 2011; Bina *et al.*, 2014). Decision-making authority can also vary according to setting, with critical care nurses experiencing greater authority than their colleagues in more general settings, for example (Al-Hamdan *et al.*, 2016; Thornton Bacon, Shrestha and Jenkins, 2019). Interestingly, a perceived lack of authority by nurses to change practice has regularly been identified as a barrier to EBP implementation (Glacken and Chaney, 2004; Varjus, Leino-Kilpi and Suominen, 2011; Powell Kennedy *et al.*, 2012; Doolan-Grimes, 2013; Ubbink, Guyatt and Vermeulen, 2013; Williams, Perillo and Brown, 2015). This perception has the potential to impact directly on nurses' and midwives' perceived role and confidence in decision-making regarding the system-wide adoption and implementation of EBP. MacDonald (2002) posited that healthcare is particularly hierarchical and not all healthcare professions experience similar autonomy. Gerrish *et al*. (2008) demonstrated that junior nurses felt disempowered by a lack of authority to change practice, and by their senior nursing and medical colleagues in their attempts to implement EBP, a finding mirrored in the Irish context (Glacken and Chaney, 2004; Doolan-Grimes, 2013). Such a culture could undermine junior nurses and prohibit them from experiencing and developing relational autonomy, which has the potential to affect their practice throughout their careers. This carries implications for graduate nurses and midwives who, despite learning about EBP in college, are potentially discouraged by their superiors from implementing it in practice, thereby severely hampering efforts to inculcate an evidence-based approach to nursing and midwifery practice in future generations. This can exert implications on patient care as greater nursing autonomy is associated with improved patient outcomes (Houser *et al.*, 2012; Rao, Kumar and McHugh, 2017). Healthcare organisations must foster nursing and midwifery autonomy by ensuring clarity around roles and responsibilities, providing positive leadership and, very importantly, supporting the professional development of their staff though education, resources, and mentorship (Bina *et al.*, 2014; Gerard, Owens and Oliver, 2016; Oostveen and Vermeulen, 2017; Li *et al.*, 2018; Choi and Kim, 2019).

EBP Role-Models / Mentors

The presence of EBP champions or mentors in practice has been shown to be invaluable and is endorsed in the advancement of EBP knowledge and skills among clinicians and the pursuit of EBP implementation in organisations (Melnyk, 2007; Wallen *et al.*, 2010; Friesen *et al.*, 2017; Lehane *et al.*, 2017; Melnyk *et al.*, 2017; Saunders and Vehviläinen-Julkunen, 2017; Fineout-Overholt and Melnyk, 2019; Li *et al.*, 2018). Melnyk and Fineout-Overholt (2018, p. 752) differentiated between an EBP champion and an EBP mentor. They defined EBP champions as "clinicians who hold expertise in EBP and are able to bring about evidence-based change, disseminate how they do their work, and improve the uptake of EBP within a culture". Their focus is the individual clinician's work. An EBP

mentor, on the other hand, typically is "an advanced practice clinician with in-depth knowledge and skills in EBP as well as in individual behavior and organizational change", whose focus is the organizational work. In their systematic review of the effectiveness of mentoring, Abdullah *et al.* (2014) considered enhanced knowledge and experience, ability and commitment to provide individual support, and capacity to engage at an interpersonal level, as key characteristics of a mentor. Their review of 10 studies of varying quality demonstrated varying results regarding the impact of mentoring on behaviour change, none of which were negative, and many that were positive. However, these findings were very likely influenced by the variance in both measures and interventions used in the selected studies. On the other hand, mentors have consistently been shown to play a critical role in EBP implementation in numerous other studies (Melnyk *et al.*, 2004, 2017; Wallen *et al.*, 2010; Mollon *et al.*, 2012; Green *et al.*, 2014; Magers, 2014; Saunders and Vehviläinen-Julkunen, 2017; Spiva *et al.*, 2017). Melnyk *et al.* (2017) demonstrated that the development of a critical mass of EBP mentors resulted in significant improvements in nurses' EBP beliefs and implementation, which in turn produced improved patient outcomes in several areas of care. Saunders and Vehviläinen-Julkunen (2017) explored the EBP beliefs and role of EBP mentors in five Finnish hospitals, and identified the lack of EBP mentors as a primary contributor to the nurses' low EBP knowledge and skills, and low belief in their ability to implement EBP. EBP mentors can assist nurses and midwives with the skills of EBP such as generating a PICOT question, searching for, and appraising the best available evidence, implementing EBP changes in their patient care, evaluating and disseminating the results of that implementation. Their presence at the point of care can also facilitate a more collaborative approach to EBP integration. In this way, frontline nurses and midwives would be enabled to get on with the business of delivering primary care while, with the support and guidance of EBP mentors, developing knowledge and competence in the steps of the EBP process (Melnyk *et al.*, 2017; Saunders and Vehviläinen-Julkunen, 2017). Hands-on, point of care support of this nature can be the difference between success and failure of an initiative to enhance EBP implementation.

EBP - The Irish Context

Nurses and midwives in Ireland care for a diversity of patients, with many, varying challenges and levels of dependence, across the lifespan and around the clock. They are therefore ideally placed to identify the needs of a diverse range of patient populations in a variety of settings (Cleary-Holdforth, 2019) and as such can be instrumental in the move towards system-wide evidence-based healthcare delivery. Equipped with the appropriate level of EBP knowledge and skills, these nurses and midwives present an invaluable means to promote and diffuse EBP across multiple systems and settings throughout the Irish healthcare system. This will ensure a profession going forward that has

the capacity to influence healthcare policy and practice for future generations. It is only in this way that the positive impacts of EBP and the goals of Sláintecare will begin to be realised in the Irish healthcare setting.

A number of studies have been undertaken in the Irish context examining aspects of EBP (Pallen and Timmins, 2002; Glacken and Chaney, 2004; McKenna, Ashton and Keeney, 2004; Leufer and Cleary-Holdforth, 2007; O'Leary and Ní Mhaolrúnaigh, 2012; Timmins, McCabe and McSherry, 2012; Yadav and Fealy, 2012; Doolan-Grimes, 2013; Hanafin *et al.*, 2014; Leufer, 2015; Lehane *et al.*, 2017). Some of these studies focus more on research utilisation or research evidence rather than on EBP, in terms of its three core components (Pallen and Timmins, 2002; Glacken and Chaney, 2004; McKenna, Ashton and Keeney, 2004; O'Leary and Ní Mhaolrúnaigh, 2012; Timmins, McCabe and McSherry, 2012) and, as such, do not include a definition of EBP. Hanafin *et al.* (2014) carried out a national multi-methods exploration of community nurses' familiarity with EBP, their use of research evidence in practice, and their perceptions of facilitators and barriers to using research evidence in practice. The findings of this study informed a strategy to support the implementation of evidence-informed policy and practice in community nursing. While the researchers asked participants about their familiarity with EBP, there was no direct measure of EBP knowledge, nor did they provide a definition of EBP. Similarly, while there is evidence of questions concerning EBP skills relating to the early steps of the EBP process (wording a question, searching databases/literature, and interpreting research papers), an explicit reference was not provided to the integration of evidence with clinical expertise and patient preferences, implementation of a practice change, or evaluation of outcomes.

Five of the studies undertaken in the Irish context defined EBP explicitly (Leufer and Cleary-Holdforth, 2007; Yadav and Fealy, 2012; Doolan-Grimes, 2013; Leufer, 2015; Lehane *et al.*, 2017). Two of these studies examined the impact of an EBP module on student nurses' EBP beliefs and implementation in one school of nursing (Leufer and Cleary-Holdforth, 2007; Leufer, 2015). Yadav and Fealy (2012) conducted a national investigation of randomly sampled psychiatric nurses' self-reported barriers, facilitators and skills for EBP (n=145), while Doolan-Grimes (2013) undertook a qualitative study of mid-line and frontline nurse managers' perspectives of EBP (n=23), which also explored their perceptions of facilitators and barriers, and their views on the likelihood of EBP becoming a reality in practice. Most recently, Lehane *et al.* (2017) undertook a national mixed methods study to ascertain the nature of EBP education in third level healthcare professional education in Ireland. Adopting a triphasic approach, Lehane *et al.* embarked on a structured review of international literature, conducted interviews with international EBP experts, and undertook a national EBP teaching survey involving 14 HEIs and 11 healthcare professions. These five studies

have contributed to some understanding of nurses' use of research evidence or EBP in Ireland. Those that focused definitively on EBP provide reasonable insight into different populations of nurses, nurse managers', nurse lecturers', and students' perceptions of EBP or aspects of it, although their methodologies varied. However, a study exploring EBP across all three key stakeholder groups of nurse and midwifery educators, clinical nurses and midwives, nurse and midwifery lecturers, and students, has not been undertaken previously in Ireland. The proposed study set out to accomplish this comprehensive approach.

The Proposed Study

This national study will establish the EBP beliefs and implementation of nurse and midwifery lecturers and students, and clinical nurses and midwives in the Irish healthcare setting, in addition to the culture and readiness for EBP of the organisations in which they work and study. Exploring these variables nationally and across these three cohorts will make it possible to establish a comprehensive understanding of the commonalities and/or differences between them in relation to EBP. Upton *et al.* (2015), in their exploration of the EBP profiles of academic and clinical staff, asserted that this approach enabled the recognition of patterns of EBP knowledge and implementation across the academic and clinical settings. This can potentially facilitate enhanced unity, as well as a shared understanding of, and commitment to EBP, between these settings which is imperative in nurse and midwifery education (Rosser, 2015; Upton *et al.*, 2015). In addition to this, the current study adds a third dimension, the students' perspective. This will shine the spotlight on areas that may need to be addressed in order to nurture and elevate the ability of current and future nurses and midwives to take an active role in the implementation of EBP. The use of an operational definition of EBP and tools specifically designed to measure EBP beliefs, implementation, and organisational culture and readiness for EBP, will guide data collection and analysis. This will maintain focus on EBP rather than research evidence and/or research utilisation, which have been the subject of a number of the aforementioned Irish studies (Pallen and Timmins, 2002; Glacken and Chaney, 2004; McKenna, Ashton and Keeney, 2004; O'Leary and Ní Mhaolrúnaigh, 2012; Timmins, McCabe and McSherry, 2012). The selected EBP beliefs, and implementation scales present participants with statements and questions that specifically address their perceptions of EBP and performance of EBP activities, facilitating a standardised and objective examination of these EBP variables. Also, the randomly selected samples provided perspective on a standardised operational definition of EBP. The organisational culture and readiness for EBP scales will identify the culture and preparedness for EBP in the organisations wherein the nurses and midwives study and practice, establishing the level of support and facilitation available to nurses and midwives within their workplaces in their attempts to implement EBP. Individual nurses' and midwives' knowledge of what

constitutes EBP will be sought by means of a single open question at the beginning of the survey that invites participants to explain in their own words their understanding of EBP. This freestyle approach will highlight the specific needs of these groups, which can be used to inform optimal pragmatic interventions to foster knowledge and skills necessary to implement EBP at the bedside among nurses and midwives.

Theory Underpinning the Proposed Study

My PhD study aims to quantify the knowledge, beliefs and implementation of EBP among nurses and midwives in Ireland and the readiness of the organisations wherein they work to embrace EBP. I intend to establish the current beliefs and behaviours of nurses and midwives in relation to EBP through the administration of the selected EBP beliefs, and implementation scales. These findings will inform the development and implementation of a practical strategy to cultivate and sustain the implementation of EBP among nurses and midwives across the Irish healthcare system, should the findings suggest a need for this. Implementing EBP is a challenging, complex and often unsuccessful endeavour (Sales *et al.*, 2006; van Achterberg, Schoonhoven and Grol, 2008; Cullen and Adams, 2012; Patelarou *et al.*, 2013). Theory is integral to the development of sensitive, appropriate interventions, the identification of appropriate outcomes, measures and variables of interest, and the evaluation of the implementation process (Lippke and Ziegelmann, 2008; Rycroft-Malone and Bucknall, 2010). Theory offers the promise of enhanced knowledge and understanding of human behaviour in various contexts. Such insight can enable the development of implementation strategies that anticipate and address the nuances of human behaviour and increase the likelihood of their long-term success and/or explain any lack of success (Sales *et al.*, 2006; Lippke and Ziegelmann, 2008; Moore, 2011). This is particularly appealing in relation to the development of a strategy to implement EBP across Irish healthcare settings in a way that targets organisations, professional groups, and individual practitioners to improve the likelihood of long-term success.

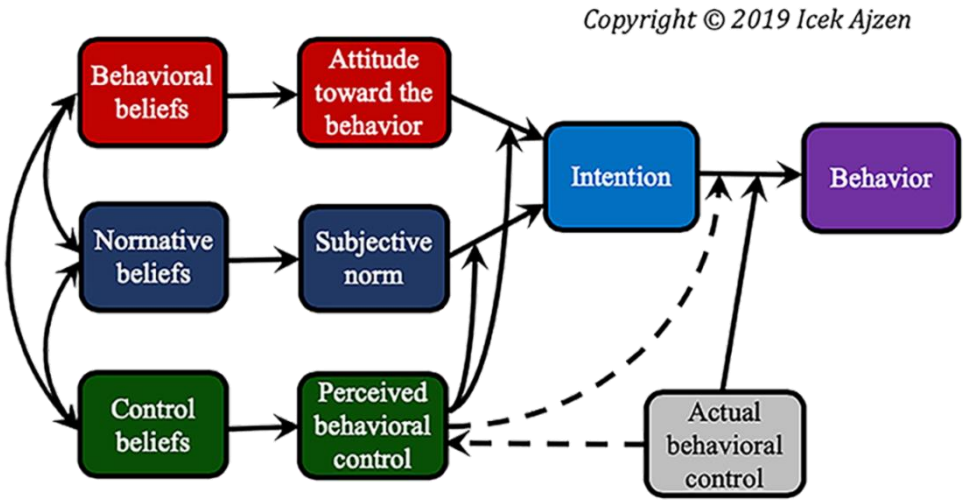
A number of theories could have been drawn upon to underpin this study. Roger's Diffusion of Innovations theory, for example, explains how over time an idea or product gains traction and diffuses through a specific population or social system, resulting, ultimately, in its adoption (Rogers, 2003). Similarly, the Knowledge to Action Framework developed by Graham *et al.* (2006) could have been employed. This framework facilitates the use of research evidence by key stakeholders such as clinicians, policy-makers and patients. It promotes knowledge enquiry and synthesis, and outline the activities necessary for the application of knowledge in practice. However, both of these theories focus largely on implementation. The nature of this study is more exploratory, seeking to establish nurses' and midwives' knowledge, beliefs and implementation of EBP, and the organisational culture and readiness for EBP of the clinical and educational organisations in which they work and learn.

Godin *et al.* (2008) suggested that although factors determining healthcare professionals' behaviour are multiple, much of clinical practice adoption decisions are *individual* professional decisions and so this study begins with the individual and draws on the Theory of Planned Behaviour (TPB). The TPB focuses on the individual and his/her beliefs, first and foremost, while allowing for the influence of external factors on the individual's behaviour. Several studies that have examined nurses' and midwives' EBP beliefs and implementation behaviours have established a relationship between these variables, whereby clinicians with higher EBP beliefs demonstrate higher EBP implementation (Melnyk, Fineout-Overholt and Mays, 2008; Estrada, 2009; Melnyk *et al.*, 2010; Wallen *et al.*, 2010; Stokke *et al.*, 2014; Skela-Savič, Pesjak and Lobe, 2016; Milner, Bradley and Lampley, 2018). However, studies exploring EBP implementation support that factors external to individual clinicians' beliefs, such as organisational culture, availability of relevant resources, opinion of others, how a particular behaviour is valued, and time and fiscal limitations, can also influence his/her implementation of EBP (Dalheim *et al.*, 2012; Shifaza, Evans and Bradley, 2014; Williams, Perillo and Brown, 2015; Melnyk *et al.*, 2016; Labrague, McEnroe-Petitte, *et al.*, 2019). Such external factors will be explored in the proposed study. This will be facilitated by administering organisational culture and readiness for EBP scales. The correlation of EBP beliefs and behaviour, coupled with the recognition of the potential impact of external influences on EBP behaviour, aligns well with the TPB. The TPB has previously been demonstrated to be very useful in explicating healthcare professionals' behaviours and intentions (Godin *et al.*, 2008; Burgess *et al.*, 2017). In particular, the TPB has been shown to effectively explain and/or predict healthcare professionals' behaviours in relation to EBP (Côté *et al.*, 2012; Kelly, Deane and Lovett, 2012; Klaic, McDermott and Haines, 2019), making it an appropriate choice for the current study, which seeks to ascertain individual nurses' and midwives' beliefs and behaviours around EBP.

The Theory of Planned Behaviour

Icek Ajzen (1985), a Professor of Psychology at the University of Massachusetts, developed the Theory of Planned Behaviour (TPB) (Figure 3). It evolved from an earlier theory, the Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975, cited in Ajzen, 1991). The basic premise of the TPB is that beliefs influence intentions which lead to actions. The theory suggests that intentions are determined by three constructs: "attitude" (toward the behaviour – favourable or unfavourable), "subjective norms" (what valued others expect us to do, social pressure) and "perceived behaviour control" (perceived ease or difficulty with which one can perform the behaviour) and the personal beliefs underpinning these constructs (Ajzen, 1991). Ajzen propounded that the more positive the attitude and subjective norms regarding a particular behaviour, the higher the perceived behavioural control and therefore the greater the person's intention to perform the behaviour.

Figure 3**: The Theory of Planned Behaviour** (http://people.umass.edu/aizen/tpb.diag.html#null-link)



This theory is reflected in the selected EBP beliefs and implementation scales and the manner in which they have been shown to correlate with each other (Melnyk, Fineout-Overholt and Mays, 2008; Wallen *et al.*, 2010; Stokke *et al.*, 2014; Skela-Savič, Pesjak and Lobe, 2016). Higher EBP beliefs scores correlate with higher EBP implementation scores, clearly suggesting that the more positive one's beliefs about EBP, the more positive one's attitude toward EBP implementation will be and therefore, the more likely one is to actually implement EBP in practice. In this way, the selected scales are a good fit for this study as they will elicit the information that is sought in a way that dovetails with the principles of the selected underpinning theory. However, Ajzen (1991) cautioned that the behaviour in question (favourable or otherwise) may not always be under the direct control of the person who is considering it. External factors may influence the degree to which a person can decide to engage in a particular behaviour (actual control), for example time, cost, ability or the support and assistance of others. This led to the inclusion of 'perceived' as opposed to 'actual' behavioural control (Ajzen, 1991; Nelson, Cook and Ingram, 2014), one of the main differences between the TPB and the TRA. In other words, an individual may have the best of intentions to engage in a behaviour that he/she believes is the right thing to do (such as the integration of evidence into clinical practice), but due to external factors such as lack of time or professional autonomy or support from management, for example, he/she is inhibited from carrying out the behaviour in question. For this reason also, it was deemed prudent to include scales that measure organisational culture and readiness for EBP to ascertain whether aspects of the organisations in which the participating nurses and midwives work, might explain their beliefs and behaviours around EBP to some degree.

Utility of the Theory of Planned Behaviour

The TPB has been used to gain insight into peoples' intentions to engage in certain behaviours and, drawing on this insight, to subsequently predict them, particularly in the area of health-related behaviours (Godin *et al.*, 2008; McEachan *et al.*, 2011). Examples can be found in relation to smoking (Higgins and Conner, 2003), exercise (Rhodes and Courneya, 2003), safe sex (Albarracín *et al.*, 2001), breast-feeding (McMillan *et al.*, 2009), and blood donation (Hyde, Knowles and White, 2013), to mention a few. Similarly, the TPB has been employed to explain and/or predict behaviours of healthcare professionals in relation to aspects of practice such as hand hygiene (Jenner *et al*, 2002) and blood pressure monitoring (Nelson, Cook and Ingram, 2014) for example. The TPB has also been used to explain and/or predict healthcare professionals' behaviours in relation to EBP. In an Australian study, exploring residential substance abuse workers' intentions to use EBP, the TPB explained 41% of variance in their intentions (Kelly, Deane and Lovett, 2012). Similarly, Côté *et al.* (2012), using the TPB to predict nurses' intentions to integrate research evidence into practice in Canadian hospitals, demonstrated that this theory explained 70% of variance among nurses. More recently, Klaic, McDermott and Haines (2019) used the TPB to explain the behaviours of allied health professionals in relation to EBP. They revealed that not only does the TPB display strong efficacy in predicting the EBP behaviours of these healthcare professionals, it was also effective in explaining their experience of EBP. Klaic, McDermott and Haines (2019) also demonstrated that the organisational context, and normative beliefs pertaining to organisational values, yield a strong influence on individuals' perceived behavioural control. These studies illustrate the value of the TPB in determining the variables that are at the core of a specific behaviour, which in turn can be capitalised upon to produce changes in that behaviour.

However, questions have been raised as to whether the three TPB constructs alone can explain a person's intention to engage in a behaviour. In particular, researchers have posited that factors such as emotion (Rapaport and Orbell, 2000; Wolff *et al.*, 2011), conscientiousness (Conner and Abraham, 2001), anticipated regret (Sandberg and Conner, 2008), and past behaviour (Abraham and Sheeran, 2003) all influence and potentially predict a person's future behaviour. These researchers have suggested the inclusion of such factors to augment the TPB. In response to such analysis, Ajzen (2011) reiterated that while the three constructs within the TPB are the primary determinants of behaviour, the origins of the beliefs underpinning them are not specified and are influenced by multiple background factors. In this way, Ajzen contended that many of the factors suggested can be accommodated within the TPB and he is open to the inclusion of such factors if their predictive value can be substantiated (Ajzen, 1991). The predictive value of the TPB has similarly been questioned. French and Hankins (2003) suggested that the use of the TPB in this way produces statistically

uninterpretable results. However, there is much support in the literature for the predictive power of this theory across many settings, illustrating the relationship between the individual constructs and intention and behaviour (Armitage and Conner, 1999, 2001; Conner and Abraham, 2001; Armitage, 2005; Côté *et al.*, 2012; Kelly, Deane and Lovett, 2012).

The Application of TPB to this EBP Study

As illustrated by Ajzen (1991) in the TPB, one's beliefs influence one's attitudes, subjective norms and perceived control, which in turn underpin one's intentions and ultimately one's actions. Nurses and midwives are generally positively predisposed to EBP, believing that it offers the best outcomes for patients (Upton and Upton, 2005; Melnyk *et al.*, 2012; Patelarou *et al.*, 2013; Stokke *et al.*, 2014; Upton *et al.*, 2015; Skela-Savič, Pesjak and Lobe, 2016; Milner, Bradley and Lampley, 2018; Ramis, Chang and Nissen, 2019). However, implementation of evidence amongst nurses and midwives remains quite low, suggesting a disconnect between their beliefs and their actions. This disconnect offers the potential for improvement. Establishing the EBP beliefs and implementation of nurses and midwives in the Irish healthcare system, as well as their perceptions of the organisational culture and readiness for EBP of their workplaces, will help determine their current situation regarding EBP, as well as the factors that may be contributing to their EBP behaviours. Participants' behavioural beliefs around EBP will be established by the EBP beliefs scales, while their normative, and control beliefs will be established by the organisational culture and readiness for EBP scale. The EBP implementation scales will reveal their actual behaviours around EBP. This should enable the identification of any barriers to and/or potential facilitators of nurses' and midwives' intentions to utilise EBP. This will provide context-specific information unique to the Irish healthcare setting that will subsequently facilitate knowledge transfer strategies that are tailored to the context and needs of these nurses and midwives, thus resulting in a change process that is contextually sensitive and appropriately facilitated. In this way, nurses' and midwives' positive beliefs regarding EBP (*attitude*), which is generally regarded as the gold standard in patient care (*subjective norms*) will be reinforced by greater ability (*perceived control*) to implement EBP in patient care (*intention and desired action*).

Conclusion

The literature review presented an overview of the history and development of EBP generally and in the context of nursing and midwifery, and provided rationale for the selection of the operational definition of EBP used in this study. The principles and process underpinning EBP were explicated and the impetus for and impact of EBP were outlined. Evidence from national and international professional literature regarding EBP knowledge, beliefs and implementation among nurses, midwives, lectures and students along with Individual and external factors influencing their EBP

implementation was examined. This enabled establishment of the current national and international picture of EBP in nursing and midwifery and identification of any gaps in the research. Theoretical frameworks with the potential to guide this study were considered, culminating in the selection of the Theory of Planned Behaviour for this purpose. The methods utilised in this study will now be discussed in Chapter.

Chapter 3: Methodology

This chapter will outline the methodology of the cross-sectional, descriptive study. Methodology, by its nature, incorporates deliberation of theoretical issues, consideration of potential methods, rationale for selected methods, and an account of the manner in which a study was conducted (Oliver, 2014). Creswell (2009, p5) purported that research design "involves the intersection of philosophy, strategies of inquiry and specific methods". The research design of this study will be presented under these areas. Initially an overview of the study's aims and objectives will be provided. This will be followed by details of the specific research design, the sampling approach employed, ethical considerations, approval, and access, the selected data collection instruments, and data collection procedures. The approach taken to data analysis will also be outlined.

The purpose of the study was to determine the beliefs, knowledge, and implementation of evidence-based practice (EBP) among nurses, midwives and students in the Republic of Ireland and the culture and preparedness for EBP within the organisations where nurses and midwives work. Originally, it had been intended that a mixed methods research approach would be taken in this study. However, the challenges of undertaking such research in contemporary healthcare services and settings eventually proved insurmountable, making it impossible to undertake the second (qualitative) phase of the original planned study. After due consideration, it was determined that a mixed methods research study was no longer possible and that the dominant quantitative phase of the mixed methods research design would be sufficient to achieve the overall objectives of the study. This approach comprised a national cross-sectional survey of three cohorts of nurses and midwives (hospital-based nurses and midwives, nurse and midwifery lecturers, and student nurses and midwives) in the Republic of Ireland.

Aim and Objectives of the Study

The goal of this study was to provide evidence to inform the development of an EBP education and implementation programme that is tailored to the identified needs of nurses and midwives working in the Republic of Ireland. The goal of this programme would be to foster a culture of EBP among nurses and midwives to yield healthcare delivery that maximises patient outcomes and does so in a time- and cost-efficient way

To this end, the objectives of the study were;

- To establish the knowledge, beliefs, and implementation of EBP of:
    - lecturers who teach on undergraduate, pre-registration nursing and midwifery programmes delivered in Higher Education Institutions (HEIs) in the Republic of Ireland;
    - students undertaking undergraduate, pre-registration nursing or midwifery programmes delivered in these HEIs;
    - clinically-based nurses and midwives working in teaching hospitals affiliated with these HEIs.
- To determine the culture and preparedness of the HEIs and hospitals (within which these nurses and midwives, student nurses and student midwives, nurse and midwifery lecturers work, learn and teach) for EBP.

The research questions were:

- What are the knowledge, beliefs and implementation of EBP of:
    - lecturers who teach on undergraduate, pre-registration nursing and midwifery programmes delivered in HEIs in the Republic of Ireland?
    - students undertaking undergraduate, pre-registration nursing or midwifery programmes delivered in these HEIs?
    - clinically-based nurses and midwives working in teaching hospitals affiliated with these HEIs?
- To what extent is there a relationship between EBP beliefs and implementation within each of these groups?
- To what degree are the HEIs and hospitals ready for and supportive of EBP?
- What is the nature of the relationship between organisational culture around EBP and EBP beliefs and implementation?

Philosophy

Rolfe (2013) cautioned against the increasing propensity to regard research, particularly quantitative research, as merely a rule-governed mechanical process that one can simply be trained to carry out. Rather he emphasised the necessity of the researcher to understand how research works and what informs the procedures and decisions that are taken, a perspective shared by Gray (2018). To this end, it is imperative to consider the philosophical assumptions that underpin research methods to ensure that the most appropriate approach and design is selected to answer the research question, and to serve as a basis for any subsequent decisions that may have to be taken in the course of the study.

All research designs have the potential to contribute to the generation, expansion, and refinement of knowledge. The research design should be selected which answers the research question most appropriately and comprehensively. The purpose of this study was to establish a tangible measure of the beliefs, knowledge and implementation of EBP among nurses, midwives and students in Ireland, along with the organisational culture and readiness for EBP of their places of work and education. This information would provide an accurate baseline of EBP beliefs, knowledge and implementation of nurses, midwives, and students in Ireland. Such context-specific information would indicate the level(s) and nature of education and support that might be needed by nurses, midwives and students in this area, the strengths and challenges that exist, and, if necessary, the way(s) forward for an educational programme tailored to the needs of these groups. To this end a quantitative approach was selected. However, it was also considered desirable to obtain the hospital-based nurses' and midwives' perceptions of EBP, their views on potential facilitators and barriers to EBP, and in-depth insight into their perceived needs (if any) regarding implementing EBP. The best approach to facilitate access to this type of information would entail face-to-face conversations with these participants, drawing on qualitative research approaches. Originally, therefore, it was decided that the design best suited to answering the research questions would be a mixed methods research (MMR) design, utilising both quantitative and qualitative research methods. This is a relatively new research approach, emerging primarily in the last two decades (Teddlie and Tashakkori, 2009). MMR has evolved from the much-cited qualitative-quantitative debate, which highlights the differences between the respective underpinning paradigms, constructivism and positivism. In a nutshell, quantitative research involves the collection and analysis of numbers, whereas qualitative research concentrates on the accumulation and interpretation of narratives (Pierce, 2013). MMR draws on both quantitative and qualitative methods to answer a research question, demonstrating an appreciation for the strengths, value and complementarity of both traditions, drawing on a pluralistic paradigm called pragmatism.

Pragmatism

The philosophical movements that underpinned the more traditional research approaches were post-positivism and constructivism, which espoused disparate beliefs and values (Gray, 2018). Post-positivism values objectivity, theory-testing, numerical representation and analysis of phenomena to determine cause and effect relationships, and the researcher strives to make unbiased, objective observations of the world (Houser, 2015, Creswell, 2009, Teddlie and Tashakkori, 2009). This paradigm informs quantitative research approaches. Constructivism, on the other hand, contends that reality is subjective. Constructivists seek to understand their participants' worlds and experiences from their participants' perspective. Constructivism underpins qualitative research approaches, such as phenomenology and ethnography, in which the researcher is an integral part of the research process and which focuses on theory generation (Creswell, 2009, Teddlie and Tashakkori, 2009). Traditionally, it was believed that these paradigms and their research approaches were incompatible and could not be linked. However, since the 1950s there have been a growing number of researchers who believe that these philosophical positions are complementary (Teddlie and Tashakkori, 2009), when viewed from a different philosophical paradigm, namely pragmatism, which had its origins in the 1800s. Some of its more well-known proponents include William James and John Dewey. Described by Harkiolakis (2017) as, "a compromising position between positivism and constructivism", the fundamental tenet of pragmatism is its focus on the best approach(es) to answer the research question. Creswell and Plano Clark (2011) asserted that combining both qualitative and quantitative research approaches offers the most comprehensive and practically-relevant answer to a research question.

A sequential explanatory mixed methods research design was proposed initially for this study. Using this approach, the quantitative component of the study is the dominant one and the qualitative component is secondary to the quantitative component. The proposed strategies of inquiry for this study were the distribution of a quantitative survey, including an open question, to all three cohorts of participants, followed by qualitative focus group interviews with hospital-based nurses and midwives. However, following completion of the quantitative data collection and analysis, it became apparent that the qualitative phase was going to be much more difficult to organise and execute. Communication with very busy Directors of Nursing and Midwifery was challenging. Multiple email and voicemail messages were not replied to, making it impossible to complete the proposed qualitative phase of the study. From the perspective of pragmatism, the researcher seeks methods that will yield practically relevant answers to the research questions posed. Quantitative questions require quantitative methods and qualitative questions require qualitative methods. In the context of the current study, the quantitative questions regarding nurses' and midwives' EBP beliefs and

implementation, and the organisational culture and readiness for EBP of their workplaces would be answered using quantitative EBP scales. The inability to conduct the previously proposed qualitative phase of the study did not eliminate the possibility of collecting nurses' and midwives' individual perceptions or understanding of EBP. The open question included on the survey would provide some of this insight into participants' knowledge and understanding of EBP. The qualitative data generated by the open question had the potential to offer insight into some of the quantitative findings. Furthermore, it may be instrumental in informing future qualitative research, which will become part of my future research career. The quantitative methodology employed will now be discussed.

Strategies of Inquiry

The purpose of this study was to determine the EBP beliefs, knowledge, and implementation among nurses and midwives in the Republic of Ireland and the culture and preparedness for EBP within the organisations where nurses and midwives work, and explore the relationship between the EBP variables under study. A national cross-sectional survey of three cohorts of nurses and midwives (hospital-based nurses and midwives, nurse and midwifery lecturers, and student nurses and midwives) was undertaken. Although this was predominantly a quantitative study, the inclusion of one open-ended question on the quantitative survey yielded some qualitative data, as previously indicated. This survey will now be discussed in detail.

Quantitative Research

Quantitative research designs tend to be differentiated into two main approaches, experimental and non-experimental (Polit and Beck, 2017). Experimental research comprises three different designs, true experimental, quasi-experimental, and pre-experimental designs. The goal of true experimental research, for example randomised control trials, is to establish 'cause and effect' relationships, measurement, explanation and prediction (Harkiolakis, 2017). Quasi- and pre-experimental research lack some of the control of true experimental research. Nonexperimental quantitative research, as the name suggests, is not experimental in nature. Sometimes referred to as observational studies, nonexperimental research design is employed when manipulation of an independent variable and/or when randomisation of participants to predetermined groups is either inappropriate or impossible for practical or ethical reasons (LoBiondo-Wood and Haber, 2014). Participants are observed in their naturally occurring groups and there is no manipulation of any variable. Nonexperimental research facilitates the observation and description of a phenomenon as it naturally exists or occurs, but it also enables the examination of the relationship between variables, and differences between groups, through the use of correlations and inferential statistics (Polit and Beck, 2017). Nonexperimental research can be cross-sectional, longitudinal, prospective,

retrospective, descriptive, correlational, exploratory, and comparative. Designs include developmental studies that explore a phenomenon at one point in time or over a period of time, and methodological studies, such as those used to develop or evaluate a measurement tool (LoBiondo-Wood and Haber, 2014). Nonexperimental research is the approach that was taken in this study, using a survey design.

Survey Design

A survey typically involves gathering data from an adequate sample of participants from a population of interest, by various means including questionnaires, scales, and interviews, and in a variety of ways such as by telephone, post or the internet (Kelley *et al.*, 2003; McLaren, 2013; Bowling, 2014). Surveys can be cross-sectional or longitudinal and they can be descriptive, exploratory, or comparative in nature (LoBiondo-Wood and Haber, 2014). They have many advantages in their application to research. Surveys can be an economical, expedient means of collecting a vast amount of data from a large group of people, and when administered by means that permit complete anonymity, such as online or self-reporting, they can yield information that is honest and frank (Bowling, 2014, McLaren, 2013, Curtis and Redmond, 2009). They are often used to describe phenomena but they can also facilitate collection of data to explore or test relationships between variables (Gray, 2018, McLaren, 2013, Kelley *et al.*, 2003), both of which will be required in this study. Surveys are one of the most widely used approaches in research, facilitating the measurement of attributes such as beliefs, attitudes and behaviours, and enjoying considerable utility in areas such as business, marketing, politics, psychology, education, and healthcare (Gray, 2018, McLaren, 2013). Kelley *et al.* (2003) emphasised the distinction between research strategy and research methods, contending that the survey approach is a research strategy that has a choice of research methods to draw on, including questionnaires, structured observations, and structured interviews.

There are a number of challenges associated with the survey approach. It can suffer low response rates. There is often an absence of researcher supervision and therefore the researcher is not present to attest to who completes the survey, or to seek further information (Polit and Beck, 2017, McLaren, 2013). Furthermore, it is imperative, when using a survey design, to ensure that the questions asked will produce replies that will help to answer the research question. To this end, it is essential, where possible, to select a tool that is known to be valid and reliable. It is also crucial to test the reliability and validity of the selected tool in each sample that it is administered to in order to ascertain its psychometric performance on each outing. The tools used in the current study have been shown to be reliable and valid. Polit and Beck (2017, p. 743) define response rate as “the rate of participation in a study, calculated by dividing the number of people participating by the number

of people sampled". While there are no hard and fast rules regarding a required minimum response rate, there is a general acceptance that a response rate below 60% is suboptimal, while a response rate of 75% is good (Groves and Couper, 1998). Manfreda *et al.'s* (2008) meta-survey of 45 surveys demonstrated that the typical response rate for electronic surveys ranged from 6-15%, while Walker and Almond (2010) suggested that response rates for postal surveys typically range from 10-15%. Poor response rates can limit the effective sample size and the generalisability of the findings (Bowling, 2014). Therefore, the sampling strategy is crucial to minimise the impact of low response rates (LoBiondo-Wood and Haber, 2014; Polit and Beck, 2017) Randomised sampling ensures an equal chance of participant selection, thereby minimising any selection bias and enhancing generalisability.

The survey method employed in this study entailed the cross-sectional administration of seven quantitative scales measuring aspects of EBP in clinicians, educators and students. The survey was administered electronically via Survey Monkey® to the student and lecturer cohorts, as up-to-date, accurate email lists were available for these cohorts. However, no such email lists were available to access the clinical nurses and midwives, so hard copies of the survey were delivered (and retrieved) by the researcher to each hospital for this cohort. The once-off cross-sectional approach permitted a timely and economical method of collecting the information sought from a vast and geographically-widespread population. The data obtained in this manner facilitated description of the phenomena of interest, exploration of any covariance between the variables, and of differences within the cohorts. This cross-sectional survey was therefore descriptive, correlational, and comparative in nature. An open qualitative question was also included in the survey. McLaren (2013) suggested that the integration of a qualitative component in a quantitative survey can augment the validity of the findings.

Inclusion of an Open Question into a Quantitative Survey

In recent years a growing interest in combining research methods to varying degrees in a variety of contexts has become increasingly evident in the literature (Gilles *et al.*, 2017, Upton *et al.*, 2015, Riiskjaer, Ammentorp and Kofoed, 2012, Vitale, Armenakis and Feild, 2008). Such combining of methods can range from the inclusion of an open question on a quantitative survey, as was the case in this study, to a complete mixed methods study. This approach is gaining momentum. O'Cathain and Thomas (2004) suggested that the inclusion of an open-ended question on a quantitative survey can offer insight into some of the quantitative findings. The use of quantitative and qualitative methods in a single study, where relevant, enables researchers to access a wider array of information. Both approaches answer different kinds of research questions, produce different kinds of knowledge, and each approach can target information that the other cannot. It has also been

suggested that quantitative survey items represent the researcher's agenda, whereas the inclusion of open questions provides an opportunity for participants to raise issues or questions that are of importance to them (Stoneman, Sturgis and Allum, 2013, Vitale, Armenakis and Feild, 2008, O'Cathain and Thomas, 2004). Following their empirical review of mixed methods studies, Greene, Caracelli and Graham (1989) proffered five purposes for undertaking a mixed methods approach. These comprise complementarity, initiation, expansion, triangulation, and development. The purpose of complementarity is to enhance the meaningfulness of the findings by drawing on the strengths of both quantitative and qualitative data, while minimising the effect of their respective limitations or biases. Initiation facilitates a more in-depth interpretation of findings which are analysed from different perspectives. Expansion enhances the richness and context of the findings by using different methods for different enquiry components. Triangulation seeks to enable corroboration of one set of results with the other, and allows for the identification by one method of variables that are unlikely to be identified by the other. Development facilitates the researcher to pinpoint the direction of, and most appropriate methods for future research on the subject matter.

The purpose of the open question on this quantitative survey was to gain insight into participants' knowledge and understanding of EBP. This question invited participants to write down in their own words, what they believe EBP to be. Harland and Holey (2011) suggested that written open questions may reduce bias that can result from face-to-face interviews, as participants are not under the influence of an interviewer, and are not under pressure to respond in a time-sensitive manner, or at all. However, Riiskjaer, Ammentorp and Kofoed (2012) cautioned that due to the absence of that interaction, collecting comments in this way is not a replacement for interviews or focus groups. Researchers who have included open questions on quantitative questionnaires have realised a number of the afore-mentioned benefits identified by Greene, Caracelli and Graham (1989). McKenna, Brooks and Vanderheide (2017), who included two open questions on their survey exploring graduate entry nurses' initial perspectives on nursing, found that these questions yielded very rich data which they used to supplement and explicate their quantitative findings. Upton *et al.* (2015) found that the inclusion of open questions on their survey examining the EBP profiles of academic and clinical staff, produced data that would not have been accessed by their quantitative survey alone. Furthermore, the qualitative data also corroborated some of their quantitative data. Other researchers employing this method in various contexts (healthcare, education, consumer research, organisational management) found that the inclusion of open questions afforded more comprehensive understanding of the subject matter, added substantial value and depth to both the results and conclusions, enhanced interpretation of findings, and generated answers that would not have been obtained by quantitative questions alone (Altintzoglou *et al.*, 2018, Gilles *et al.*, 2017,

Riiskjaer, Ammentorp and Kofoed, 2012). Although this was not a mixed methods study, it is anticipated that the findings yielded from the inclusion of the open question on the survey utilised in this study, will similarly benefit from the additional outcomes of complementarity, initiation, expansion, triangulation, and development and this will be considered in the Chapter 4 (Findings).

When using a qualitative approach to collect data, it is important, in terms of enhancing creditability of the findings, to establish the researcher's own perspective on the subject in question (Creswell, 2009). This requires the researcher to reflect on his/her own background, experiences, beliefs, for example, and to consider how these shape his/her interpretation of the findings.

My Position on EBP

I have been particularly passionate about EBP since 2006 when I undertook an EBP mentorship immersion programme at Arizona State University under the auspices of Dr. Bernadette Melnyk and Dr. Ellen Fineout-Overholt. I subscribe to their definition of EBP, which is the operational definition used in the current study, which emphasises integrating three core components: best available evidence, the clinician's expertise, and the patient's preferences and values. Ideally all three components of EBP should always be included when planning and delivering care. However, there may be some exceptions to this. For example, it might not be possible to ascertain the patient's preferences due to unconsciousness, in which case the clinicians will endeavour to act in the patient's best interest in the absence of expressly knowing his/her preferences or values. I have taught EBP to nurses at both under- and post-graduate levels since 2006, and have more recently become involved with teaching EBP to all healthcare professionals with colleagues from the National Cancer Care Programme and the Department of Health. I believe, both from my own experience as a nurse educator and researcher, and from the professional literature, that many nurses and midwives (in both clinical and education settings) believe that they know what EBP is, and that their practice is evidence-based, but that in many cases they are conflating EBP with research utilisation. I suspect that there is a dearth of knowledge and understanding of what EBP actually is among some nurses and midwives. I think that this is compounded by common usage of the term EBP, which I feel has become a buzzword in healthcare. As such EBP is mentioned a lot, both in conversation and in documentation, leading to the development of much, often false, rhetoric about EBP. I suspect that this has created a situation, in many instances, where nurses and midwives either assume that they know what it is, or perhaps are not sure about what it is but are reluctant to admit this, due to the perception (again often false) that everyone else knows what it is. This study is an attempt to either support or refute my suspicions so that my beliefs and practice are based on evidence.

Validity of the Research

The quality of a quantitative research study, and the confidence in, and usefulness of its findings are dependent on the internal and external validity of its overall design. Consideration of the internal and external validity of a study helps to establish the rigour of the research design and the generalisability of the findings (Roberts and Priest, 2006). Internal validity concerns the degree to which changes in the dependent variable are directly related to changes in the independent variable, while external validity relates to the applicability or generalisability of the findings to other populations (Polit and Beck, 2017, LoBiondo-Wood and Haber, 2014, Parahoo, 2006). In designing a study, the researcher must take care to augment its validity by minimising any threats to the study's internal or external validity, in order to strengthen the confidence and capacity to apply the findings to practice.

Threats to Internal Validity

LoBiondo-Wood and Haber (2014) describe six potential threats to internal validity: selection, history, maturation, mortality/attrition, testing, and instrumentation. Each of these will now be considered in respect of the current study.

Selection

This potential threat considers the bias that can result from pre-existing differences between groups. In experimental research randomised selection of participants and random allocation to the control or experimental group assists in reducing this threat to internal validity. In nonexperimental research there is no control or experimental group, the participants exist within their naturally occurring groups and so cannot be randomly assigned to these groups.

History

This potential threat is realised when events outside of the study occur that could impact the study findings, for example events in the media or in the organisations in which participants work, or diverse levels of exposure to EBP training or education among the participants. Any events relating to EBP that might have arisen during the data collection phase of this study were observed for.

Maturation

This item concerns changes that can occur in participants as a result of the passage of time. As this was a once-off cross-sectional study, maturation presented no threat to the internal validity of this study.

Mortality/Attrition

Mortality refers to the loss of participants from one data collection point to another in a longitudinal study. This was not relevant to this study as there was only one data collection point. However, attrition in the context of a survey can refer to the loss of data collection sites and to the response rate of the participating groups. These phenomena and their potential impact were given due consideration, where they occurred.

Testing

Testing, which concerns the effect of repeated testing on participants' responses, was not an issue in this study due to the one-off data collection.

Instrumentation

Instrumentation refers to any changes in how the instrument of choice might measure the construct of interest from one data collection point to another. Again, due to the single data collection point in this study, instrumentation was not a threat. However, the reliability of the instruments used was assessed.

Threats to External Validity

Key external threats to validity have been described by LoBiondo-Wood and Haber (2014) as selection effects, measurement effects and reactive effects. These will now be considered.

Selection Effects

Selection effects concern the sampling strategy and its impact on the generalisability of the findings. This is of particular concern if an optimal sample cannot be obtained, as in the case of a non-probability sample, or a very small sample (LoBiondo-Wood and Haber, 2014). Sampling strategies were considered carefully.

Measurement Effects

This threat refers to the effect of distributing a pre-test on the responses obtained in a post-test, and ultimately on the generalisability of the findings. This was not a threat to the external validity of this study as the survey was administered once only.

Reactive Effects

Participants in a study can behave or respond in a particular way by virtue of knowing that they are being studied or observed. This is often referred to as the Hawthorne effect (Polit and Beck, 2017, LoBiondo-Wood and Haber, 2014). In experimental research, blinding can be implemented to reduce the impact of reactive effects. However, in a nonexperimental study where there is no manipulation

of the variables or environment, measures, such as blinding, are not available to the researcher. Participants in this study could have been influenced by reactive effects as they may have felt, in their respective roles, that they 'should be', or at least should be seen to be knowledgeable about EBP. This should be borne in mind when considering the application or generalisability of the findings. The open question included on the survey, which invited participants to explain, in their own words, their understanding of EBP, should assist in discerning whether this threat impacted on the quantitative findings.

Research Methods

Sample

Eighteen sites were selected for participation in this study, nine schools of nursing/midwifery based at Higher Education Institutions (HEI) and nine affiliated teaching hospitals within the Republic of Ireland. Following approval of the study by the Research Ethics Committees of each of the selected sites, opportunities to meet with the relevant Department Heads in these sites were sought in order to introduce and explain the study. Information about the study was provided both electronically (via email and a podcast) and in the form of leaflets to potential participants to describe the study and provide contact details for the researcher and the DCU Research Ethics Committee.

Sample Selection

The process of sampling in quantitative research involves the selection of cases (the sample) to represent a complete population so that conclusions or predictions drawn from the sample can be inferred to the complete population (Polit and Beck, 2017). This is achieved to varying degrees depending on the type of sampling strategy employed, which can determine how closely the sample might resemble the population, or in other words how representative it is. The size and nature of the sample are key considerations in quantitative research to ensure heterogeneity, maximum variation, and randomness, which in turn enhances the representativeness of the population under scrutiny, thereby increasing the generalisability of the findings (Harkiolakis, 2017). There are two over-arching forms of sampling in quantitative research, probability and non-probability sampling (Polit and Beck, 2017). Probability sampling is considered preferable. It involves random selection of the sample, which ensures an equal chance for elements or cases to be involved, and so reduces selection bias. This improves the representativeness of the sample. Non-probability sampling is non-random in nature so it is not possible to know or estimate the probability of a case being selected, and so every case does not necessarily have an equal chance of being included (LoBiondo-Wood and Haber, 2014). This increases the risk of selection bias, and diminishes the representativeness of the sample and the generalisability of the findings. Probability sampling was employed in this study as it is a

national study, and enhancing sample representativeness and generalisability of findings was an important goal.

Stratified random sampling (Figure 4) was utilised to select nine of the thirteen Higher Education Institutions (HEIs), in the Republic of Ireland that offer pre-registration nursing programmes. The sample was stratified in terms of the type of HEI (university or institute of technology), and the five divisions of the NMBI Register (general nursing, psychiatric nursing, intellectual disability nursing, midwifery, and children's and general nursing) for which students undertake pre-registration programmes of study (Figure 5). Stratified random sampling ensures that homogenous sub-groups within a population are proportionally represented in the sample (LoBiondo-Wood and Haber, 2006), endeavouring to avoid over- or under-representation of individual groups (Bowling, 2014). Sub-groups of a population should be represented accurately in the sample to reduce the risk of sampling error (Gray, 2018, McLaren, 2013). In this study, stratified random sampling was used to ensure representation of a good geographical spread across the Republic of Ireland, a representative mix of University-based and Institute of Technology-based schools of nursing and midwifery, and representation of the five divisions of the NMBI Register that students study for at pre-registration/undergraduate level (general, midwifery, children's and general, intellectual disability, and mental health nursing).

Simple random sampling was then used to select one general teaching hospital affiliated with each HEI, affording each general teaching hospital an equal chance of being included. This was done by placing the names of all general teaching hospitals affiliated with each of the selected HEIs into a hat. The first hospital that was drawn from the selection of hospitals affiliated with each HEI was the hospital that was included in the study. Thereafter, the survey was made available to all eligible participants at each randomly selected site, thus mirroring a population or census study. This is a straight-forward approach that offers all eligible participants an equal chance of participating. it can limit representativeness of the findings when participation (response rates) are low.

Figure 4: **Stratified Random Sampling for Representation of HEI**

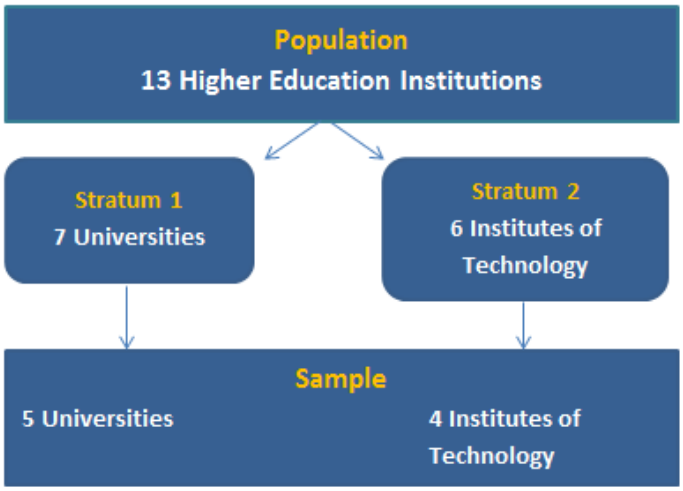
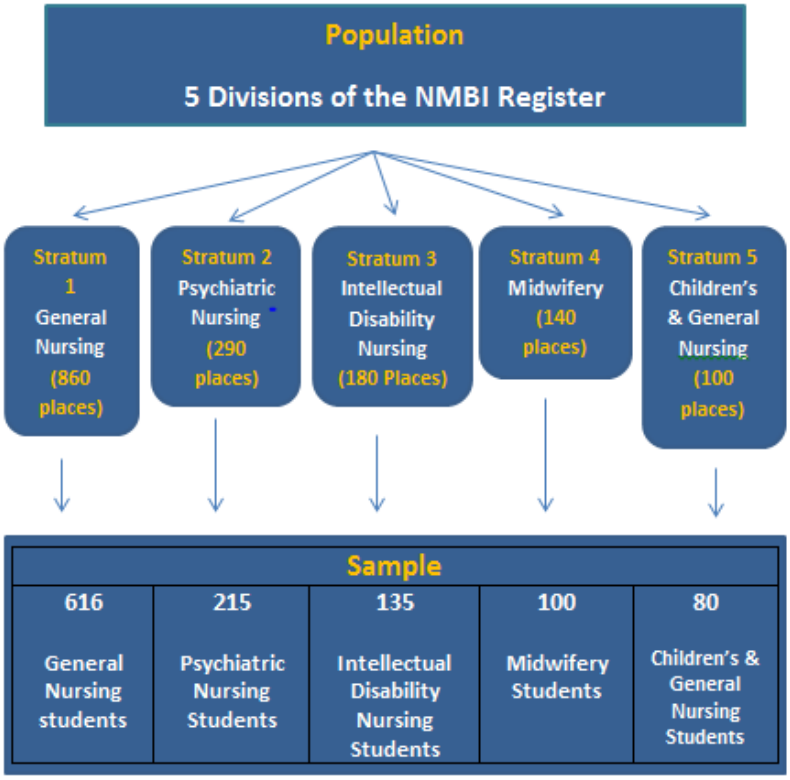


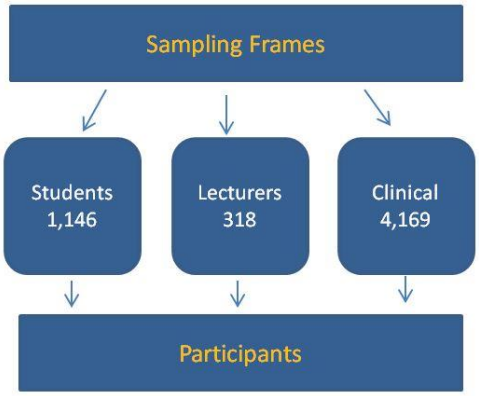
Figure 5: **Stratified Random Sampling Process for Representation of NMBI Register Divisions within HEIs**



Participants

Figure 6 presents the sampling frames for the three cohorts involved in the study, which were 1,146 students (Nursing and Midwifery Board of Ireland, 2014), 318 lecturers (verified by respective Heads of Schools), and 4,169 clinical nurses and midwives (Health Service Executive, 2013).. As previously illustrated, a randomised sampling strategy was used in this study, to enhance the generalisability of the findings. Actual participant numbers in each cohort will be provided in Chapter 4 (Findings).

Figure 6: Participant Sampling Frames



Data Collection

Data collection was achieved using a survey that comprised three EBP scales for each cohort (Appendices 2, 5 and 8), some demographic questions (Appendix 1), and one open question. Scales are designed to quantify a construct that is understood to exist but which is difficult or impossible to measure directly (Gray, 2018). Scales require participants to respond to a pre-determined number and order of questions, all of which relate to the construct being measured. However, in order to make statistical inferences and generalise findings from the sample to the population, the scale must be valid and reliable (LoBiondo-Wood and Haber, 2014). While researchers can develop their own scales, and many do, it is a very complex and time-consuming process. A considerable advantage of using previously designed scales is that their validity and reliability will have been measured and documented (Gray, 2018).

Validity

The validity of a measurement instrument is the extent to which it measures the construct that it claims to measure (Gray, 2018, Polit and Beck, 2017, LoBiondo-Wood and Haber, 2014). Gray (2018) contended that in order to realise validity, the subject area of the measurement instrument and the operational definition should correspond directly, as they do in this study. Three principal methods exist for assessing the validity of an instrument: content, criterion-related, and construct validity (LoBiondo-Wood and Haber, 2014). Content validity considers whether the scale and its individual items reflect the construct of interest. Criterion-related validity concerns the relationship between the participants' responses on the scale and their actual behaviour. Construct validity concerns the extent to which the scale measures the construct that it was designed to measure. Demonstrating this is complicated and is established over time through repeated use of the scale. A number of techniques are used in its demonstration, such as factor analysis and contrasted-groups approaches. The established validity of the scales used will be discussed presently.

Reliability

The reliability of a measurement instrument is its capacity to measure the construct of interest consistently on repeated measures (Gray, 2018, Polit and Beck, 2017, LoBiondo-Wood and Haber, 2014). LoBiondo-Wood and Haber (2014) proposed that the three main characteristics of reliability are stability, homogeneity, and equivalence. Stability focuses on the consistency of the instrument, or its ability to produce the same results on recurrent administrations. Homogeneity concerns the individual scale items and whether they all measure the same construct or characteristic. Equivalence of an instrument exists when it yields the same results when other equivalent instruments are used. The established reliability of the scales used will be discussed presently.

Measurement

Seven scales were used in this study measuring different aspects of EBP. The scales are based on the definition of EBP proffered by Melnyk and Fineout-Overholt (2019, p. 8) and selected as the operational definition for this study. The developers gave permission to use the scales. Their definition of EBP is:

> "a lifelong problem-solving approach to clinical practice that integrates the following:
>
> - A systematic search for and **critical appraisal** of the most relevant and best research (i.e., **external evidence**) to answer a burning clinical question;
> - One's own clinical expertise, including use of **internal evidence** generated from **outcomes management** or **evidence-based quality improvement projects**, a thorough patient assessment, and evaluation and use of available resources necessary to achieve desired patient outcomes;
> - Patient/family preferences and values." (Melnyk and Fineout-Overholt, 2019, p. 8, emphasis in original)

The seven scales used are as follows:

- The Evidence-based Practice Beliefs Scale© (EBPB) (Melnyk and Fineout-Overholt, 2003a);
- The Evidence-based Practice Beliefs Scale for Educators© (EBPB-E) (Fineout-Overholt and Melnyk, 2010);
- The Evidence-based Practice Implementation Scale© (EBPI) (Melnyk and Fineout-Overholt, 2003b);
- The Evidence-based Practice Implementation Scale for Educators© (EBPI-E) (Fineout-Overholt and Melnyk, 2010b);
- The Organisational Culture & Readiness for System-wide Integration of EBP Survey© (OCRSIEP) (Fineout-Overholt and Melnyk, 2006);
- Organisational Culture & Readiness for School-wide Integration of EBP Survey for Educators© (OCRSIEP-E) (Fineout-Overholt and Melnyk, 2010);

- Organisational Culture & Readiness for School-wide Integration of EBP Survey for Students© (OCRSIEP-ES) (Fineout-Overholt and Melnyk, 2011).

As these scales have previously been used without any problems in the Irish context, it was deemed unnecessary to undertake a pilot study (Leufer and Cleary-Holdforth, 2007; Leufer, 2015).

Evidence-Based Practice Belief Scale©

The EBPB Scale© (Appendix 2) was developed by Melnyk and Fineout-Overholt (2003a), evolving from a previous belief scale that emerged from work undertaken by Melnyk (1994), Melnyk (1995) and Melnyk and Fineout-Overholt (2002). It is a 16-item scale that measures participants' beliefs about the value of EBP and their ability to implement EBP. Beliefs in EBP are defined as, "endorsement of the premise that EBP improves clinical outcomes and confidence in one's EBP knowledge/skills" (Melnyk, Fineout-Overholt and Mays, 2008, p. 210). Some examples of the items on the scale include, "I am sure that I can implement EBP", "I am sure that implementing EBP will improve the care that I deliver to my patients", and "I am sure that I can access the best resources in order to implement EBP". It uses a 5-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree. This scale contains two negatively worded items which must be reverse-scored before the scores are summed to attain the overall group score. Possible total scores range from 16 to 80 with higher scores indicating greater belief in and confidence about implementing EBP. Scores less than 48 suggest that there is no commitment to EBP. Scores less than 64 indicate less than agreement with participants' knowledge of, confidence and belief in their ability to implement EBP. Scores greater than 48 but less than 64 (neither agree nor disagree) indicate that there is not full commitment to full EBP at this stage but there is potential for it. Scores ≥64 indicate firm belief in and confidence about implementing EBP (Fineout-Overholt, 2017). The EBPB Scale© has established face, construct, and content validity. Results of exploratory factor analysis and known groups comparisons have demonstrated that the EBPB scale measures a distinct, unidimensional construct (Melnyk, Fineout-Overholt and Mays, 2008). Reported Cronbach alpha coefficients in excess of 0.9, and internal consistency reliabilities in excess of 0.85 in numerous studies demonstrate reliability and validity respectively (Singleton, 2017, Warren *et al.*, 2016, Wallen *et al.*, 2010, Melnyk, Fineout-Overholt and Mays, 2008).

Evidence-Based Practice Belief in Education Scale©

The EBPB-E Scale© (Fineout-Overholt and Melnyk, 2010) (Appendix 2) was developed to evaluate educators' beliefs about and confidence in their ability to teach and implement EBP. This scale comprises 22 items that reflect the target participants' role as educators in nursing and midwifery,

and include, “I am sure that I can teach how to search for the best evidence”, “I am sure that I can teach how to develop a PICOT question” and “I am sure that integrating EBP into the curriculum will improve the care that students deliver to their patients”. There are two negatively worded items on this scale which must be reverse-scored before the scores are summed to attain the overall group score. Possible total scores for the EBPB-E Scale© range from 22 to 110. There are several corresponding interpretation markers for this scale. For example 66 and 88 are markers of commitment: <66 – no commitment; 66-88 – not full commitment but could be; ≥88 – full commitment and confidence (Fineout-Overholt, 2018). The EBPB-E Scale© has established face, construct, and content validity, and has performed well (internal consistency reliabilities in excess of 0.85) across multiple samples (Fineout-Overholt, 2018; Milner, Bradley and Lampley, 2018; Cardoso *et al.*, 2020).

Evidence-Based Practice Implementation Scale©

The EBPI Scale© (Melnyk and Fineout-Overholt, 2003b) (Appendix 4) is underpinned by the understanding that implementation of EBP is “engaging in relevant behaviours” such as searching for and appraising evidence, sharing evidence with colleagues or patients, evaluating outcomes, and using evidence to change practice (Melnyk, Fineout-Overholt and Mays, 2008, p. 210). It is an 18-item questionnaire that uses a 5-point Likert scale to measure participants’ actual implementation of EBP in the previous 8 weeks (0 = zero times to 4 = >8 times). The scale requires participants to consider how often in the previous 8 weeks they have undertaken specific EBP-related tasks such as, “generated a PICO question about my clinical practice”, “shared an EBP guideline with a colleague”, and “used an EBP guideline or systematic review to change clinical practice where I work”. Possible total scores range from 0 to 72 with higher scores reflecting more frequent implementation of EBP by participants. A score of 0-17 indicates that in the past 8 weeks, the participant has implemented EBP less than once. Implementation of EBP between 1-3 times but less than 4 in 8 weeks is denoted by a score of 18-35. A score of 36-53 suggests implementation of EBP between 4-5 times but less than 6. Participants who score 54-71 have implemented EBP 6-7 times but less than 8. A score of 72 indicates implementation of EBP 8 times or more in the previous 8 weeks (Fineout-Overholt, 2017). The EBPI Scale© has established face, construct, and content validity. Results of exploratory factor analysis and known groups comparisons have demonstrated that the EBPI scale measures a distinct, unidimensional construct (Melnyk, Fineout-Overholt and Mays, 2008). Reported Cronbach alpha coefficients in excess of 0.9, and internal consistency reliabilities in excess of 0.85 in numerous studies demonstrate reliability and validity respectively (Singleton, 2017, Warren *et al.*, 2016, Wallen *et al.*, 2010, Melnyk, Fineout-Overholt and Mays, 2008).

Evidence-Based Practice Implementation Scale for Educators©

The EBPI-E Scale© (Fineout-Overholt and Melnyk, 2010b) reflects the context and role of teaching and implementing EBP (Appendix 4). Items include, "used evidence to change my teaching", "evaluated an educational initiative by collecting outcomes", and "changed curricular policies/materials based on outcome data". Interpretation of scores is the same as the EBPI Scale©. The EBPI-E Scale© has established face, construct, and content validity, with reported internal consistency reliabilities in excess of 0.85 in numerous studies (Fineout-Overholt, 2018; Milner, Bradley and Lampley, 2018; Cardoso *et al.*, 2020).

The Organizational Culture and Readiness for System-Wide Integration of EBP Scale©

The OCRSIEP Survey© (Fineout-Overholt and Melnyk, 2005) measures cultural factors that influence the implementation of EBP and participants' perceptions of the state of preparedness of their organisation for EBP, and how it compares to six months prior as an indicator of readiness for advancing culture toward EBP (Appendix 6). The OCRSIEP Survey© contains 25 items and uses a 5-point Likert scale that determines the support in the organisation's culture for EBP, which helps to pinpoint the potential facilitators and opportunities for system-wide EBP integration. Items on this scale include, "In your organization, to what extent is there a critical mass of faculty who have strong EBP knowledge and skills?", "To what extent are there Advanced Nurse Practitioners who are EBP mentors for staff nurses as well as other ANPs?", and "To what extent do you believe that EBP is practiced in your organisation?" Possible total scores range from 1 to 125 with higher scores reflecting greater organisational readiness for EBP. Scores less than 75 indicate opportunity for growth toward a culture of EBP. Scores greater than 75 represent moderate movement toward a culture of EBP but not yet sustainable. Scores of 100 or above demonstrate essential movement toward a sustainable culture of system- or school-wide EBP (Fineout-Overholt, 2018). The OCRSIEP Survey© has performed consistently with internal consistency reliabilities in excess of 0.85 (Melnyk and Fineout-Overholt, 2015, Melnyk *et al.*, 2010, Wallen *et al.*, 2010).

The Organizational Culture and Readiness for School-Wide Integration of EBP Survey for Educators©

The OCRSIEP-E Survey© (Fineout-Overholt and Melnyk, 2011) has 25-items and uses a 5-point Likert scale that determines the support in the organisation's culture for EBP within the educational setting from the educators' perspective (Appendix 6). This helps to identify potential facilitators and opportunities for school-wide EBP integration. The OCRSIEP-E Survey© also measures educators' perceptions of their organisation for EBP, and how it compares to six months prior as an indicator of

readiness for advancing culture toward EBP. Items on this scale include, “In your organization, to what extent is there a critical mass of faculty who have strong EBP knowledge and skills?”, “To what extent are fiscal resources used to support EBP?”, and “To what extent do you believe that evidence-based education is practiced in your organisation?” Possible total scores range from 1 to 125 with higher scores reflecting greater organisational readiness for EBP. The scoring system is the same as that described for the OCRSIEP Survey© The OCRSIEP-E Survey© has performed reliably, with internal consistently reliabilities in excess of 0.85 (Fineout-Overholt, 2018; Cardoso *et al.*, 2020).

The Organizational Culture and Readiness for School-Wide Integration of EBP Survey for Students©

The OCRSIEP-ES Survey© (Fineout-Overholt and Melnyk, 2011) is also a 25-item scale that uses a 5-point Likert scale (Appendix 6). It determines the support in the organisation’s culture for EBP within the educational setting from the students’ perspective. This aids the identification of potential facilitators and opportunities for school-wide EBP integration. The OCRSIEP-ES Survey© measures students’ perceptions about EBP within their educational organisation, and how it compares to six months prior as an indicator of readiness for advancing culture toward EBP. Items on this scale include, “To what extent are the faculty who teach you committed to EBP?”, “To what extent are decisions generated from students?”, and “To what extent do students have proficient computer skills?” Possible total scores range from 1 to 125 with higher scores reflecting greater organisational readiness for EBP. The higher the score, the more forward movement with integrating EBP into the educational setting. Specifically, scores greater than 75 demonstrate moderate movement toward an educational culture of EBP. Scores 100< indicate essential movement toward a sustainable culture of school-wide EBP. The OCRSIEP-ES Survey© has performed consistently with internal consistency reliabilities in excess of 0.85 (Fineout-Overholt, 2018).

Demographic Questions and Open-ended Question

In addition to the EBP scales, the complete survey included some demographic questions regarding area of practice, level of professional qualifications, age bracket, years in the current organisation, and role currently occupied. Following these demographic questions, an open-ended question was also added. Participants were invited to explain in their own words what they believe EBP to be. This question was included on the survey in an attempt to explore participants’ knowledge and understanding of EBP, as well as to reveal any misunderstandings that may exist among participants in relation to EBP. Such data may contribute to a greater understanding of the quantitative findings yielded by the survey, potentially enhancing their interpretation (Harland and Holey, 2011).

Data Management and Analysis

Quantitative data were managed and analysed using the computer software programme, IBM® Statistical Package for the Social Sciences® version 23. The level of significance was set at 0.05 (α = 0.05). Data were entered and checked for missing values, outliers and errors. The frequency of all variables was inspected. In each case, all cases were accounted for and minimum and maximum values were correct. Missing values were addressed by excluding cases pairwise, which results in the exclusion of a case only if it is missing data required for specific analysis (Pallant, 2016). Two other options for dealing with missing values involve replacing them with the mean value, or excluding cases listwise, in which instance those cases with missing values would be excluded entirely from any analysis (Polit and Beck, 2017). However, Pallant (2016) cautioned against using either of these options as the former can critically distort the results, and the latter can substantially reduce the sample size. The normality of all continuous variables was assessed by obtaining skewness and kurtosis values, the Kolmogorov-Smirnov statistic, and by examining the histograms, box-plots and Q-Q plots for each continuous variable. This was undertaken to check for statistical assumptions before deciding on the most appropriate type of statistical analysis to be performed. Implications of the nature of data on the choice of statistical analysis will be discussed presently.

Analysis of the data was exploratory in nature, and driven by the research questions. Null hypotheses were not tested. Total scores were generated for the EBPB, EBPB-E, EBPI, EBPI-E, OCRSIEP, OCRSIEP-E and OCRSIEP-Scales© in their respective cohorts. Descriptive, correlational and inferential statistics were used to analyse the relationships among EBP attitudes and beliefs, knowledge and implementation. Descriptive statistics revealed the demographic characteristics of the sample. Measures of central tendency and dispersion demonstrated group mean scores and established the distribution of each cohort on the respective scales. Inferential statistics were used to identify any differences between the scores within each cohort based on factors such as age and academic qualification, for example. Parametric tests, such as t-tests, one-way between groups ANOVA and post hoc tests, facilitated such within- and between-group exploration. Correlational analysis was performed using Pearson product-moment correlation coefficient to establish the direction (positive or negative) and strength of the relationship between the EBP beliefs, EBP implementation and organisational culture and readiness for EBP within each of the cohorts.

Implications of the Nature of the Continuous Data for Statistical Analysis

Parametric statistics, such as t-tests, Pearson correlations, and analysis of variance (ANOVA) are the optimal choice to explore relationships between EBP beliefs, implementation, and organisational culture and readiness for EBP, as well as any differences within the groups. As mentioned previously,

it is generally accepted that in order to use these tests, the data should meet the respective assumptions. These assumptions include, scale level of data, probability sampling, normal distribution, independence of observations, related pairs, and homogeneity of variance (Kellar and Kelvin, 2013; Heavey, 2015; Pallant, 2016; Field, 2017). Each of these will now be considered:

- **Scale level of data** – the level of data for most parametric tests must be scale (interval or ratio). There is much debate on the use of parametric analysis in relation to Likert scales (Grace-Martin, 2008; Grech and Calleja, 2018). While one school of thought advocates the strict use of non-parametric analysis with Likert scales as their data is considered to be ordinal, (Kuzon, Urbanchek and McCabe, 1996), another maintains that parametric tests are sufficiently robust to withstand this violation (Norman, 2010). In this study, data were collected using Likert scales that were 5-point in design, and measured a single continuous construct, both important criteria for the use of parametric analysis of likert-generated data (Allen and Seamen, 2007; Grace-Martin, 2008). Norman (2010), a highly regarded leader in medical education research, using multiple real and simulated datasets, demonstrated comprehensively that parametric tests can be employed with ordinal data. Therefore data yielded by the Likert scales in this study were treated as scale data for the purpose of analysis.
- **Probability sampling** – many parametric tests assume that the data have been collected from a random sample of the population. This is not always feasible. In the current study, stratified random sampling was used to select the Higher Education Institutions to be included, and simple random sampling was used to select the hospital sites.
- **Normal distribution** – this refers to the shape of the data when plotted on a histogram. Data that are normally distributed resemble the Gaussian or bell curve. The benefit of normally distributed data is that inferences can be extrapolated about data values that lie anywhere in the curve (Grech and Calleja, 2018). However, in larger samples violation of this assumption is not unusual (Pallant, 2016). Traditionally it has been suggested that should data assume a non-normal distribution, then either non-parametric analysis should be performed, or data should be transformed until a distribution that is closer to the normal bell curve is produced (Pallant, 2016). The nature of the scales' distributions and their impact on the type of analysis employed will be considered in the findings chapter.
- **Independence of observations** - observations that make up the data must be independent of each other to avoid the situation where one observation can influence another. In the current study, data were collected from individual participants across 16 different sites by means of survey completion. No group data collection activities were used. It is therefore

highly unlikely that participants were influenced by other participants. However, it cannot be entirely guaranteed that participants working or studying in the same data collection site might not have completed the survey simultaneously or together.

- **Related pairs** - each participant must have responded on the variables in question. Missing values were treated by excluding cases pairwise. In this instance, if a case/person is missing a value on one of the variables in question, they will be excluded from that specific analysis. Missing values were also analysed using Little's MCAR test to establish whether they were missing at random or if there was a non-random pattern. A non-random pattern to missing values is demonstrated when the significance level (Sig.) is less than 0.05.
- **Homogeneity of variance** – this concerns the level of variance between the variables where the variability in x is similar to the variability in y. This was checked while conducting the ANOVA using Levene's test for equality of variance within each cohort where relevant. Homogeneity is demonstrated when the significance level (Sig.) is greater than 0.05.
- **Linearity** – this concerns the relationship between the variables and can be checked by generation and observation of the scatterplots - straight line on a scatterplot. The data should adopt a cigar-shape on the scatterplot rather than a cone-shape.

When data do not meet the assumptions for a parametric test, there are three options to be contemplated. The first is to simply analyse the data using the non-parametric statistical equivalent, for example Spearman's rank order correlation rather than the Pearson product correlation coefficient, or the Kruskal-Wallis test instead of one-way analysis of variance (ANOVA). The parametric tests consider the relationship between two continuous variables using raw data, whereas the non-parametric tests consider the ranked values for categorical variables rather than the raw data, making for weaker analysis that is less likely to detect a difference between variables or groups, and therefore less persuasive interpretation of findings (Pallant, 2016; Field, 2017). Parametric analyses are generally more powerful than their non-parametric equivalents, and are therefore preferable to use, when possible (Pallant, 2016; Grech and Calleja, 2018).

The second option is to consider transforming the non-normally distributed data using one of a number of mathematical logarithms, until it more closely resembles a normal distribution (Field, 2017, Pallant, 2016, Tabachnick and Fidell, 2013). In so doing, the use of parametric tests is facilitated. Transforming skewed data has disadvantages, such as potentially altering the hypothesis and the construct being measured, which can have implications for interpretation of data, particularly if data comparisons were important (Tabachnick and Fidell, 2013). It has also been posited that transformation done incorrectly could be worse than undertaking parametric analysis

on skewed data (Field, 2017), and therefore requires caution.

The third option is to use parametric tests on the skewed data. In the current study, analysis of interest involved looking for differences in variables across each cohort based on factors such as age and academic qualification, for example. Parametric tests, such as t-tests, one-way between groups ANOVA and post hoc tests, facilitate such within-group exploration, and are the tests of choice. These tests have been shown to be sufficiently robust even with very skewed, non-normally distributed data, and with various sample sizes (Norman, 2010; Blanca *et al.*, 2017; Grech and Calleja, 2018).

Management and Analysis of Open Question

Content analysis was used to analyse the participants' responses (narrative data) to the open question on the survey. Content analysis evolved from journalistic beginnings in the late 19th to early 20th centuries when its application changed from examining the extent of coverage of various matters in the newsprint of the day, to the representation of different ethnic backgrounds, to changes that a story undergoes between the points of origin and publication, and later, to the influence of media publications on public attitude, behaviour and beliefs (Krippendorff, 2013). Following the Second World War, its application became more widespread, finding popularity in fields such as psychology, anthropology, literature, political science, and history. Content analysis is a means of systematically analysing narrative data, either by counting comparable responses or by coding them and sorting them into categories to facilitate the identification of prevalent themes or patterns, and the extraction of replicable, valid conclusions (Polit and Beck, 2017, LoBiondo-Wood and Haber, 2014, Krippendorff, 2013, Schreier, 2012). It can be used with either quantitative or qualitative data to test or develop theories, although Krippendorff (2013) questions the utility of drawing a distinction between qualitative and quantitative content analysis, arguing that all text is qualitative, even if some of its features are assigned numerical values for the purpose of analysis. In this study, content analysis of the qualitative data will be used to describe and interpret the narrative content yielded by the open question. Krippendorff (2013, p. 24) propounds that content analysis "provides new insights, increases a researcher's understanding of particular phenomena, or informs practical actions". Content analysis of the open question on the survey should be particularly relevant and helpful in developing an understanding of the participants' perceptions of EBP prior to completing the survey, and contributing to an explanation of the quantitative findings. This knowledge will potentially inform the development of an implementation strategy at individual, organisational and national levels to ensure a culture of EBP use among nurses and midwives within the Irish healthcare system.

The Process of Content Analysis

Qualitative content analysis comprises three main stages, namely, "preparation, organising and reporting" (Elo and Kyngäs, 2008, p. 109). Preparation entails planning the details of data analysis and making decisions regarding what constitutes a unit of analysis, and whether manifest and/or latent content will be analysed. A unit of analysis can consist of words, phrases, paragraphs or whole interviews (Graneheim and Lundman, 2004). In the current study, the unit of analysis is the written response of each participant to the open question on the survey. Manifest content is described as the visible content, the actual words, and latent content as what the content implies or its underlying meaning (Polit and Beck, 2017, Berg, 2004). Manifest content can be summarised and described, whereas latent content requires more in-depth interpretation. The qualitative data in this study comprise, for the most part, relatively short responses, and isn't particularly in-depth. However, the latent content will be analysed in an attempt to understand what the participants' responses might be indicating. In order to engage in meaningful analysis of any qualitative data, the researcher must become wholly immersed in the data and entirely familiar with it. This is achieved by reading through each transcript several times. The researcher then decides on the use of inductive or deductive coding and thereafter moves through the steps involved in organising the data and reporting the findings. Inductive analysis of the open responses was employed in this study. The goal of content analysis is to present the crucial components of participants' descriptions, which comprises the following steps (Creswell, 2009):

1. Organise and prepare the data for analysis
2. Read through all data
3. Code the data
4. Generate a description of the setting, people, categories and themes for analysis
5. Decide on how the themes will be represented
6. Make an interpretation of the data.

The qualitative data analysis computer software package, NVivo (version 11) was used to aid management and analysis of the qualitative data, and navigation through the above six steps. Increasingly since the 1980s, qualitative researchers rely on computer software packages to facilitate management of substantial amounts of data (Holloway and Wheeler, 2009). NVivo is one such package. NVivo facilitates the storage, organisation, categorisation, analysis, and visualisation of qualitative data (QSR International, 2018). Some of the advantages of using such a software package include enhanced organisation, and easier, quicker accessibility of data, being more time-effective for sorting and coding, allowing more systematic synthesis of findings, and the maintenance of a codebook and an accurate decision trail (Houghton *et al.*, 2017, Wiltshier, 2011, Holloway and

Wheeler, 2009). On the other hand, Holloway and Wheeler (2009) caution that computer software packages may leave researchers less familiar with the data. However, the researcher must still study the data in order to code and categorise it, so this is probably not too great a risk in real terms. Leech and Onwuegbuzie (2007) advise that despite the convenience of computer assisted data management, it is still the researcher who makes decisions regarding data analysis, coding, categorising and interpretation. As with any computer software package, it is only as effective as its user's knowledge and skill permits. It is imperative to obtain professional training in the use of such programmes in order to maximise the benefits they afford, and minimise the risk of error. The six-step process of content analysis proposed by Creswell (2009) and employed in this study will now be outlined.

Step 1 - Organise and prepare the data for analysis

Data were collected electronically from the student and lecturer cohorts via SurveyMonkey®. This data were imported into Microsoft® Word to facilitate reading, and were then imported into NVivo. Data were collected from the clinical cohort using hard copies of the questionnaire. The textual responses to the open question on the survey were transcribed into Microsoft® Word to facilitate reading, and this was then imported into NVivo. Once in NVivo, the qualitative responses were formatted so that analysis by classification (cohort) could be undertaken.

Step 2 - Read through all data

The participants' responses to the open question on the survey were read through several times, in order to get a sense of this data within each cohort. Reading the responses in this way began to provide a good impression of the nature of participants' understanding of EBP. Thoughts or questions that came to mind about the data were recorded for later consideration.

Step 3 - Code the data

Following thorough reading of the data, the responses were examined individually and the process of open-coding commenced. This entailed breaking the data down phrase-by-phrase, and applying labels or headings that described the content of these phrases. These labels were in fact the codes, which were reviewed again later for fit, when they were grouped into categories. Cohen, Manion and Morrison (2011) describe codes as a label that the researcher assigns to a portion of text that contains an idea or concept, and affirm that the same portion of text may have a number of codes assigned to it, depending on its breadth and depth. As the researcher encounters the same or a similar idea or concept in other pieces of text from other participants, these are assigned the same code, thereby facilitating the detection of similar information across cases. This process is inductive and data-driven in that the codes assigned are identified from the data itself and are not

predetermined. NVivo facilitates the storage of these codes in the form of nodes, and chronicles every piece of information that contributes to a node in the form of a qualitative codebook. Following completion of coding, similar codes or those containing similar ideas are grouped into categories, which are named by the researcher.

Step 4 - Generate a description of the setting, people, categories and themes for analysis

The settings for this study, coupled with a description of its participants will be presented in the findings chapter. Details of the codes and categories identified from the data in each cohort will also be provided.

Step 5 - Decide on how the themes will be represented

The codes and categories established through the process of content analysis will be presented in the findings chapter. Verbatim quotes will be used to explicate these codes and categories and expose the process by which they were arrived at. Figures and tables will be presented to illustrate some of the qualitative findings visually.

Step 6 - Make an interpretation of the data.

This step involves ascertaining the meaning of the data. The findings of the participants' responses to the open question will be discussed in their own right initially but they will also be discussed in the context of the quantitative findings, where it is anticipated that they may offer insight into some of these findings. Interpretation of the findings by the researcher can be influenced by a number of factors which could jeopardise their trustworthiness. It is important that such influences are acknowledged and given due consideration.

Trustworthiness of Qualitative Data

Holloway and Wheeler (2009, p. 302) describe trustworthiness in qualitative research as the "soundness and adequacy" of the methodology. It is the qualitative equivalent of the concepts of validity and reliability in quantitative research. Silverman (2017) argues that qualitative research demands complex theoretical underpinnings, and robust methodology, no different than quantitative research. In fact he contends that "just because we do not use complicated statistical tests or do much counting, this does not mean that we can wallow in comforting hot baths of 'empathic' or 'authentic' discussions with respondents" (Silverman, 2017, p. 377), likening this to nothing more than being a talk show host. It is imperative, therefore, to scrutinise qualitative research findings before they can be considered relevant or appropriate for application in practice. Although the qualitative component of this study comprised only one open question, it is prudent to consider the trustworthiness of the findings produced, along with any factors that could potentially

impact them. Holloway and Wheeler (2009) draw on the criteria developed by Guba and Lincoln (1989) to illustrate the trustworthiness of qualitative research. These criteria are dependability, creditability, transferability, and confirmability.

Dependability

This criterion refers to the consistency and accuracy of the findings and is dependent on the degree of detail offered by the researcher in terms of decisions made in the course of data collection and analysis (Holloway and Wheeler, 2009). An audit trail is usually integral to this criterion. In this study, all the qualitative data from the surveys were entered into NVivo, which keeps a record of these responses and how they were analysed.

Creditability

This criterion considers the degree to which the researcher remains true to the findings. It concerns whether participants would recognise the meaning attributed to the findings as their own. Often in qualitative studies, the researcher will return to the participants to ascertain their opinion on his/her interpretation of their data. This is referred to as member checking (Creswell, 2009). In this study, the participants' data were anonymous making member checking impossible. However, participants' responses were transcribed verbatim and were drawn on directly to inform the coding and categorising processes. Verbatim quotes were also used to corroborate the codes and categories assigned. Triangulation is a strategy proposed to enhance the creditability of qualitative findings (Gray, 2018, Creswell, 2009). This can include triangulation of data, methods, investigators, or theories. In this study, the open qualitative question allowed some triangulation, which can provide a clearer, more comprehensive picture of the phenomenon under study. Concurrence of findings yielded by the different methods can also augment the creditability of the findings. Another useful strategy which can help to identify the impact of the researcher's own perception of, or position on, the subject under study, and subsequently on the creditability of the findings, is that of reflexivity (Creswell, 2009). This entails self-reflection by the researcher on his/her own background, experience, beliefs, for example, and how these shape his/her interpretation of the findings. This information was articulated in Chapter 3 (Methodology).

Transferability

This qualitative criterion relates to the quantitative notion of generalisability, referring to the application of findings to other similar populations (Holloway and Wheeler, 2009). The use of thick descriptions to illustrate the context of the data collection site(s), and the findings increases the transferability of findings (Gray, 2018, Creswell, 2009, Holloway and Wheeler, 2009). In the presentation and discussion of the qualitative findings, the settings, participants, and responses will

be provided. The same open question was administered to the three participant cohorts and it will be interesting to consider where or how the findings concur or differ across the cohorts.

Confirmability

Confirmability in qualitative research relates to objectivity in quantitative research (Holloway and Wheeler, 2009). Gray (2018) describes confirmability as the extent to which the study can be audited, or replicated. The audit trail is particularly useful to address this criterion. Confirmability is also concerned with demonstrating that the findings are not the product of the researcher's assumptions or agenda. Similar to creditability, self-disclosure by the researcher of his/her assumptions, and purpose of the research, allow the reader to recognise whether the interpretation of the findings is unduly influenced by these factors.

Ethical Considerations

When people participate in research studies, it is imperative that their rights are protected, that they are protected from harm, and that the research is undertaken ethically and responsibly so as to ensure that this is achieved (Polit and Beck, 2017). Gray (2018, p. 70) describes research ethics as "conducting research in a responsible and morally defensible way". Many examples of ethically contentious research practice can be cited from history, both distant and relatively recent, including the World War II atrocities perpetrated by doctors in the Nazi regime, the Tuskegee syphilis trial, and the Willowbrook Hospital study, to mention a few of the more infamous cases (LoBiondo-Wood and Haber, 2014, Greaney *et al.*, 2012). However, unethical research practice does not always occur in the most extreme ways (O'Mathúna, 2012) or solely in bioethical research. In terms of social science research, there are also examples of poor or potentially harmful research practice that emphasise the importance of ethical consideration of even seemingly non-invasive research studies. Examples such as the ethnographic study conducted by Chagnon and Neel from the 1960s to the 1990s, better known now as the El Dorado scandal, and the sociological study by Laud Humphrey in 1970, heightened concerns around covert observation, deception, informed consent and confidentiality. These cases also raised questions regarding the lengths researchers should or should not go in the pursuit of knowledge. This demonstrates that risk is not always physical in nature, rather it can concern psychological well-being and the sensitive treatment of participants' data for example. As a result of such contentious research practice, and in an attempt to prevent further cases, numerous codes of ethics such as the Nuremberg Code in 1947, the Declaration of Helsinki in 1964, and the Belmont Report in 1979, have been developed (Doody and Noonan, 2016). Such codes were established to provide ethical principles and guidelines for the conduct of research and the protection of human participants (Polit and Beck, 2017). The ethical principles of respect for persons, beneficence, and justice espoused in the Belmont Report are frequently drawn on to guide and

underpin research practice (Polit and Beck, 2017, LoBiondo-Wood and Haber, 2014, Greaney *et al.*, 2012). Each of these principles will now be contemplated with respect to the current study.

Respect for Persons

This principle espouses the right to personal autonomy and self-determination. Beauchamp and Childress (2013, p. 101) asserted that personal autonomy comprises "self-rule that is free from both controlling interference by others and limitations that prevent meaningful choice, such as inadequate understanding". This suggests the ability and confidence to determine one's own actions and make one's own decisions, without undue influence or control from external sources. In the context of research therefore, people are free to make decisions about whether or not to participate. In cases where the person is not competent to make such a decision, he/she has the right to protection. This principle also underpins the right to privacy, anonymity and confidentiality (LoBiondo-Wood and Haber, 2014).

Access and Consent to Participate

In the first instance ethics approval to undertake the study was sought from the Research Ethics Committees of the selected HEIs and clinical sites, 18 in total. Access to the clinical sites was requested in writing, and obtained from the relevant Directors of Nursing and Midwifery. A copy of the ethics approval was provided to Heads of Schools in the selected HEIs, and to Directors of Nursing and Midwifery in the selected clinical sites. All potential participants were furnished with an information sheet (Appendix 8) about the study. This provided information about the researcher, the study, what participation in the study would entail, and contact details of the researcher, her PhD supervisor, and the DCU Research Ethics Committee, should participants have any questions or concerns. Participants were informed that their participation in the study was entirely voluntary and that they could withdraw from the study anytime in advance of submitting a completed questionnaire. Submission of a completed questionnaire was taken as consent to participate.

Right to Privacy

No uniquely identifying information was sought from participants, either in terms of themselves or their organisations. The survey was distributed electronically to the student and lecturer cohorts using Survey Monkey®. IP addresses were not collected. Consequently, there was no way of distinguishing which of the nine HEIs lecturer or student participants were based in. With respect to the clinical nurse and midwife cohort, hard copies of the survey were distributed due to the lack of email lists for participants in this cohort. The surveys were delivered to the various departments in the selected hospitals by the researcher. Completed questionnaires were collected by the

researcher from some hospitals and in some cases they were returned by post to the researcher by the Director of Nursing, or his/her personal assistant.

Right to Anonymity and Confidentiality

Confidentiality and anonymity were assured. Only the researcher has had access to the data. The data are anonymized. Hard copies of the data are stored in a locked cabinet in a locked office and electronic data are stored on an encrypted, password protected computer at all times. Data will be destroyed 5 years following completion of the study. Data may be subject to Freedom of Information legislation in the interim.

Beneficence

The term beneficence means 'to do good' (Johnstone, 2016) and it also incorporates the principle of non-maleficence, which is to prevent harm (Greaney *et al.*, 2012). This gives the researcher an obligation to maximise any benefit to the participants and minimise any potential harm. This study explored knowledge, beliefs and implementation of EBP via completion of a questionnaire and involved no obvious risks to the participants. However, in relation to the student cohort, some participants may have been students at the researcher's place of employment and may have been undertaking modules coordinated, delivered and assessed by the researcher. Students were clearly advised that their participation or non-participation would not have any effect on their assessments or results.

Justice

This principle entails fair treatment of participants including equitable selection (LoBiondo-Wood and Haber, 2014). Participants were recruited from a selection of Higher Education Institutions and affiliated acute general hospitals from the Republic of Ireland. These sites were selected using probability stratified random sampling and thereafter, every potential participant in these sites had an equal opportunity to participate in the study. The survey was available to all potential participants for several weeks and two reminders were emailed to the lecturer and student cohorts, and were communicated via the Directors of Nursing and Midwifery offices to the clinical nurses and midwives.

Conclusion

This chapter has provided a detailed overview of the design of this study. The rationale underpinning methodological choices has been discussed with regard to the aim and objectives of the study. Ethical considerations relevant to this study have also been explicated. The findings from the study will be presented in Chapter 4.

Chapter 4: Findings

The aim of this study is to establish the knowledge, beliefs, and implementation of evidence-based practice (EBP) among nurses, midwives and students in the Irish healthcare system. In addition, the culture and preparedness for EBP within the organisations where nurses, midwives and students work/study will be explored. This study seeks to answer the following research questions:

- What are the knowledge, beliefs, and implementation of EBP of:
    - Lecturers who teach on undergraduate nursing and midwifery programmes delivered in Higher Education Institutions (HEIs) in the Republic of Ireland;
    - Students undertaking these programmes;
    - Nurses and midwives working in teaching hospitals affiliated with these HEIs?
- What is the relationship between EBP beliefs and implementation within these populations?
- To what degree are the HEIs and hospitals (within which these nurses and midwives, student nurses and student midwives, nurse and midwifery lecturers work, learn and teach) ready for and supportive of EBP?
- What is the relationship between organisational culture and readiness for EBP and EBP beliefs and implementation within these populations?

A quantitative cross-sectional survey design incorporating one open question was selected to answer these questions. The quantitative data yielded will ascertain the knowledge, beliefs and implementation of EBP among nurses, midwives and students in Ireland along with the organisational culture and readiness for EBP of their workplaces. This will afford an informed starting point from which a specifically tailored education programme, underpinned with specific knowledge of the needs of the nurses, midwives and students, as well as the challenges and opportunities present in their workplaces, can be developed and implemented where necessary. The goal of such a programme would be to foster a sustainable culture of EBP among nurses, midwives and students, in both clinical and academic settings, so that healthcare delivery that maximises patient outcomes in a time- and cost-efficient way, becomes the standard approach to patient care among nurses and midwives across the Republic of Ireland.

This chapter provides an overview of the data analysis performed, and related decisions about this. This will be followed by presentation of demographic findings, and the detailed results generated by the seven EBP scales (EBPB©, EBPB-E©, EBPI©, EBPI-E©, OCRSIEP©, OCRSIEP-E© and OCRSIEP-ES©

Scales) from the respective cohorts of students, clinical nurses and midwives, and lecturers. The data collected via the survey were quantitative in nature. However, one open question was included on the survey, producing qualitative responses that were analysed using content analysis. Findings produced by the qualitative responses to the open question on the survey will also be presented.

Data Analysis Overview

The data distribution of all of the scales, along with the reliability coefficients, will be considered and discussed below. Measures of central tendency and dispersion demonstrated group mean scores of each cohort on the respective scales. Inferential statistics were used to look for differences within each cohort based on factors such as age and academic qualification, for example. Parametric tests, such as t-tests, one-way between groups ANOVA and post hoc tests, facilitated such exploration. Correlational analysis was performed using Pearson product-moment correlation coefficient to establish the direction (positive or negative) and strength of the relationship between the EBP beliefs, EBP implementation and organisational culture and readiness for EBP within each of the cohorts. The demographic findings will be presented initially, followed by the findings on each of the EBP variables.

Validity of the Study

Consideration of the internal and external validity of a study helps to establish the rigour of the research design and the generalisability of the findings (Roberts and Priest, 2006). LoBiondo-Wood and Haber (2014) describe six potential threats to internal validity: selection, history, maturation, mortality/attrition, testing, and instrumentation. These have been described in the methodology chapter. Each threat will now be considered in respect of the current study.

Threats to Internal Validity

Selection

The three cohorts of participants (student nurses and midwives, nurse and midwifery lecturers, and clinical nurses and midwives) in this study fall into these naturally occurring pre-existing groups. The data collection sites were selected randomly, therefore selection bias did not present a threat to the internal validity of this study.

History

No events relating to EBP external to the study coincided with the data collection phase of this study. There were no government, or regulatory body (NMBI), or industrial relations publications with a specific focus on EBP during that time. However, EBP is taught to varying degrees and in varying ways on most nursing and midwifery under- and post-graduate programmes (Lehane *et al.*, 2017). Therefore if, during the data collection period, an EBP module was taught in one HEI and not

in the others, this could alter the responses of the participants on the module, posing a potential risk of bias. This diverse exposure to EBP could affect participants in all three cohorts, the lecturers who deliver EBP content, the undergraduate students who receive this content through their curriculum, and clinical nurses and midwives undertaking postgraduate programmes where they may encounter EBP content. This would potentially raise their knowledge, understanding and implementation of EBP, affect their beliefs and attitude towards EBP, as well as their perception of their organisations' culture and readiness for EBP. This threat was beyond the scope of the current study and is therefore a limitation.

Maturation

This was a once-off cross-sectional study. Consequently, maturation presented no threat to the internal validity of this study.

Mortality/Attrition

Mortality is not relevant to this study as there is only one data collection point. In relation to the loss of data collection sites, nine HEIs were selected to participate in this study, as well as nine acute general hospitals (each affiliated with one of the HEIs). However, in the end, only seven of the nine hospitals selected participated in this study. These non-participating hospitals were lost from the study due to complex internal governance issues around ethics approval, and protracted communication challenges. Repeated attempts to overcome these difficulties were made to no avail. In both cases, these delays rendered it unfeasible to continue with their inclusion in the study within the timeframe available. This has the potential to affect the generalisability of the findings, as the responses from these hospitals may have differed from the other seven. Therefore the findings produced by the study may not necessarily represent the situation in these two hospitals. As will be elaborated on later in this chapter, the response rates for the three cohorts, student nurses and midwives, nurse and midwifery lecturers, and clinical nurses and midwives, were 19.4%, 22.3% and 7% respectively. These are low, but not necessarily unexpected with the survey method. The sampling strategy and sample size of a study can help to overcome any bias exerted by low response rates.

Testing

The effects of testing were not an issue in this study due to the one-off data collection.

Instrumentation

Due to a single data collection point in this study, instrumentation was not a threat. However, the reliability of the instruments used will be discussed in detail later in this chapter.

Threats to External Validity

LoBiondo-Wood and Haber (2014) describe selection effects, measurement effects and reactive effects as key external threats to validity. These have been described in the methodology chapter and will now be considered with respect to this study.

Selection Effects

Stratified random sampling was used to select nine of the thirteen HEIs, in the Republic of Ireland that offer pre-registration nursing programmes. The sample was stratified in terms of the type of HEI (university or institute of technology), and the five divisions of the NMBI Register (general nursing, psychiatric nursing, intellectual disability nursing, midwifery, and children's and general nursing) for which students undertake pre-registration programmes of study, using information obtained from the NMBI (Nursing and Midwifery Board of Ireland, 2014b). This was done to ensure, as far as practicable, equivalent representation of nursing and midwifery students across the five divisions of the NMBI register, the HEI settings, and the country. Simple random sampling was used to select one general teaching hospital affiliated with each HEI, affording each general teaching hospital an equal chance of being included. This was done by placing the names of all general teaching hospitals affiliated with each of the selected HEIs into a hat. The first hospital that was drawn from the selection of hospitals affiliated with each HEI was the hospital that was included in the study. Consequently, the generalisability of the findings from this study should not be greatly affected by selection effects.

Measurement Effects

The survey in this study was administered once only, therefore measurement effects did not present a threat to the external validity of this study.

Reactive Effects

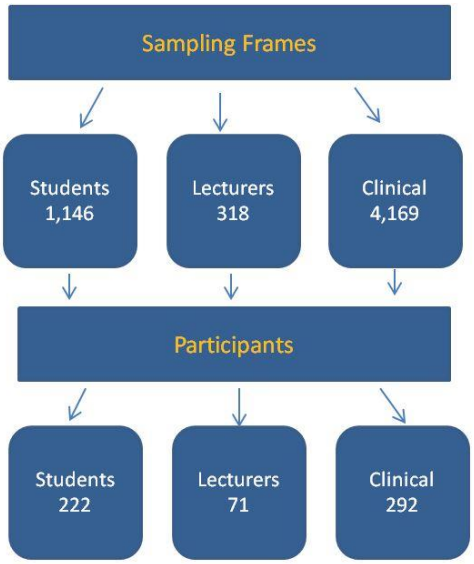
Participants in this study may have been influenced by reactive effects. Participants comprised student nurses and midwives currently undertaking their undergraduate degree, lecturers in nursing and midwifery, and clinical nurses and midwives. In their respective roles, they may have felt that they 'should be', or at least be seen to be, knowledgeable about EBP due to the perception that, as students they should be learning about it, as lecturers they should be sufficiently knowledgeable and competent to teach it, and as clinical practitioners they should be implementing it in practice. It is therefore possible that some responses may have reflected a higher level of knowledge and implementation of EBP than is the reality. This will be borne in mind when considering the application or generalisability of the findings. The open question, which invited participants to give their understanding of EBP, should help to discern if this threat impacted the quantitative findings.

Demographic Findings

Sample

Nine hospitals were selected to participate in this study. However, in the end, only seven participated for the reasons just noted. The sampling frames for the three cohorts were 1,146 students (Nursing and Midwifery Board of Ireland, 2014b), 318 lecturers (verified by respective Heads of Schools) and 4,169 clinical nurses and midwives (Health Service Executive, 2013). Two hundred and twenty two nursing and midwifery students, 71 lecturers, and 292 clinical nurses and midwives participated (Figure 7), representing response rates of 19.4%, 22.3% and 7% respectively. Overall 585 participants were involved in the survey. The response rates for the three cohorts in this study are low, but not necessarily atypical of the survey method, as illustrated previously. However, the employment of probability sampling to select the samples, limits, to some degree, the impact of the low response rate on the generalisability of the findings, as has been discussed in the previous chapter. Descriptive statistics were performed to reveal the demographic characteristics of the three sample cohorts and will now be presented.

Figure 7: Participant Flowchart



Lecturer Cohort

This cohort consisted of 71 lecturers from departments of nursing and midwifery based in nine HEIs in the Republic of Ireland. Their demographics are presented in Table 2. In relation to the NMBI register, many of the lecturers are registered on more than one division. These categories are therefore not mutually exclusive. Similarly, these participants teach across the five divisions of the register that are relevant to undergraduate nurse and midwifery education in Ireland, with many of them teaching on more than one division (RGN: n = 41, RPN: n = 26, RNID: n = 21, RCN: n = 15, RM: n = 12).

Table 2: **Lecturer Cohort – Demographic Findings**

Age Profile	Divisions of NMBI Register	Highest Academic Qualification	Years in Nurse/Midwifery Education
25-34 years **5**	RGN **41**	Bachelor's Degree **1**	≤2 years **5**
35-44 years **20**	RPN **26**	Higher/Postgrad Diploma **1**	3-5 years **7**
45 years+ **45**	RNID **21**	Master's Degree **44**	6-10 years **11**
Missing **1**	RCN **15**	PhD/Doctorate **22**	11-15 years **13**
	RM **12**	Post-Doc Qualification **2**	16 years+ **34**
	RNT **38**	Missing **1**	Missing **1**
	Missing **0**		

Student Cohort

This cohort comprised 222 undergraduate students undertaking a BSc in Nursing or Midwifery programme from departments of nursing/midwifery based in nine HEIs in the Republic of Ireland. Their demographics are outlined in Table 3.

Table 3: **Student Cohort – Demographic Findings**

Students' Programme of Study	Students' Year of Programme	Students' Age Profile
RGN **44**	1st Year **44**	18-24 years **153**
RPN **2**	2nd Year **63**	25-34 years **33**
RNID **50**	3rd Year **60**	35-44 years **30**
RCN **63**	4th Year **50**	45 years+ **6**
RM **60**	5th Year **2**	Missing **0**
Missing **3**	Missing **3**	

Students were asked about the source(s) of their exposure to EBP. Categories provided were not mutually exclusive so students could tick more than one response to this question. Ninety four percent of students learned about EBP in college. Almost 52% of students learned about EBP on

clinical practice and 25.7% of students learned about EBP by reading up on it themselves.

Clinical Cohort

This cohort comprised 292 participants. Their demographic findings are presented in Table 4. These participants are nurses and midwives currently practicing in 7 hospitals affiliated with the HEIs selected for inclusion in this study. Findings reveal that almost 77% of nurses and midwives in this cohort hold at least a degree level qualification.

Table 4: Clinical Cohort – Demographic Findings

Age Profile	Years Qualified	Divisions of NMBI Register	Highest Academic Qualification
20-24 years **8**	<2 years **7**	RGN **284**	Certificate **37**
25-34 years **50**	2-5 years **20**	RPN **2**	Diploma **31**
35-44 years **118**	6-10 years **32**	RNID **3**	Bachelor's Degree **112**
45 years+ **116**	>10 years **232**	RCN **19**	Higher/Postgrad Diploma **82**
		RM **29**	Master's Degree **30**
		RNT 2	

Participants in the clinical cohort were asked if they knew much about EBP. Almost 95% (94.5%) answered that they did not know much about EBP. When asked about the source(s) of their exposure to EBP (*categories provided were not mutually exclusive so participants could tick more than one response to this question*), 35.6% and 55.5% said that they learned about EBP on a pre-registration and on a post-registration programme of nursing, respectively. Almost 62% (61.6%) of participants said that they learned about EBP through their workplace, while 37.7% of participants had read about EBP themselves.

Qualitative Findings

Following the demographic questions and in advance of completing the EBP Scales on the survey, all participants were invited to write down in their own words their personal understanding of EBP. To re-state this study's operational definition of EBP, Melnyk and Fineout-Overholt (2018, p. 8) define EBP as,

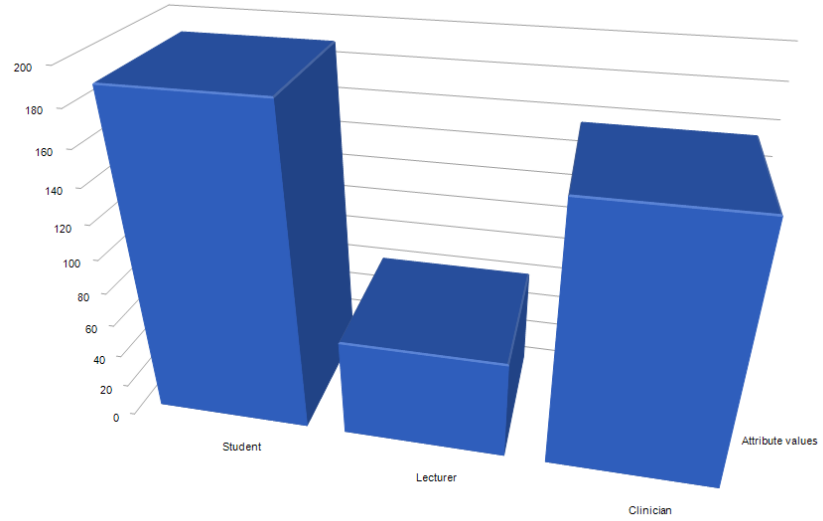
> "a lifelong problem-solving approach to clinical practice that integrates the following:
>
> - A systematic search for and **critical appraisal** of the most relevant and best research (i.e., **external evidence**) to answer a burning clinical question;
> - One's own clinical expertise, including use of **internal evidence** generated from **outcomes management** or **evidence-based quality improvement projects**, a thorough patient assessment, and evaluation and use of available resources necessary to achieve desired patient outcomes;
> - Patient/family preferences and values." (Melnyk and Fineout-Overholt, 2019, p. 8, emphasis in original)

The purpose of this qualitative question was to elucidate participants' description of EBP in order to ascertain insight into their knowledge of EBP; consider how their understanding of EBP may have influenced the quantitative findings; and establish a realistic starting point for a programme of education tailored to the needs of the three cohorts in question. In the interest of creditability and confirmability, it is important to provide insight into the researcher's position on EBP, prior to presenting the qualitative findings. This has been done in Chapter 3 and should facilitate the reader to consider how the researcher's position may have influenced her interpretation of the qualitative findings.

Responses to Open Question

Fifty nine lecturers (83%, n = 71), 188 students (85%, n = 222), and 155 clinical nurses and midwives (53%, n = 292), elected to provide a response to this open question (Figure 6). While this qualitative component is the smaller part of the study, it, nonetheless, elicited data from 402 participants. These findings will be presented, using verbatim quotes (precisely as provided by participants, including any typos) to substantiate conclusions reached.

Figure 8: Responses by Cohort to Open Question.



Responses were all transcribed into a Word document and were read through several times. Responses tended to be short and factual, and so a descriptive rather than an interpretative approach to content analysis was taken. They were entered into the computer software package, NVIVO© version 11 where they were considered in terms of the codes they appeared to naturally fall into.

Table 5: Codes identified from open responses by cohort.

Codes of Participants' Understanding of EBP	Student (n = 188)	Lecturer (n = 59)	Clinical (n = 155)
1: Research led practice/research utilisation/proven practice	124	44	105
2: Improved patient care decision-making and outcomes	21	8	75
3: Best way of delivering patient care	32	6	2
4: Changing or improving Practice / PPGs	17	1	16
5: Descriptions containing references to all three core components of EBP (in operational definition)	10	10	11
6: Clinical experience or expertise	15	3	12
7: Quality or Standards Improvement	12	2	16
8: Knowledge for safe and/or effective practice	9	3	10

These codes were identified from the recurring descriptions of EBP proffered by all three cohorts of participants (Table 5). Participants sometimes referred to more than one code. The identified codes were re-visited and grouped according to their commonalities into a smaller number of categories. These categories, described below, comprised:

1. Definitions of EBP
2. Best practice
3. Nurses' and Midwives' role in EBP
4. Knowledge
5. Barriers and facilitators of EBP

Definitions of EBP

Table 5 shows that most participants described EBP in terms of, "research led practice/research utilisation/proven practice". This finding was uniform across the three cohorts (75% lecturers; 66% students; 68% clinical), reinforcing the view that much conflation of EBP with research or research utilisation exists among nurses, midwives and students in Ireland. The following extracts exemplify this conflation.

Clinical Cohort:

"Nursing practice which is based on up to date research."

"Basing practice standards on well researched and proven methods that have withstood rigorous testing, questioning and practical application."

"tailoring your nursing care and changing practices in accordance with recent, relevant and up-to-date valid research."

Student Cohort:

"Using research findings in order to use the best practice to care for patients."

"Evidence based practice involves Using the best research proven assessments in nursing care."

"Doing things in the best way possible, proven through research."

Lecturer Cohort:

"Clinical practice that is in accordance with the latest research internationally."

"Basing practice on evidence gained via research."

"Practice that is underpinned by evidence gained from robust research findings."

This finding provides useful insight that can inform an educational programme to develop and enhance EBP knowledge and competencies of nurses and midwives in both the clinical and lecturer cohorts. Table 5 also shows that 'improved patient care decision-making and outcomes', 'best way of delivering patient care', and 'changing and improving practice and/or PPGs', were the next most commonly identified categories. This finding suggests that nurses and midwives perceive that EBP exerts a beneficial influence on nursing practice and patient care. The following exemplify these categories:

Clinical Cohort:

"Using the most up to date, researched tried + tested methods to care for patients, develop services and policies procedures + guidelines to standardise practice for all."

"It is an approach to making clinical decisions and providing care to the patient by combining current research + clinical pathways."

Student Cohort:

"Standards based on evidence by which we (nurses) use as guidelines for best practice in the workplace because they are proven the best way to do something with the best possible outcomes."

"Evidence-based practise is using the most current, researched information about clinical practise which includes clinical expertise and education to make desicions on the best care for the patient to improve care provided."

Lecturer Cohort:

"Using evidence (depends on definition of evidence) to underpin decision making in practice. Ideally in collaboration with patients."

"Using the findings from research studies to inform patient care (usually informs guidelines, protocols and standards)."

Some participants in all three cohorts did describe EBP in terms of its three core components. Of those responding to the open question, 11 participants (7%) in the clinical cohort, 10 participants (5%) in the student cohort, and 10 participants (17%) in the lecturer cohort described EBP in the context of the integration of best available evidence, clinician's expertise, and patient values/preferences. Thus, a small number of participants in all three cohorts can articulate a definition of EBP that more closely reflects the operational definition of this study which is widely

recognised in the literature. The following descriptions are evidence of this knowledge:

Clinical Cohort:

"Care that is given and research has proven that it is the best practice. Strong quality evidence based on (1) good clinical trials (2) individual clinical expertise and the need of the patient and often opinions of clinicians making good clinical decisions based on sound quality evidence as a result if good research and also good experience."

"Best evidence used / available for decision making for patient care. The integration of clinical expertise, patient values and the best research for patient care providing best outcomes."

"Evidence-based practice involves the use of current best evidence when making decisions about patients care. The goal of EBP is the amalgamation of (1) clinical expertise, together with (2) scientific evidence and (3) patient views to provide good quality care and services reflecting the values, requirements and wishes of the patients we care for."

"Contributing clinical expertise with best evidence available to provide best possible patient care according to patient need."

Student Cohort:

"EBP means using the most rigorous and best studies of evidence for practice those that include rct's or systematic reviews it also means incorporating clinical judgement meaning does this evidence suit your clinical case and incorporating patient preferences too."

"'Evidence-based practice' combines the use of the best available evidence from research studies with clinical expertise and patient values and preferences to inform clinical practice."

"It means incorporating clinical expertise, patient values (and opinions) and best research evidence into the care planning for patients. Using the best evidence to define new best practice as opposed to just supporting the practices already in place. Keeping up to date with the latest developments in nursing to guide new policy and guidelines as well as changes to nurse training."

"It is a culture that seeks to search for the latest best research and findings and to use that evidence alongside clinician experiences and patient values in order to implement the best practice for caring in the clinical environment."

Lecturer Cohort:

"I understand EBP to be a process that involves the healthcare practitioner (and his/her expertise), the best available evidence and the patient's preferences and values. These are all brought together when making a healthcare decision about the patient's treatment / future."

"Practice that integrates the best available research findings or empirical evidence with evidence from health care professionals' experience as well as acknowledging and incorporating knowledge from patients' experiences into practice. It is not solely about integrating research findings."

"EBP is about using the totality of knowledge skills and experience of the clinician, the patient clinical presentation and vitals, and the best research evidence into the decision making process for patient care."

Responses to the open question produced some secondary information which was also very revealing. These findings were identified under the codes of "best practice" and "the role of nurses and midwives in EBP" will be presented now.

Best Practice

A clear and unmistakable association was found between EBP and, what is referred to frequently by participants as, "best practice", which is evident in the following quotes from participants in the clinical cohort:

"Evidence based practice means using the most up to date research and practice expertise to provide the best and most optimal holistic patient care."

"Most up to date studies done on procedures, education etc to provide best quality care."

"Evidence-based practice enables the best care and outcome for patients by examining care given, evaluating that care, establishing best practice for that care and implementing that care in the best possible way whilst still in continuous evaluation."

Similarly it would appear that students also perceive EBP as a route to ensuring "best practice", as the following extracts convey:

"Is the best current methods of delivering nursing care and practices."

"It is using of up to date evidence based researched information and approved practice and incorporating both into patient care. Therefore providing the best quality care by continuously

using up to date researched and approved practices."

"It means we are using the best available knowledge/research in practice. It still allows for individualised care in the clinical setting. It is sometimes also referred to as ""best practice"" in the clinical setting."

Participants in the lecturer cohort also reported that EBP yields "best care", as is evident from the following narratives:

"Evidence based practice means carrying out practical work with the best practice obtained from the most up to date research and studies."

"EBP means that the practitioner operate in accord with the best research driven and established practice....peer reviewed, scientific, proven and agreed as the best way of carrying out practice."

Nurses' and Midwives' Role in EBP

This category was derived from the descriptions of EBP offered by participants from each of the three cohorts in response to the open question, and was the smallest or most infrequently referenced category in the dataset. These were responses that contained references to activities that nurses undertake or should undertake in relation to EBP, and in some cases the knowledge and skills needed to do this. Some descriptions of these activities were quite clear and specific but many tended to be more ambiguous or general in nature. Various activities or roles were mentioned by clinical participants in relation to this category, including asking questions, reading journals, critiquing research, changing practice, and evaluating care. However, while these activities comprise some of the steps of the EBP process, they were rarely cited together by an individual participant. Some responses were quite comprehensive, clearly outlining specific activities required in undertaking EBP, as the following one from a clinical participant illustrates:

"I believe that evidence-based practice is whereby one identifies a specific area of need and relevant research is critiqued and evaluated. Certain aspects may then be incorporated to ensure quality seamless care and to improve the condition for the patient and their family."

A response from a lecturer is similarly quite inclusive:

"…the use the evaluation and judgment of existing research (and other sources such as policy, legislation, guidelines etc) to weigh up how we may best inform our practice with the most real and accurate knowledge we have at a point in time."

One student participant offered a thorough set of actions to be undertaken by the nurse with regard to EBP:

> *"the nurse identifies clinical questions while working (ie. what type of dressing to use) and then researches answers to their question, then evaluates the current evidence/research that they find and combine this evidence with their own expertise and patient preferences when answering their clinical question."*

As previously indicated, not all descriptions of activities were quite as complete. Some were more tenuous and vague in nature, as indicated by two clinical participants:

> *"All nurses are accountable for their own practice + should use "best of practice evidence based practices."*

> *"… to make decisions on care and treatment and to constantly evaluate our practice"*

Some participants alluded to the knowledge and/or skills needed for EBP as the following quotes from clinical participants indicate:

> *"Nurses need to be able to effectively search research databases + articles in order to keep themselves up to date with current practice."*

> *"All aspects of patient care are based on up to date and current knowledge. This knowledge is research based and relevant to current practice. All nurses are continuously updating their skills and education."*

Two of the three participants from the lecturer cohort who contributed to this category referred to skills needed for EBP:

> *"Within the hierarchy of research, recognising what is more appropriate evidence to base your practice on. (i.e. RCT over anecdotal evidence)",*

> *"The ability to competently source, evaluate and apply the best available evidence supporting the best possible outcomes for patient/ client care in all settings."*

Knowledge

One student who had initially answered the open question at the start of the survey and completed the student-focussed EBP Scales subsequently returned to the open question to write the following:

> *"using case studies to teach/study? - wrote that initially. I've realised after doing the full survey that I have absolutely no idea what evidence based practice is however the lecturers mention it*

quite often."

While no other student stated that they did not know what EBP is, some of their responses indicate limited knowledge of EBP nonetheless. All students' responses were re-examined looking for descriptions that made no reference to types of evidence, research, clinical expertise or patient preferences/values and several were found that met this brief. The following extracts are testament to this:

"Using fact and knowledge to carry out a procedure in a certain way following particular steps."

"I think it has to do with learning as you're going. For example as a student we get to see things such as dressings or catheterisations being done. I believe Evidence Based Practice to be us seeing these procedures being done, then being allowed to assist in the same procedure on other occasions and finally being allowed to do them ourselves under supervision."

"Using new discoveries in the clinical area."

"Seeing the results first hand from what we've been practicing on the wards."

Similarly the responses from the lecturers, clinical nurses and midwives were perused using the same criterion and one instance found in the lecturer cohort. One lecturer's description of EBP reveals a complete dearth of knowledge around EBP:

"The application of theory to support clinical decision making."

The following extracts from the clinical cohort also indicate inadequate EBP knowledge among at least some clinical nurses and midwives:

"To ensure best, and safe care for a patient."

"Integration of knowledge in the clinical area."

"Using the evidence based to plan care."

Barriers and Facilitators of EBP

A few participants from the clinical cohort indicated factors that made using EBP in practice difficult. Inhibiting factors were not identified by the student and lecturer cohorts. The barriers suggested by the clinical participants have been cited previously in the literature:

"It can be hard to introduce if a certain procedure has been done the same way for years. It depends on staff's attitudes towards the new practice. Also workload, staffing levels and

management's support can be a barrier."

"It can be difficult with the huge volume of evidence available, to find all the relevant studies pertaining to a certain topic, there is a chance you may miss a vital study."

"With regard to nursing best example would be dressings. There must be coordination between all concerned with a particular patient. At present this is extremely poor. Very disjointed with community nurses and outpatient settings not in communication. Should be central clinic dealing with all dressings thereby use of EBP could be implemented. But that is probably never going to happen. Very understaffed, the profession is bleeding nurses. They are so badly treated, they leave the country when they qualify."

Reference was made to enabling factors of EBP by one lecturer:

"*This requires IT support and a good librarian to ensure that only proper peer reviewed research is used in clinical care. It is not easy to do but technology does help enormously."*

Conclusion

The inclusion of an open-ended question on this quantitative survey has provided findings relating to nurses' and midwives' EBP knowledge and understanding from a qualitative perspective. These findings revealed that participants generally perceive EBP in a positive light, associating it with improved outcomes for patients. However, there is evidence of poor knowledge and understanding of what EBP is, among the majority of participants in each cohort. There is also evidence of substantial conflation of EBP with research utilisation predominantly, as well as with other concepts, including quality improvement. These findings serve to augment the meaning and context of some of the quantitative findings, corroborate them, and facilitate a more in-depth interpretation of findings overall. They also demonstrate that further research to measure nurses' and midwives' knowledge directly, would be beneficial. In this way, the five purposes of combining quantitative and qualitative techniques espoused by Greene, Caracelli and Graham (1989), complementarity, expansion, triangulation, initiation, and development, have been realised in this study.

Quantitative Findings

Reliability of Scales

EBPB and EBPB-E Scales©

The EBPB Scale© was administered to both the student, and the clinical cohorts. The EBPB-E Scale© was distributed to the lecturer cohort as it more accurately measures EBP beliefs within their context and role, as previously outlined. They have repeatedly established good reliability, achieving Cronbach alpha statistics in excess of 0.85 in numerous studies (Melnyk, Fineout-Overholt and Mays, 2008; Wallen *et al.*, 2010; Warren *et al.*, 2016b; Singleton, 2017; Milner, Bradley and Lampley, 2018; Cardoso *et al.*, 2020). Similarly in the current study, the Cronbach alpha coefficients for the EBPB-E Scale© administered to the lecturers was 0.91 and for the EBPB Scale© administered to the student and clinical cohorts was 0.89, and 0.9, respectively, demonstrating good reliability in all three cohorts (Appendix 3).

EBPI and EBPI-E Scales©

The EBPI Scale© was administered to the student and clinical cohorts, while the EBPI-E Scale© was administered to the lecturer cohort. They have repeatedly established good reliability, achieving Cronbach alpha statistics in excess of 0.85 in numerous studies (Melnyk, Fineout-Overholt and Mays, 2008; Wallen *et al.*, 2010; Warren *et al.*, 2016b; Singleton, 2017; Milner, Bradley and Lampley, 2018; Cardoso *et al.*, 2020). In the current study, the Cronbach alpha coefficients for the EBPI-E Scale© administered to the lecturers was 0.93 and 0.90. and 0.95 respectively for the EBPI Scale© administered to students, and the clinical nurses and midwives, establishing good reliability in all three cohorts (Appendix 5).

OCRSIEP, OCRSIEP-E and OCRSIEP-ES Surveys©

The OCRSIEP Survey© was distributed to clinical staff, the OCRSIEP-E Survey© to the lecturers, and the OCRSIEP-ES Survey© to the students. They have demonstrated face and content validity, with internal consistency reliabilities in excess of 0.85 (Melnyk *et al.*, 2010; Wallen *et al.*, 2010; Fineout-Overholt, 2017, 2018; Fineout-Overholt, Stillwell, *et al.*, 2019; Cardoso *et al.*, 2020). Good reliability was established in all three cohorts of the current study, yielding Cronbach alpha coefficients of 0.91 for the OCRSIEP-E, 0.92 for the OCRSIEP-ES, and 0.95 for the OCRSIEP (Appendix 7).

Normality of Scales

EBPB and EBPB-E Scales©

The normality of the EBPB and EBPB-E Scales© was assessed in each cohort by obtaining skewness and kurtosis values, in addition to calculating the Kolmogorov-Smirnov statistic (Table 6). Tabachnick and Fidell (2013) also recommend reviewing the shape of the distribution on the histogram, to establish the shape and nature of the distribution of a variable, particularly with larger samples.

Table 6: Tests of Normality – EBP Beliefs Scales

Scale	Kolmogorov-Smirnov	Skewness	Kurtosis
EBPB-E Scale©	0.200	0.29	-0.709
EBPB Scale© (Student Cohort)	0.000	-1.166	1.689
EBPB Scale© (Clinical Cohort)	0.005	-0.301	0.257

Lecturer Cohort (EBPB-E Scale©)

In the Lecturer cohort (n=71), the Kolmogorov-Smirnov Statistic (Sig.=.200) is non-significant, signifying a normal distribution on the EBPB-E Scale©, which is congruent with a normal Q-Q plot (Figure 8), boxplot (Figure 9) and histogram (Figure 10).

Figure 9: Q-Q Plot EBPB-E Scale©

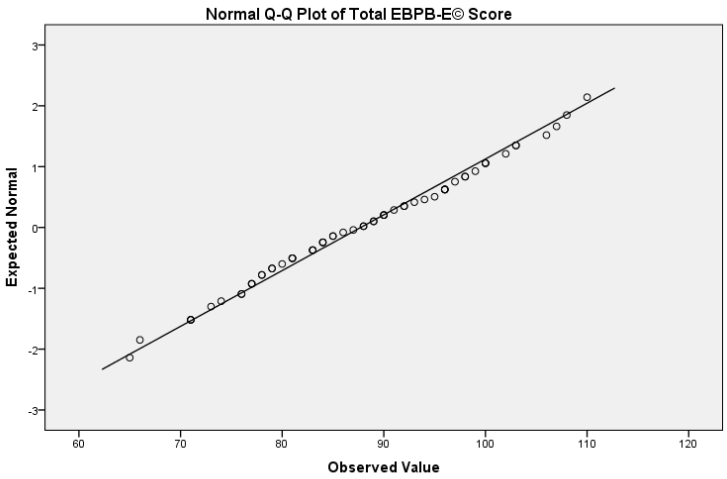


Figure 10: Boxplot EBPB-E Scale©

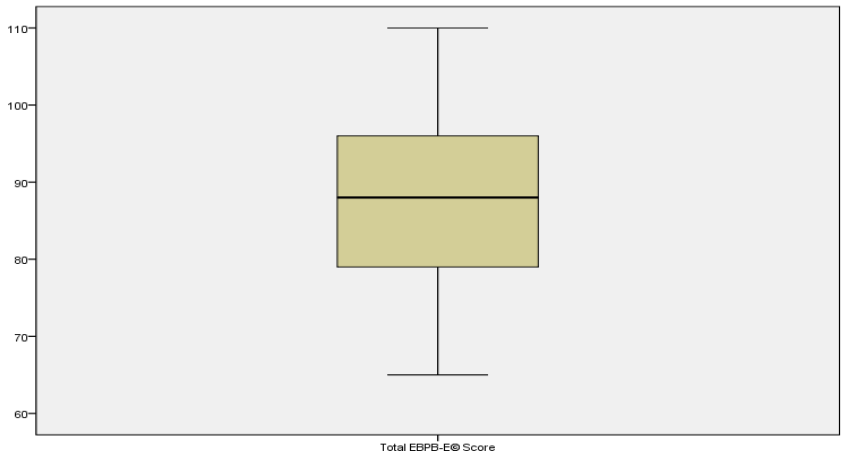
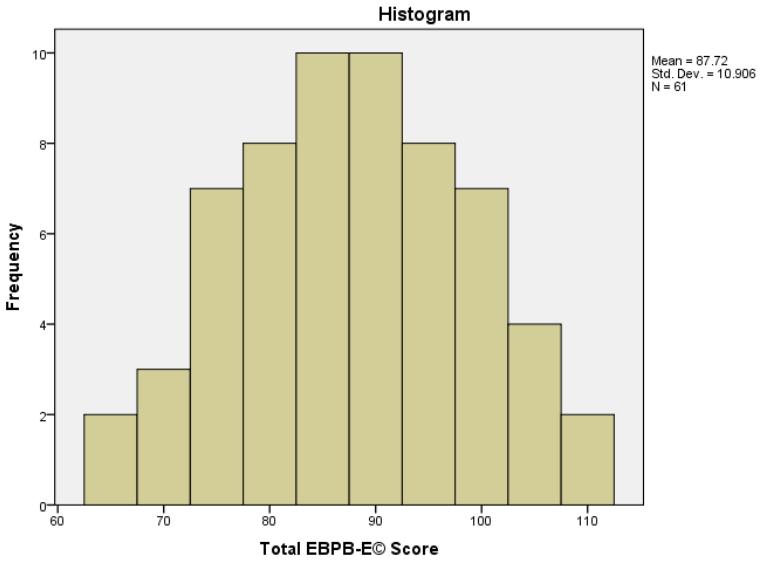


Figure 11: Histogram of the EBPB-E Scale©



Student Cohort (EBPB Scale©)

In the student cohort (n = 222), the Kolmogorov-Smirnov statistic (Sig. = 0.000) indicates violation of the assumption of normality, which is not uncommon with sample sizes in excess of 200 (Pallant, 2016). The negative skewness value (-1.166) indicates that the distribution is clustered to the right towards the higher values. The positive kurtosis value (1.689) indicates that the distribution is rather peaked but in keeping with Walker and Almond´s (2010) guidelines regarding normality of a distribution. Both the normal Q-Q Plot (Figure 11), and the boxplot (Figure 12) indicate a normal distribution. The histogram (Figure 13) reveals a bi-modal distribution indicating a small group of students who scored differently to the majority in relation to EBP beliefs. The distribution of the larger mode or group of students represented on the histogram appears relatively normal.

Figure 12: Q-Q Plot of the EBPB Scale© (Student Cohort)

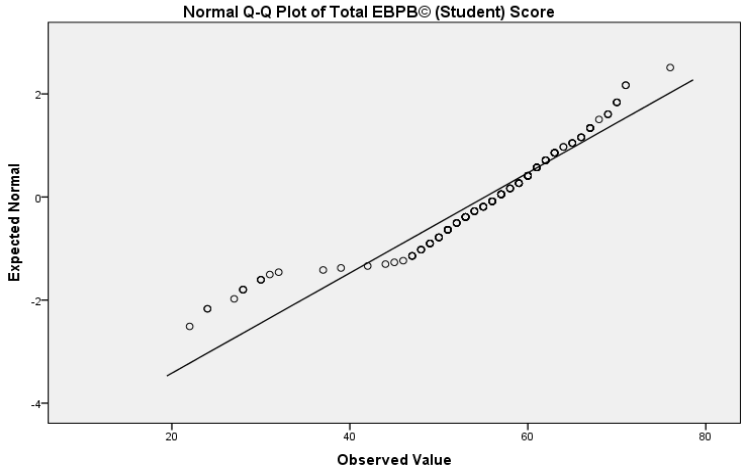


Figure 13: Boxplot of the EBPB Scale© (Student Cohort)

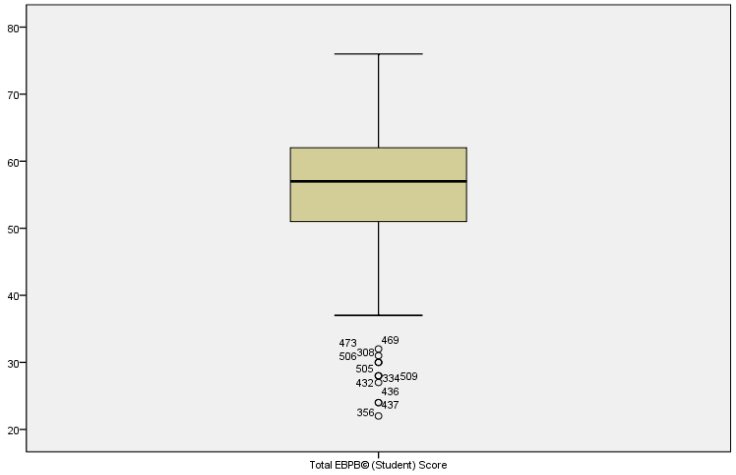
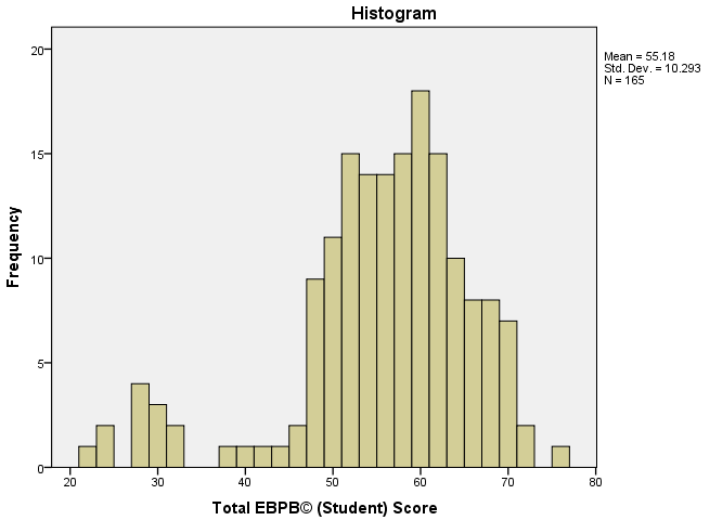


Figure 14: Histogram of the EBPB Scale© (Student Cohort)



Clinical Cohort (EBPB Scale©)

In the clinical cohort (n = 292), the Kolmogorov-Smirnov statistic (Sig. = 0.005) indicates that the assumptions of normality have been breached, which commonly occurs with large sample sizes (Pallant, 2016). The skewness value slightly exceeds the parameters provided by Walker and Almond (2010), while the kurtosis value (0.257) lies within the acceptable parameters implying that the distribution is relatively normal. Similarly, the normal Q-Q plot (Figure 14), the boxplot (Figure 15) and the histogram (Figure 16), are all suggestive of a normal distribution.

Figure 15: Boxplot of the EBPB Scale© (Clinical Cohort)

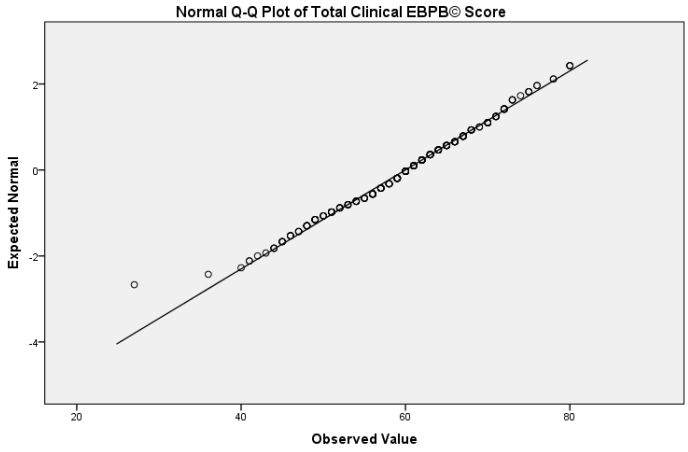


Figure 16: Boxplot of the EBPB Scale© (Clinical Cohort)

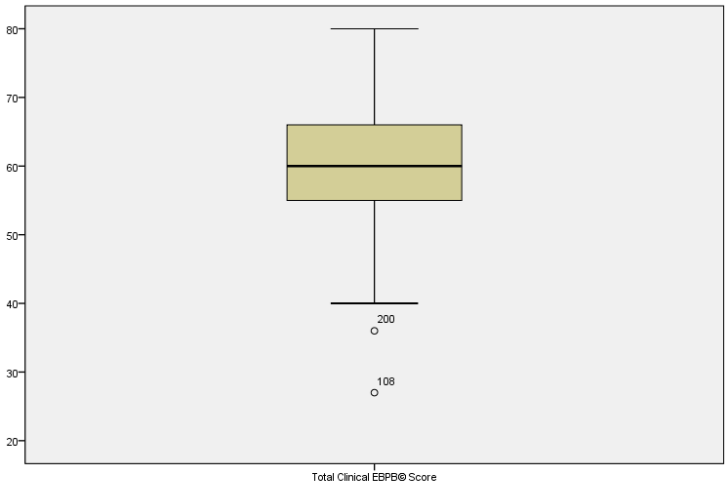
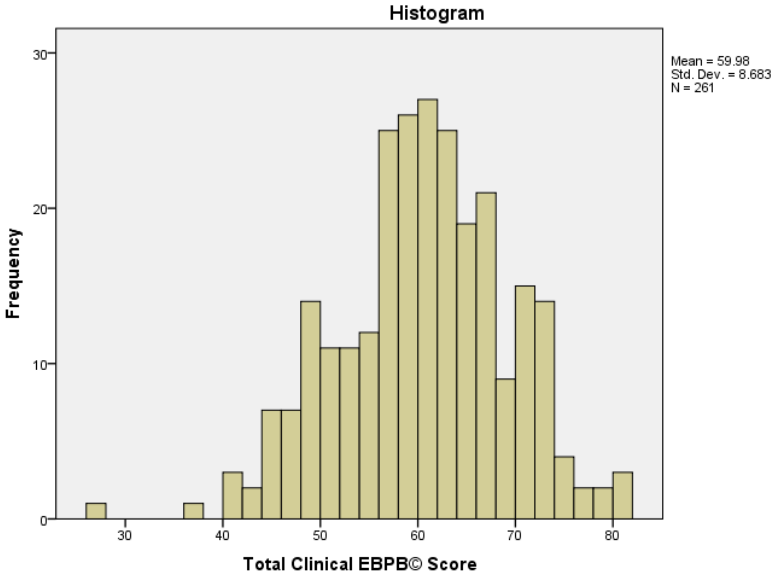


Figure 17: Histogram of the EBPB Scale© (Clinical Cohort)



EBPI and EBPI-E Scales©

The normality of the EBPI and EBPI-E Scales© was assessed in each cohort by obtaining skewness and kurtosis values, in addition to calculating the Kolmogorov-Smirnov statistic (Table 7). The Q-Q plots, boxplots, and histograms were also examined.

Table 7: Tests of Normality – EBP Implementation Scales

Scale	Kolmogorov-Smirnov	Skewness	Kurtosis
EBPI-E Scale©	0.104	0.708	-0.334
EBPI Scale© (Student Cohort)	0.143	1.307	1.410
EBPI Scale© (Clinical Cohort)	0.181	1.683	2.501

Lecturer Cohort (EBPI-E Scale©)

The Kolmogorov-Smirnov statistic (Sig. = 0.104) generated for the EBPI-E Scale© was not significant, suggesting a normal distribution in the lecturer cohort (n = 71). However, the skewness value (0.708) fell outside of the acceptable parameters proposed by Walker and Almond (2010), which indicates a distribution that is positively skewed, revealing a preponderance of responses towards the low end of the EBPI-E Scale©. This is not unexpected as implementation of EBP across education and clinical settings is known to be low. Furthermore, the findings from the relevant graphs, the normal Q-Q plot (Figure 17), the boxplot (Figure 18) and the histogram (Figure 19) all revealed a relatively normal distribution, although the positive skewness is evident on the histogram.

Figure 18: Q-Q Plot of EBPI-E Scale©

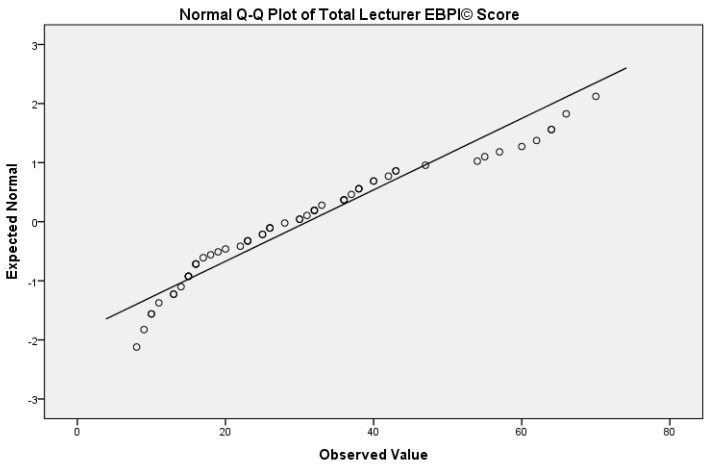


Figure 19: Boxplot of EBPI-E Scale©

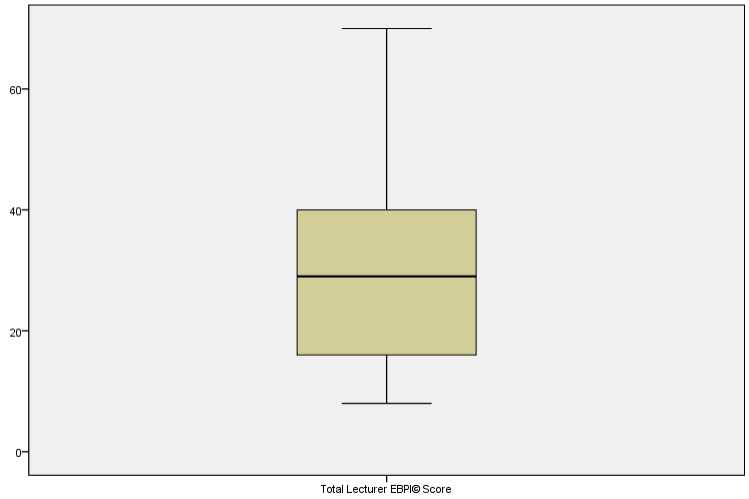
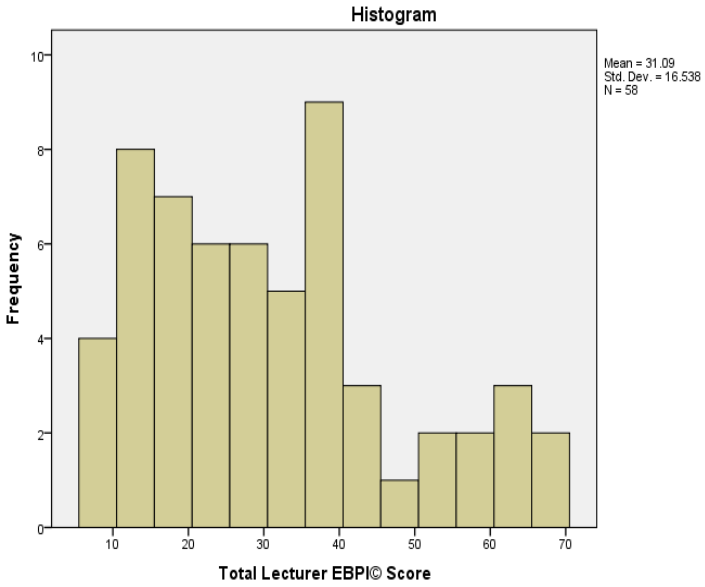


Figure 20: Histogram of the EBPI-E Scale©



Student Cohort (EBPI Scale©)

Both the Kolmogorov-Smirnov statistic (Sig. = 0.143) and the kurtosis value (1.410) signify a normal distribution on the EBPI Scale© in the student cohort (n = 222). The positive skewness value (1.307), however, indicates that there is a prevalence of scores towards the lower end of the scale, with the same expectation as with the lecturer cohort. This is congruent with the normal Q-Q plot (Figure 20), the boxplot (Figure 21) and the histogram (Figure 22).

Figure 21: **Q- Q Plot of EBPI Scale© (Student Cohort)**

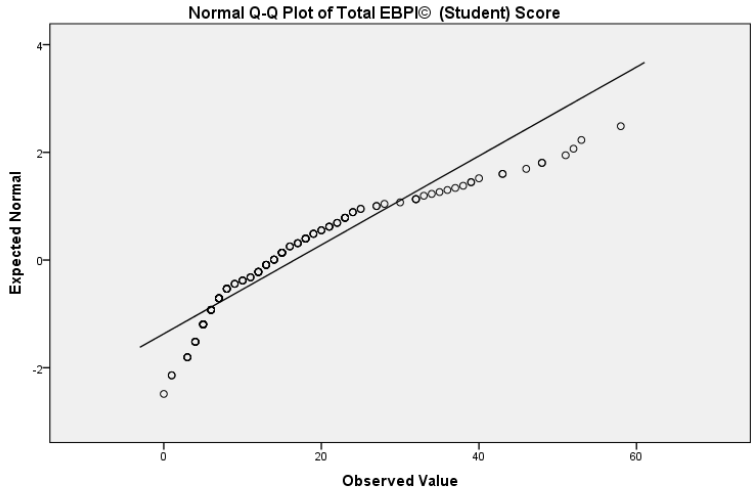


Figure 22: Boxplot of EBPI Scale© (Student Cohort)

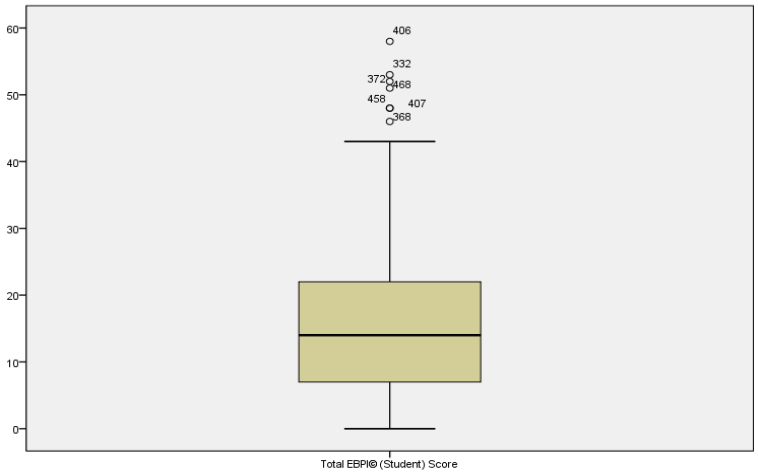
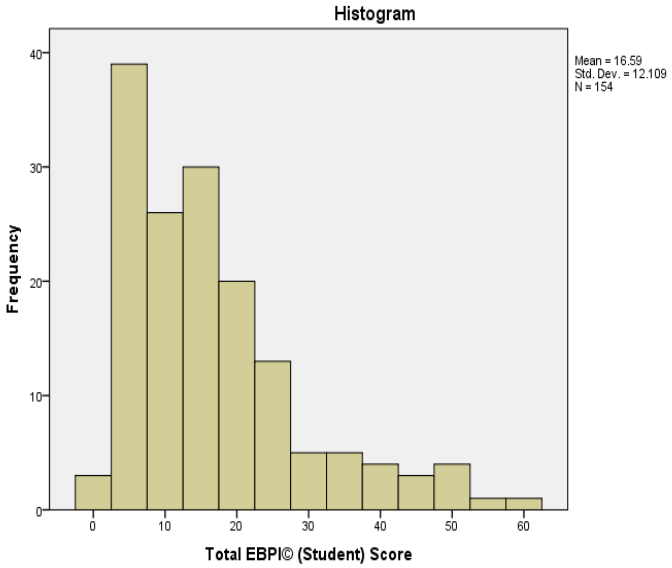


Figure 23: Histogram of the EBPI Scale© (Student Cohort)



Clinical Cohort (EBPI Scale©)

While the non-significant Kolmogorov-Smirnov statistic (Sig. = 0.181) suggests a normal distribution on the EBPI Scale© in the clinical cohort (n = 292), the skewness and kurtosis values indicate a positively skewed and peaked distribution. As with the lecturer and student cohorts, there is an expected distinct leaning towards low scores on this scale in the clinical cohort. This is equally clear on normal Q-Q plot (Figure 23), the boxplot (Figure 24) and the histogram (Figure 25).

Figure 24: Q-Q Plot of the EBPI Scale© (Clinical Cohort)

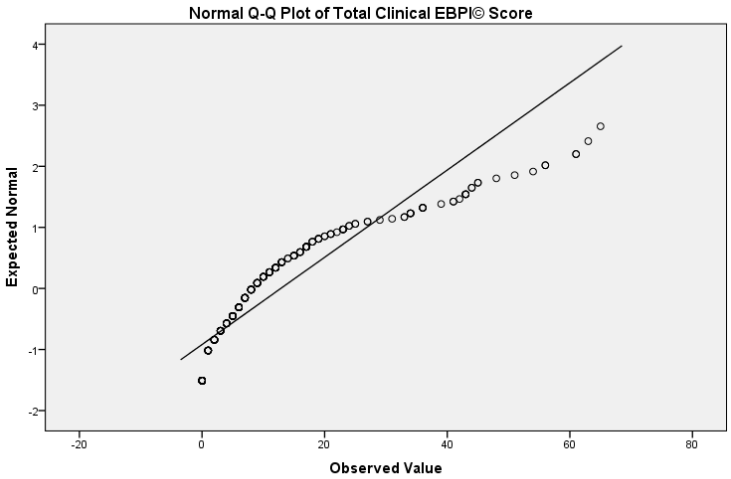


Figure 25: Boxplot of the EBPI Scale© (Clinical Cohort)

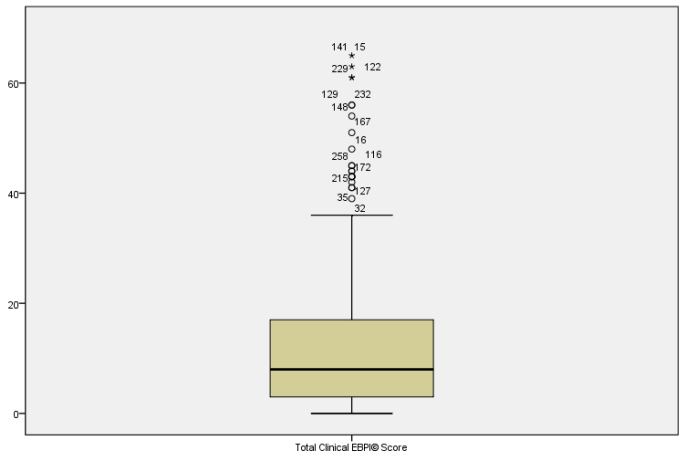
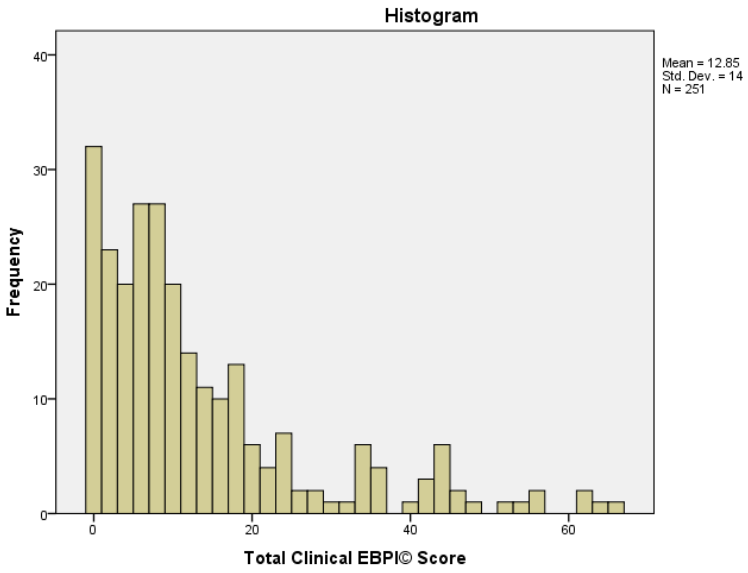


Figure 26: Histogram of the EBPI Scale© (Clinical Cohort)



OCRSIEP, OCRSIEP-E and OCRSIEP-ES Surveys©

The normality of the OCRSIEP, OCRSIEP-E and OCRSIEP-ES Surveys© was assessed in each cohort by obtaining skewness and kurtosis values, in addition to calculating the Kolmogorov-Smirnov statistic (Table 8). The Q-Q plots, boxplots, and histograms were also examined.

Table 8: Tests of Normality – Organisational Culture and Readiness for EBP Surveys

Scale	Kolmogorov-Smirnov	Skewness	Kurtosis
OCRSIEP-E	0.062	0.060	-0.733
OCRSIEP-ES	0.066	-0.509	0.037
OCRSIEP	0.046	-0.055	-0.3

Lecturer Cohort (OCRSIEP-E Survey©)

The non-significant Kolmogorov-Smirnov statistic (Sig. = 0.062), and the skewness value on the OCRSIEP-E Survey© indicate a normal distribution in the lecturer cohort (n = 71). The negative kurtosis value, which falls within acceptable parameters, indicates a somewhat flat distribution, suggesting a slightly wide spread of data with cases in either extreme. This is also evident from the Q-Q plot (Figure 26), the boxplot (Figure 27) and the histogram (Figure 28).

Figure 27: Q-Q Plot of the OCRSIEP-E Survey©

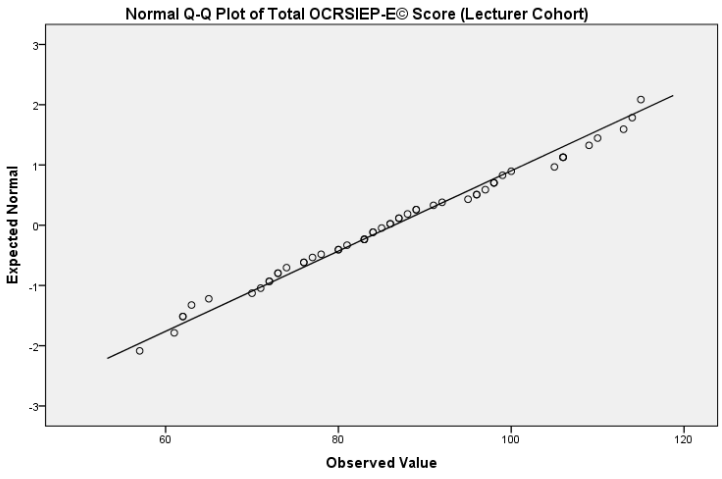


Figure 28: Boxplot of the OCRSIEP-E Survey©

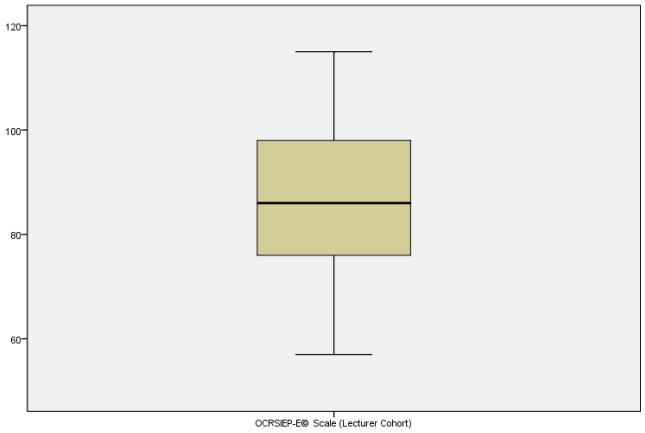
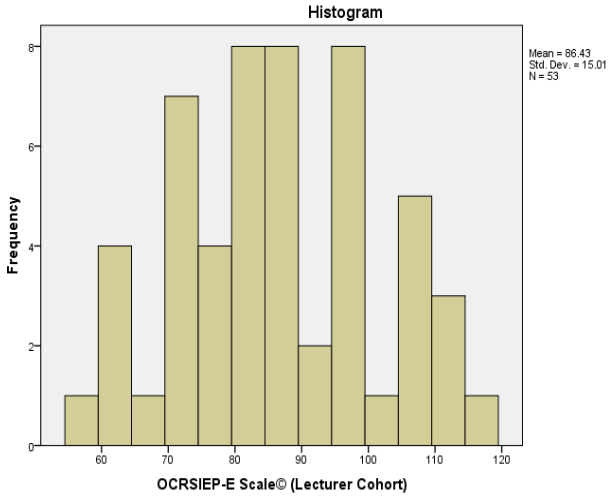


Figure 29: Histogram of the OCRSIEP-E Survey©



Student Cohort (OCRSIEP-ES Survey©)

The non-significant Kolmogorov-Smirnov statistic (Sig. = 0.066), and the kurtosis value suggest a distribution that is normal with no extreme values. The negative skewness value implies that there is a slight prevalence of scores towards the lower end of the scale but it does not breach normal parameters. This presentation is also evident on the normal Q-Q plot (Figure 29), the boxplot (Figure 30) and the histogram (Figure 32).

Figure 30: Q-Q Plot of the OCRSIEP-ES Survey©

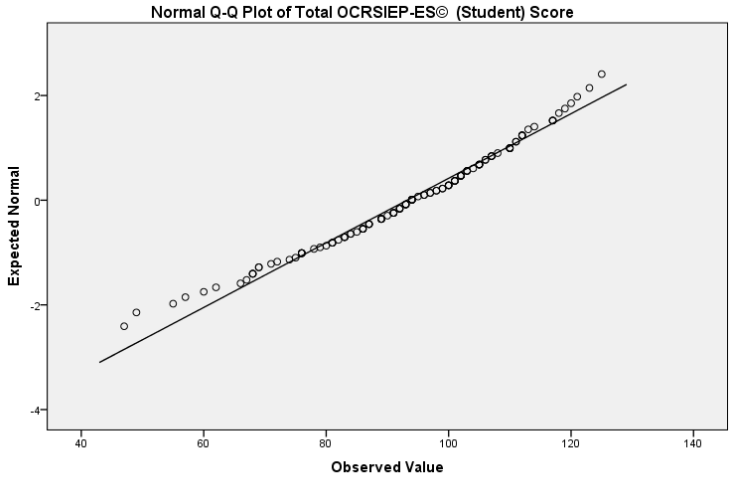


Figure 31: Boxplot of the OCRSIEP-ES Survey©

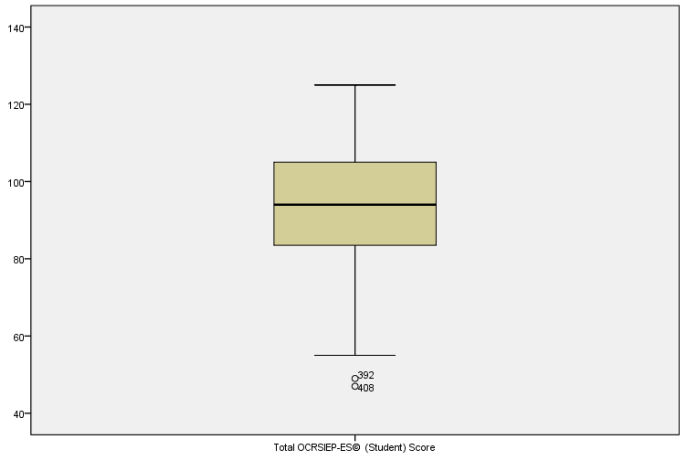
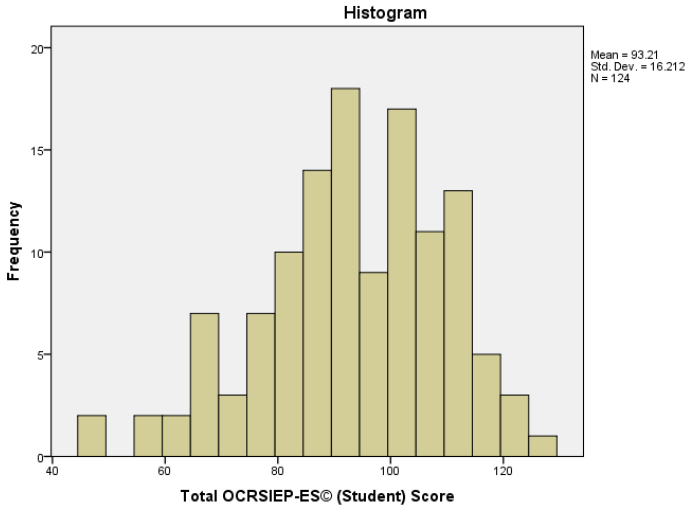


Figure 32: Histogram of the OCRSIEP-ES Survey©



Clinical Cohort (OCRSIEP Survey©)

The significant Kolmogorov-Smirnov statistic (Sig. = 0.046) suggests violation of the assumption of normality on the OCRSIEP Survey© in the clinical cohort (n = 292), which tends to happen with sample sizes in excess of 200 (Pallant, 2016). The negative skewness value indicates a slight propensity for scores towards the lower end of the scale. The negative kurtosis value indicates a distribution with a somewhat wide spread of values. However neither the skewness nor kurtosis values exceed acceptable parameters. While the normal Q-Q plot (Figure 32), the boxplot (Figure 33) and the histogram (Figure 34) all appear relatively normal, they indicate a wide spread of values.

Figure 33: Q-Q Plot of the OCRSIEP Survey©

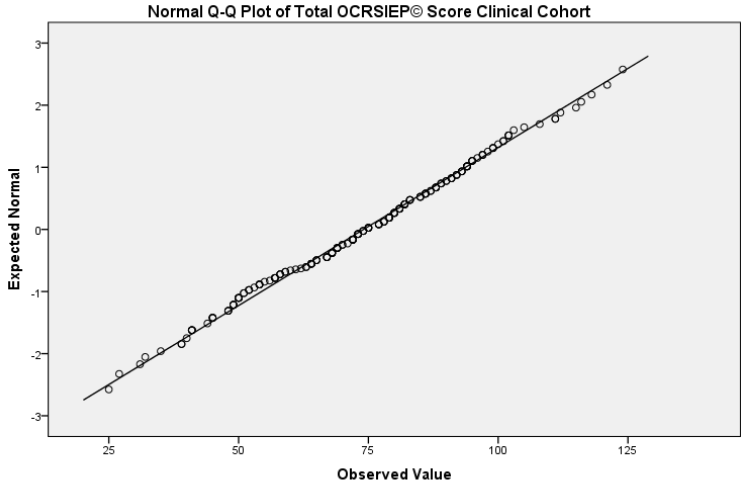


Figure 34: Boxplot of the OCRSIEP Survey©

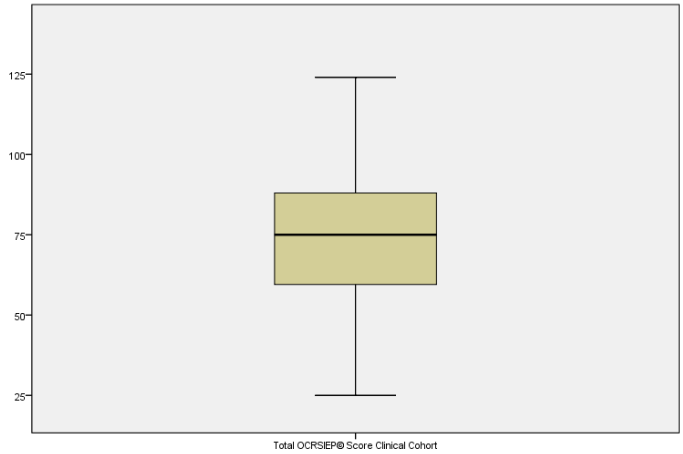
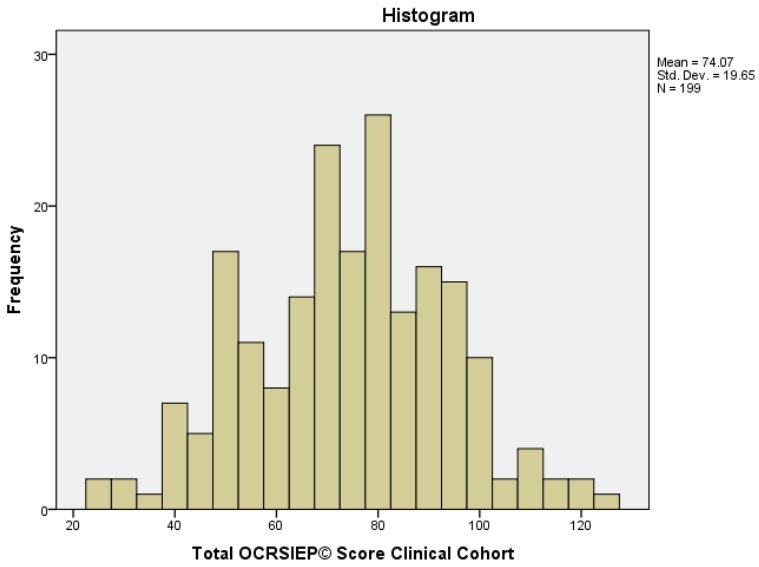


Figure 35: Histogram of the OCRSIEP Survey©



Findings: EBP Beliefs, EBP Implementation, and Organisational Culture and Readiness for EBP within the Educational and Clinical Settings

Following examination of the continuous variables (EBP beliefs, implementation, and organisational culture and readiness for EBP findings) within each cohort of participants, it was discovered that the distribution of the following variables was non-normal;

- The EBP Implementation in the student cohort.
- The EBP Implementation in the clinical cohort.

The data on these variables were positively skewed with a preponderance of values toward the lower end of the respective variables, which was not unexpected. Consideration must be given to skewed data which violates the assumption of normality. When data do not meet the assumptions for a parametric test, there are three options to be contemplated. These have been discussed in the methodology chapter. In considering the possible options, the evidence urging caution around data transformation, coupled with that in support of using parametric tests with non-normally distributed data, it was decided that the most appropriate approach was to employ parametric analyses to explore the relationships within the data.

Measures of central tendency and dispersion were used to ascertain group mean scores of each cohort on EBP beliefs, implementation, and organisational culture and readiness for EBP findings. Inferential statistics were used to look for differences within each cohort based on factors such as age, years of experience, and academic qualification. Table 9 provides an overview of the mean scores (and standard deviations) achieved on each scale within each cohort. The median scores are presented for EBP implementation as their distributions on this variable were all positively skewed. Possible scores for each variable are also provided in the table to serve as a point of reference.

Table 9: Total Mean Scores by Cohort on the EBP Scales

	EBP Beliefs	EBP Implementation	Organisational Culture and Readiness for EBP
Lecturer Cohort	**87.72 (10.91)** (Possible Scores 22-110)	**31.09 (16.54)** **Median = 29** (Possible Scores 0-72)	**86.43 (15.01)** (Possible Scores 25-125)
Student Cohort	**55.18 (10.29)** (Possible Scores 16-80)	**16.59 (12.11)** **Median = 14** (Possible Scores 0-72)	**93.21 (16.21)** (Possible Scores 25-125)
Clinical Cohort	**59.98 (8.68)** (Possible Scores 16-80)	**12.85 (14.00)** **Median 8** (Possible Scores 0-72)	**74.07 (19.65)** (Possible Scores 25-125)

EBP Beliefs

Lecturer Cohort – Descriptive Statistics

The mean score for EBP beliefs in the lecturer cohort was 87.72 (SD 10.91). This score conveys positive commitment among lecturers to EBP. It also signifies opportunity for improving agreement across lecturers in their knowledge of, confidence in and belief in their ability to teach and implement EBP. The minimum score was 65 and the maximum score was 110. There were between 4 and 6 missing values on each of the items on this scale. However, Little's MCAR test determined that values were missing at random (Sig. = 0.563) and therefore no further consideration was required. Participants indicated means between 4.19 and 4.7 on scale items concerning participants' belief in the positive impact of EBP, for example, "I am sure that implementing EBP will improve the care that my students deliver to patients", and "I believe that EBP results in the best clinical care for patients", all attracted scores between 4.19 and 4.7. This represents an "agree" response leaning toward a "strongly agree" response, signifying clearly that lecturers consider that EBP offers the best clinical care and yields positive outcomes. The two lowest scoring items on the EBPE-E Scale© were the reverse-scored items, "I believe that EBP takes too much time" and "I believe that EBP is difficult". These items obtained scores of 2.04 and 2.69 respectively, suggesting that the majority of lecturers did not indicate that EBP takes too much time or is difficult. Forty percent of participants agreed that EBP takes too much time and 28% of participants agreed that EBP is difficult.

Participants' mean responses to items about confidence in their ability to teach EBP and integrate it into the curriculum ranged from 3.94 to 4.27, largely signifying a positive "agree" response to these items. Yet, 31% of participants indicated that they did not "agree" or "strongly agree" with the item "I am sure that I can teach how to develop a PICOT question" and 18% did not "agree" or "strongly agree" with the item "I am clear about the steps of EBP". Means ranging from 3.24 to 4.07 for items concerning their ability to implement EBP indicated some agreement among lecturers but with a larger group choosing the neutral response of "neither agree nor disagree". For example, items lecturers were unsure about included "I believe that I can implement EBP in a time efficient way" (30%), "I believe that I can overcome barriers in implementing EBP" (27%), and "I am sure that I can implement EBP" (18%). Table 10 displays the mean scores of items concerning lecturers' beliefs in EBP and items concerning belief in ability to implement EBP in rank order of responses.

Table 10: Mean Scores in rank order of items on EBPB-E Scale©

Mean Scores in rank order of items on EBPB-E Scale© (n = 71)					
Items in Rank Order of Responses (high to low)	**Mean(SD)**	**Strongly agree/ agree**	**Neither agree nor disagree**	**Strongly disagree/disagree**	**Miss-ing**
I believe that critically appraising evidence is an important step in the EBP process	4.7(.46)	94%	0%	0%	6%
I believe that evidence-based guidelines can improve clinical care	4.38(.70)	85%	7%	1%	7%
I am sure that integrating EBP into the curriculum will improve the care that students deliver to their patients	4.33(.71)	87%	4%	3%	6%
I am sure that implementing EBP will improve the care that my students deliver to patients	4.27(.71)	86%	6%	1%	7%
I believe that EBP results in the best clinical care for patients	4.19(.96)	81%	6%	7%	6%
I believe that EBP is difficult*	2.69(1.06)	28%	19%	43%	8%
I believe that EBP takes too much time*	2.04(1.00)	11%	15%	68%	6%
Items concerning <u>self-belief</u> in ability to implement EBP on the EBPB-E Scale©					
I am sure that I can teach EBP	4.27(.65)	83%	10%	0%	7%
I am sure that I can teach how to search for the best evidence	4.25(.66)	86%	7%	1%	6%
I am sure that I can access the best resources in order to integrate EBP in the curriculum	4.16(.85)	76%	14%	4%	6%
I am clear about the steps of EBP	4.07(.84)	76%	13%	5%	6%
I am confident about my ability to implement EBP where I work	4.07(.91)	77%	10%	7%	6%
I know how to teach EBP sufficiently enough to impact students' practice	4.07(.79)	75%	17%	3%	5%
I believe that I can search for the best evidence to answer clinical questions in a time efficient way	4.04(1.04)	73%	10%	11%	6%
I know how to implement EBP sufficiently enough to make curricular changes	3.99(.79)	76%	13%	6%	5%
I am sure that I can teach EBP in a time efficient way	3.97(.76)	74%	16%	4%	6%
I believe the care that I deliver is evidence-based	3.97(.72)	69%	25%	0%	6%
I am sure that I can teach how to develop a PICOT question	3.94(1.01)	63%	21%	10%	6%
I am sure that I can implement EBP	3.89(.81)	69%	18%	6%	7%
I am sure about how to measure the outcomes of clinical care	3.75(.84)	66%	18%	10%	6%
I believe that I can overcome barriers in implementing EBP	3.28(1.03)	44%	27%	24%	5%
I am sure that I can implement EBP in a time efficient way	3.24(1.02)	39%	30%	24%	7%
***Reverse scores provided**					

Lecturer Cohort – Inferential Statistics

Independent t-tests were conducted to compare the EBP beliefs of lecturers who are registered on the Nurse Tutors division (RNT) of the NMBI register (n=38) with those who are not (n=33) (Table 11). In advance of performing a t-test, it is important to consider Levene's test for equality of variance in order to discern which t-value is the appropriate one to use. As is evident from the Independent Samples Test table (Table 8), the p-value (0.557) was non-significant, indicating that the assumption regarding homogeneity of variance has not been violated. Using the "equal variances assumed" line, it can be seen that there was no statistically significant difference in EBP beliefs between lecturers who were registered on the RNT Division of the NMBI register (*M* = 86.62, *SD* = 10.56) and lecturers who were not (*M* = 88.87, *SD* = 11.32; *t* (59) = -.805, *p* = .424, two-tailed). Therefore registration with the NMBI as an RNT did not make a difference in EBP beliefs among lecturers.

Table 11: Independent Samples Test - RNT Registration on EBP Beliefs Lecturer Cohort

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
EBPB-E Score	Equal variances assumed	.349	.557	-.805	59	.424	-2.254	2.801	-7.859	3.352
	Equal variances not assumed			-.804	58.382	.425	-2.254	2.805	-7.867	3.359

One-way between-groups analysis of variance was undertaken to investigate the effects of both the number of years that lecturers have been in education, and their academic qualification, on the EBP beliefs (Table 12). Participants were divided into five groups (Group 1: < 2 years, n=5; Group 2: 3-5 years, n=7; Group 3: 6-10 years, n=11; Group 4: 11-15 years, n=13; and Group 5: > 16 years, n=34). No statistical difference was detected between the EBP beliefs across these groups. The number of years in education therefore yielded no difference on EBP beliefs of lecturers.

Table 12: ANOVA –Years in Education on EBP Beliefs Lecturer Cohort

		Sum of Squares	df	Mean Square	F	Sig.
EBPB-E Score	Between Groups	591.110	4	147.777	1.264	.295
	Within Groups	6545.153	56	116.878		
	Total	7136.262	60			

Academic qualification was designated as PhD (*n* = 17), master's degree (*n* = 39) and the remaining categories (bachelor's degree; higher/postgraduate diploma; post-doctoral qualification) which had 2 or fewer cases each. EBPB-E scores of those who held a master's degree were compared with those who held a PhD by independent t-tests. As is evident in Table 13, no statistical difference was detected on the EBP beliefs of lecturers who held an MSc qualification (*M* = 88.28, *SD* = 11.54) compared to those who held a PhD (*M* = 88.94, *SD* = 8.35; *t*(54) = .212, *p* = .833, two-tailed).

Table 13: Independent Samples Test – Academic Qualification on EBP Beliefs Lecturer Cohort

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
EBPB-E Score	Equal variances assumed	2.851	.097	-.212	54	.833	-.659	3.108	-6.891	5.573
	Equal variances not assumed			-.240	41.609	.811	-.659	2.741	-6.193	4.875

Student Cohort – Descriptive Statistics

The mean score for EBP beliefs in the student cohort was 55.18 (SD 10.29), indicating less than agreement with their knowledge of, confidence in and belief in their ability to implement EBP (Fineout-Overholt, 2017). The minimum score was 22 and the maximum score was 76, revealing quite a wide range of beliefs in EBP. However, the majority of cases scored higher than 50, suggesting that students believe in EBP. On each item of this scale missing items were detected in the range of 33 to 45 (15-20%). When analysed using Little's MCAR test, it was found that these values were missing 'not at random' (Sig.=.007), suggesting that there is a non-random pattern to these missing values that is related to the scale items themselves. This might suggest poor

understanding of these questions among some students and/or a lack of knowledge of how to answer them, for example.

The highest scores were reported on the items concerning students' beliefs about the positive impact of EBP (EBP yielding the best clinical care of patients, EBP guidelines improving clinical care, EBP improving participants' care of patients). These scores ranged from 4.01 to 4.06, with all students indicating they "agree" with each of these items. The remaining items largely concerned the students' belief in their own ability to implement EBP and these scores ranged from 2.94 to 3.54, ranking them in the neutral response of "neither agree nor disagree", indicating students are unsure about their abilities to implement EBP. Two of the lower scoring items were the reverse-scored items, "I believe that EBP takes too much time" and "I believe that EBP is difficult". These items obtained scores of 3.04 and 2.37 respectively, suggesting that the majority of students did not indicate that EBP takes too much time or is difficult. Ten percent of participants agreed that EBP takes too much time and 30% of participants agreed that EBP is difficult. The lowest reported score (2.94) was on the item "I know how to implement EBP sufficiently enough to make practice changes", with only 28% of students agreeing or strongly agreeing with this statement. Table 14 outlines the EBPB Scale© items in rank order in the student cohort.

Table 14: Mean Scores in rank order of items on EBPB Scale© in student cohort

Mean Scores in rank order of items on EBPB Scale© in student cohort (*n* = 222)					
Items in Rank Order of Responses (high to low)	**Mean(SD)**	**Strongly agree / agree**	**Neither agree nor disagree**	**Strongly disagree/ disagree**	**Missing**
I am sure that evidence-based guidelines can improve clinical care	4.06(1.26)	71%	2%	11%	16%
I am sure that implementing EBP will improve the care that I deliver to my patients	4.02(1.22)	68%	4%	10%	18%
I believe that EBP results in the best clinical care for patients	4.01(1.31)	68%	5%	12%	15%
I believe that critically appraising evidence is an important step in the EBP process	3.85(1.26)	63%	9%	12%	16%
I believe that EBP is difficult*	3.04(1.08)	30%	25%	27%	18%
I believe that EBP takes too much time*	2.37(.93)	10%	23%	48%	19%
Items concerning students' self-belief in ability to implement EBP					
I believe the care that I deliver is evidence-based	3.54(1.19)	53%	16%	13%	18%
I am sure that I can implement EBP	3.40(1.14)	47%	18%	18%	18%
I am sure that I can implement EBP in a time efficient way	3.20(1.06)	34%	29%	19%	18%
I am clear about the steps of EBP	3.17(1.09)	36%	20%	26%	18%
I believe that I can search for the best evidence to answer clinical questions in a time efficient way	3.13(1.07)	34%	24%	24%	18%
I believe that I can overcome barriers in implementing EBP	3.10(.92)	28%	34%	19%	19%
I am sure about how to measure the outcomes of clinical care	3.09(.99)	30%	27%	24%	19%
I am sure that I can access the best resources in order to implement EBP	3.03(1.04)	31%	25%	25%	19%
I am confident about my ability to implement EBP where I work	3.03(1.07)	33%	19%	28%	20%
I know how to implement EBP sufficiently enough to make practice changes	2.94(.98)	28%	21%	31%	20%
***Reverse scores provided**					

Student Cohort – Inferential Statistics

One-way between-groups analysis of variance was conducted to explore the effect of year of study, and the programme of study (RGN, n=44; RM, n=60; RNID, n=50; RPN, n=2; RCN, n=63) on students' EBP beliefs. One-way analysis of variance is employed when the independent variable has a number of different groups and the dependent variable is a continuous variable (Pallant, 2016). In this case there were five subgroups comprising years 1 (n=44), 2 (n=63), 3 (n=60), 4 (n=50), and 5 (n=2), and the continuous variable was EBP beliefs. Prior to ascertaining the presence of any differences between these groups, it was imperative to establish if the groups were homogenous. This was checked while conducting the ANOVA using Levene's test for equality of variance (Table 15).

Table 15: Test of Homogeneity of Variances (Year of Study) Student Cohort

Test of Homogeneity of Variances (Year of Study)			
Students' Year of Study (1, 2, 3, 4, 5)			
Levene Statistic	df1	df2	Sig.
.704	4	159	.591

As is evident from the Levene statistic (Table 16), the significance value is 0.591, indicating that the assumption regarding homogeneity of variance has not been violated (Field, 2017). Between groups ANOVA revealed no statistically significant differences in the EBP beliefs of students in different year groups: $F(4, 159) = .839$, $p = .502$ (Table 13). The student's year of study did not affect his/her beliefs around EBP.

Table 16: ANOVA –Year of Study (1-5) on EBP Beliefs Student Cohort

ANOVA – Student Cohort - Year of Study (1-5) on EBP Beliefs					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	358.886	4	89.721	.839	.502
Within Groups	16993.602	159	106.878		
Total	17352.488	163			

With regard to the impact of the programme of study that students were undertaking on their EBP beliefs, the students were again divided into 5 groups (Group 1- RGN, n=44; Group 2 – RCN, n=63; Group 3 – RM, n=60; Group 4 – RNID, n=50; and Group 5 – RPN, n=2) to facilitate between-groups ANOVA (Table 17). Between-groups ANOVA did not uncover any statistically significant differences between the EBP beliefs of these groups: $F(4, 159) = .839$, $p = .502$.

Table 17: ANOVA – Programme of Study on EBP Beliefs Student Cohort

ANOVA – Impact of Programme of Study on EBP Beliefs						
		Sum of Squares	df	Mean Square	F	Sig.
EBPB Score (Students)	Between Groups	358.886	4	89.721	.839	.502
	Within Groups	16993.602	159	106.878		
	Total	17352.488	163			

Clinical Cohort – Descriptive Statistics

The mean score for EBP beliefs in the clinical cohort was 59.98 (SD 8.68). This score suggests positive beliefs about EBP but less than agreement with their knowledge of, confidence in and belief in their ability to implement EBP (Fineout-Overholt, 2017). The minimum score was 27 and the maximum score was 80, indicating quite a variation in responses. Missing values on this scale varied from 2 to 11 (0.7-3.8%) per item. Missing values analysis demonstrated that these values were missing at random (Sig. = .079) and therefore no further consideration was required.

Items with higher reported scores concerned participants' beliefs about the positive impact of EBP (scores ranging from 4.24-4.44), such as EBP resulting in the best clinical care of patients, EBP guidelines improving clinical care, EBP improving participants' care of patients, and the importance of critical appraisal of evidence in EBP. Items with lower reported scores generally concerned participants' confidence in their ability to implement EBP (scores ranging from 3.39-3.9), for example, accessing resources and searching for evidence to implement EBP, how to implement EBP to change practice, overcoming barriers to EBP, knowledge of the steps of EBP, and evaluation of outcomes. However, despite the lower scores generally being achieved on items concerning participants' confidence to implement EBP, 81% of participants believed that the care they deliver is evidence-based and 74% believe that they can implement EBP. The two lowest scoring items on the were the reverse-scored items, "I believe that EBP takes too much time" and "I believe that EBP is difficult". These items obtained scores of 2.73 and 2.64 respectively, suggesting that the majority of nurses and midwives did not indicate that EBP takes too much time or is difficult. Eighteen percent of participants agreed that EBP takes too much time and 20% of participants agreed that EBP is difficult. Table 18 outlines the EBPB Scale© items in rank order of participant responses in the clinical cohort.

Table 18: Mean Scores in rank order of items on EBPB Scale© in clinical cohort

Mean Scores in rank order of items on EBPB Scale© in clinical cohort (*n* = 292)					
Items in Rank Order of Responses (high to low)	**Mean(SD)**	**Strongly agree/ agree**	**Neither agree nor disagree**	**Strongly disagree/d isagree**	**Missing**
I believe that EBP results in the best clinical care for patients	4.44(.67)	**93%**	**5%**	**1%**	**1%**
I am sure that evidence-based guidelines can improve clinical care	4.43(.60)	94%	5%	0%	1%
I am sure that implementing EBP will improve the care that I deliver to my patients	4.31(.65)	92%	6%	1%	1%
I believe that critically appraising evidence is an important step in the EBP process	4.24(.70)	87%	9%	2%	2%
I believe that EBP is difficult*	2.73(.97)	20%	36%	43%	1%
I believe that EBP takes too much time*	2.64(1.02)	18%	35%	46%	1%
Items concerning nurses' & midwives' self-beliefs in ability to implement EBP					
I believe the care that I deliver is evidence-based	4.02(.74)	81%	15%	3%	1%
I am sure that I can implement EBP	3.90(.86)	74%	15%	7%	4%
I am confident about my ability to implement EBP where I work	3.61(.90)	63%	24%	12%	1%
I am clear about the steps of EBP	3.60(1.02)	57%	27%	13%	3%
I believe that I can search for the best evidence to answer clinical questions in a time efficient way	3.57(1.00)	58%	25%	16%	1%
I am sure that I can implement EBP in a time efficient way	3.52(.82)	50%	41%	8%	1%
I am sure about how to measure the outcomes of clinical care	3.53(.96)	56%	25%	17%	2%
I believe that I can overcome barriers in implementing EBP	3.46(.85)	49%	40%	10%	1%
I am sure that I can access the best resources in order to implement EBP	3.43(.90)	47%	38%	13%	2%
I know how to implement EBP sufficiently enough to make practice changes	3.39(.94)	51%	29%	17%	3%
***Reverse scores provided**					

Clinical Cohort – Inferential Statistics

One-way between-groups analysis of variance was conducted to explore the effect of age, number of years qualified, academic qualification, and clinical role on EBP beliefs in the clinical cohort. With regard to age, participants were divided into four age-groups (Group 1: 20-24 years, n=8); Group 2: 25-34 years, n=50); Group 3: 35-44 years, n=118); Group 4: 45 years and above, n=116). Homogeneity of variance was checked using Levene's test (Table 19). The non-significant result (.724) indicates that there is homogeneity of variance.

Table 19: Test of Homogeneity of Variances (Age Groups) EBP Beliefs Clinical Cohort

Test of Homogeneity of Variances (Age Groups)			
Clinical EBPB Score			
Levene Statistic	df1	df2	Sig.
.441	3	257	.724

As the ANOVA table (Table 20) demonstrates, there were no statistically significant differences detected on the EBPB scores between any of the age-groups: F (3, 257) = .377, p = .77). Therefore, in the clinical cohort, age did not make a difference in participants' beliefs about EBP.

Table 20: ANOVA - Age-groups on EBP Beliefs Clinical Cohort

ANOVA (Clinical Cohort – Age-groups on EBP Beliefs)					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	85.936	3	28.645	.377	.770
Within Groups	19518.003	257	75.946		
Total	19603.939	260			

The effect of the number of years clinical nurses and midwives were qualified was explored in relation to their EBP beliefs (Table 21). Participants were divided into the following four groups; 1 (> 2 years, n=7), 2 (2-5 years, n=20), 3 (6-10 years, n=32), and 4 (>10 years, n=232). There were no statistically significant differences found in EBP beliefs across these groups: F(3, 256) = .732, p = .534). Therefore, in the clinical cohort, the number of years that a nurse or midwife was qualified did not make a difference in their beliefs about EBP.

Table 21: ANOVA - Years Qualified on EBP Beliefs Clinical Cohort

ANOVA - Clinical Cohort – Years Qualified on EBP Beliefs						
		Sum of Squares	df	Mean Square	F	Sig.
Total Clinical EBPB Score	Between Groups	166.709	3	55.570	.732	.534
	Within Groups	19436.257	256	75.923		
	Total	19602.965	259			

The highest academic qualification was considered with regard to its potential impact on the EBP beliefs in the clinical cohort (Table 22). Participants were divided into five groups (Group 1 – certificate, n=37; Group 2 – diploma, n=31; Group 3 - bachelor's degree, n=112; Group 4 - postgraduate/higher diploma, n=82; and Group 5 - master's degree, n=30) since there were no PhD's in this cohort. Statistically significant differences across these groups indicate that EBP beliefs vary based on academic preparation within the clinical cohort: F(4, 256) = 7.929, p = .000.

Table 22: ANOVA - Academic Qualification on EBP Beliefs Clinical Cohort

ANOVA - Clinical Cohort – Academic Qualification on EBP Beliefs						
		Sum of Squares	df	Mean Square	F	Sig.
Total Clinical EBPB Score	Between Groups	2161.129	4	540.282	7.929	.000
	Within Groups	17442.810	256	68.136		
	Total	19603.939	260			

However, using eta squared, the effect size was calculated at 0.11, indicating a trivial effect according to the guidelines provided by Walker and Almond (2010) (Table 23).

Table 23: Effect Size (Eta Squared) (Walker and Almond, 2010)

Eta Squared	Interpretation
< 0.1	Trivial effect
0.2-0.5	Small effect
0.5-0.8	Moderate effect
≥ 0.8	Large effect

Post hoc tests using Tukey HSD were conducted to identify where the differences occurred in these groups (Appendix 9). Group 1 (*M* = 53.94, *SD* = 10.85) differed significantly from Groups 3 (*M* = 59.89, *SD* = 8.09), 4 (*M* = 61.34, *SD* = 7.93), and 5 (*M* = 65.42, *SD* = 4.98). Clinical nurses and midwives who hold a bachelor's degree or higher education scored significantly higher on the EBPB Scale© and therefore had significantly higher beliefs in EBP than clinical nurses and midwives whose highest academic qualification was at certificate level.

The role held by participants in the clinical cohort was examined with respect to its potential influence on their EBP beliefs (Table 24). Between-groups ANOVA facilitated this exploration. Participants were divided into seven groups (Group 1 - Staff Nurse/Midwife, n=185; Group 2 - Clinical Nurse/Midwife Manager 1, n=26; Group 3 - Clinical Nurse/Midwife Manager 2, n=51; Group 4 - Clinical Nurse/midwife Manager 3, n=3; Group 5 - Clinical Nurse/Midwife Specialist, n=14; Group 6 - Registered Advanced Nurse/Midwife Practitioner, n=6; and Group 7 - Assistant Director of Nursing/Midwifery, n=7). Statistically significant differences were found in EBP beliefs in these groups: *F* (6, 253) = 4.557, *p* = .000). Therefore, in the clinical cohort, the role held by nurses made a difference in their beliefs about EBP. Using eta squared, the size of effect was calculated at 0.1, indicating a small effect.

Table 24: ANOVA - Clinical Cohort – Role held by Clinical Nurses and Midwives on EBP Beliefs

ANOVA - Clinical Cohort – Role held by Clinical Nurses and Midwives on EBP Beliefs						
		Sum of Squares	df	Mean Square	F	Sig.
EBPB Score (Clinical Cohort)	Between Groups	1956.707	6	317.884	4.557	.000
	Within Groups	17647.231	253	69.752		
	Total	19603.939	259			

Post hoc tests using Tukey HSD were conducted to identify where the differences occurred in these groups (Appendix 9). Group 1 (*M* = 58.5, *SD* = 8.5) differed significantly from group 3 (*M* = 63.3, *SD* = 8.84). Group 3 (*M* = 63.3, *SD* = 8.84) differed significantly from group 8 (*M* = 51.67, *SD* = 12.24).

Group 5 (*M* = 64.85, *SD* = 5.98) differed significantly from group 8 (*M* = 51.67, *SD* = 12.24). These findings indicate that clinical nurse or midwife managers 2 (CNM2 / CMM2) have significantly higher beliefs about EBP than staff nurses and midwives. Clinical nurse or midwife managers 2 (CNM2 / CMM2) have significantly higher beliefs about EBP than assistant directors of nursing or midwifery. Clinical nurse or midwife specialists have significantly higher beliefs in EBP than assistant directors of nursing or midwifery.

EBP Implementation

Lecturer Cohort – Descriptive Statistics

The mean score for EBP implementation in the lecturer cohort was 31.09 (SD 16.54). Given the positively skewed distribution of this scale, the median score was preferable as this is not affected by extreme scores and therefore more accurately represents the centre-point of the data. The median score was 29, which is lower than the mean score suggests, and signifies low levels of EBP implementation among lecturers. The minimum score was 8 and the maximum score was 70, demonstrating very disparate responses. On inspection of missing values, 9 to 10 (13-14%) were detected on each item of the scale. However, these were found to be missing at random (Sig. = .974) and therefore no further consideration was required.

As is evident on Table 25, which lists the items on the EBPI-E Scale© in rank order of participant responses, 10 items had reported scores ranging from 2.05 to 2.9, placing them largely in the "1-3 times in the previous 8 weeks" category. These items comprise activities such as generating PICOT questions, sharing evidence from studies, an EBP guideline, or outcome data with colleagues, the use of an EBP guideline or systematic review to change educational strategies. Educators teaching about EBP would be expected to engage in such activities 6-7 times in an 8 weeks period (Fineout-Overholt, 2018). Items with reported scores ranging from 3.00 to 3.84 ("4-5 times in the previous 8 weeks") included the critical appraisal of evidence from research studies, use of evidence to change practice, informal discussion of evidence with colleagues, collection of data on a clinical education issue, sharing evidence with a student, or accessing the National Guidelines Clearinghouse, National Institute for Clinical Excellence or other sources of healthcare guidelines. Interestingly, in the previous eight weeks 31% of lecturers did not use an EBP guideline or systematic review to change educational strategies where they work. Almost 40% did not evaluate an educational initiative by collecting outcomes, and 38% did not share outcome data with colleagues. In consideration of these findings, it is unsurprising that the lowest score (1.92) was attributed to the item "changed curricular policies/materials based on outcome data", with almost 50% of lecturers not engaging in this activity at all in the same time frame.

Table 25: Mean Scores in rank order of items on the EBPI-E Scale©

Mean Scores in rank order of items on the EBPI-E Scale© (*n* = 71)							
Items in Rank order of Responses (high to low). In the past 8 weeks I….	**Mean (SD)**	**0 times**	**1-3 times**	**4-5 times**	**6-8 times**	**>8 times**	**Missing**
Critically appraised evidence from a research study	3.84 (1.16)	0%	17%	16%	20%	35%	12%
Shared evidence from a research study with a student	3.61 (1.30)	4%	17%	20%	14%	32%	13%
Read and critically appraised a clinical research study	3.42 (1.38)	4%	28%	11%	14%	30%	13%
Used evidence to change my teaching	3.39 (1.18)	3%	23%	18%	25%	18%	13%
Informally discussed evidence from a research study with a colleague	3.27 (1.23)	4%	27%	14%	25%	17%	13%
Accessed National Guidelines Clearinghouse, National Institute for Clinical Excellence or other source of healthcare guidelines	3.05 (1.47)	17 %	17%	18%	13%	21%	14%
Collected data on a clinical/educational issue	3.00 (1.31)	13 %	25%	20%	9%	21%	12%
Accessed the Cochrane database of systematic reviews	2.90 (1.53)	20 %	22%	15%	6%	24%	13%
Shared evidence from a study or studies in the form of a report or presentation to more than 2 colleagues	2.68 (1.47)	24 %	21%	20%	4%	18%	13%
Promoted the use of EBP to my colleagues	2.53 (1.41)	30 %	18%	11%	20%	8%	13%
Shared an EBP guideline with a colleague	2.34 (1.31)	28 %	28%	13%	10%	9%	13%
Evaluated the outcomes of an educational change	2.23 (1.30)	31 %	28%	11%	7%	9%	14%
Shared evidenced from a Research study with a multi disciplinary team member	2.23 (1.49)	42 %	17%	6%	11%	11%	13%
Used an EBP guideline or Systematic review to change Educational strategies where I work	2.18 (1.22)	31 %	30%	14%	6%	7%	12%
Generated a PICO question about my teaching/practice specialty	2.05 (1.18)	32 %	35%	6%	7%	6%	14%
Evaluated an educational initiative by collecting outcomes..	2.05 (1.29)	39 %	25%	10%	4%	9%	13%
Shared the outcome data collected with colleagues	2.05 (1.26)	38 %	25%	10%	6%	7%	14%
Changed curricular policies /materials based on outcome data	1.92 (1.23)	46 %	18%	11%	6%	6%	13%

Lecturer Cohort – Inferential Statistics

Independent sample t-tests were conducted to compare the EBP implementation of lecturers who are registered on the Nurse Tutors division (RNT) of the NMBI register (n=38) with those who are not (n=33) (Table 26). Homogeneity of variance was checked using Levene's test and had not been violated (Sig. = .418). No statistically significant difference was revealed between the EBP implementation of lecturers registered on the RNT division of the NMBI register (*M* = 30.46, *SD* = 17.22), and those who were not (*M* = 31.67, *SD* = 16.15; *t*(56) = .274, *p* = .785, two-tailed). Therefore RNT registration made no difference in EBPI-E scores.

Table 26: Independent Samples Test - RNT Registration on Lecturer EBP Implementation

Independent Samples Test - RNT Registration on Lecturer EBP Implementation										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
EBPI-E Score Lecturer Cohort	Equal variances assumed	.665	.418	-.274	56	.785	-1.202	4.381	-9.980	7.575
	Equal variances not assumed			-.274	55.009	.785	-1.202	4.391	-10.003	7.598

The effects of both the number of years that lecturers have been in education, and their academic qualification on the EBPI-E Scale© score (Table 27) were investigated. Participants were divided into five groups (Group 1: >2 years, n=5; Group 2: 3-5 years, n=7; Group 3: 6-10 years, n=11; Group 4: 11-15 years, n=13; and Group 5: >16 years, n=34). The number of years in education exerted no significant difference on lecturers' EBP implementation: *F*(4, 52) = .647, *p* = .632.

Table 27: ANOVA – Years in Education on Lecturer EBP Implementation

ANOVA – Years in Education on Lecturer EBP Implementation						
		Sum of Squares	df	Mean Square	F	Sig.
EBPI-E Score	Between Groups	731.597	4	182.899	.647	.632
	Within Groups	14710.333	52	282.891		
	Total	15441.930	56			

Independent t-tests were conducted to explore the influence that academic preparation might exert on the EBP implementation (Table 28), as the majority of lecturers held either a master's degree (*n* = 39) or a PhD (*n* = 17). Group 1 comprised lecturers whose highest academic qualification was a master's degree and Group 2 comprised lecturers who held a PhD. These tests identified statistically

significant differences between the EBP implementation of these two groups but the size of effect (Eta squared = .02) was trivial (Walker and Almond, 2010). Group 1 (*M* = 26, *SD* = 13.28) differed significantly from Group 2 (*M* = 41.74, *SD* = 18.20; *t*(52) = 3.642, *p* = .001). This indicates that lecturers whose highest academic qualification was a PhD had significantly higher implementation of EBP than lecturers who hold a master's degree.

Table 28: Independent Samples Test – Academic Preparation on Lecturer EBP Implementation

Independent Samples Test – Academic Preparation on Lecturer EBP Implementation										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
EBPI-E Score	Equal variances assumed	3.445	.069	-3.642	52	.001	-15.737	4.321	-24.407	-7.066
	Equal variances not assumed			-3.320	28.632	.002	-15.737	4.741	-25.438	-6.036

Student Cohort – Descriptive Statistics

The mean score for EBP implementation in the student cohort was 16.59 (SD 12.11). The minimum score was 0 and the maximum score was 58. The positively skewed distribution of this scale, coupled with the scale score itself, indicates low levels of EBP implementation among students. However, as previously mentioned, it is always beneficial to consider the median in the case of a positively skewed distribution. The median score on EBP implementation among the student cohort was 14, which is lower than the mean. Missing values were detected on all variables in the range of 59-61 (26.6-27.5%) per item. When analysed using Little's MCAR test, it was found that these values were missing 'not at random' (Sig. = .009), suggesting that there is a non-random pattern to these missing values that is related to the scales themselves. This could indicate poor understanding of the questions among some students, and/or a lack of knowledge of how to answer them, for example.

As Table 29 demonstrates, the highest scoring item on the EBPI Scale© in the student cohort is "used evidence to change my clinical practice," achieving a score of 1.49 and indicating that on average students used evidence to change practice less than three times in the previous eight weeks. Seventeen percent of students did not use evidence to change practice at all in the previous eight weeks. Twenty seven percent of students stated that they used evidence to change practice less than three times in the previous eight weeks while 29% percent of students did so at least five times in the same timeframe. This implies that 56% of students have, to varying extents, used

evidence to change practice in the previous eight weeks. The mean score on ten of the eighteen items was less than 1 (ranging from 0.48 – 0.97) placing these items in the 0 (zero times) category. These items include generating a PICOT question, sharing evidence from a research study, or EBP guidelines with colleagues, evaluation of outcomes of practice change or care initiative, using an EBP guideline or systematic review to change practice, changing practice based on patient outcome data, and sharing outcome data with colleagues. Most of these items relate to steps of the EBP process that are integral to its implementation. In other words, the virtual absence of these steps (as the scores suggest) indicates an absence of EBP. Students learning about EBP would be expected to engage in such activities 6-7 times in an 8 weeks period (Fineout-Overholt, 2017).

Participants reported scores between 1.01 and 1.40 on the remaining items on the scale, including critical appraisal of a research study, informal discussion of evidence from a study with a colleague, or patient/family member, collection of data on a patient problem, or accessing the Cochrane database or National Clearinghouse or NICE for sources of evidence. As low as these item means were, the distribution of the EBPI Scale© in the student cohort is positively skewed (towards lower scores) and, as a result, the medians, which are probably a more accurate measure of central tendency in such circumstances, are all lower than the listed means (ranging from 0.00 – 1.00).

Table 29: Mean Scores in rank order of items on EBPI (Student Cohort)

EBPI Mean Scores in Student Cohort (*n* = 222)							
Items in Rank Order of Responses (high to low). In the past 8 weeks I…	**Mean (SD)**	**0 times**	**1-3 times**	**4-5 times**	**6-8 times**	**>8 times**	**Missing**
Used evidence to change my clinical practice	1.49 (1.25)	17%	27%	12%	10%	7%	27%
Accessed the National Guidelines Clearinghouse, National Institute for Clinical Excellence or other source of healthcare guidelines	1.40 (1.34)	23%	22%	11%	9%	8%	27%
Critically appraised evidence from a research study	1.35 (1.25)	22%	26%	10%	9%	6%	27%
Collected data on a patient problem	1.26 (1.18)	31%	18%	8%	8%	8%	27%
Informally discussed evidence from a research study with a colleague	1.25 (1.18)	22%	27%	14%	4%	6%	27%
Read and critically appraised a clinical research study	1.20 (1.16)	23%	27%	12%	6%	5%	27%
Accessed the Cochrane database of systematic reviews	1.06 (1.26)	32%	21%	8%	5%	6%	27%
Shared evidence from a research study with a patient/family member	1.01 (1.13)	32%	21%	12%	5%	3%	27%
Shared an EBP guideline with a colleague	.97 (1.04)	30%	24%	12%	5%	2%	27%
Evaluated the outcomes of a practice change	.86 (1.07)	34%	23%	9%	5%	2%	27%
Shared evidence from a study or studies in the form of a report or presentation to more than 2 colleagues	.83 (1.08)	38%	19%	9%	5%	2%	27%
Promoted the use of EBP to my colleagues	.73 (1.00)	39%	22%	7%	3%	2%	27%
Evaluated a care initiative by collecting patient outcome data	.68 (1.04)	44%	18%	4%	5%	2%	27%
Changed practice based on patient outcome data	.54 (.90)	47%	17%	5%	2%	2%	27%
Shared evidenced from a research study with a multi disciplinary team member	.53 (.91)	48%	16%	5%	2%	2%	27%
Generated a PICO question about my clinical practice	.53 (.81)	46%	17%	8%	1%	1%	27%
Used an EBP guideline or systematic review to change clinical practice where I work	.52 (.91)	50%	14%	5%	4%	1%	27%
Shared the outcome data collected with colleagues	.48 (.85)	50%	14%	5%	4%	0%	27%

Student Cohort – Inferential Statistics

One-way between-groups analysis of variance was conducted to explore the impact of year of study (Year 1, n=44); Year 2, n=63; Year 3, n=60; Year 4, n=50; and Year 5, n=2), and the programme of study (RGN, n=44; RM, n=60; RNID, n=50; RPN, n=2; RCN, n=63) on EBP implementation in the student cohort. Homogeneity of variance was checked using Levene's test for equality of variance (Table 30), and was demonstrated (Sig. = .482).

Table 30: Test of Homogeneity of Variances (Year of Study) EBPI (Student Cohort)

Test of Homogeneity of Variances (Year of Study)			
EBPI Score (Student Cohort)			
Levene Statistic	df1	df2	Sig.
.825	3	148	.482

Between groups ANOVA revealed no statistically significant differences in EBP implementation of students in different year groups: $F(4, 148) = .914$, $p = .458$ (Table 31). The year of study that a student was in, therefore, did not affect significantly his/her implementation of EBP.

Table 31: ANOVA – Year of Study (1-5) on Student EBP Implementation

ANOVA – Year of Study (1-5) on Student EBP Implementation					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	538.751	4	134.688	.914	.458
Within Groups	21820.190	148	147.434		
Total	22358.941	152			

With regard to the impact of the programme of study that students were undertaking on EBP implementation, the students were again divided into 5 groups (Group1 – RGN, n=44; Group 2 – RCN, 63; Group 3 – RM, 60; Group 4 – RNID, n=50; and Group 5 – RPN, n=2) to facilitate between-groups ANOVA (Table 32). Between-groups ANOVA did not reveal any statistically significant differences between EBP implementation across these groups: $F(4, 148) = .914$, $p = .458$.

Table 32: ANOVA – Programme of Study on Student EBP Implementation

ANOVA – Programme of Study on Student EBP Implementation						
		Sum of Squares	df	Mean Square	F	Sig.
Total EBPI Score	Between Groups	538.751	4	134.688	.914	.458
	Within Groups	21820.190	148	147.434		
	Total	22358.941	152			

Clinical Cohort – Descriptive Statistics

The mean score for EBP implementation in the clinical cohort was 12.85 (SD14), revealing very low levels of EBP implementation. The minimum score was 0 and the maximum score was 65. Similar to the lecturer and student cohorts, the distribution of this scale was positively skewed demonstrating a leaning towards low scores. The median, therefore, is likely to be more representative of the central tendency, and in this case the median is 8, substantially lower than the mean. Missing items in the range of 7 to 21 (2.4-7.2%) were identified on all items of this scale. Missing values analysis revealed that these items were missing 'not at random', suggesting a pattern related to the variables themselves. This may be indicative of lack of knowledge of the subject matter, poor understanding of what was being asked, or inability to answer. Table 33 provides an overview of the EBPI items in rank order.

The most common implementation item was the use of evidence to change practice with a mean score of 1.35 indicating that on average participants in this group performed this activity less than three times in the previous 8 weeks. Over 72% of participants (n = 211) stated that they had used evidence to change clinical practice with 32% (n = 93) doing so on at least five occasions in that period. More than 40% (n = 118) of clinical nurses and midwives reported that they had done so fewer than three times in the 8-week period and almost 24% of participants (n = 69) stated that they did not use evidence at all to change practice. The least common implementation item was accessing published EBP guidelines followed by the generation of a PICOT question, both of which were performed, on average, zero times in the previous 8 weeks. However, despite 72% of participants reporting that they used evidence to change practice, less than 50% (n = 142) indicated that they had evaluated the outcomes of a practice change, with the majority of those (n = 92) only doing so less than three times in that period. In the same timeframe, 24% (n = 70) generated a PICOT question about clinical practice, 39% (n = 114) read and critically appraised a clinical research study, 37% (n = 109) used an EBP guideline or systematic review to change practice, 47% (n = 136) collected data on a patient problem, and 35% (n = 102) evaluated a care initiative using patient outcome data. All of these activities reflect key steps of the EBP process. Evidence-based practitioners would reasonably be expected to perform these EBP activities 6-7 times in an 8 week period (Fineout-Overholt, 2017).

Table 33: Mean Scores in rank order of items on EBPI (Clinical Cohort)

EBPI Scale ©Mean Scores in Clinical Cohort (*n* = 292)							
Items in Rank Order of Responses (high to low).	**Mean (SD)**	**0 times**	**1-3 times**	**4-5 times**	**6-8 times**	**>8 times**	**Missing**
Used evidence to change my clinical practice	1.35 (1.91)	24%	40%	14%	10%	8%	4%
Informally discussed evidence from a research study with a colleague	.98 (1.09)	39%	36%	12%	6%	5%	3%
Collected data on a patient problem	.94 (1.24)	49%	23%	12%	4%	8%	4%
Shared an EBP guideline with a colleague	.85 (1.04)	44%	35%	9%	5%	4%	3%
Promoted the use of EBP to my colleagues	.84 (1.00)	46%	32%	10%	5%	4%	3%
Evaluated the outcomes of a practice change	.81 (1.05)	49%	32%	8%	6%	3%	2%
Critically appraised evidence from a research study	.79 (1.16)	54%	24%	10%	5%	4%	3%
Shared evidence from a research study with a patient/family member	.78 (1.03)	51%	30%	9%	5%	3%	2%
Read and critically appraised a clinical research study	.74 (1.15)	58%	22%	7%	4%	6%	3%
Shared evidence from a study or studies in the form of a report or presentation to more than 2 colleagues	.71 (1.02)	55%	26%	9%	5%	3%	2%
Shared evidenced from a research study with a multi-disciplinary team member	.71 (.93)	49%	36%	6%	3%	3%	3%
Evaluated a care initiative by collecting patient outcome data	.66 (1.10)	62%	19%	7%	5%	4%	3%
Used an EBP guideline or systematic review to change clinical practice where I work	.61 (.98)	59%	26%	5%	3%	3%	4%
Shared the outcome data collected with colleagues	.60 (.99)	62%	22%	6%	4%	3%	3%
Changed practice based on patient outcome data	.56 (.93)	62%	23%	6%	3%	3%	3%
Accessed the Cochrane database of systematic reviews	.53 (1.11)	72%	12%	4%	3%	6%	3%
Generated a PICO question about my clinical practice	.42 (.82)	69%	14%	6%	3%	1%	7%
Accessed the National Guidelines Clearinghouse, National Institute for Clinical Excellence or other source of healthcare guidelines	.29 (.84)	82%	6%	3%	2%	3%	4%

Two particularly infrequently implemented items concern accessing databases for EBP guidelines or systematic reviews. Just under 14% (n = 40) of participants accessed the National Guidelines Clearinghouse while 24% (n = 71) accessed the Cochrane Database of Systematic Reviews. Approximately 60% (n = 169) of participants stated that they had informally discussed evidence from a research study with a colleague, but almost 36% (n = 104) of participants did this less than three times in the 8-week period. While over 52% of participants shared an EBP guideline with a colleague only 18% did so more than three times in the previous 8 weeks and 45% not at all. Similarly, 48% (n =

141) of participants shared evidence from a research study with a member of the multidisciplinary team. However, only 17% had done so more than three times in the 8-week period, and 49% hadn't done so at all. Forty-three percent of participants shared evidence from a study in the form of a report/presentation but 26% did so less than three times and 55% not at all in the previous eight weeks. Nonetheless, over half of participants (n = 147) reported that they promoted the use of EBP to colleagues in the previous 8 weeks. Given that the distribution of EBP implementation in the clinical cohort is positively skewed, the majority of the medians, a more accurate measure of central tendency in such circumstances, are lower than the listed means, ranging from 0.00 – 1.00 (zero times).

Clinical Cohort – Inferential Statistics

One-way between-groups analysis of variance was conducted to explore the impact of age, number of years qualified, academic qualification, and clinical role on EBP implementation in the clinical cohort. In relation to age, participants were divided into four groups (Group 1: 20-24 years; Group 2: 25-34 years; Group 3: 35-44 years; Group 4: 45 years and above). Levene's test of homogeneity of variance yielded a significant statistic (Sig. = .02), indicating that this assumption has been violated (Table 34).

Table 34: Test of Homogeneity of Variances (Age Groups) EBPI (Clinical Cohort)

Test of Homogeneity of Variances (Age Groups)			
Clinical Cohort EBPI Score			
Levene Statistic	df1	df2	Sig.
3.344	3	247	.020

It was therefore necessary to consult the Robust Test of Equality of Means table to examine whether the EBPI score statistically varied across different age groups in the clinical cohort. Both the Welch test (p = .002) and the Brown-Forsythe test (p = .013) were statistically significant, indicating that there are differences in the EBPI scores across the different age-groups (Table 35).

Table 35: Robust Tests of Equality of Means – EBPI Clinical Cohort

Robust Tests of Equality of Means – EBPI Clinical Cohort				
Clinical Cohort EBPI Score				
	Statistic[a]	df1	df2	Sig.
Welch	6.315	3	27.228	.002
Brown-Forsythe	3.742	3	143.615	.013
a. Asymptotically F distributed.				

While ANOVA can detect differences between groups, it cannot specify which groups the differences exist between, so it was necessary to conduct post-hoc tests (Appendix 9) to ascertain this information. Post-hoc comparisons using the Tukey HSD test demonstrated a statistically significant

difference at the p < 0.05 level between groups 2 (25-34 years) and 3 (35-44 years). The mean EBP implementation score for group 2 was 17.98, and for group 3 was 11.58. While statistically significant, the size of the difference or effect was unclear. Using eta squared, an effect size of 0.04 was calculated. This indicates a trivial effect size (Walker and Almond, 2010) or a small difference between the two groups in question. Groups 1 and 4 did not differ significantly from any other groups.

The effect of the number of years clinical nurses and midwives were qualified was explored in relation to their EBP implementation (Table 36). Participants were divided into four groups (Group 1: <2 years, n=7; Group 2: 2-5 years, n=20; Group 3: 6-10 years, n=32; and Group 4: >10 years, 232). Significant differences were detected across the groups: $F(3, 247) = 3.676$, $p = .013$. Despite achieving statistical significance, the size of effect, calculated using eta squared was .04, representing a trivial effect only.

Table 36: ANOVA - Clinical Cohort – Years Qualified on EBP Implementation Clinical Cohort

ANOVA - Clinical Cohort – Years Qualified on EBP Implementation Clinical Cohort						
		Sum of Squares	df	Mean Square	F	Sig.
EBPI Score	Between Groups	2094.122	3	698.041	3.676	.013
	Within Groups	46905.424	247	189.901		
	Total	48999.546	250			

Post hoc tests using Tukey HSD were conducted to identify where the differences occurred in these groups (Appendix 9). Group 2 ($M = 22.94$, $SD = 28.15$) was significantly different from group 4 ($M = 11.8$, $SD = 13.16$), suggesting that clinical nurses and midwives who were qualified between 2 and 5 years, reported significantly higher EBP implementation than their colleagues who were qualified for 10 years or more. No significant differences were identified across the other groups.

The highest academic qualification was considered with regard to EBP implementation in the clinical cohort (Table 37). Participants were divided into five groups (Group 1 – certificate, n=37; Group 2 – diploma, n=31; Group 3 - bachelor's degree, n=112; Group 4 - postgraduate/higher diploma, n=82; and Group 5 - master's degree, n=30). Statistically significant differences across these groups were uncovered: $F(4, 246) = 8.460$, $p = .000$. Using eta squared, the effect size was calculated at 0.12, indicating a small effect as per the guidelines proffered by Walker and Almond (2010).

Table 37: ANOVA - Clinical Cohort – Academic Qualification on EBP Implementation Clinical Cohort

ANOVA - Clinical Cohort – Academic Qualification on EBP Implementation Clinical Cohort						
		Sum of Squares	df	Mean Square	F	Sig.
EBPI Score	Between Groups	5925.212	4	1481.303	8.460	.000
	Within Groups	43074.334	246	175.099		
	Total	48999.546	250			

Post hoc tests using Tukey HSD were conducted to identify where the differences occurred in these groups (Appendix 9). Group 4 (*M* = 23.46, *SD* = 16.47) differed significantly from groups 1 (M = 5.6, SD = 6.03), 2 (*M* = 6.54, *SD* = 7.51), and 3 (M = 14.39, SD = 14.66). This implies that clinical nurses and midwives who hold a master's degree have significantly higher EBP implementation than their colleagues who are qualified to certificate, diploma, and bachelor degree levels. Group 1 (M = 5.6, SD = 6.03) also differed significantly from group 3 (M = 14.39, SD = 14.66). This indicates that clinical nurses and midwives who hold bachelor degrees report significantly higher EBP implementation than their colleagues who are qualified to certificate level.

The role held by participants in the clinical cohort was explored in relation to its potential impact on EBP implementation. Between-groups ANOVA facilitated this exploration (Table 38). Participants were divided into seven groups (Group 1 - Staff Nurse/Midwife, n=185; Group 2 - Clinical Nurse/Midwife Manager 1, n=26; Group 3 - Clinical Nurse/Midwife Manager 2, n=51; Group 4 - Clinical Nurse/midwife Manager 3, n=3; Group 5 - Clinical Nurse/Midwife Specialist, n=14; Group 6 - Registered Advanced Nurse/Midwife Practitioner, n=6; and Group 7 - Assistant Director of Nursing/Midwifery, n=7). Statistically significant differences in EBP implementation were not detected across these groups: $F(6, 243) = 2.036$, $p = .062$).

Table 38: ANOVA - Role on EBP Implementation Clinical Cohort

ANOVA - Role held by Clinical Nurses and Midwives on EBP Implementation Clinical Cohort						
		Sum of Squares	df	Mean Square	F	Sig.
EBPI Score	Between Groups	2340.245	6	390.041	2.036	.062
	Within Groups	46555.919	243	191.588		
	Total	48896.164	249			

Organizational Culture & Readiness for EBP

Lecturer Cohort – Descriptive Statistics

The mean score for organisational culture and readiness for EBP in the lecturer cohort was 86.43 (SD 15.01), demonstrating a moderate movement toward a culture of EBP but that culture was not yet sustainable (Fineout-Overholt, 2018). The minimum score was 57 and the maximum score was 115, illustrating variation in lecturers' perceptions of their organisations' readiness for EBP. Each item on the OCRSIEP-E Survey© had missing values ranging from 10 to 15 (14-21%). Little's MCAR test revealed that these values were missing at random (Sig. = .754) and therefore no further consideration was required. Table 39 provides an overview of the mean scores in rank order of participant responses on the OCRSIEP-E Survey©.

The majority of items had reported scores ranging from 3.00 to 3.93, placing them in the "somewhat" category. Such items included the extent to which: EBP is described as central to the mission and philosophy of the school; participants believe that EBP is practiced in their schools; faculty (lecturers), administrators, and clinical partner services are committed to EBP; there is a critical mass of faculty with strong EBP knowledge and skills; there are EBP champions among lecturers, senior lecturers, and clinical skills nurses; faculty model EBP in their educational and clinical settings; librarians are used to search for evidence; there is on-going research by nurse scientists (PhD- and doctorally-prepared researchers) to assist in the generation of evidence when it does not exist; measurement and sharing of outcomes is part of the culture; and fiscal resources are used to support EBP.

Three items had reported scores in excess of 4, placing them in the "moderately" category. These items concerned the extent to which: faculty have proficient computer skills; librarians have EBP knowledge and skills; and faculty have access to quality computers and electronic databases. While recognising that these educational organisations have librarians with EBP knowledge and skills to a moderate extent (4.41), the librarians are only called upon "somewhat" to assist with the search for evidence.

The lowest scoring items on the OCRSIEP-E Survey© concerned decision-making authority in the organisation and the existence of EBP mentors/champions. Reported scores on these items ranged from 2.56 to 2.97, placing them in the second lowest category of "a little" in the case of the EBP mentor/champion-related items, and "25%" in the case of the decision-making-related items. In relation to decision-making in educational institutions in this study, the findings suggest that decision-making authority lies largely with the University/Institute administration and to a lesser

degree with individual school administration and lecturing staff. The extent to which there are EBP champions among faculty, administration/management, and among clinical partner services is "a little".

With regard to how ready their institutions are for EBP, 17% of participants reported that their institution was "past ready and onto action". Just over 28% reported that their organisation was "ready to go" with a further 25% reporting that their institution has "been ready but not acting". Seven percent of participants stated that their organisations are "not ready" and almost 9% stated that they were "getting ready". The mean score reported on this item was 3.46 (been ready but not acting). In terms of how much movement there has been in their institutions towards an EBP culture compared to six months beforehand, the mean score was 3.13, suggesting that the movement towards an EBP culture in the last six months has been "somewhat". Only 7% of participants stated that there has been no movement at all toward an EBP culture in their organisations, with 21%, 24%, 21% and 13% suggesting that there has been "a little", "somewhat", "moderately" and "very much" movement, respectively.

Table 39: OCRSIEP-E Survey© Mean Scores in Lecturer Cohort

OCRSIEP-E Survey© Mean Scores in Lecturer Cohort (*n* = 71)							
	Mean (SD)	**None at all**	**A little**	**Some-what**	**Moderately**	**Very much**	**Missing**
• To what extent do faculty have access to quality computers and access to electronic databases for searching for best evidence?	4.74 (.66)	0%	3%	1%	11%	71%	14%
• To what extent do librarians within your organization have EBP knowledge and skills?	4.41 (.90)	1%	2%	11%	18%	54%	14%
• To what extent do faculty have proficient computer skills?	4.38 (.64)	0%	0%	7%	39%	39%	14%
• To what extent do you believe that evidence-base education is practiced in your organization?	3.93 (1.05)	0%	9%	24%	18%	35%	14%
• To what extent are the faculty with whom you work committed to EBP?	3.92 (1.09)	0%	10%	24%	15%	37%	14%
• To what extent is EBP clearly described as central to the mission and philosophy of your educational agency?	3.83 (1.24)	3%	13%	17%	15%	37%	15%
• To what extent are there EBP champions (i.e., those who will go the extra mile to advance EBP) in the environment among lecturers?	3.82 (1.09)	2%	11%	17%	28%	28%	14%
• To what extent are librarians used to search for evidence?	3.79 (1.14)	3%	11%	16%	28%	28%	14%
• To what extent are there EBP champions (i.e., those who will go the extra mile to advance EBP) in the environment among senior lecturers?	3.64 (1.27)	7%	10%	17%	25%	27%	14%

• In your organization, to what extent is there a critical mass of faculty who have strong EBP knowledge and skills?	3.57 (1.12)	1%	17%	20%	27%	21%	14%
• To what extent are the clinical partner services with whom you work committed to EBP?	3.56 (.90)	0%	10%	32%	30%	14%	14%
• To what extent is there ongoing research by nurse scientists (doctorally prepared researchers) in your organization to assist in generation of evidence when it does not exist?	3.44 (1.19)	6%	14%	21%	27%	18%	14%
• To what extent do faculty model EBP in their educational and clinical settings?	3.28 (1.05)	1%	21%	28%	23%	13%	14%
• To what extent is the measurement and sharing of outcomes part of the culture of the organization in which you work?	3.26 (1.15)	3%	23%	27%	17%	17%	14%
• To what extent are fiscal resources used to support EBP (e.g. education-attending EBP conferences/workshops, computers, paid time for the EBP process, mentors)	3.25 (1.15)	6%	20%	20%	29%	11%	14%
• To what extent are there EBP champions (i.e., those who will go the extra mile to advance EBP) in the environment among clinical skills nurses?	3.25 (1.14)	7%	13%	30%	22%	13%	15%
• To what extent are there administrators within your educational organization committed to EBP (i.e., have planned for resources and support [e.g., time] to initiate EBP?	3.00 (1.24)	11%	18%	28%	16%	13%	14%
• To what extent are there EBP champions (i.e., those who will go the extra mile to advance EBP) in the environment among clinical partner services?	2.97 (.98)	4%	24%	34%	18%	6%	14%
• In your organization, to what extent are there faculty who are EBP mentors?	2.75 (1.30)	18%	20%	20%	18%	9%	15%
• To what extent are there EBP champions (i.e., those who will go the extra mile to advance EBP) in the environment among administers / management?	2.56 (1.22)	18%	28%	20%	13%	7%	14%
Item	**M (SD)**	**None**	**25%**	**50%**	**75%**	**100%**	**Missing**
• To what extent are decisions generated from Lecturing Staff?	2.88 (.94)	1%	31%	27%	16%	4%	21%
• To what extent are decisions generated from School Administration?	2.61 (1.00)	9%	32%	22%	13%	3%	21%
• To what extent are decisions generated from University / Institute administration?	3.23 (1.12)	3%	21%	24%	20%	13%	19%

Item	M (SD)	Not Ready	Getting ready	Been ready but not acting	Ready to go	Past ready and onto action	Missing
• Overall, how would you rate your institution in readiness for EBP (how ready is it)?	3.46 (1.16)	7%	9%	25%	28%	17%	14%
Item	**M (SD)**	**None at all**	**A little**	**Some-what**	**Moderately**	**Very much**	**Missing**
• Compared to 6 months ago, how much movement in your educational organization has there been toward an EBP culture.	3.13 (1.19)	7%	21%	24%	21%	13%	14%

Lecturer Cohort – Inferential Statistics

Independent t-tests were conducted to compare the perceptions of organisational culture and readiness for EBP of lecturers who are registered on the Nurse Tutors division (RNT) of the NMBI register (n=38) with those lecturers who are not (n=33). Levene's test was performed to ascertain homogeneity of variance (Table 40). The significant statistic (Sig. = .037) produced by this test attests to heterogeneity variance so the results in the "equal variances not assumed" row are appropriate to consider. The non-significant result on the independent t-tests signifies that no statistically significant difference in perceptions of organisational culture and readiness for EBP was found between lecturers registered on the RNT division of the NMBI register (*M* = 82.62, *SD* = 11.69) and those who are not (*M* = 90.11, *SD* = 17.04; *t*(46.16) = 1.873, *p* = .067, two tailed). RNT registration, therefore, did not make a difference in lecturers' perceptions of organisational culture and readiness for EBP.

Table 40: Independent Samples Test - RNT Registration on OCRSIEP-E Scores Lecturer Cohort

Independent Samples Test - RNT Registration on OCRSIEP-E Scores Lecturer Cohort										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
OCRSIEP-E Score	Equal variances assumed	4.568	.037	-1.860	51	.069	-7.496	4.030	-15.586	.595
	Equal variances not assumed			-1.873	46.159	.067	-7.496	4.002	-15.551	.560

Independent t-tests were conducted to determine the effect that academic preparation might impose on lecturers' perceptions of organisational culture and readiness for EBP (Table 41), as the majority of lecturers held either a master's degree (*n* = 39) or a PhD (*n* = 17). Group 1 comprised lecturers whose highest academic qualification was a master's degree and Group 2 comprised lecturers who held a PhD. No statistical difference was identified between the perceptions of organisational culture and readiness for EBP of lecturers who held an MSc qualification (*M* = 88.37, *SD* = 14.33), and those who held a PhD (*M* = 86.83, *SD* = 15.50; *t*(46) = .348, *p* = .729, two-tailed).

Table 41: Independent Samples Test – Academic Preparation on OCRSIEP-E Scores Lecturer Cohort

Independent Samples Test – Academic Preparation on OCRSIEP-E Scores Lecturer Cohort										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
OCRSIEP-E Score	Equal variances assumed	.344	.561	.348	46	.729	1.533	4.404	-7.332	10.398
	Equal variances not assumed			.341	33.716	.735	1.533	4.493	-7.600	10.667

The effect of the number of years that lecturers have been in education on their perceptions of organisational culture and readiness for EBP (Table 42) was explored. Participants were divided into five groups; (Group 1: > 2 years; Group 2: 3-5 years; Group 3: 6-10 years; Group 4: 11-15 years; and Group 5: > 16 years). The number of years in education exerted no significant difference on lecturer's perceptions of organisational culture and readiness for EBP: *F*(4, 48) = .561, *p* = .692.

Table 42: ANOVA –Years in Education on OCRSIEP-E Scores Lecturer Cohort

ANOVA –Years in Education on OCRSIEP-E Scores Lecturer Cohort						
		Sum of Squares	df	Mean Square	F	Sig.
OCRSIEP-E Score	Between Groups	523.155	4	130.789	.561	.692
	Within Groups	11191.864	48	233.164		
	Total	11715.019	52			
	Total	15441.930	56			

Student Cohort – Descriptive Statistics

The mean score for organisational culture and readiness for EBP in the student cohort was 93.21 (SD 16.21), indicating moderate movement toward a culture of EBP but that culture was not yet sustainable (Fineout-Overholt, 2018). The minimum score was 47 and the maximum score was 125, demonstrating disparity in perceptions. Between 71 and 81 (32-36%) missing items were detected on each item of this scale. However, missing values analysis established that these values were missing at random (Sig. = .155) and therefore no further consideration was required.

The mean scores on individual items on the OCRSIEP-ES Survey© ranged from 2.44 – 4.42 (Table 43). The eight items with reported scores of 4 or above ("moderately") were largely those concerning the educational resources that support EBP. Examples of these include the extent to which: students believe that EBP is practiced in their educational organisation; EBP is described as central to the mission and philosophy of the educational institution; faculty are committed to EBP; there is a critical mass of faculty with strong EBP knowledge and skills; students have access to quality computers and databases, and proficient computer skills; and there are EBP champions among lecturers and clinical skills nurses.

Sixteen of the 25 items had reported scores ranging from 3.00 – 3.99, placing them in the "somewhat" category. These items focused on the extent to which: clinical partners, and administrators in the educational institution are committed to EBP; on-going research is undertaken by doctorally prepared nurses to assist with the generation of evidence; there are faculty who are EBP mentors; faculty model EBP in the classroom and the clinical setting; librarians in the educational institution have EBP knowledge and skills; librarians are used to search for evidence; fiscal resources are used to support EBP; there are EBP champions among Deans/Professors, Associate Deans/Associate Professors, and students; measurement and sharing of outcomes is part of the culture; and decisions are generated from lecturing staff and Deans/Professors. The lowest scoring item concerned the extent to which decisions are generated from students.

When asked how they would rate their educational institutions' readiness for EBP, the overall score indicates that students perceive that these organisations are "ready but not acting". Similarly, when asked how their educational institutions' current readiness for EBP compares to their readiness six months before, the score again suggests that students perceive that there has been some movement toward an EBP culture in their institutions in the last six months.

Table 43: OCRSIEP-ES Survey© Mean Scores in Student Cohort

OCRSIEP-ES Survey© Mean Scores in Student Cohort (*n* = 222)							
Items in Rank Order of Responses (High to low).	**Mean (SD)**	**None at all**	**A little**	**Some-what**	**Modera tely**	**Very much**	**Missing**
• To what extent are the faculty who teach you committed to EBP?	4.42 (.93)	1%	3%	8%	12%	44%	32%
• To what extent are there EBP champions (i.e., those who will go the extra mile to advance EBP) in the environment among lecturers?	4.41 (.88)	0%	4%	6%	15%	41%	35%
• To what extent do students have access to quality computers and access to electronic databases for searching for best evidence?	4.40 (.96)	1%	3%	7%	13%	44%	32%
• To what extent is EBP clearly described as central to the mission and philosophy of your educational agency?	4.37 (1.01)	1%	6%	4%	14%	43%	32%
• In your educational organization, to what extent is there a critical mass of faculty who have strong EBP knowledge and skills?	4.18 (1.05)	2%	5%	6%	21%	33%	33%
• To what extent do students have proficient computer skills?	4.11 (.78)	0%	1%	13%	30%	24%	32%
• To what extent are there EBP champions (i.e., those who will go the extra mile to advance EBP) in the environment among clinical skills nurses?	4.07 (1.02)	1%	5%	10%	22%	28%	34%
• To what extent do you believe that evidence-base education is practiced in your organization?	4.02 (.97)	1%	5%	11%	26%	24%	32%
• To what extent are there administrators within your educational organization committed to EBP (i.e., have planned for resources and support [e.g., time] to teach EBP across your courses)?	3.99 (1.05)	2%	6%	9%	25%	26%	32%
• To what extent do librarians within your educational organization have EBP knowledge and skills?	3.91 (1.17)	2%	8%	12%	17%	28%	33%
• To what extent do faculty model EBP in your didactic and clinical settings?	3.88 (1.17)	4%	5%	12%	20%	25%	34%
• To what extent are the clinical partners in which you have clinical practice committed to EBP?	3.60 (.99)	1%	8%	20%	26%	12%	33%
• To what extent is the measurement and sharing of outcomes part of the culture of your educational organization?	3.58 (1.02)	1%	9%	19%	24%	13%	34%
• To what extent are there EBP champions (i.e., those who will go the extra mile to advance EBP) in the environment among associate deans / associate professors?	3.48 (1.30)	7%	7%	14%	19%	17%	36%
• To what extent are there EBP champions (i.e., those who will go the extra mile to advance EBP) in the environment among students?	3.47 (1.12)	4%	9%	19%	21%	13%	34%
• To what extent are there EBP champions (i.e., those who will go the extra mile to advance EBP) in the	3.46 (1.34)	8%	6%	14%	18%	18%	36%

environment among deans/ professors?							
• In your educational organization, to what extent are there faculty who are EBP mentors?	3.41 (1.29)	7%	12%	10%	23%	14%	34%
• To what extent is there ongoing research by nurse scientists (doctorally prepared researchers) in your educational organization to assist in generation of evidence when it does not exist?	3.32 (1.18)	5%	10%	20%	19%	12%	34%
• To what extent are librarians used to search for evidence?	3.16 (1.26)	6%	17%	17%	15%	13%	32%
• To what extent are fiscal resources used to support EBP (e.g. education-attending EBP conferences/workshops, computers, paid time for the EBP process, mentors)	3.00 (1.25)	8%	18%	16%	15%	10%	33%
Item	**Mean (SD)**	**None**	**25%**	**50%**	**75%**	**100%**	**Missing**
• To what extent are decisions generated from faculty / lecturing Staff?	3.74 (.95)	1%	5%	18%	26%	15%	35%
• To what extent are decisions generated from deans / professors?	3.07 (1.29)	9%	13%	17%	14%	10%	37%
• To what extent are decisions generated from students?	2.44 (1.07)	10%	31%	13%	7%	4%	35%
Item	**Mean (SD)**	**Not ready**	**Getting Ready**	**Been Ready but Not Acting**	**Ready to Go**	**Past Ready & onto Action**	**Missing**
• Overall, how would you rate your educational organization in readiness for EBP (how ready is it)?	3.79 (1.14)	3%	8%	11%	23%	22%	33%
Item	**Mean (SD)**	**None at All**	**A Little**	**Some-what**	**Modera tely**	**Very Much**	**Missing**
• Compared to 6 months ago, how much movement in your educational organization has there been toward an EBP culture.	3.72 (1.09)	3%	6%	17%	22%	18%	34%

Student Cohort – Inferential Statistics

A one-way between-groups analysis of variance was conducted to explore the impact of year of study (Year 1, n=44; Year 2, n=63; Year 3, n=60; Year 4, n=50; and Year 5, n=2) and programme of study (RGN, n=44; RM, n=60; RNID, n=50; RPN, n=2; RCN, n=63) on students' perceptions of organisational culture and readiness for EBP. Homogeneity of variance was checked using Levene's test for equality of variance (Table 44), and was established (Sig. = .630).

Table 44: Test of Homogeneity of Variances (Year of Study) OCRSIEP-ES Scores (Student Cohort)

Test of Homogeneity of Variances (Year of Study) OCRSIEP-ES (Student Cohort)			
OCRSIEP-ES Score (Student Cohort)			
Levene Statistic	df1	df2	Sig.
.579	3	118	.630

However, between groups ANOVA revealed no statistically significant differences in students' perceptions of organisational culture and readiness for EBP across different year groups: $F(4, 118) = 1.086$, $p = .367$ (Table 45). The year of study that a student was in, therefore, did not affect significantly his/her perception of organisational culture and readiness for EBP.

Table 45: ANOVA – Impact of Year of Study (1-5) on OCRSIEP-ES Scores (Student Cohort)

ANOVA – Impact of Year of Study (1-5) on OCRSIEP-ES Scores (Student Cohort)					
OCRSIEP-ES Score (Student Cohort)					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1141.925	4	285.481	1.086	.367
Within Groups	31008.710	118	262.786		
Total	32150.634	122			

In relation to the programme of study, table 46 indicates that there were no statistically significant differences in students' perceptions of organisational culture and readiness for EBP across these groups: $F(4, 118) = 1.086$, $p = .367$. Students' programme of study made no difference to their perceptions of organisational culture and readiness for EBP.

Table 46: ANOVA –Programme of Study on OCRSIEP-ES Score (Student Cohort)

ANOVA –Programme of Study on OCRSIEP-ES Score (Student Cohort)					
OCRSIEP-ES Score (Student Cohort)					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1141.925	4	285.481	1.086	.367
Within Groups	31008.710	118	262.786		
Total	32150.634	122			

Clinical Cohort – Descriptive Statistics

The mean score for organisational culture and readiness for EBP in the clinical cohort was 74.07 (SD 19.65), suggesting that there is opportunity for growth within these organisations toward a culture of EBP. The minimum score was 25 and the maximum score was 124 (Table 47), providing evidence of substantial variation between responses. On inspection of the data, it was found that each item on the OCRSIEP Survey© had missing values ranging from 10 to 36 (3.4-12.3%). Missing value analysis using Little's MCAR test determined that these values were missing at random (Sig. = .182) and therefore no further consideration was required.

The item on this scale with the highest reported score in the clinical cohort concerned the extent to which they believe that EBP is practiced in their organisations with a mean of 3.58 (SD 1.1). The majority of participants answered "somewhat" to "moderately" in response to this item, with a substantial number answering "very much". Similarly, the majority of participants (>70%) agreed that EBP is central to the mission and philosophy of their institutions, ranging from "somewhat" to

"very much". Nine items were scored between 3.05 and 3.53 by the clinical cohort, again rating these items in the "somewhat" category. These items included the extent to which: the nursing staff, and physician team are committed to EBP; there is a critical mass of nurses with strong EBP knowledge and skills; practitioners (e.g. nurses and doctors) model EBP; nurses have access to quality computers and electronic databases; staff nurses have proficient computer skills; librarians have EBP knowledge and skills; decisions are generated by upper management; and decisions are generated by physicians and other health care provider groups.

The lowest score (1.99) was reported on the item regarding the extent to which there are doctorally prepared nurses in the organisation to assist in the generation of evidence when it does not exist, which concurs with the student cohort responses. Fourteen of the twenty five items were scored less than three ("somewhat"), putting them in the "a little" bracket. These low scoring items concerned the extent to which: there are EBP champions among managers, physicians, nurse educators, registered advanced nurse and midwifery practitioners, and staff nurses and midwives in these institutions; there are registered advanced nurse and midwifery practitioners who are EBP mentors; librarians are used to search for evidence; there is fiscal support for EBP; outcome measurement and sharing of this information is part of the culture; decisions are generated from direct care providers such as nurses; and the level of commitment to EBP by administrators within the educational organisations. In relation to the items regarding the current state of participants' institutions' readiness for EBP and how this compares to six months ago, the scores attained on these items were 2.94 and 2.7, respectively. This implies that participants felt that their institutions were somewhat ready for EBP and that their level of readiness was a little better than it had been six months ago.

Table 47: OCRSIEP Survey© Mean Scores in Clinical Cohort

OCRSIEP Survey© Mean Scores in Clinical Cohort (*n* = 292)							
Items in Rank Order of Responses (high to low).	**Mean (SD)**	**None at all**	**A little**	**Some-what**	**Modera tely**	**Very much**	**Missing**
• To what extent do you believe that EBP is practiced in your organization?	3.58 (1.07)	2%	15%	26%	31%	22%	4%
• To what extent is the physician team with whom you work committed to EBP?	3.53 (1.16)	6%	15%	21%	33%	21%	5%
• To what extent is the nursing staff with whom you work committed to EBP?	3.51 (1.09)	3%	15%	25%	33%	18%	6%
• To what extent is EBP clearly described as central to the mission and philosophy of your organization?	3.38 (1.24)	7%	18%	27%	21%	24%	4%
• To what extent do staff nurses have proficient computer skills?	3.20 (1.05)	4%	20%	33%	28%	11%	4%
• To what extent do librarians within your organization have EBP	3.18 (1.35)	16%	12%	20%	27%	16%	9%

knowledge and skills?							
• To what extent do practitioners (e.g. nurses, doctors etc) model EBP in their clinical settings?	3.07 (1.21)	6%	27%	28%	24%	11%	4%
• In your organization, to what extent is there a critical mass of nurses who have strong EBP knowledge and skills?	3.06 (1.05)	5%	26%	33%	24%	9%	3%
• To what extent do staff nurses have access to quality computers and access to electronic databases for searching for best evidence?	3.05 (1.21)	9%	27%	23%	23%	14%	4%
• To what extent are there EBP champions (i.e., those who will go the extra mile to advance EBP) in the environment among nurse educators?	2.99 (1.31)	16%	15%	20%	26%	11%	12%
• To what extent is the measurement and sharing of outcomes part of the culture of the organization in which you work?	2.96 (1.18)	12%	22%	28%	22%	10%	6%
• To what extent are there administrators within your educational organization committed to EBP (i.e., have planned for resources and support [e.g., time] to initiate EBP?	2.93 (1.19)	15%	19%	29%	24%	8%	5%
• To what extent are there EBP champions (i.e., those who will go the extra mile to advance EBP) in the environment among advanced nurse practitioners?	2.89 (1.38)	21%	15%	22%	19%	14%	10%
• To what extent are there EBP champions (i.e., those who will go the extra mile to advance EBP) in the environment among physicians (consultants)?	2.82 (1.32)	17%	23%	19%	17%	12%	12%
• To what extent are librarians used to search for evidence?	2.75 (1.34)	22%	19%	22%	16%	12%	9%
• To what extent are there EBP champions (i.e., those who will go the extra mile to advance EBP) in the environment among staff nurses?	2.59 (1.15)	19%	25%	26%	15%	5%	10%
• To what extent are fiscal resources used to support EBP (e.g. education-attending EBP conferences/workshops, computers, paid time for the EBP process, mentors)	2.35 (1.24)	33%	22%	22%	14%	6%	5%
• In your organization, to what extent are there Advanced Nurse Practitioners who are EBP mentors for staff nurses as well as other ANPs?	2.30 (1.22)	31%	28%	16%	14%	5%	6%
• To what extent are there EBP champions (i.e., those who will go the extra mile to advance EBP) in the environment among administrators (management)?	2.28 (1.20)	31%	22%	22%	11%	4%	10%
• To what extent are there nurse scientists (doctorally prepared researchers) in your organization to assist in generation of evidence when	1.99 (1.17)	45%	21%	15%	10%	3%	6%

it does not exist?							
Item	**Mean (SD)**	**None**	**25%**	**50%**	**75%**	**100%**	**Missing**
• To what extent are decisions generated from physician or other health care provider groups?	3.40 (1.12)	7%	11%	21%	37%	12%	12%
• To what extent are decisions generated from upper administration (upper management)?	3.11 (1.24)	12%	17%	21%	27%	11%	12%
• To what extent are decisions generated from direct care providers (such as nurses)?	2.83 (1.15)	13%	24%	27%	20%	7%	9%
Item	**Mean (SD)**	**Not ready**	**Getting Ready**	**Been Ready but Not Acting**	**Ready to Go**	**Past Ready & onto Action**	**Missing**
• Overall, how would you rate your organization in readiness for EBP (how ready is it)?	2.94 (1.17)	13%	18%	32%	22%	9%	6%
Item	**Mean (SD)**	**None at All**	**A Little**	**Some-what**	**Modera tely**	**Very Much**	**Missing**
• Compared to 6 months ago, how much movement in your organization has there been toward an EBP culture.	2.70 (1.16)	18%	24%	26%	20%	6%	6%

Clinical Cohort – Inferential Statistics

One-way between-groups analysis of variance was conducted to explore the impact of age, number of years qualified, academic qualification, and clinical role on the perception of organisational culture and readiness for EBP in the clinical cohort. With regard to age, participants were divided into four groups (Group 1: 20-24 years, n=8; Group 2: 25-34 years, n=50; Group 3: 35-44 years, n=118; Group 4: 45 years and above, n=116). Levene's test was conducted to determine homogeneity of variance between groups (Table 48), which demonstrated that this assumption has not been violated.

Table 48: Test of Homogeneity of Variances (Age Groups) OCRSIEP (Clinical Cohort)

Test of Homogeneity of Variances (Age Groups) OCRSIEP (Clinical Cohort)			
OCRSIEP Score (Clinical Cohort)			
Levene Statistic	df1	df2	Sig.
.029	3	195	.993

A statistically significant difference (Sig. = .018) at the $p < 0.05$ level was revealed by ANOVA; $F(3, 195) = 3.443$, $p = .018$ (Table 49).

Table 49: ANOVA – Age on OCRSIEP Scores Clinical Cohort

ANOVA – Age on OCRSIEP Scores Clinical Cohort					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3845.911	3	1281.970	3.443	.018
Within Groups	72603.104	195	372.324		
Total	76449.015	198			

Post hoc tests using Tukey HSD were conducted to identify where the differences occurred in these groups (Appendix 9). These revealed a statistically significant difference between groups 2 (*M* = 81.67, *SD* = 19.79) and 4 (*M* = 69.79, *SD* = 18.61), suggesting that clinical nurses and midwives aged between 25 and 34 years, report a significantly higher perception of organisational culture and readiness for EBP than their colleagues aged 45 years and above. Using eta squared, an effect size of 0.05 was calculated, indicating a trivial effect size (Walker and Almond, 2010) in the difference between the two groups in question. Groups 1 and 3 did not differ significantly from any other groups.

The number of years clinical nurses and midwives were qualified was explored in relation to their perceptions of organisational culture and readiness for EBP (Table 50). Participants were divided into four groups (Group 1: <2 years, n=7; Group 2: 2-5 years, n=20; Group 3: 6-10 years, n=32; and Group 4: >10 years, n=232). Significant differences were detected across the groups: $F(3, 195) = 5.253$, $p = .002$. However, the size of effect, calculated using eta squared was .08, representing a trivial effect.

Table 50: ANOVA - Clinical Cohort –Years Qualified on OCRSIEP Scores Clinical Cohort

ANOVA - Clinical Cohort –Years Qualified on OCRSIEP Scores Clinical Cohort						
		Sum of Squares	df	Mean Square	F	Sig.
OCRSIEP Score	Between Groups	5716.035	3	1905.345	5.253	.002
	Within Groups	70732.980	195	362.733		
	Total	76449.015	198			

Post hoc tests using Tukey HSD were conducted to identify where the differences occurred in these groups (Appendix 9). Group 4 (*M* = 71.68, *SD* = 19.25) differs significantly from groups 2 (*M* = 84.69, *SD* = 16.48), and 3 (*M* = 83.69, *SD* = 19.63). This indicates that clinical nurses and midwives who qualified 2-5 years, or 6-10 years beforehand, reported a significantly higher perception of organisational culture and readiness for EBP than their colleagues who were qualified 10 years or more.

The highest academic qualification was considered with respect to its potential effect on organisational culture and readiness for EBP in the clinical cohort (Table 51). Participants were divided into five groups (Group 1 – certificate, n=37; Group 2 – diploma, n=31; Group 3 - bachelor's degree, n=112; Group 4 - postgraduate/higher diploma, n=82; and Group 5 - master's degree, n=30). Statistically significant differences across these groups were uncovered: $F(4, 194) = 4.698$, $p = .001$. Using eta squared, the effect size was calculated at 0.09, indicating a trivial effect.

Table 51: ANOVA - Academic Qualification on OCRSIEP Scores Clinical Cohort

ANOVA - Academic Qualification on OCRSIEP Scores Clinical Cohort					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6750.690	4	1687.673	4.698	.001
Within Groups	69698.325	194	359.270		
Total	76449.015	198			

Post hoc tests using Tukey HSD were conducted to identify where the differences occurred in these groups (Appendix 9). Group 2 (*M* = 59.88, *SD* = 17.03) differed significantly from groups 3 (*M* = 75.89, *SD* = 18.68), 4 (*M* = 76.54, *SD* = 20.88), and 5 (*M* = 80.13, *SD* = 19.65). These findings imply that clinical nurses and midwives who hold a bachelor's degree, a higher/postgraduate diploma, or a master's degree respectively perceive a significantly higher organisational culture and readiness for EBP than their colleagues with a diploma. Group 5 (*M* = 80.13, *SD* = 19.65) differed significantly from groups 1 (*M* = 64.24, *SD* = 18.85) and 2 (*M* = 59.88, *SD* = 17.03), suggesting that clinical nurses and midwives who hold a master's degree perceive significantly higher organisational readiness for EBP than their colleagues who qualified at certificate, or diploma levels.

The role held by participants in the clinical cohort was explored in relation to organisational culture and readiness for EBP. Between-groups ANOVA facilitated this exploration (Table 52). Participants were divided into seven groups (Group 1 - Staff Nurse/Midwife, n=185; Group 2 - Clinical Nurse/Midwife Manager 1, n=26; Group 3 - Clinical Nurse/Midwife Manager 2, n=51; Group 4 - Clinical Nurse/midwife Manager 3, n=3; Group 5 - Clinical Nurse/Midwife Specialist, n=14; Group 6 - Registered Advanced Nurse/Midwife Practitioner, n=6; and Group 7 - Assistant Director of Nursing/Midwifery, n=7). No statistically significant differences on the OCRSIEP scores were detected across these groups: $F(7, 191) = .688$, $p = .682$).

Table 52: ANOVA - Role of Clinical Nurses and Midwives on OCRSIEP Scores Clinical Cohort

ANOVA - Role of Clinical Nurses and Midwives on OCRSIEP Scores Clinical Cohort					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1880.317	7	268.617	.688	.682
Within Groups	74568.698	191	390.412		
Total	76449.015	198			

Correlations among EBP Beliefs, EBP Implementation, and Organisational Culture and Readiness for EBP within Each Cohort

Correlation analysis is undertaken to explore the direction and strength of relationship between two or more variables (Pallant, 2016). A perfect correlation of +1 or -1 suggests that the value of one variable has a direct correlation (positive or negative) with the other, and therefore one value can determine the other (Kellar and Kelvin, 2013; Pallant, 2016). Walker and Almond (2010) posit guidelines to assist with the interpretation of correlation coefficients (r) within the social sciences (Table 53).

Table 53: Correlation Guidelines (Walker and Almond, 2010)

Correlation Coefficient (r)	Interpretation
0-0.15	No association
0.15-0.29	Weak association
0.3-0.59	Moderate association
0.6+	Strong association

A positive correlation has previously been demonstrated between the EBPB and EBPI Scales©, suggesting that the higher one's beliefs in EBP, the greater one's implementation of EBP is likely to be (Melnyk, Fineout-Overholt and Mays, 2008; Wallen *et al.*, 2010; Stokke *et al.*, 2014; Skela-Savič, Pesjak and Lobe, 2016). In order to determine if such a relationship existed between these scales in this study, Pearson product-moment correlation coefficients were calculated for them in all three cohorts. In addition, the relationship between EBP beliefs, implementation, and the organizational culture and readiness for EBP was also investigated within all three cohorts. Scatterplots were produced to visually inspect the nature of the relationships between the EBP beliefs and implementation, the EBP beliefs and organizational culture and readiness for EBP, and EBP Implementation and organizational culture and readiness for EBP, respectively, within the three cohorts. Preliminary analyses were performed to ensure no violation occurred of the assumptions of normality, linearity and homoscedasticity.

Lecturer Cohort

A weak positive correlation was detected between the lecturers' EBP beliefs and implementation (r = .210, n = 54, p = .128) (Table 54) and no correlation between the lecturers' EBP implementation and organizational culture and readiness for EBP (r = .146, n = 51, p = .307). There was a moderate positive correlation between the lecturers' EBP beliefs and organizational culture and readiness for EBP, which was statistically significant (r = .367, n = 49, p = .010).

Table 54: Correlations among EBP Beliefs, EBP Implementation and Organisational Culture and Readiness for EBP in the Lecturer Cohort

Correlations Among EBP Beliefs, EBP Implementation and Organisational Culture and Readiness for EBP in the Lecturer Cohort				
		Total EBPB-E Score	Total EBPI-E Score	Total OCRSIEP-E Score
Total EBP Beliefs Score	Pearson Correlation	1	.210	.367**
	Sig. (2-tailed)		.128	.010
	N	61	54	49
Total EBP Implementation Score	Pearson Correlation	.210	1	.146
	Sig. (2-tailed)	.128		.307
	N	54	58	51
Total Organisational Culture and Readiness for EBP Score	Pearson Correlation	.367**	.146	1
	Sig. (2-tailed)	.010	.307	
	N	49	51	53
**. Correlation is significant at the 0.01 level (2-tailed).				

Student Cohort

No correlation was detected between the students' EBP beliefs and implementation (r = .128, *n* = 139, *p* = .134) (Table 55). A weak positive correlation was detected between the students' EBP beliefs and organizational culture and readiness for EBP (*r* = .172, *n* = 116, *p* = .065), and between their EBP implementation and organizational culture and readiness for EBP (*r* = .230, *n* = 119, *p* = .012), respectively. Only the correlation between the EBP implementation and organizational culture and readiness for EBP was statistically significant.

Table 55: Correlations among EBP Beliefs, EBP Implementation and Organisational Culture and Readiness for EBP in the Student Cohort.

Correlations Among EBP Beliefs, EBP Implementation and Organisational Culture and Readiness for EBP in the Student Cohort.				
		Total EBPB (Student) Score	Total EBPI (Student) Score	Total OCRSIEP-ES (Student) Score
Total EBP Beliefs Score	Pearson Correlation	1	.128	.172
	Sig. (2-tailed)		.134	.065
	N	165	139	116
Total EBP Implementation Score	Pearson Correlation	.128	1	.230*
	Sig. (2-tailed)	.134		.012
	N	139	154	119
Total Organisational Culture and Readiness for EBP Score	Pearson Correlation	.172	.230*	1
	Sig. (2-tailed)	.065	.012	
	N	116	119	124
*. Correlation is significant at the 0.05 level (2-tailed).				

Clinical Cohort

A moderate positive correlation was detected between the clinical cohort's EBP beliefs and implementation (r = .372, n = 225, p = .000), and between their EBP implementation and organizational culture and readiness for EBP (r = .361, n = 183, p = .000) (Table 56). A moderate positive correlation was detected between their EBP beliefs and organizational culture and readiness for EBP (r = .492, n = 181, p = .000). These correlations were all statistically significant.

Table 56: Correlations among EBP Beliefs, EBP Implementation and Organisational Culture and Readiness for EBP in the Clinical Cohort.

Correlations among EBP Beliefs, EBP Implementation and Organisational Culture and Readiness for EBP in the Clinical Cohort.				
		Total Clinical EBPB Score	Total Clinical EBPI Score	Total Clinical OCRSIEP Score
Total EBP Beliefs Score	Pearson Correlation	1	.372**	.492**
	Sig. (2-tailed)		.000	.000
	N	261	225	181
Total EBP Implementation Score	Pearson Correlation	.372**	1	.361**
	Sig. (2-tailed)	.000		.000
	N	225	251	183
Total Organisational Culture and Readiness for EBP Score	Pearson Correlation	.492**	.361**	1
	Sig. (2-tailed)	.000	.000	
	N	181	183	199
**. Correlation is significant at the 0.01 level (2-tailed).				

Conclusion

EBP knowledge, beliefs and implementation among lecturers, nurses, midwives and students in the Republic of Ireland, along with the organisational culture and EBP readiness of their workplaces were explored in this study. This chapter provided an outline of the data analysis performed and presented the findings that analysis produced, including demographic findings, those generated by the seven EBP scales from the respective cohorts, and the findings yielded by the one open question that was included on the survey. Five hundred and eighty five participants completed the survey, 71 lecturers, 222 students and 292 clinical nurses and midwives. Qualitative findings revealed poor knowledge and ability to describe EBP in a manner that reflected commonly accepted definitions, among the majority of participants. Participants reported positive beliefs about the impact of EBP but their belief in their own ability to implement EBP was lower. EBP implementation was very low among participants in the three cohorts. Perceptions of organisational culture and readiness for EBP varied across the cohorts, with the educational organisations faring somewhat better, although a sustainable culture of EBP was not reported to exist just yet in either setting. The findings produced by this study will now be considered and discussed in Chapter 5.

Chapter 5: Discussion

Introduction

Several definitions of evidence-based practice (EBP) have been proffered by numerous reputable proponents (Sackett *et al.*, 2000; Dawes *et al.*, 2005; Melnyk and Fineout-Overholt, 2019). While they may vary in their articulation, they are united by three core components: the best available evidence, the clinician's experience and expertise, and the patient's values and preferences. EBP is an approach to healthcare decision-making and delivery that integrates these three core components to ensure that 'best practice' is achieved, producing improved patient outcomes, reduced errors and geographical variations in care, and saving time and money (Melnyk *et al.*, 2012; Doran *et al.*, 2014; Macias *et al.*, 2017; Melnyk and Fineout-Overholt, 2019). Despite this, the knowledge and skills needed to implement EBP are largely lacking among healthcare professionals, including nurses and midwives, even at senior level (Ubbink, Guyatt and Vermeulen, 2013; Vlada *et al.*, 2013; Heydari *et al.*, 2014; Stokke *et al.*, 2014; Melnyk *et al.*, 2016; Saunders and Vehviläinen-Julkunen, 2016b; Skela-Savič, Pesjak and Lobe, 2016; Melnyk *et al.*, 2018). Individual and organisational factors contribute to this, including lack of education and training in EBP, low belief in the value of EBP, and unsupportive organisational culture (Glacken and Chaney, 2004; Timmins, McCabe and McSherry, 2012; Yadav and Fealy, 2012; Doolan-Grimes, 2013; Melnyk *et al.*, 2016, 2018). The current study explored the EBP knowledge, beliefs and implementation level among lecturers, nurses, midwives and students in the Republic of Ireland, along with the organisational culture and EBP readiness of their workplaces. The findings from this study, presented in the previous chapter, will now be discussed.

Knowledge of Evidence-Based Practice

To elicit their knowledge of the concept of EBP, all participants were invited to explain in their own words what they believe the term 'evidence-based practice' means. Descriptions were numerous and varied in nature. Sixteen percent of the participants overall included the three core components of best available evidence, clinician's expertise, and patient preference/values, demonstrating that they have a sound basic knowledge of EBP, an appreciation that it is distinct from other concepts such as quality improvement, and that it is more than just research utilisation. There seems to be a variance across the contexts in the spread of this perspective, with the smallest number from the student cohort (5%), followed by 7% from the clinical cohort, and most from the academic cohort (17%). This variance is not surprising, as it would be expected that lecturers would have a complete definition and students would still be learning.

The challenging finding is that the majority (84%) of responses did not reflect accepted definitions of EBP, offering a large opportunity for education within the three cohorts. Even more challenging is the confusion demonstrated by participants across the three cohorts indicating most frequently that EBP is "research led practice/research utilisation/proven practice". This was consistent across the three cohorts (75% academics; 66% students; 68% clinical nurses). More encouraging, and an entry point for education, are the participant definitions that referenced improved patient care decision-making, patient care delivery, practice improvement, and knowledge of safe, best and/or effective practice, which are the outcomes of EBP. These could also represent further confusion between EBP and concepts such as quality improvement and research utilisation that can be remedied by education. Though these concepts contribute to the enhancement of nursing practice and patient outcomes, they do not explain what EBP is (Newhouse, 2007; Shirey *et al.*, 2011; Baker *et al.*, 2014), which was what was asked of the participants. These findings indicate that the majority of participants lacked ability to explain what EBP is, in a manner that reflects commonly held definitions, and that encompasses the three core components. This, arguably, suggests that they do not accurately know or understand what EBP is. However, the language used by them to explain EBP is a starting point that affords an opportunity to provide knowledge and skills that build on what is already known and, thereby, enhance the participants' knowledge of EBP based on this foundation.

The findings from this study corroborate those from several other studies. For example, Saunders and Vehviläinen-Julkunen (2016) conducted an integrative review of nurses' readiness for EBP comprising 37 primary research studies published between 2004 and 2014, involving 18,355 nurses from 21 different countries. They found extensive confusion among nurses about the meaning of EBP, widely varying interpretations of EBP, and descriptions of EBP that did not correspond with accepted definitions. Similar findings are mirrored throughout the nursing literature (Rycroft-Malone and Stetler, 2004; Scott-Findlay and Pollock, 2004; Newhouse, 2007; Shirey *et al.*, 2011; Baker *et al.*, 2014; Carter *et al.*, 2017). The dominant misinterpretation of EBP as "research led practice/research utilisation/proven practice" in the current study substantiates these findings in the context of nursing and midwifery in Ireland. The terms EBP and research utilisation have often been used interchangeably (Estabrooks, 1999; Newhouse, 2007; Baker *et al.*, 2014; Saunders and Vehviläinen-Julkunen, 2016b; Carter *et al.*, 2017; Fineout-Overholt, Stillwell, *et al.*, 2019). The literature is indicative of this conflation existing not only among clinicians, but also among authors, whose manuscript titles and abstracts suggest that EBP is the subject of their papers, when in actual fact they are writing about research utilisation (Doolan-Grimes, 2013). Saunders and Vehviläinen-Julkunen (2016) revealed that from the mid-1990s up until 2003, the more commonly referred-to concept in the nursing literature by far was research utilisation. Between 2004 and 2007 both

concepts were used, perhaps laying the foundation for the confusion reflected in the findings of this and other studies. From then on evidence-based practice has been increasingly more prevalent in the nursing literature. However, Saunders and Vehviläinen-Julkunen argue that this evolution has happened in language only as nurses' employment of evidence, and their teaching of EBP continues to emphasise the use of single research studies rather than synthesised, pre-appraised evidence summaries. This apparent disconnect between nurses' descriptions of EBP and their actualisation of it certainly has the potential to reinforce the muddling of concepts and impede definitional clarity. Nurses' and midwives' definitions of EBP may or may not be an indicator of their knowledge and understanding of it, with clear definitions evidencing good knowledge and poor definitions evidencing poor knowledge. However, even if it is the case that nurses' and midwives' knowledge and understanding of EBP are good and it is just their ability to define it in clear or accurate terms that is poor, this remains unhelpful at best. Such lack of definitional clarity permits the confusion to endure, potentially limits the recognition of individuals' knowledge deficits and needs, stymies opportunity for appropriate intervention, and hinders effective implementation of EBP and realisation of its positive impact in nursing and midwifery practice.

Evidence-Based Practice Beliefs

Lecturer Cohort

The total EBP beliefs score achieved by the lecturer cohort (EBPB-E mean = 87.72, SD 10.91) is just marginally under the score (88) that would indicate firm belief in, and confidence about implementing and teaching EBP (Fineout-Overholt, 2018), suggesting clear commitment to and confidence in EBP by lecturers but also evidence of some room for improvement. Registration on the Registered Nurse Tutor division of the NMBI register, years in education, or academic qualification made no difference to lecturers' EBP beliefs. Lecturers' beliefs about EBP were compelling with the vast majority (81%) agreeing that EBP results in the best clinical care for patients. This is a great foundation that the NMBI could maximise by advocating strongly for educational standards that require the explicit inclusion of EBP in the curricula of nurse and midwifery programmes. That said, it is hard for lecturers to teach what they do not know, as evidenced by their lack of belief in their own ability to implement and teach EBP. This could be indicative of a knowledge deficit as evidenced by the 17% agreement with accepted definitions of EBP in the open question. Given that the majority of lecturers in this sample were unable to describe the concept of EBP, it is reasonable that their knowledge of the EBP process and current capacity to implement and teach it could be enhanced through education. Consideration of individual scale item means can help identify areas in which to focus resources to maximise enhanced beliefs and, perhaps, knowledge. Interventions that bolster

where lecturers indicated their deficits may offer robust, expedient and appropriate opportunities to enhance those areas of beliefs.

Lecturers' responses to some individual EBPB-E Scale© items demonstrated inconsistencies in their beliefs (Click here for EBPB-E Scale©). For example, lecturers (83%) indicated that they believe that they can teach EBP, they are clear about the steps of EBP (76%) and can teach how to search for the best available evidence (83%); however, only 63% are sure they can teach how to develop a PICOT question, 69% indicate that they can implement EBP, and only 73% can search for the best available evidence in a time-efficient way. Furthermore, although 69% of lecturers agreed that they can implement EBP, only 40% agreed that they can do so in a time-efficient way. Given that only 44% of lecturers agreed that they can overcome barriers in implementing EBP, it is reasonable to conclude that these findings may be impacted by either individual or organisational barriers or deficits that impede the performance of these EBP activities. Some of these barriers may be identified by lecturer responses to EBP culture and readiness within their organisations. This may help to pinpoint opportunities for interventions that can improve lecturers' ability and confidence in these areas.

Item analysis indicated that lecturers' had several items that they responded to neutrally (neither agree nor disagree), such as their ability to implement EBP (18%), to implement it in a time efficient way (30%), to overcome barriers to implementing EBP (27%), their belief that the care they deliver is evidence-based (25%), and their ability to teach how to develop a PICOT question (21%). This neutral response may further support that participants lack knowledge or ability to implement EBP but, moreover, the neutral response may indicate a hesitation to disclose such deficits. However, it is possible that some of these items caused confusion among some lecturers, leaving them unsure as to whether they concerned EBP implementation in clinical practice rather than their day to day practice as educators. This may have affected some of their responses, leading them to select the neutral response. Overall, the findings from the EBPB-E Scale© suggested poor knowledge among lecturers regarding what EBP is and how to teach it, and speak to the need for foundational education and training of lecturers in the knowledge and skills of EBP.

Education around teaching EBP would also enhance lecturer confidence and delivery within the educational setting. An area that lecturers showed complete agreement (94%) was that critically appraising evidence is an important step in the EBP process, with no disagreeing responses to this item. Of note, this positive belief in critical appraisal perhaps influenced a positive perspective in students, with 63% of students agreeing that critically appraising evidence is an important step in the EBP process. Evidence that the lecturers' belief led to action is that 87% of lecturers reported that they critically appraised evidence at least 1 – 3 times in the previous eight weeks with 35%

indicating that they did so more than once a week. Lecturer's EBP beliefs were higher than the student and clinical cohorts, an unsurprising finding given their role as teachers of nursing and midwifery, coupled with their high academic qualifications.

Student Cohort

Students' EBP beliefs score (EBPB mean = 55.18, SD 10.29) suggested they are not fully committed to EBP but showed that there is potential in this group to achieve full commitment (Fineout-Overholt, 2017). Neither the programme nor the year of study influenced the students' EBP beliefs. Similar to the lecturer cohort, students' beliefs about the positive impact of EBP were higher than their beliefs about their ability to implement EBP. Sixty eight percent of students agreed that EBP results in the best clinical care for patients, and 71% agreed that evidence-based guidelines can improve clinical care. Such positive beliefs about EBP provide a springboard for further learning and development of EBP knowledge and skills. However, students' beliefs about their ability to implement EBP were less compelling with 47% agreeing that they can implement EBP, and 33% agreeing that they are confident about their ability to implement EBP where they work. Students, by virtue of their subordinate role, coupled with their focus on passing their clinical placements, may not feel that they have autonomy or authority to take an active or leading role in EBP implementation. These findings regarding students' beliefs about their ability to implement EBP are also understandable, given that 95% of student responses to the open question did not approximate commonly accepted definitions of EBP. This presents a real opportunity to build on students' positive beliefs, enhance their EBP knowledge and skills, and boost their confidence and capacity to begin to implement EBP. However, this can only be achieved in the presence of lecturers who can provide the EBP education that students need, and clinical nurses and midwives who can demonstrate its value and application in practice.

Students' responses to some individual items demonstrated inconsistencies in their beliefs (Click here for Students' EBPB Scale), mirroring the findings in the lecturer cohort. For example, 64% of students agreed that critical appraisal is an important step in EBP and 53% agreed that the care they deliver is evidence-based. However, only 36% agreed that they are clear about the steps of EBP; 34% agreed that they can search for the best evidence in a time efficient way; 33% agreed that they are confident about their ability to implement EBP where they work; 31% agreed that they can access the best resources to implement EBP; 30% agreed that they are sure about how to measure outcomes; 28% agreed that they can overcome barriers in implementing EBP; and 28% agreed that they know how to implement EBP sufficiently enough to make practice changes. Given the low percentages of students who feel confident in implementing these integral steps and skills of the

EBP process, student EBP will not result. The fact that all items concerning students' beliefs in their ability to implement EBP fell below scores of 3.54 (on a scale of 1 to 5), would imply an opportunity to provide an intervention to improve students' knowledge and skills in all of these areas (Fineout-Overholt, 2017). Yet despite the low numbers of students who believe in their ability to perform these activities, 47% were sure that they can implement EBP and 53% agreed that their care is evidence-based. This dissonance corroborates the dearth of knowledge and/or understanding of EBP found in the qualitative findings, demonstrating a knowledge deficiency among students regarding EBP. Students' EBP beliefs were lower than those of the lecturer and clinical cohorts. This is expected because, as students, they are learning their craft, which is led and supported by the other two cohorts, who would be expected to have higher beliefs.

Fifteen to twenty percent of responses were missing in this cohort. Little's MCAR test found that these values were missing 'not at random', suggesting that there is a non-random pattern to these missing values that is related to the scale items themselves. This might suggest poor understanding of the questions and/or a lack of knowledge of how to answer them. For example, the items "I am sure that I can implement EBP" and "I am clear about the steps of EBP" were both missing 18% of the time. This may indicate inadequate knowledge and understanding of the EBP process, which would hamper one's ability to implement EBP. The extent of missing values may suggest a reluctance to confirm these gaps in knowledge by selecting to disagree with the items. As students, they may have been concerned that such an admission would reflect unfavourably on them, particularly if they felt that EBP is something they should know about. This further reinforces the importance of providing EBP education to these students to equip them with the competence and confidence necessary to deliver evidence-based patient care.

Furthermore, similar to the lecturer cohort, a significant number (16-34%) of students responded neutrally (neither agree nor disagree) on items regarding their belief in their ability to implement EBP. For example, 20% responded neutrally on the item "I am clear about the steps of EBP"; 25% on the item "I am sure that I can access the best resources in order to implement EBP"; 25% on the item "I am sure that I can access the best resources in order to implement EBP"; and 34% on the item "I believe that I can overcome barriers in implementing EBP". As with lecturers, choosing a neutral response may indicate students' lack of EBP knowledge and skill or a hesitancy to disclose this lack of knowledge. Students' hesitance to disclose this lack of knowledge, coupled with the fact that, on average, 19% of them chose not to respond at all to these items (missed responses) could indicate a lack of understanding of what EBP is, corroborating the findings from student responses to the definition of EBP. Also, the uncertainty demonstrated by the neutral responses and non-random

missing items responses could help explain students' low EBPI scores.

Clinical Cohort

EBP beliefs in the clinical cohort (EBPB mean = 59.98, SD 8.68) did not reflect full commitment to EBP but indicated potential to achieve full commitment (Fineout-Overholt, 2017). As expected, the items with the highest mean scores concerned the positive impact of EBP. Clinical nurses and midwives displayed considerable agreement (93%) that EBP results in the best clinical care for patients. However, on the open question, the same percentage (93%) of participants in this cohort did not articulate a definition of EBP that reflected commonly accepted definitions. This speaks to an opportunity to enhance their knowledge and understanding of EBP, and their positive beliefs about EBP provide a constructive foundation on which to build their competence and confidence in EBP implementation through tailored educational interventions. Nurses' and midwives' reported lower beliefs about their ability to implement EBP. This too potentially points to a knowledge and skills deficit which may also explain their low EBPI scores.

Nurses' and midwives' responses to some individual items demonstrated inconsistencies in their beliefs (Click here for Clinical Cohort EBPB Scale©), reflecting the findings in the lecturer and student cohorts. For example, 63% reported that they are confident about their ability to implement EBP where they work; 74% are sure that they can implement EBP; and 81% believe that the care they deliver is evidence-based. However, only 57% agreed that they are clear about the steps of EBP; 56% agreed that they can measure the outcomes of clinical care; 51% agreed that they can implement EBP sufficiently enough to make practice changes; and 47% agreed that they can access the best resources in order to implement EBP. This dissonance again suggests limited knowledge of EBP among this cohort, a finding supported by their responses to the open question. This, in addition to the finding that only 49% agreed that they overcome barriers to EBP implementation, indicates that there may be organisational, as well as individual, factors or deficits contributing to this situation. Nurses' and midwives' responses to the EBP culture and readiness within their organisations may highlight areas for potential intervention that can improve their competence and confidence in EBP implementation.

Mirroring the lecturer and student cohorts, a large number (15-41%) of participants in the clinical cohort responded neutrally (neither agree nor disagree) on items regarding their belief in their ability to implement EBP. For example, 40% responded neutrally to the item "I believe that I can overcome barriers in implementing EBP"; 41% on the item "I am sure that I can implement EBP in a time efficient way"; 38% on the item "I am sure that I can access the best resources in order to implement EBP"; and 29% on the item "I know how to implement EBP sufficiently enough to make

practice changes". The use of the neutral response could reflect uncertainty about these items, poor knowledge and understanding of EBP, or a reluctance to disclose their EBP knowledge deficit. Together with their responses to the open question on the definition of EBP, this finding speaks to limited EBP knowledge and skills, and an opportunity to intervene with tailored, context-specific EBP education. This suggested EBP knowledge deficit may also explain the very low EBPI scores in the clinical cohort.

Neither age nor the number of years qualified made a difference to EBP beliefs in the clinical cohort. This differs from other studies that revealed higher EBP beliefs among younger clinicians (Warren *et al.*, 2016b). However, higher academic qualification and nursing and midwifery roles both exerted a positive influence on EBP beliefs, emulating findings in other studies (Melnyk, Fineout-Overholt and Mays, 2008; Heydari *et al.*, 2014; Underhill *et al.*, 2015; Wilson *et al.*, 2015; Warren *et al.*, 2016b; Azmoude *et al.*, 2017). Clinical nurses and midwives whose highest academic qualification is at certificate level reported significantly lower EBP beliefs than clinical nurses and midwives who hold higher educational qualifications. This finding arguably reflects the changes that have occurred through the transition of nurse and midwifery education from the apprenticeship model of education (certificate qualification) which ended in 1994, through the diploma model (1995-2002), to the degree model of education that was introduced in 2002 (nursing) and 2006 (midwifery) in Ireland. It also highlights an important opportunity to focus on the development of EBP knowledge and skills in this particular group of nurses and midwives to enhance their EBP knowledge, beliefs, and implementation.

In terms of the influence of nursing and midwifery roles on EBP beliefs, clinical nurse or midwife managers 2 (CNM2/CMM2) reported higher EBP beliefs than either staff nurses and midwives, or assistant directors of nursing or midwifery. In addition, clinical nurse or midwife specialists (CNS/CMS) reported higher EBP beliefs than assistant directors of nursing or midwifery. Other studies have established a similar link between role and EBP beliefs (Warren, Montgomery and Friedmann, 2016). Nurses and midwives with higher academic qualifications, and those occupying CNM2/CMM2 and CNS/CMS roles, should be targeted as potential EBP champions or mentors (Melnyk *et al.*, 2017; Fineout-Overholt and Melnyk, 2018) who can model EBP in their everyday practice, and assist their colleagues towards greater EBP beliefs, knowledge and implementation, thereby contributing to a sustainable culture of EBP. The organisational culture and readiness for EBP scale demonstrated that availability of EBP champions in the clinical organisations involved in this study is a challenge for EBP implementation.

Summary of Beliefs

All three cohorts of participants hold positive EBP beliefs. Lecturers reported the highest EBP belief score, followed by clinical nurses and midwives, and then students. This emulates other studies (Melnyk, Fineout-Overholt and Mays, 2008; Hankemeier *et al.*, 2013; Malik, McKenna and Plummer, 2015; Upton *et al.*, 2015) where lecturers hold higher beliefs in EBP and, in light of their role, which is to be expected. The mean EBP beliefs score achieved by lecturers in the current study (87.72) was very close to the EBP beliefs score achieved by nurse and health professions faculty (89.49) in a study undertaken by Milner, Bradley and Lampley (2018). Like participants in this study, Milner *et al*.'s participants scored higher in their beliefs about the benefits of EBP than their beliefs in their ability to implement and teach EBP. Furthermore, the researchers similarly found that faculty EBP beliefs were not influenced by years teaching in higher education. Higher EBP beliefs correlate positively with higher EBP implementation (Melnyk, Fineout-Overholt and Mays, 2008; Estrada, 2009; Melnyk *et al.*, 2010; Wallen *et al.*, 2010; Stokke *et al.*, 2014; Skela-Savič, Pesjak and Lobe, 2016; Ramis, Chang and Nissen, 2019), echoing the theory of planned behaviour (Ajzen, 1985) which underpins this study. This theory asserts that beliefs (attitude), along with subjective norms and perceived control, influence behaviour (implementation). The EBP beliefs across the three cohorts in the current study, and in particular by the lecturers (87.72), would be expected to bode well for their EBP implementation scores.

Positive EBP beliefs are not an unusual finding. Numerous studies have shown that nurses and midwives are generally positively predisposed to EBP, believing that it improves patient care and outcomes (Stichler *et al.*, 2011; Melnyk *et al.*, 2012; Maaskant *et al.*, 2013; Heydari *et al.*, 2014; Belowska *et al.*, 2015; Malik, McKenna and Plummer, 2015; Orta *et al.*, 2016; Patelarou *et al.*, 2016; Warren *et al.*, 2016; Azmoude *et al.*, 2017; Saunders and Vehviläinen-Julkunen, 2017). However, the same studies reveal that nurses' and midwives' beliefs in their ability to actualise EBP were typically lower. Internationally, the dissonance between belief in EBP and belief in the ability to implement EBP appears to be the result of a combination of individual and organisational factors including knowledge and skill deficit, time, workload, and lack of necessary resources and empowering leadership (Ubbink, Guyatt and Vermeulen, 2013; Khammarnia *et al.*, 2015; Williams, Perillo and Brown, 2015; Caramanica and Spiva, 2018). The results from the current study support these international findings, with all three cohorts revealing clear beliefs about the positive impact of EBP, but lower beliefs in their ability to implement it.

Evidence-Based Practice Implementation

Lecturer Cohort

EBP implementation in the lecturer cohort was low (EBPI-E Mean 31.09, SD 16.54). Given the positively skewed distribution on this variable, the median score (29), which is more appropriate to use in such circumstances, was lower than the mean. This score demonstrates that lecturers had implemented EBP between 1-3 times but less than 4 times in the previous 8 weeks (Fineout-Overholt, 2018). Lecturers who teach EBP would be expected to implement EBP at least 6-7 times in an 8-week period which would be reflected in a mean EBPI-E score of 54-71 (Fineout-Overholt, 2018). Such low EBP implementation by lecturers may seem surprising in light of their favourable EBP beliefs. However, depending on the timing of their completion of the survey, lecturers may not have been at a planning or development stage of their work in the course of the previous eight weeks (focus of the EBPI-E scale©), which may be when they would typically engage with EBP more actively and meaningfully, as they prepare their teaching and assessment strategies. This may have impacted on some of their responses. Previous studies have determined a correlation between EBP beliefs and implementation (Melnyk, Fineout-Overholt and Mays, 2008; Estrada, 2009; Melnyk *et al.*, 2010; Wallen *et al.*, 2010; Stokke *et al.*, 2014; Skela-Savič, Pesjak and Lobe, 2016). However, correlation analysis revealed only a weak positive correlation in this cohort between EBP beliefs and implementation (0.210), which was not statistically significant. This finding contrasts with the previously cited studies and is not congruent with the theory of planned behaviour (Ajzen, 1985), in terms of the influence that attitude can assert on behaviour.

With such low EBP implementation, it was important to examine individual EBPI-E items (Click here for EBPI-E Scale©) and identify those with reported means between 2-2.5 (score range for individual items 0-4), as these are the areas where considerable opportunity for improvement exists, and where support and resources should be focused. There were seven such items, placing them largely in the "1-3 times in the previous 8 weeks" category. These items included the generation of PICOT questions by participants about their teaching or practice speciality (M=2.05); sharing an EBP guideline (M=2.34), or outcome data (M=2.05) with work colleagues, or sharing research evidence with a multidisciplinary team member (M=2.23); the use of an EBP guideline or systematic review to change educational strategies in the workplace (M=2.18); evaluation of an educational initiative by collecting outcomes (M=2.05); and evaluation of outcomes of an educational change (M=2.23). Low implementation on these items may indicate lecturers' lack of knowledge or skill for the EBP process. However, they may also reflect organisational factors that could hinder EBP implementation in these areas. For example, in relation to "evaluation of an educational initiative by collecting outcomes",

one means of evaluation is to survey the students. However, there may be organisational structures in place that limit this option, so that students are not over-burdened with such surveys. This may impact on lecturers' scope in the evaluation of educational initiatives. Overall, the results of the EBPI-E scale demonstrate good opportunity for education of lecturers in the specific knowledge and skills necessary to execute these activities and enhance their existing knowledge, competence, and implementation of EBP. Findings from the lecturers' EBP culture and readiness in the organisations provided insight into organisational factors where opportunity for intervention may exist.

The EBP implementation item with the highest reported mean was critical appraisal of evidence from a research study (M=3.84), which lecturers did on average 4-5 times in the previous 8 weeks, with 55% having done so at least 6-8 times. This corresponds with the high score reported by lecturers regarding their belief that critical appraisal is an important step in the EBP process, and is an example of beliefs leading to action. The next four highest scoring items concerned sharing research evidence with a student (M=3.61), reading and critically appraising research evidence (M=3.42), using evidence to change teaching practice (M=3.39), and discussing research evidence with a colleague (M=3.27), with at least 42% of lecturers doing so at least 6-8 times in the previous 8 weeks. These findings suggest that many lecturers are engaging in these EBP behaviours at a level that would be expected, and that they are discussing evidence with students and colleagues, which is both constructive and promising. Furthermore, it indicates that there are lecturers who possess reasonable knowledge and skill around EBP, who perhaps could be called upon to support their colleagues whose EBP knowledge and skill are not yet sufficiently developed. That said, it also demonstrates that there are still considerable numbers of lecturers not doing so on these or other items listed in the EBPI-E Scale©, reiterating the opportunity for appropriate educational intervention.

Notably, a number of the items with lower reported means concern decision-making, such as the implementation of change or educational initiative based on evidence, and outcome measurement or evaluation of the educational initiative. In the previous eight weeks, 31% of participants did not use an EBP guideline or systematic review to change educational strategies where they work. Almost 40% did not evaluate an educational initiative by collecting outcomes, and 38% did not share outcome data with colleagues. It is, therefore, unsurprising that the lowest score (M=1.92) was attributed to the item "changed curricular policies/materials based on outcome data", with almost 50% of participants not engaging in this activity at all in the same time frame. Such low scores could perhaps be attributed to poor EBP knowledge and skills on the part of the lecturers. However, other factors may also be exerting an impact. For example, curricular review or revision is not typically

conducted on an on-going week-to-week, or even month-to-month basis. Nursing and midwifery curricula are reviewed as determined, in the first instance, by the NMBI, and, thereafter, according to local arrangements. In the absence of such a curricular review within the time-frame specified in the EBPI-E scale© (previous eight weeks), participants would have been hindered in their ability to respond positively to that item on the scale. The low scores on the items in question may also be a symptom of little involvement with, or authority in decision-making by lecturers. The findings on EBP culture and readiness in the organisation indicate that lecturers perceived that their involvement in decision-making is low. This is an organisational challenge that presents an opportunity for appropriate intervention that can enhance lecturers' confidence in their ability and authority to make decisions required to effect the EBP process in full, and contribute to a sustainable culture of EBP.

Neither years in education nor registration on the RNT division of the NMBI Register influenced EBP implementation. However, lecturers who hold a PhD reported significantly higher implementation levels of EBP than those whose highest academic qualification is a master's degree, suggesting that higher academic qualification improves EBP implementation. This finding is mirrored in other studies (Melnyk, Fineout-Overholt and Mays, 2008; Underhill *et al.*, 2015; Warren, Montgomery and Friedmann, 2016). The experience and learning that one encounters in the course of undertaking a PhD study, certainly compels one to acquire knowledge and skills that are integral to at least some of the steps of the EBP process, which might be one explanation for this observed difference. However, not all lecturers will study to PhD level, nor do they need to in order to become competent in EBP implementation. Specific education in the knowledge and skills of implementing and teaching EBP for lecturers (with and without a PhD) can overcome their deficits and augment their EBP competence and capacity.

The response frequencies on several items provide greater understanding of the variance of implementation by lecturers in specific EBP activities. For example, while lecturers reported that, on average, they generated a PICOT question about their teaching or practice speciality 1-3 times in the previous 8 weeks (M=2.05, SD 1.18), 18% of them did so at least four times in that time frame, and 32% did not generate a PICOT question at all. This suggests inconsistent implementation of this key step of the EBP process across this cohort. This could represent a lack of knowledge about PICOT questions and/or how to generate them, which can be addressed by education. Other possible factors could include lack of time, heavy workloads and teaching commitments, or an organisational culture that doesn't encourage or embrace EBP, to mention a few. The findings on EBP culture and readiness in the organisations indicate that lecturers perceived a number of areas where

opportunities exist to intervene to expedite a sustainable culture of EBP.

Low EBP implementation in this cohort is a concern as lecturers are responsible for the education of nurses and midwives of the future and have the potential to influence their students' EBP attitudes, capacity and behaviour (Mehrdad *et al.*, 2012; Leach, Hofmeyer and Bobridge, 2016). One cannot teach what one does not know (Melnyk *et al.*, 2012). Could this be the case in relation to the lecturers in this study? Do many lecturers not know or understand what EBP is? There certainly appears to be evidence of poor knowledge of what EBP is, with the term frequently and incorrectly used interchangeably with research utilisation (Estabrooks, 1999; Glacken and Chaney, 2004; Timmins, McCabe and McSherry, 2012; Yadav and Fealy, 2012; Saunders and Vehviläinen-Julkunen, 2016b). This was echoed in the qualitative findings among this group in the current study. In the case of many nursing and midwifery programmes, the arduous processes of conducting research are taught in isolation from the application of research findings to practice, which often fosters negative attitudes towards research (Melnyk, Fineout-Overholt and Mays, 2008; Melnyk *et al.*, 2012; Orta *et al.*, 2016). Recent studies have demonstrated that students' attitudes towards research are one of the most powerful indicators of their use of research in their future professional practice (Griffioen, 2019; Ross and Burrell, 2019), mirroring the fundamental premise of Ajzen's (1985) theory of planned behaviour, which underpins this study. Students with negative attitudes towards research are therefore unlikely to use research evidence in the delivery of evidence-based patient care, further perpetuating the delay of EBP implementation in practice. Moreover, if a lecturer is teaching research methods alone, in the guise of EBP, the core components of EBP (the application of the best available evidence, and the respective roles of clinical expertise, and patient values in healthcare decision-making) are at serious risk of being overlooked. Further education and development of lecturers in EBP knowledge and skills will be crucial if this situation is to be corrected in the Irish context for the future (Lehane *et al.*, 2019).

Student Cohort

EBP implementation in the student cohort was very low (EBPI Mean 16.59, SD 12.11). Given the positively skewed distribution on this variable, the median (14), which is lower still, is arguably a more accurate reflection of central tendency. The findings suggest that in the previous 8 weeks students had implemented EBP less than 1 time (Fineout-Overholt, 2017). Neither the programme nor year of study influenced EBP implementation among students. Students who are learning about EBP would be expected to implement EBP at least 6-7 times in an 8-week period (Fineout-Overholt, 2017). This raises questions about whether students are learning about, or are being taught about EBP. Nurse and midwifery lecturers must be knowledgeable and competent in the teaching of EBP

(Orta *et al.*, 2016) but findings from this and other studies (Stichler *et al.*, 2011; Mehrdad *et al.*, 2012; Malik, McKenna and Plummer, 2015) suggest that they have deficiencies in the knowledge and competence to do so. They, along with the nurses and midwives in the clinical setting, are the key providers of education and training to nurse and midwifery students and, as such, exert significant influence on students' belief in their ability and their intention to use EBP (Gloudemans *et al.*, 2013; Lam and Schubert, 2019; Ramis, Chang and Nissen, 2019). If, as the low EBP implementation scores in the lecturer and clinical cohorts (M=31.09 and M=12.85, respectively) suggest, there is low implementation and therefore little role-modelling of EBP among the nurse and midwifery lecturers who teach student nurses and midwives, and among clinical nurses and midwives who mentor them in clinical practice, it stands to reason that there will be low implementation of EBP among these students. In their study exploring predictors of graduate nurses' application of EBP in practice, Blackman and Giles (2017) demonstrated a positive relationship between exposure to EBP in clinical placements and students' subsequent application of EBP. Students who witness clinicians engaging in EBP in clinical practice are much more likely to emulate this approach in their future practice, a position supported by other studies (Smith-Strøm *et al.*, 2012; Brooke, Hvalič-Touzery and Skela-Savič, 2015; Fiset, Graham and Davies, 2017; Labrague, McEnroe-Pettite, *et al.*, 2019). Conversely, when students are not exposed to EBP in practice, they are far less likely to participate in EBP themselves. Furthermore, students, by their nature, arguably lack the autonomy and authority (Fiset, Graham and Davies, 2017) as well as the necessary knowledge and skills perhaps, to engage in EBP. Their student status therefore could compound matters as they are in a potentially vulnerable situation being dependent on their senior colleagues to teach them and assess their performance in practice. This can stymy students' willingness to challenge practice or question their preceptors (Felstead, 2013; Ryan, 2016) as they won't want to be perceived as impertinent or troublesome out of concern that this could potentially result in poorer assessment outcomes for them. Furthermore, in the course of their undergraduate programmes, student nurses' and midwives' time and learning are split between the educational and practice settings. It is impossible to know where the student participants in this study were based (clinical practice or college) when they completed this survey. However, it is worth noting that their responses could have been affected by their setting at the time of participation. Some students may have been responding from the context of the clinical setting, while others may have been responding in the educational context. Similar to the lecturer cohort, little correlation was found between the EBPB and EBPI Scales© (0.128) in the student cohort, suggesting that higher EBP beliefs among students have not, to date, translated into higher EBP implementation. Items with reported mean scores less that 2-2.5 indicate opportunity for intervention and improvement. In this cohort, all EBPI items fall into this category, indicating

opportunity for interventions that focus on approaches to enhance students' EBP knowledge and skill, in order to enhance their competence and confidence to implement EBP (Click here for Students' EBPI Scale©).

Eight items on the scale scored between 1.01 and 1.49, including: used evidence to change clinical practice (M=1.49); accessing databases such as NICE (M=1.40) or Cochrane (M=1.06) for sources of evidence; critical appraisal of a research study (M=1.35), or a clinical research study (M=1.20); collection of data on a patient problem (M=1.26); informal discussion of evidence from a study with a colleague (M=1.25); and sharing evidence with a patient or family member (M=1.01). This indicates that on average students performed these EBP activities less than three times in the previous eight weeks. The degree to which these activities were performed varied among the students. For example, in the case of the item with the highest reported mean, "used evidence to change my clinical practice", 27% of students stated that they did this less than three times in the previous eight weeks, while 29% of students did so four times or more in the same timeframe. This implies that 56% of students have, to greater or lesser extents, used evidence to change practice in the previous eight weeks. Conversely, 17% of students did not use evidence to change practice at all in that time. This variance in the use of evidence by students to change practice raises questions about what (or perhaps 'if' in some cases) students are being taught about EBP, with these findings indicating that delivery of EBP education is inconsistent. However, it also provides the foundation for considerable opportunity to build on students' EBP knowledge and skills to augment their capacity for and engagement with these activities.

Ten items had a reported mean score less than 1 (ranging from 0.48 – 0.97) placing these items in the "zero times" category. These items included: sharing an EBP guideline with a colleague (M=0.97); evaluating the outcomes of a practice change (M=0.86); sharing evidence in the form of a report or presentation with 2 or more colleagues (M=0.83); promoting the use of EBP to colleagues (M=0.73); evaluating a care initiative by collecting outcome data (M=0.54); sharing evidence with a multi-disciplinary team member (M=0.53); generating a PICOT question about clinical practice (M=0.53); using an EBP guideline or systematic review to change practice (M=0.52); and sharing outcome data with colleagues (M=0.48). Most of these items relate to steps of the EBP process that are integral to its implementation. Such minimal performance of these activities (as the scores suggest) is indicative of minimal EBP implementation. In particular, such low scores relating to use of PICOT questions, and sharing evidence from research studies or EBP guidelines, suggest poor EBP knowledge, and calls into question the nature of EBP education that these students are receiving. It is important to acknowledge that some of the low-scoring activities, such as evaluation of a practice change or care

initiative, or changing practice based on patient outcome data, may be somewhat advanced for students, or beyond the scope of their practice, depending on their year of programme. However, statistical analysis to explore differences that the year of study might make to EBP implementation scores revealed no difference, implying that students across all years of their programmes responded similarly to these items. A focused approach to EBP education in nurse and midwifery programmes, that is advocated by the NMBI, and delivered by lecturers competent in the teaching and implementation of EBP is imperative if these scores are to improve.

Given that these students were undertaking full time programmes of education in nursing or midwifery, it would be expected that they would need to search for, read, critically appraise and use evidence regularly in the course of their studies. Perhaps, as posited by Ryan (2016), when in clinical practice the practicalities of the job in hand supersede a research and EBP focus, particularly if the culture doesn't support or encourage engagement in these areas. In their study exploring nursing students' socialisation in clinical practice, Ewertsson, Bagga-Gupta and Blomberg (2017) found that frequently the prevailing priority for students and their preceptors alike is the attainment of practical skills, which can result in students directing their time and attention to this end. This can be further reinforced by the students' desire to fit in, and please their preceptors by mimicking their practice and focusing on approaches to practice valued by their preceptors (Ewertsson, Bagga-Gupta and Blomberg, 2017). Therefore, if EBP is not valued or role-modelled by their preceptors, students are less likely to engage in EBP activities. This reflects the influence of subjective norms on one's behaviour as described by Ajzen (1985) in the theory of planned behaviour. In addition, perhaps the students' poor understanding of what EBP is, as illustrated by their responses to the open question, limits their recognition of these activities as steps of the EBP process or as activities that are relevant to nursing and midwifery practice. However, their EBP implementation may be influenced by other factors such as an unsupportive organisational culture or the challenging contemporary working conditions in the healthcare setting. The results of the OCRSIEP-ES Survey© will help to identify such factors.

Items with mean scores less than 2.5 are all areas where tailored intervention is required to improve students' implementation of EBP (Fineout-Overholt, 2017) and they should be the focus of curricular planning for the future. The students' EBP implementation mean scores, all of which were less than 2.5, do not reflect the scores on the students' EBP belief scores, which demonstrated that students hold positive beliefs about EBP. There appears to be a dissonance in the findings here. Furthermore, 27% (approximately 60 participants) of responses were missing on all 18 EBPI© items. This could suggest that these students are unclear about what EBP is, and what activities are related to it.

Certainly the student responses to the open question that indicated poor ability to define EBP would support this interpretation. If students knew what EBP is but simply didn't engage in it, it could be argued that they would simply select the "0" response indicating that they did not engage in these activities in the previous eight weeks, rather than not responding at all. Alternatively, given their positive beliefs about EBP, they may be reluctant to indicate that these EBP activities are not part of their clinical practice.

Clinical Cohort

EBP implementation in the clinical cohort was very low (EBPI mean score 12.85, SD 14) but this is not uncommon (Melnyk *et al.*, 2010, 2017; Wallen *et al.*, 2010; Cruz *et al.*, 2016; Warren *et al.*, 2016b). It is lower than the EBP implementation scores attained by the lecturer (M=31.09) and student (M=16.59) cohorts and suggests that in the previous 8 weeks nurses and midwives in the selected hospital settings implemented EBP less than 1 time (Fineout-Overholt, 2017). Given the positively skewed distribution of EBP implementation in the clinical cohort, the median, a more accurate measure of central tendency, is lower than the mean (8). Their low EBP implementation is congruent with 95% of these participants reporting that they did not know much about EBP, and their low beliefs in their ability to implement EBP. Yet, a statistically significant correlation between their EBP beliefs and EBP implementation (0.372) infers a positive relationship between these variables in this cohort. This offers promise that measures taken to enhance their EBP beliefs and competence will result in improved EBP implementation.

The most common implementation item was the use of evidence to change practice (M=1.35) followed by informal discussion of a research study with colleagues (M=0.98). The least common implementation item was accessing published EBP guidelines (M=0.29) followed by the generation of a PICOT question (M=0.42). These very low EBP implementation scores contrast starkly with their belief (81%) that the care they deliver is evidence-based. Arguably this could be indicative of confusion about what EBP is, or a lack of EBP knowledge and skills. This presents an opportunity for tailored educational intervention for this cohort, the goal of which would be improved EBP knowledge and skills, which would enhance their EBP implementation. Other factors that could be contributing to their low EBP implementation may include an unsupportive organisational culture or the challenging contemporary working conditions in the healthcare setting. The results of the OCRSIEP Survey© may offer some insight into such factors.

Item analysis revealed variance among the participants and some inconsistencies (Click here for Clinical Cohort EBPI Scale©). For example, in relation to the item concerning the use of evidence to

change clinical practice, (M=1.35), over 72% of participants stated that they had done this in the previous 8 weeks, with 32% doing so on at least five occasions in that period. However, more than 40% reported having done so fewer than three times, and almost 24% of participants reported that they did not use evidence at all to change practice in that period. Furthermore, despite 72% of participants reporting that they used evidence to change practice, less than 50% evaluated the outcomes of a practice change, with the majority of those only doing so less than three times in that period. In the same timeframe, only 24% generated a PICOT question about clinical practice, 39% read and critically appraised a clinical research study, 37% used an EBP guideline or systematic review to change practice, 47% collected data on a patient problem, and 35% evaluated a care initiative using patient outcome data. All of these are key steps in the EBP process. Such infrequent performance of these key steps of EBP does not correspond with 72% of nurses and midwives reporting that they used evidence to change clinical practice.

Inconsistency is also evident in items concerning the discussion of EBP or sharing of EBP data or guidelines with nursing or midwifery colleagues, the multidisciplinary team, patients and their families. The findings suggest that this is happening but on an inconsistent basis. Approximately 60% of participants stated that they had informally discussed evidence from a research study with a colleague, but almost 36% of participants did this less than three times in the 8-week period. While over 52% of participants shared an EBP guideline with a colleague only 18% did so more than three times in the previous 8 weeks and 45% not at all. Similarly, 48% of participants shared evidence from a research study with a member of the multidisciplinary team. However, only 17% had done so more than three times in the 8-week period, and 49% hadn't done so at all. Forty-three percent of participants shared evidence from a study in the form of a report/presentation but 26% did so less than three times and 55% not at all in the previous 8 weeks. Nonetheless, over half of participants stated that they promoted the use of EBP to colleagues in the previous 8 weeks. Such variance and inconsistency in the performance of the steps of the EBP process could suggest limited knowledge and skills in EBP and/or a fundamental lack of knowledge of what constitutes EBP. This would certainly converge with the qualitative findings. A collaborative approach to the EBP process in clinical practice has been proposed in order to render its implementation more straight-forward and feasible (Melnyk *et al.*, 2017; Saunders and Vehviläinen-Julkunen, 2017). Adopting this approach requires the assembly of a critical mass of EBP mentors and advanced nurse/midwife practitioners (ANP/AMP) who will support and nurture the frontline staff as they endeavour to integrate an EBP approach to their patient care delivery, while getting on with the business of primary care. This would allow frontline staff to master and focus on identifying relevant clinical questions, and, with the help of their EBP mentors, integrate evidence into practice. The remaining steps of the EBP

process would be managed by the EBP mentors and ANPs/AMPs, who are competent in all steps of the EBP process. In this way the benefits of EBP can be realised without overwhelming frontline staff which in turn thwarts the implementation of EBP. A critical mass of EBP mentors is integral to the success of this collaborative approach (Melnyk *et al.*, 2017; Fineout-Overholt and Melnyk, 2018).

Two particularly infrequently implemented items concerned accessing databases for EBP guidelines and systematic reviews. Fewer than 14% of participants accessed the National Guidelines Clearinghouse while 24% accessed the Cochrane Database of Systematic Reviews. The National Guidelines Clearinghouse was a publicly available database of evidence-based clinical practice guidelines sponsored by the Agency for Healthcare Research and Quality (AHRQ) in the United States. As such, it may not be well known to nurses and midwives in the Irish healthcare setting. Funding for the National Guidelines Clearinghouse ceased in 2018 (Agency for Healthcare Research and Quality, 2018) but it was funded and operational throughout the data collection phase of this study. The Cochrane Database of Systematic Reviews may perhaps be perceived, by some, to be more medically oriented and, as such, not frequently called upon by clinical nurses and midwives. However, there is a robust, and growing, presence of nurse and midwife involvement with Cochrane as lead authors on Cochrane systematic reviews. "Cochrane Nursing", which is part of Cochrane Collaboration, engages strategically in activities to promote the engagement of nurses in EBP.

Poor awareness of such sources of evidence is more likely to be the challenge, and this has been shown to be the case among healthcare professionals including nurses internationally (Ubbink, Guyatt and Vermeulen, 2013) so this finding is not exclusive to this study. Maaskant *et al.* (2013) revealed that 52% of nurses in their study did not know relevant sources of information. Numerous studies have demonstrated that nurses frequently turn to their colleagues, their own experience, and knowledge gained in nurse registration programmes when seeking information on which to inform patient care (Gerrish, Guillaume, *et al.*, 2011; Marshall, West and Aitken, 2011; Mills, Field and Cant, 2011; O'Leary and Ní Mhaolrúnaigh, 2012; Ubbink, Guyatt and Vermeulen, 2013; Malik, McKenna and Plummer, 2015; Bin Naeem, Bhatti and Isltfaq, 2017). Limited awareness of more robust forms of evidence in this cohort can be remedied through tailored educational interventions.

Summary of EBP Implementation Findings

All three cohorts demonstrated low levels of EBP implementation. These low implementation levels are somewhat incongruent with the EBP beliefs scores achieved which indicated commitment to and potential for EBP among participants. Previous studies have determined a correlation between EBP beliefs and implementation (Melnyk, Fineout-Overholt and Mays, 2008; Estrada, 2009; Melnyk *et al.*, 2010; Wallen *et al.*, 2010; Stokke *et al.*, 2014; Skela-Savič, Pesjak and Lobe, 2016). Lecturers, who

demonstrated the highest beliefs in and strongest commitment to EBP, also achieved the highest EBP implementation score followed by students and then clinical nurses and midwives. Statistical analysis, however, revealed little correlation between EBP beliefs and EBP implementation in both the lecturer and student cohorts, but a statistically significant correlation between these variables in the clinical cohort. The findings realised in the lecturer and student cohorts contrast with those previously cited studies and are not in keeping with the theory of planned behaviour (Ajzen, 1985), in terms of the influence that attitude can assert on behaviour. However, Ajzen (1991) advised that the person's attitude or beliefs alone may not be sufficient to produce the desired behaviour. Other influencing factors such as ability, autonomy and authority, time, cost and organisational support (perceived control), and the perceptions of influential others (subjective norms), for example, can enable or restrain the person's engagement with the desired behaviour. Such factors must therefore be considered carefully in order to pinpoint the existing barriers with a view to overcoming them and finding a relevant, realistic and context-specific way forward. The findings from the EBPI and EBPI-E Scales©, coupled with the OCRSIEP, OCRSIEP-E, and OCRSIEP-ES Surveys©, will help to uncover some of these factors.

Despite achieving the highest EBP implementation score, lecturers demonstrated that on average they had implemented EBP between 1 and 3 times in the previous 8 weeks, which falls well short of what lecturers who teach EBP or from an EBP perspective would reasonably be expected to demonstrate. Clinical nurses and midwives achieved the lowest score which revealed that they implemented EBP on average 1 time or less in the previous 8 weeks. Such low implementation levels among these two cohorts, coupled with the qualitative findings that demonstrated that their knowledge of EBP is poor, are a real cause for concern. They are jointly responsible for delivering and supporting nurse and midwifery education in Ireland. If students, the nurses and midwives of the future, are not learning about EBP in college and are not exposed to it during their clinical practice placements in their host teaching hospitals, they are highly unlikely to acquire EBP knowledge or the skills necessary to implement it. This will be to the detriment of nursing and midwifery practice, patient care and outcomes, and the efficacy and efficiency of healthcare organisations. Low EBP implementation is a challenge that is not exclusive to nurses and midwives, nor to Ireland, as the systematic scoping review by Ubbink, Guyatt and Vermeulen (2013) demonstrated. The low EBP implementation scores achieved in this study are comparable to those realised in other studies using the same scales (Melnyk, Fineout-Overholt and Mays, 2008; Wallen *et al.*, 2010; Melnyk *et al.*, 2016; Warren, Montgomery and Friedmann, 2016; Friesen *et al.*, 2017; Singleton, 2017). The findings yielded by the EBPI and EBPI-E Scales© in this study reveal that the most fundamental steps of the EBP process are performed infrequently, in particular the generation

of PICOT questions, the use and sharing of EBP guidelines, and the evaluation of educational or patient care initiatives. While these activities were engaged in least, the remaining activities were not engaged in to an extent that would demonstrate consistent actualisation of EBP either in clinical or academic settings.

Education in the concept, process and skills of EBP is needed by all three cohorts. Participants in each cohort possess varying levels of EBP knowledge and skills so, for some, further enhancement or development of this knowledge coupled with support mechanisms necessary to implement it in practice will be warranted. For others, the education will need to start with the fundamentals of EBP and progress from there. In addition, the skills to not only implement EBP but also to teach it and support its implementation will also be required, if its integration into nursing and midwifery practice is to be successful and sustainable. In addition to the more apparent measures to improve EBP implementation, such as increasing EBP instruction at under- and post-graduate levels, it is also important to closely examine why such low EBP implementation exists. The potential barriers, which may be individual or organisational, should be considered in an effort to ascertain those that are surmountable and ways in which this can be achieved (Ubbink, Guyatt and Vermeulen, 2013; Warren, Montgomery and Friedmann, 2016). In terms of the theory of planned behaviour (Ajzen, 1985), organisational culture, supports and resources for EBP represent factors that can influence subjective norms and individuals' perceived control, both of which affect an individual's behaviour (implementation of EBP). In the absence of a culture that is supportive of EBP, sustainable EBP implementation will not be realised (Melnyk, 2016a). To this end, the context-specific findings from the organisational culture and readiness scales administered in this study will make a constructive contribution to identifying the areas where intervention is particularly needed.

Organisational Culture and Readiness for EBP

Lecturer Cohort

The total OCRSIEP-E© score in the lecturer cohort was 86.43 (SD 15.01), indicating moderate movement toward a culture of EBP but that culture is not yet sustainable. Ideally a score of 100-125 is desirable, demonstrating essential movement toward a sustainable culture of school-wide EBP (Fineout-Overholt, 2018). There is, therefore, considerable opportunity for measures to be implemented that will enhance this situation. Consideration of individual items on the OCRSIEP-E Survey© (Click here for OCRSIEP-E Survey©) can facilitate identification of areas where such opportunities exist.

Items with reported mean scores of 4 or higher (score range for individual items 1-5) concerned the computer proficiency of faculty (78%), the EBP knowledge and skills of librarians (72%), and faculty's access to quality computers and electronic databases (82%). This is a very encouraging finding as these attributes are integral to the success of EBP in any organisation. Lack of access to computers and databases has frequently been cited as a barrier to EBP (McKenna, Ashton and Keeney, 2004; Eizenberg, 2011; Yadav and Fealy, 2012; Khammarnia *et al.*, 2015; Williams, Perillo and Brown, 2015). Scores of 4 or greater indicate the presence to a moderate extent of these resources in the educational organisations. This represents a legitimate strength that should be valued and capitalised on in the drive to integrate EBP into the culture and practice of the organisation. However, despite having librarians with EBP knowledge and skills to a moderate extent in these organisations, the librarians are only called upon "somewhat" to assist with the search for evidence. This represents under-utilisation of an existing pivotal resource and, as such, is a lost or wasted opportunity. Involvement of librarians in the delivery of EBP instruction is invaluable both to the lecturers and the students (Middlebrooks, Carter-Templeton and Mund, 2016; Lehane *et al.*, 2017; Hartzell and Fineout-Overholt, 2019). In addition, their assistance in teaching the skills of literature searching, and conducting literature searches is equally indispensable in expediting the task, maximising the results of the search, and contributing to finding an answer to the clinical question (Tod *et al.*, 2007; Maatta and Wallmyr, 2010).

The majority of organisational culture and readiness items had reported mean scores ranging from 3.00 to 3.93, placing them in the "somewhat" category. These included the extent to which: EBP is described as central to the mission and philosophy of the school; participants believe that EBP is practiced in their schools; faculty, and administrators are committed to EBP; there is a critical mass of faculty with strong EBP knowledge and skills; there are EBP champions among lecturers, senior lecturers, and clinical skills nurses; faculty model EBP in their educational and clinical settings;

librarians are used to search for evidence; there is on-going research by nurse scientists (PhD- and doctoral-prepared researchers) to assist in the generation of evidence when it does not exist; measurement and sharing of outcomes is part of the culture; and fiscal resources are used to support EBP. These items may be perceived as barriers but they also represent areas of potential strength and opportunity for enhancement. They indicate some commitment to EBP, which is a good starting point, and the existence of systems that can be utilised and enhanced to foster its growth. Similar barriers to EBP implementation have been identified in other studies (Malik, McKenna and Plummer, 2015; Upton *et al.*, 2015; Milner, Bradley and Lampley, 2018). Melnyk *et al.* (2016) propounded that it is imperative that an environment conducive to and supportive of sustainable EBP implementation is fostered so that the benefits of EBP can be attained. This begins with the integration of EBP into the philosophy, mission statement and job descriptions of the organisation, so that it becomes an expectation as well as an aspiration. In this way, EBP should become the norm rather than the exception (Canada, 2016). The presence of lecturers with strong EBP knowledge and skills, who promote and role-model EBP, is crucial (Ubbink, Guyatt and Vermeulen, 2013; Lehane *et al.*, 2017). To this end the knowledge and skills of lecturers, senior lecturers and clinical skills nurses should be developed and/or advanced as necessary through continuing professional development so that competence in EBP and its instruction is achieved (Melnyk *et al.*, 2016; Lehane *et al.*, 2017). All identified challenges to EBP implementation should be examined closely and tackled to improve school-wide uptake and integration of EBP.

The items on the OCRSIEP-E Survey© with the lowest reported means concerned the decision-making authority within the organisation, and the existence of EBP mentors/champions. These items achieved scores greater than 2.5 but less than 3, situating them in the second lowest category of “a little” in the case of the EBP mentor/champion-related items, and “25%” in the case of the decision-making-related items. Mean scores of between 2.56 and 2.97 were reported on the items concerning the extent to which there are EBP champions among administration/management, clinical partner services, and mentors among faculty. The categorical impact that EBP mentors and champions exert on nurses’ readiness for, and capacity to utilise EBP in their organisations, in addition to their contribution to fostering enduring EBP cultures, has been clearly demonstrated (Melnyk *et al.*, 2017; Saunders and Vehviläinen-Julkunen, 2017; Fineout-Overholt and Melnyk, 2018). The identified lack of such catalysts of successful and sustainable EBP integration in this sample represents a significant challenge that requires equally significant attention. In order to realise a critical mass of EBP mentors and champions among lecturers, administration/management, and clinical partner services, an educational strategy tailored to the respective needs of these groups in relation to EBP knowledge and skills, should be developed, implemented and evaluated in the

educational and clinical organisations involved in this study.

In relation to decision-making in educational institutions in this study, the findings suggest that decision-making authority lies largely with the University/Institute administration (50%), and to a lesser degree with individual school administration (25%), and lecturing staff (25%). Such low decision-making involvement or authority could perhaps explain some of the lower scoring items on the EBPI-E Scale© relating to the implementation of change and activities leading to change. The EBP implementation item with the lowest reported mean score (1.92) was "changed curricular policies/materials based on outcome data", with almost 50% of participants not engaging in this activity at all in the previous eight weeks. Melnyk *et al.* (2010) demonstrated that when nurses perceive that their organisation supports EBP, their EBP beliefs and implementation are higher and they feel more empowered. The participants in this cohort perceived that the academic institutions in which they work are only somewhat supportive of EBP, which might explain to some extent why they may not be/feel as empowered as they could, the low EBP implementation scores achieved by this cohort, and their apparently low involvement in decision-making. In organisations where EBP is supported and encouraged, nurses and midwives feel more empowered, experience greater job satisfaction and less desire to leave the profession (Kramer *et al.*, 2007; Melnyk *et al.*, 2010; Kelly, McHugh and Aiken, 2011; Belden *et al.*, 2012; Wilson *et al.*, 2015; Kim *et al.*, 2016; Saunders and Vehviläinen-Julkunen, 2016a). This clearly illustrates that EBP implementation not only benefits the recipients of evidence-based care, it also benefits the providers of that care and the organisations in which they work.

On the item concerning their institutions' readiness for EBP, 17% of participants responded that their institution was "past ready and onto action", just over 28% responded "ready to go", and a further 25% responded "been ready but not acting". These findings imply that 70% of lecturers perceived that their organisation was at least ready for EBP, which is an encouraging result. Seven percent of participants stated that their organisations are "not ready" and almost 9% stated that they were "getting ready". The mean score reported on this item was 3.46 ("been ready but not acting"). In terms of how much movement there had been in their institutions towards an EBP culture compared to six months beforehand, the mean score was 3.13, suggesting that the movement towards an EBP culture in the previous six months had been "somewhat". Only 7% of participants stated that there had been no movement at all toward an EBP culture, with 21%, 24%, 21% and 13% suggesting that there had been "a little", "somewhat", "moderately" and "very much" movement toward an EBP culture in their organisations, respectively. The findings in relation to both of these items are reasonably reassuring. However, there was little correlation between the EBP

implementation and organisational culture and readiness for EBP (0.146), implying that higher perceptions of organisational culture and readiness for EBP had not necessarily translated into higher EBP implementation among this cohort. This is an unusual finding. There was, however, a statistically significant moderate positive correlation between the EBP beliefs and organisational culture and readiness for EBP (0.367), suggesting that higher organisational culture and readiness for EBP is associated with higher EBP beliefs. However, in terms of the overall score for organisational culture and readiness for EBP, and EBP implementation, there is much room for improvement. This work needs to focus on the EBP knowledge and skills of all stakeholders of the organisation, the lecturers, the administration/management of both the school and the university/institute, and the clinical partner services. In addition, decision-making at school-, university- and institute-levels should be scrutinised with a view to ascertaining why lecturers and school administration are not more actively involved at all levels. It is important to ascertain the factors that contribute to this situation, whether it is a lack of capability, confidence, authority, a combination of these, or something else, in order to develop a bespoke solution that will address the nuances of the situation in each individual organisation.

Student Cohort

The total score for the OCRSIEP-ES Survey© in the student cohort was 93.21 (SD 16.21) indicating moderate movement toward a culture of EBP but that culture is not yet sustainable. Ideally a score of 100-125 is desirable, which would demonstrate essential movement toward a sustainable culture of school-wide EBP (Fineout-Overholt, 2017). The students' year of study did not make any difference to their perceptions of organisational culture and readiness for EBP in their institutions. Of particular significance was the high rate of missed responses on the OCRSIEP-ES Survey© (Click here for OCRSIEP-ES Survey©). An average of 34% of responses was missed across all 25 items. This may signify that these students did not understand the questions, or lacked the knowledge with which to answer these questions.

Items with reported mean scores of 4 or above concerned, for the most part, the educational resources that support EBP, indicating moderate availability or presence of these resources. Examples include the extent to which: students believe that EBP is practiced in their educational organisation (50%); EBP is described as central to the mission and philosophy of the educational institution (57%); faculty are committed to EBP (56%); there is a critical mass of faculty with strong EBP knowledge and skills (54%); students have access to quality computers and databases (57%), and have proficient computer skills (54%); and there are EBP champions among lecturers (56%) and clinical skills nurses (50%). The moderate presence of quality computers and databases, students'

computer skills, and EBP champions among lecturers and clinical skills nurses, all represent a firm foundation from which to build EBP knowledge, skills and implementation. Students scored the overall readiness of their schools for EBP, and the centrality of EBP to the mission and philosophy of their schools, their lecturers' commitment to, and knowledge and skills of EBP higher than lecturers did. This suggests that students perceive that their academic institutions and lecturers are performing better in terms of getting or being ready to embrace EBP than lecturers do. However, the EBP implementation by lecturers (M=31.09) could imply that they are not yet the facilitators of EBP learning that 91% of students in this cohort perceive them to be. Given students' poor ability to articulate what EBP is in response to the open question, their ability to comment on the state of their institutions' and their lecturers' level of EBP readiness or capacity, could be questioned. Alternatively, socially desirable responding could also be exerting an influence. This refers to the inclination of some participants to respond over-favourably to items on the basis of how others would like them to respond (Paulhus and Reid, 1991; Holden and Passey, 2010; Bensch *et al.*, 2019). Students are reliant on lecturers for learning and assessment and are therefore in a dependent relationship with them. This awareness may influence the responses of some students.

Sixteen of the 25 items on the OCRSIEP-ES Survey© had reported mean scores ranging from 3.00 – 3.99, placing them in the "somewhat" category. These items focused on the extent to which: clinical partners, and administrators in the educational institution are committed to EBP; on-going research is undertaken by doctorally prepared nurses to assist with the generation of evidence; there are faculty who are EBP mentors; faculty model EBP in the classroom and the clinical setting; librarians in the educational institution have EBP knowledge and skills; librarians are used to search for evidence; fiscal resources are used to support EBP; there are EBP champions among Deans/Professors, Associate Deans/Associate Professors, students; measurement and sharing of outcomes is part of the culture; and decisions are generated from lecturing staff and Deans/Professors. These findings point to areas of opportunity where appropriate interventions can be implemented to foster and embed EBP as the standard approach to nurse and midwifery education and practice. In their systematic review of students' intention to use EBP post-graduation, Ramis, Chang and Nissen (2018) revealed that, together with students' own beliefs in EBP, the EBP beliefs, capacity and support from clinical and academic institutions are key predictors of students' intention to implement EBP. Development and utilisation of all these components will advance EBP beliefs and implementation among students who are the practitioners of the future. EBP champions who are reported to exist in these institutions must be utilised in terms of what they can offer their colleagues and students in EBP education and support. Lam and Schubert (2019) emphasise the importance of role-modelling EBP competence for students as well as assisting them in its

application to practice. Librarians, a readily available resource in these institutions, should be called upon more to promote the development of knowledge and skills of evidence searching among faculty and students so that clinical and educational PICOT questions can be pursued completely and efficiently (Middlebrooks, Carter-Templeton and Mund, 2016; Lehane *et al.*, 2017; Hartzell and Fineout-Overholt, 2019). Development of such knowledge and skills among students renders EBP a more feasible prospect in the clinical arena.

The lowest scoring item concerned the extent to which decisions are made by students, which may be expected given where they are in their education. However, perhaps greater consideration should be given to students' contribution to decision-making in the educational institutions. Students are key stakeholders in their educational organisations, regular contributors to healthcare delivery during the numerous clinical placements across their programmes, and they are the registered nurses and midwives of the future. As such, they can offer unique perspectives and insights into matters of interest and concern to their educational and clinical organisations alike. The student voice should therefore be a pivotal consideration and inclusion at school and programme decision-making levels. The data yielded from students in this study is a testament to the constructive contribution that they can make. When asked how they would rate their educational institutions' readiness for EBP, the overall score (3.79) indicates that students perceived that these organisations are "ready but not acting". Similarly, when asked how their educational institutions' current readiness for EBP compares to their readiness six months before, the score (3.72) again suggests that students perceived that there had been some movement toward an EBP culture. However, given students' current poor understanding of EBP as indicated by their responses to the open-ended question, they may not necessarily be optimally positioned to offer an informed opinion on the overall state of their organisations' readiness for EBP. A statistically significant correlation was detected between the EBP implementation and organisational culture and readiness for EBP (0.230) in the student cohort, intimating that the more positive the organisational culture and readiness for EBP, the greater the EBP implementation will be among students. These findings represent a significant opportunity for targeted interventions that will enable educational organisations to grow their capacity for EBP across all stakeholder levels including students, lecturers, professors and managers.

Clinical Cohort

The total score for the OCRSIEP Survey© in the clinical cohort was 74.07 (SD 19.65). This score reflects organisations that are "somewhat" ready for EBP. Age appeared to make a difference to the organisational culture and readiness for EBP in the clinical cohort, with nurses and midwives aged

25-34 years (M=81.67) reporting significantly higher perceptions of organisational culture and readiness for EBP than those aged 45 years and above (M=69.79). Ideally a score of 100-125 is desirable, demonstrating essential movement toward a sustainable culture of system-wide EBP score (Fineout-Overholt, 2017). Considerable opportunity for growth exists within these hospital organisations toward a culture of EBP. A closer look at individual items will assist in the identification of areas to focus on (Click here for OCRSIEP Survey©)**.**

No items on this scale had reported mean scores of 4 or higher in the clinical cohort. The item with the highest reported mean score concerned the extent to which clinical nurses and midwives believe that EBP is practiced in their organisations (M=3.58). The majority of participants answered "somewhat" to "moderately" in response to this item, with a substantial number answering "very much". Similarly, the majority of participants (>70%) agreed that EBP is central to the mission and philosophy of their institutions, selecting responses ranging from "somewhat" to "very much". These findings suggest that the majority of participants believe that EBP is not only central to the ethos of their respective institutions; moreover they believe that it is practiced to a reasonable degree in their organisations. This mirrors their EBP beliefs that the care they deliver is evidence-based. However, their EBP implementation score indicates that these beliefs are not currently translating into action. This dissonance is echoed in both the lecturer and student cohorts, arguably representing a lack of knowledge of what EBP actually is, as confirmed by responses to the open question. Nine items had reported mean score between 3.05 and 3.53, again rating these items in the "somewhat" category. These items included the extent to which: the nursing staff, and physician team are committed to EBP; there is a critical mass of nurses with strong EBP knowledge and skills; practitioners (e.g. nurses and doctors) model EBP; nurses have access to quality computers and electronic databases; staff nurses have proficient computer skills; librarians have EBP knowledge and skills; decisions are generated by upper management; and decisions are generated by physicians and other health care provider groups. These are areas of potential strength, demonstrating that there is some commitment to EBP and the basic infrastructure to support it in these hospitals. However, much scope exists for intervention to bring these scores up and move towards actualisation of EBP in patient care delivery.

Fourteen of the twenty five items had reported mean scores between 2.28 and 2.99 ("a little"). These items concerned the extent to which: there are EBP champions among managers, physicians, nurse educators, registered ANPs/AMPs, and staff nurses and midwives in these institutions; there are registered ANPs/AMPs who are EBP mentors; librarians are used to search for evidence; there is fiscal support for EBP; outcome measurement and sharing of this information is part of the culture;

decisions are generated from direct care providers such as nurses; and the level of commitment to EBP by administrators within the educational organisations. Provision of adequate fiscal support to ensure that relevant resources such as access to quality computers and databases as well as progressing the IT capability of clinical nurses and midwives will be an important step. Involvement of librarians in searching for evidence to answer clinical questions and imparting these skills to clinical staff plays a significant role in the sustainable implementation of EBP (Tod *et al.*, 2007; Maatta and Wallmyr, 2010; Middlebrooks, Carter-Templeton and Mund, 2016; Lehane *et al.*, 2017; Hartzell and Fineout-Overholt, 2019). As with the previous cohorts, increasing the presence and capacity of healthcare professionals in the clinical cohort who have good EBP knowledge and skills, and who will role-model, teach and support the implementation of EBP will advance the learning and implementation of EBP by frontline care staff (Melnyk *et al.*, 2017; Saunders and Vehviläinen-Julkunen, 2017; Fineout-Overholt and Melnyk, 2018). Advanced nurse and midwifery practitioners who are prepared to master's level and have extensive experience and expertise may be a suitable port of call to take on this role (Gerrish, Guillaume, *et al.*, 2011a; Gerrish, McDonnell, *et al.*, 2011b). However, the education of a select number of staff nurses or midwives in EBP from each department initially has also been proposed as a pragmatic and cost-effective approach to embedding EBP in practice and promoting its implementation among their colleagues (Stokke *et al.*, 2014; Warren, Montgomery and Friedmann, 2016).

The item regarding the extent to which there are doctorally prepared nurses or midwives in the organisation to assist in the generation of evidence when it does not exist had the lowest reported mean score (M=1.99), which is perhaps unsurprising given that a master's degree was the highest academic qualification reported in this cohort. This suggests that there is a distinct dearth of doctoral prepared nurses and midwives in the Irish healthcare system. The focus of Doctor of Nurse Practice (DNP) programmes (or the equivalent DMP for midwives) is to promote EBP, quality improvement, and nursing leadership (Chavez *et al.*, 2019). Notably, the first DNP programme established outside of the United States was in Ireland (Brar, Boschma and McCuaig, 2010). This is an area that presents real opportunity if doctoral nursing programmes were to become more readily available in Ireland and it is certainly a gap in nurse and midwifery education that higher education institutions must strive to close.

In relation to the items regarding the current state of the hospitals' readiness for EBP and how this compares to six months ago, the reported mean scores on these items were 2.94 and 2.7, respectively. This implies that participants felt that their institutions were getting ready for EBP and that their level of readiness was a little better at the point of data collection than it was six months

previously. Statistically significant correlations were detected between EBP implementation and organisational culture and readiness for EBP (0.361); and between the EBP beliefs and organisational culture and readiness for EBP (0.492), inferring that a more positive organisational culture and readiness for EBP will promote higher EBP beliefs, and, in turn, greater implementation of EBP in this cohort.

These results show that significant opportunity for intervention exists and that there is much work to be done if the integration of EBP into nursing and midwifery practice in hospital settings is to become a reality in the Irish healthcare services. Foundations exist from which to begin, but challenges will need to be overcome. EBP is somewhat reflected in the ethos of the organisations involved in the study and there is a perception among clinical participants that EBP is somewhat practiced in their respective organisations. However, little fiscal support exists for EBP, and EBP knowledge, skills and behaviours (such as measurement and sharing of outcomes) appear to be relatively lacking across the healthcare team, as are practitioners who model and promote EBP. Nurses and midwives reported average computer access and skills ("somewhat"). Librarians were perceived to have average ("somewhat") EBP knowledge and skills and were only used a little to assist with searching for evidence. Nurses and midwives appear to have the least involvement in decision-making and few doctorally prepared nurses and midwives are available to assist in the generation of evidence when it does not exist. Similar to the educational organisations, these findings reveal a need for enhancement of EBP knowledge and skills in this cohort, fostering of EBP champions and mentors, greater utilisation of librarians, and an examination of decision-making processes in these organisations, in order to establish the culture and systems that are conducive to making EBP a reality in practice.

Summary of Organisational Culture and Readiness for EBP Findings

Participants in this study generally perceived that EBP is "somewhat" central to the philosophy and mission statements of, and "somewhat" practiced in, their organisations. This suggests that there has been some exposure to or experience of EBP in these organisations and that strengths and opportunities exist that can be used to bolster their commitment to and actualisation of EBP. In terms of their organisations' culture and readiness for EBP and how it compared to 6 months beforehand, the academic settings fared better than the hospitals. Lecturers and students alike rated the organisational culture and readiness of their settings as "been ready but not acting". Clinical nurses and midwives, on the other hand, perceived that their organisations are "getting ready" for EBP and are "a little" more ready than they were 6 months previous. The organisational strengths, opportunities and challenges identified by each cohort are presented in Table 57.

Table 57: Organisational Strengths, Opportunities & Challenges (Organisational Culture and Readiness for EBP Findings)

Organisational Strengths, Opportunities & Challenges (Organisational Culture and Readiness for EBP Findings)			
	Lecturers (Mean 86.43)	**Students (Mean 93.21)**	**Clinical (74.07)**
Strengths (score > 4)	• Access to quality computers and databases • Librarians with EBP knowledge and skills • Proficient computer skills	• Lecturers' commitment to EBP • EBP champions among lecturers • Access to quality computers and databases • EBP central to mission and philosophy • Critical mass of lecturers with strong EBP knowledge and skills • Proficient computer skills • EBP champions among clinical skills nurses • EBP practiced in organisation • Commitment of management to EBP	
Opportunities (score > 3 but <4)	• EBP practiced in organisation • Lecturers' commitment to EBP • EBP central to mission and philosophy • EBP champions among lecturers and senior lecturers • Librarians used to search for evidence • Critical mass of lecturers with strong EBP knowledge and skills • Commitment of clinical partner services to EBP • Doctorally prepared nurses to generate evidence • Role-modelling of EBP by lecturers • Measurement and sharing of outcomes • Fiscal resources to support EBP • EBP champions among clinical skills nurses • Commitment of management to EBP • Decisions generated from university / institute administration	• Librarians with EBP knowledge and skills • Role-modelling of EBP by lecturers • Commitment of clinical partners to EBP • Measurement and sharing of outcomes • EBP champions among deans and professors, associate deans and associate professors • EBP champions among students • Lecturers who are EBP mentors • Doctorally prepared nurses to generate evidence • Librarians used to search for evidence • Fiscal resources to support EBP • Decisions generated from lecturers, deans and professors	• EBP practiced in organisation • Commitment of physician team to EBP • Commitment of nursing staff to EBP • EBP central to mission and philosophy • Proficient computer skills • Librarians with EBP knowledge and skills • Role-modelling of EBP by practitioners • Critical mass of nurses with strong EBP knowledge and skills • Access to quality computers and databases • Decisions generated from physician and other healthcare provider groups • Decisions generated from upper management
Challenges (score <3)	• EBP champions among clinical partner services • EBP mentors among lecturers • EBP champions among	• Decisions generated from students	• EBP champions among nurse educators • Measurement and sharing of outcomes • Commitment of

	administrators or management • Decisions generated from lecturers & school administration		management to EBP • EBP champions among staff nurses, advanced nurse practitioners, physicians & management • Librarians used to search for evidence • Fiscal resources to support EBP • Doctorally prepared nurses to generate evidence • Decisions generated from direct care providers (e.g. nurses)

Lecturers recognised their access to quality computers and databases, their computer proficiency, and librarians' EBP knowledge and skills as moderate strengths in their organisations. These attributes provide an excellent foundation for searching and finding the best available evidence and should be utilised to teach and foster these skills in these organisations. Clinical nurses and midwives reported the existence of these attributes to a lesser degree. Lecturers reported the extent to which there are lecturers who are EBP champions, a critical mass of lecturers with strong EBP knowledge and skills, and their collective commitment to EBP in their organisations as "somewhat". Despite a reported critical mass of lecturers with strong EBP knowledge and skills, lecturers' knowledge of the definition of EBP in this study was poor. Areas that require particular focus in the clinical setting include the availability of EBP champions and mentors among managers, physicians, nurse and midwifery educators, and clinical nurses and midwives at all levels; the use of librarians to search for evidence; outcome measurement and sharing of outcomes; and fiscal support. The findings demonstrate that although potential for improvement exists in all three cohorts in relation to their searching skills, lecturers and clinical nurses and midwives reported using librarians "somewhat" to assist with these skills, while students reported using librarians "a little". This represents an available resource that is not taken advantage of to the extent that it could be.

Overall, the findings relating to organisational culture and readiness for EBP certainly indicate that some strengths and resources are present in the academic settings and, to a lesser degree, in the hospital settings. These strengths can be worked with and cultivated to initiate and support the implementation of EBP. It is imperative that, where they exist, such strengths and resources are utilised and nurtured so that these organisations, their lecturers, clinicians, and students can advance towards a sustainable culture of EBP.

Conclusion

This study sought to determine the EBP knowledge, beliefs and implementation of nurses, midwives, and students in the Republic of Ireland, along with the culture and readiness for EBP of the organisations in which they study and work. A summary of the key findings from this study is presented in Table 58.

Table 58: Key Findings framed in the Theory of Planned Behaviour

Key Findings framed in the Theory of Planned Behaviour
Attitude • All three cohorts reported positive beliefs in EBP. • All three cohorts reported higher beliefs in the positive impact of EBP than in their own ability to implement or teach it.
Perceived Control and Subjective Norms in Educational Settings • The majority of lecturers and students did not define EBP in literature-supported terms. • Opportunity for growth exists within the organisations for sustainable EBP culture.
Perceived Control and Subjective Norms in Hospital Settings • The majority of clinical nurses and midwives did not define EBP in literature-supported terms. • Moderate movement toward EBP culture was shown, but not yet sustainable.
Behaviour • Low EBP implementation identified in all three cohorts

In terms of knowledge, responses to the open question demonstrated a substantial deficit in relation to the ability to define or describe EBP across all three cohorts. This, coupled with the low EBP implementation scores that transcended all cohorts, although to a lesser degree among lecturers, speaks to poor EBP knowledge among nurses, midwives, lecturers and students in the Irish healthcare system. Substantial confusion of EBP with concepts such as research utilisation or quality improvement corroborated the knowledge deficit. Such absence of shared knowledge and understanding of what EBP is will hinder its actualisation and result in an inconsistent approach to EBP at best. This calls into question what is being taught as "EBP" or whether, in fact, EBP is being taught. Tailored education and intervention is needed with each group within their respective organisations. The EBP beliefs of all cohorts were favourable overall. Higher beliefs in the positive impact of EBP than in participants' own ability to teach and/or implement it was also consistent across the cohorts. Despite holding lower beliefs in their ability to perform EBP activities, participants in both the clinical and student cohorts believed strongly that the care they deliver is evidence-based. Similarly, lecturers believed strongly that they can teach EBP. However, low EBP

implementation scores in the three cohorts indicate that evidence-based patient care delivery and EBP teaching is not happening nearly as much as these participants believe. The organisational culture and readiness for EBP varied across cohorts, but findings revealed that the more supportive of EBP the organisational culture was, the higher the EBP beliefs among lecturers, the higher the EBP implementation among students, and the higher the EBP beliefs and implementation among clinical nurses and midwives. Organisational culture therefore plays an integral role in the successful, sustainable implementation of EBP and represents a repertoire of factors that can be considered carefully and enhanced to expedite this goal. From a theory of planned behaviour perspective, such factors reflect subjective norms and perceived control that can influence nurses' and midwives' behaviour around EBP either positively or negatively. Nurses and midwives are one of the largest groups of healthcare professionals in the healthcare system, potentially posing an opportune catalyst, which, if appropriately equipped and supported, could facilitate system-wide integration of EBP across all levels of healthcare. Recommendations arising from this study will be presented in chapter six.

Chapter 6: Conclusions and Recommendations

Introduction

This study, underpinned by the theory of planned behaviour (Ajzen, 1985), has established the EBP knowledge, beliefs and implementation among those clinical nurses and midwives, nurse and midwifery lecturers, and students in the Republic of Ireland who participated, along with the culture and EBP readiness of the organisations in which they work and study. Following the discussion of findings in chapter 5, the conclusions drawn and recommendations that have emerged will now be outlined.

EBP Knowledge, Beliefs and Implementation

Although the concept of EBP has grown steadily since the 1970s with particular escalation from the 1990s onwards, in the current study, the majority of clinical nurses and midwives (79%) and lecturers (66.5%), who have been active in their roles for at least 10 years, had poor knowledge and understanding of the concept of EBP, which is a surprising outcome. This lack of understanding helps to explain the poor scores across all three cohorts on the EBP implementation scale. Furthermore, the lack of clarity about EBP was reflected in the dissonance demonstrated between participants' firm belief that most of their practice is evidence-based, and their low implementation scores. Particularly interesting is that, despite a significant correlation between EBP beliefs and EBP implementation, the clinical cohort had the lowest EBP implementation scores. The practice implications for this finding, a major deficit in EBP knowledge and skill among frontline nurses and midwives, are worrisome.

In the lecturer and student cohorts the frequent selection of the neutral response on the EBP Beliefs Scales©, coupled with a high proportion of non-random missing values on the students' EBP Beliefs Scale©, suggest opportunity to impact the future of healthcare in Ireland, particularly lecturers' ability to teach, and both lecturer and student ability to implement EBP. Both of these cohorts had a lack of definitional clarity regarding EBP, and, along with their low EBP implementation scores, this reinforces the opportunity to improve this within the educational setting. Furthermore, these findings from the lecturer and student cohorts invite an assessment of what is being taught as EBP, or if EBP is being taught at all. The common conflation of EBP with research utilisation further compounds the problem of what is taught and how to properly inform lecturers and their students about how to remedy the problem of low EBP implementation. An important issue that could impact what is taught is that clinicians and other key stakeholders, such as nurse and midwifery academics,

may believe that EBP is in fact research utilisation and, therefore, are likely to believe that they already have sufficient knowledge, understanding and skills about EBP. They would reasonably then be unable to recognise any knowledge deficits and/or identify any learning needs that they may have in relation to EBP. The findings from this study illuminate that EBP knowledge and skills need to be augmented in all three cohorts under study. EBP education should also be accompanied by enhanced opportunities in the practice setting to engage in EBP activities. Examples of such activities include EBP rounds, EBP case studies and journal clubs .This would provide nurses and midwives the opportunity to consolidate their EBP learning by practicing what they have learned, while gaining confidence in their ability to implement EBP. Given that the EBP knowledge and skills needs of each cohort will differ, a multi-pronged approach will be required. However, it is reasonable to begin with the future clinical nurses and midwives by initially providing educational content and interventions that are tailored to the lecturer and student cohorts.

Organisational Culture and Readiness for EBP

Organisational barriers, strengths and opportunities can influence individual and system-wide EBP implementation (Melnyk *et al.*, 2010; Fineout-Overholt, Giggleman, *et al.*, 2019; Fineout-Overholt, Stillwell, *et al.*, 2019). On-going evaluation of these can help organisations build a culture that enhances EBP knowledge, skills and implementation of clinical nurses and midwives, as well as lecturers and students, resulting in the optimal organisational culture to support actualisation of EBP within these institutions.

Some strengths to capitalise on in the academic setting include computer efficiency, librarians' EBP knowledge and skills, and access to quality computers and databases, lecturers' knowledge and commitment to EBP, the presence of EBP champions among lecturers and clinical skills nurses, management's commitment to EBP, and the extent to which EBP is practiced in the organisation, and included in the philosophy. However, the clinical cohort did not identify any strengths in their organisations. By reinforcing these academic strengths, students, as future clinical nurses and midwives can facilitate EBP in the clinical setting.

Challenges and opportunities for improvement were also identified in the educational and clinical settings. These include the under-utilisation of librarians, insufficient EBP champions or mentors, and insufficient EBP commitment at various levels, lack of decision-making involvement/authority, the extent to which EBP is central to the organisational mission and philosophy, inadequate role-modelling and performance of EBP activities, and inadequate fiscal support. These areas require particular attention in both the educational and clinical settings. A tailored, multi-pronged approach will be required to meet group- and context-specific needs. Careful consideration of these factors is

critical in order to build on existing strengths, harness opportunities, and work to overcome the challenges so that the capacity of these organisations to move towards successful, sustainable EBP implementation is maximised.

Recommendations

In essence, the EBP implementation (behaviour) and capacity of all three cohorts need to be elevated. In order to accomplish this, a number of steps must be taken that will influence the three constructs identified by Ajzen (1985) as those that determine an individual's intention to act or behave in a particular way, namely attitude, subjective norms and perceived control. To this end, a multi-pronged approach, using measures that target the EBP beliefs (attitude) and the EBP knowledge and skills (perceived control) of nurses, midwives, lecturers and students in the Republic of Ireland, and the organisational culture and readiness for EBP (subjective norms and perceived control) of the institutions in which they work and study, must be inaugurated. This approach will help to build capacity for sustainable integration of EBP within these organisations. Recommendations regarding the kind of measures that need to be taken will be provided for each cohort and for the organisations themselves.

Lecturers

EBP Knowledge and Competence

"Nurse *[and midwifery]* educators have the opportunity to promote improved patient outcomes in the future by facilitating an evidence-based approach" (Penz and Bassendowski, 2006, p. 251, [*my inclusion]).* To this end, it is crucial that those developing and delivering EBP education are themselves competent in its theory, application and instruction. In other words, nurse and midwifery lecturers need to know about EBP, be able to execute it, and be competent in the design and delivery of nursing and midwifery curricula that are underpinned by, and explicate, the theory and process of EBP. Gallagher-Ford (2014) contended that lecturers must be committed to the EBP paradigm while Rosser (2015) posited that they should also be excited and enthusiastic about it and engender these traits in their students. To achieve this nationally in the long term, EBP education must become an integral part of undergraduate and post-graduate nursing and midwifery programmes, including those focused on the preparation of nurse and midwifery lecturers. This needs to be led by the Nursing & Midwifery Board of Ireland (NMBI), whose role includes the regulation of nurse and midwifery education, and implemented by the HEIs responsible for the delivery of these programmes. This will require collaboration and negotiation between the NMBI, nurse and midwifery lecturers, and leaders, and national bodies such as the newly established "Evidence-Based Practice Ireland". The inclusion of EBP standards and requirements in all nursing

and midwifery programme curricula is the only way to ensure delivery of EBP content. Explicit focus on EBP in the philosophy and mission statements of educational organisations, and inclusion of EBP competencies in job descriptions and performance reviews will enhance organisational and individual commitment to EBP education and a sustainable culture of EBP implementation.

In the short to medium term, current nurse and midwifery lecturers should be encouraged and supported to actively reflect on their own EBP knowledge and competence, and consider, where relevant, why their positive attitudes towards EBP do not translate into higher EBP implementation in their educational practice. This information will enable identification of specific areas of need that can inform the creation of a tailored programme of education to elevate lecturers' EBP knowledge and competencies. Such programmes could be established and provided by lecturers already competent in EBP in their own organisations. If this is not feasible, external programmes should be sought. There are a number of bodies, both nationally and internationally, offering programmes that focus on the practice of EBP and also the teaching of EBP. Examples include the Centre for Evidence Based Medicine at the University of Oxford and the Helene Fuld Health Trust National Institute for Evidence-based Practice in Nursing and Healthcare (The Fuld) at Ohio State University. The Fuld offers a free massive open online course (MOOC) on the basics of EBP, which may provide a good, easily accessible entry point for some. Against the current backdrop of the Covid-19 crisis, demand for online, or blended courses at least, is likely to soar and become a regular feature of future professional development. Evidence-Based Practice Ireland offers three-day EBP workshops which target all disciplines and levels of healthcare professionals and academics, and to date, have been provided free of charge. It would be prudent for bodies like Evidence-Based Practice Ireland to develop their programmes online, and offer a suite of digital EBP resources, to meet this need. National bodies like Evidence-Based Practice Ireland are instrumental in fostering a consistent approach to EBP implementation, evidence generation and curriculum development (Jylhä *et al.*, 2017). Arising out of Evidence-Based Practice Ireland, regional EBP networks are beginning to form such as the North East EBP Network, for example, which has begun to run EBP workshops for healthcare professionals and educators within the HSE North East region. Collaboration at a local level facilitates identification of specific needs, delivery of tailored education, and improvement of healthcare outcomes (Jylhä *et al.*, 2017). The College of Medicine and Health at University College Cork offers an online continuing professional development programme on EBP for quality improvement in healthcare. Organisational support in terms of time and funds to attend these programmes will be necessary if lecturers' participation is to be encouraged and realised.

Collaboration with Librarians

Librarians are knowledgeable and skilled in EBP and in searching for evidence, and are an invaluable resource that lecturers are not calling upon as much as they should. Lecturers must involve librarians earlier and more often in their delivery of EBP instruction and development of EBP skills with students throughout their programme (Fineout-Overholt, Stillwell, *et al.*, 2019). This will not only enhance students' and lecturers' searching skills (Tod *et al.*, 2007; Maatta and Wallmyr, 2010; Middlebrooks, Carter-Templeton and Mund, 2016; Hartzell and Fineout-Overholt, 2019; Larsen *et al.*, 2019), it will also bring librarians and their particular skill-base to the attention of students who may, as a result, be more inclined to access them in the future. This, in turn, will be instrumental in rendering EBP more 'do-able' in clinical practice and therefore more likely to be adopted.

Students

EBP Curriculum

Consistent education of nurses and midwives in the knowledge and skills of EBP is crucial to produce students who are competent in the fundamental skills of EBP upon graduation and beyond (Aglen, 2016; André, Aune and Brænd, 2016; Hande *et al.*, 2017; Sin and Bliquez, 2017; Vetter and Latimer, 2017; Charania *et al.*, 2018; Fineout-Overholt, Stillwell, *et al.*, 2019; Lopez and Cleary, 2019). Nursing and midwifery curricula should be underpinned by the 7 steps of the EBP process and embedding of this approach should commence with the NMBI who regulate the standards and requirements for nurse and midwifery education. A more comprehensive and explicit focus on the importance of EBP in nursing and midwifery practice by the NMBI within their documentation governing the standards and requirements for nurse and midwifery education, would inevitably translate into a greater and more explicit focus on, and delivery of EBP content in the respective programme curricula nationally. Given the findings in this study which demonstrated that the majority of students lack confident in their EBP knowledge and skills, EBP content should commence early in year 1 of undergraduate programmes, beginning with the fundamentals of EBP (definition, principles, core components, for example) and progressing through, and acquiring competence in the 7 steps of the EBP process over the subsequent years. Employment of a standardised set of core EBP competencies will enhance the consistency of EBP teaching in nursing and midwifery programmes nationally. Such frameworks should be incorporated incrementally across the four years of nursing and midwifery curricula, both theoretically and clinically. This will direct and pace the acquisition of the knowledge and competencies required by nurses and midwives to enable them to successfully engage with EBP and implement evidence-based care upon graduation. EBP education must continue beyond graduation in postgraduate programmes, continuing professional development programmes, and in clinical

practice. In particular, the availability of doctorally prepared nurses or midwives to assist in the generation of evidence when it does not exist, was the lowest scoring item on the organisational culture and readiness for EBP scale in the clinical cohort, identifying it as a real challenge to system-wide integration of EBP. To address this, the educational institutions, in collaboration with the NMBI need to develop further Doctorate programmes in Nursing Practice (DNP), and the equivalent (DMP) for midwives, in the Republic of Ireland. These programmes promote EBP, quality improvement, and nursing leadership, all attributes that have been shown to augment EBP integration (Chavez *et al.*, 2019).

Teaching EBP

Teaching methods that improve not only EBP knowledge but also competence and behaviour should be used in EBP instruction (Thomas, Saroyan and Dauphinee, 2011; Fineout-Overholt, Stillwell, et al., 2019) and should be underpinned by the 7 steps of the EBP process and not just the more commonly taught steps concerning searching and critically appraisal (Albarqouni et al., 2018; Lehane et al., 2019; Melnyk and Fineout-Overholt, 2019). Innovative and novel approaches to teaching, such as problem-based learning, blended learning, team-based learning, the flipped classroom, oral presentations, and even games, can enhance student learning, interest, ownership and enthusiasm for EBP (Hickman, Kelly and Phillips, 2014; Aglen, 2016; Hande et al., 2017; Milner and Cosme, 2017; Vetter and Latimer, 2017). Students must also be afforded the opportunity to practice the skills learned and there should be an expectation that they would incorporate EBP into their clinical placements and theoretical assignments (Linton and Prasun, 2013; Fineout-Overholt, Stillwell, et al., 2019). EBP instruction should be integrated into theoretical and clinical modules across the programme rather than being delivered in stand-alone modules (Melnyk et al., 2012; Lopez and Cleary, 2019) and should incorporate relevant patient/client scenarios or case studies from clinical practice to render learning more meaningful and sustainable (Thomas, Saroyan and Dauphinee, 2011; Blackman and Giles, 2017; Fiset, Graham and Davies, 2017; Horntvedt et al., 2018; Lehane et al., 2019). Teaching activities using real-world applications such as journal clubs, EBP rounds and case study discussions should be utilised with students in academic and clinical settings. These activities afford students the opportunity to actively engage with and apply the theory that they have learned, thereby illuminating EBP knowledge and skills for students and making them relevant, authentic and impactful (Khan and Coomarasamy, 2006; Linton and Prasun, 2013; Phillips and Cullen, 2014; Malik, McKenna and Griffiths, 2017; Fineout-Overholt, Stillwell, *et al.*, 2019; Lehane *et al.*, 2019).

Similar to the teaching strategies that should be employed to enhance EBP knowledge, competence and implementation, assessment of clinical practice and theoretical modules should also mirror the process of EBP, demonstrating that it is a continuum that comprises a mix of knowledge and skills (Thomas, Saroyan and Dauphinee, 2011). Academic assignments and prescribed evidence from clinical practice placements should be based on real patients/clients and clinical questions, structured on the steps of EBP, and require students to demonstrate their knowledge and capacity for adopting an evidence-based approach to their practice (Malik, McKenna and Griffiths, 2017; Fineout-Overholt, Stillwell, *et al.*, 2019). In this way students must engage consistently and incrementally with the steps and skills of the EBP process throughout their programme, ensuring confidence and competence in these areas by graduation.

Clinical Nurses and Midwives

EBP Knowledge and Competence

As posited by the World Health Organisation (WHO), nurses and midwives are integral to the integration of EBP across the healthcare service (Jylhä *et al.*, 2017). Enhancing nurses' and midwives' capacity to actualise EBP improves outcomes for their patients/clients, as well as real time EBP exposure and experience for the students that they work with. Relevant competency-based EBP education, training and on-going support of registered nurses and midwives at all levels in clinical practice (locally if possible) is needed if the capacity for EBP implementation in clinical practice is to be increased. EBP workshops, delivered jointly by competent EBP champions from both the clinical setting and affiliated academic institutions, could be offered locally. Nurses and midwives should be actively encouraged and supported in terms of time to attend such workshops. As discussed in relation to the lecturer cohort, external EBP workshops are also available that nurses and midwives could be supported to attend, if the capacity to deliver one locally does not yet exist. Other activities that help to consolidate EBP learning in the clinical setting and make it relevant and meaningful include EBP rounds, EBP case studies and journal clubs (Khan and Coomarasamy, 2006; Linton and Prasun, 2013; Phillips and Cullen, 2014; Malik, McKenna and Griffiths, 2017; Fineout-Overholt, Stillwell, *et al.*, 2019; Lehane *et al.*, 2019). Hauck, Winsett and Kuric (2013) highly recommended implementing systems to recognise nurses' and midwives' contribution to practice, such as a hospital conference, annual nursing reports, or newsletters where the results of their EBP projects or initiatives can be shared. This generates a 'feel-good' factor, increases confidence in the use of EBP and helps to sustain the culture of EBP.

Collaboration

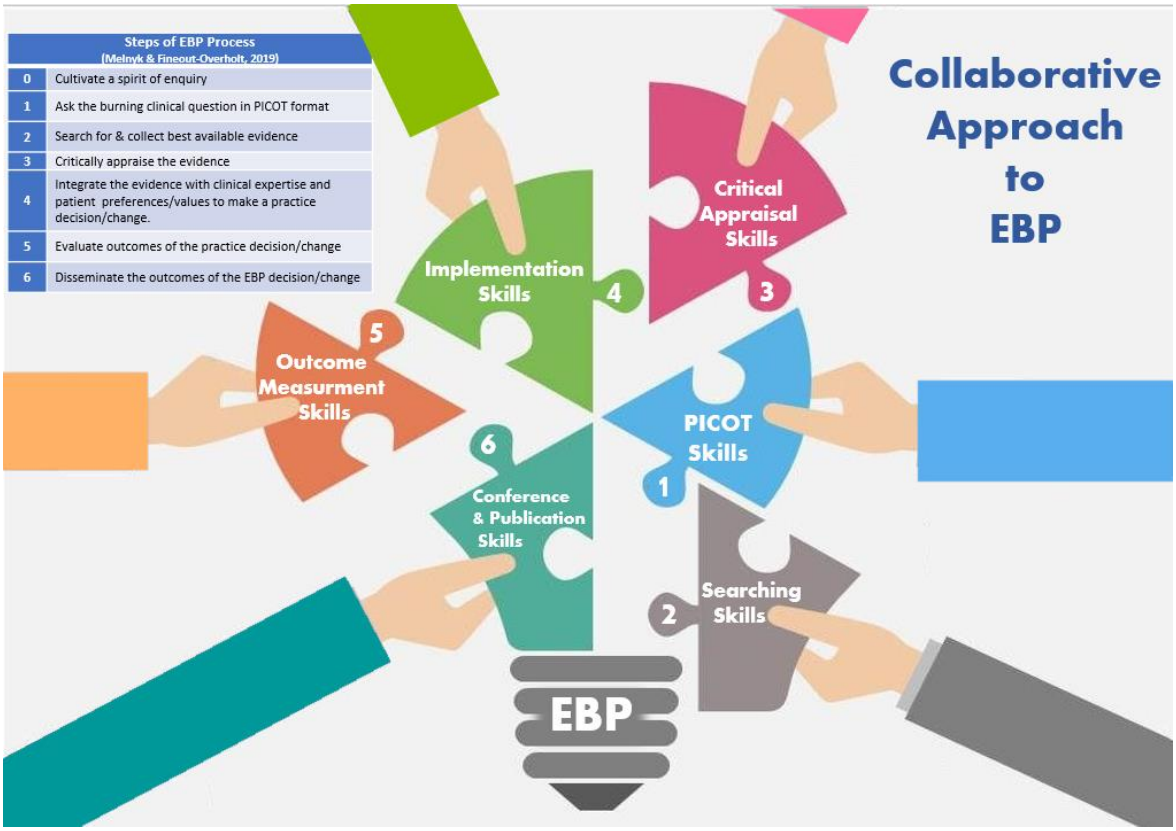
EBP by its very nature is collaborative. At the very least it involves collaboration between clinician and patient. Collaboration at a number of other levels will be crucial in the drive for system-wide EBP integration; collaboration between nurses and midwives at different levels within their clinical settings, and collaboration between clinical nurses and midwives, and nurse and midwifery lecturers. As the findings of this study demonstrated, nurses' and midwives' knowledge of EBP is generally not at the level it would need to be at to ensure the competent and consistent delivery of evidence-based care currently. The level of EBP knowledge and skills varies among nurses and midwives. This is a global challenge and one that will take time to resolve. The question of whether all nurses and midwives must individually possess knowledge and skill in all areas of EBP has been raised previously (Saunders and Vehviläinen-Julkunen, 2016b; Warren, Montgomery and Friedmann, 2016). A collaborative approach to EBP involving nurses and midwives with varying levels of EBP knowledge and skills working together can still ensure the delivery of evidence-based patient care.

Collaborative Approach to EBP

The EBP knowledge and skill mix of the nurses or midwives in a particular unit or hospital can be pooled to maximum effect in order to produce the end goal of evidence-based patient care. It will involve working with the EBP knowledge and skills that currently exist within a team and simultaneously taking steps to build greater capacity over time. The first step would entail identifying the EBP knowledge and experience that exists within the team. This can be done informally in conversation or more formally by using an EBP knowledge assessment tool such as the EBP Knowledge Assessment in Nursing (EKAN) (Spurlock and Wonder, 2015). This will enable identification of individuals who can develop PICOT questions, conduct critical appraisal, who have experience in implementation, evaluation and so on. Not only does this identify individuals' level of EBP knowledge and skills, it also helps to identify their EBP learning needs. A blueprint for the operationalisation of evidence-based care delivery by the nursing or midwifery team, and a programme of EBP knowledge and skill development for the nursing or midwifery team, can then be devised. In this scenario, individual nurses or midwives, or a team of nurses or midwives, will begin with a clinical question which must be converted into a PICOT question. They must then find and critically appraise the best available evidence. In order to make an informed decision regarding patient care, they must integrate the evidence with clinical expertise and patient values. The care decision must then be implemented and evaluated. In other words, in order to answer the clinical question raised and provide the most appropriate and best patient care, the process of EBP must be followed. The individual nurse or midwife may or may not possess the knowledge and skills to

execute this to completion independently and, even if he/she did, there are EBP steps, such as the implementation and evaluation steps, where collaboration is beneficial if not essential. In the absence of the necessary knowledge and skills to execute any or all of the steps of the EBP process, the individual nurse or midwife (or the team) can confer with and seek assistance from one or more colleagues who have been identified as having knowledge and competence in the particular EBP steps where such help is needed. Collaboration may also extend to members of the multi-disciplinary team, including physicians, pharmacists, physiotherapists, and dieticians, depending on the nature of the clinical question. Such collaboration may concern specific EBP knowledge or skills, or it may concern the higher steps of the EBP process (implementation and evaluation, for example) where a multi-disciplinary approach to patient care is necessary. An alternative approach to EBP collaboration could entail those colleagues who are already experienced in EBP, buddying up with less experienced colleagues to pursue a clinical question(s). Furthermore, involvement of nurse or midwifery lecturers from the affiliated educational institution can also be instrumental to the success of this collaborative approach (Linton and Prasun, 2013). In this way, one individual alone does not have to hold all the pieces of the puzzle to complete the picture (Figure 36).

Figure 36: Collaborative Approach to EBP



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Collaboration of this nature would enable nurses and midwives to get on with the business of delivering patient care that is evidence-based, while simultaneously learning the skills of EBP 'on the job' where it should yield its greatest impact. It may be the case that there will always be clinicians within an organisation with different levels of EBP knowledge and skills (Dawes *et al.*, 2005) but a minimum standard of EBP knowledge and skills is required by all (Dawes *et al.*, 2005; Melnyk *et al.*, 2014; Albarqouni *et al.*, 2018; Lehane *et al.*, 2018). To this end, it would be important to ensure that this point-of-care learning is accompanied or complemented by participation in EBP workshops or courses by the team members over time. This will build on and consolidate the shared EBP knowledge and skill base, thereby increasing capacity for EBP integration at the point of care. Nurses and midwives with higher levels of EBP knowledge should be nurtured to become established EBP mentors, a key resource in the successful integration of EBP in practice (Wallen *et al.*, 2010; Magers, 2014a; Friesen *et al.*, 2017; Saunders and Vehviläinen-Julkunen, 2017; Singleton, 2017; Spiva *et al.*, 2017; Fineout-Overholt and Melnyk, 2018). Their preparation and development should focus on not only elevating their EBP knowledge and competence, but also on developing skills around teaching EBP and supporting colleagues. This approach by which colleagues can learn from, encourage and support each other in the drive to achieve EBP competence, may prove to be a very pragmatic, cost-effective and efficient means of integrating EBP into day-to-day nursing and midwifery practice (Stokke *et al.*, 2014; Saunders and Vehviläinen-Julkunen, 2016b; Warren, Montgomery and Friedmann, 2016).

Collaboration between Clinical and Academic Institutions

Closer collaboration between higher education institutions, clinical partners services, and the nursing and midwifery planning and development units (NMPDU) would facilitate streamlining of resources for the development of initiatives such as EBP workshops. It would also promote a shared understanding of EBP among the key stakeholders involved in under- and post-graduate nurse and midwifery education, and nursing and midwifery practice. This would substantially increase the likelihood of achieving successful, sustainable EBP implementation in nursing and midwifery education and practice and pave the way for collaborative EBP projects. Wonder and York (2017) used an academic/practice partnership approach to undergraduate nurse education, where both lecturers and clinical leaders worked together with students who were tasked with reviewing a hospital policy for their assignment. They demonstrated that this approach not only enhanced the students' EBP knowledge and skills, it also facilitated development of EBP policies which supported evidence-based care and ensured the achievement of organisational benchmarks. In the same way, collaboration between academic and clinical nurses and midwives would significantly strengthen the success of the collaborative approach to embedding EBP in daily practice discussed previously. In the

words of Rosser (2015, p. 1105), “our collective commitment across education and practice is key to its *[EBP]* widespread adoption” *[my inclusion]*.

Educational and Clinical Organisations

Organisational Culture and Readiness

An organisation’s culture and readiness for EBP comprises a complex combination of factors that must be in place to operationalise and sustain EBP implementation successfully. These factors include a core group of healthcare professionals and leaders who are knowledgeable and competent in EBP and can mentor those less knowledgeable; a culture that supports EBP with time, fiscal resources and the relevant infrastructure (access to quality computers and databases, or adequate staffing numbers, as examples), actively encourages a spirit of enquiry, and makes tangible efforts to embed EBP into the organisational fabric (Gale and Schaffer, 2009; Schaefer and Welton, 2018). The findings in this study revealed the presence of these factors, to varying degrees in the clinical and educational organisations. In the educational organisations there is scope for improvement in relation to the presence and extent of: a critical mass of lecturers with strong EBP knowledge and skills; lecturers who are EBP champions; and lecturers’ collective commitment to EBP in their organisations. Areas that require attention in the clinical organisations include the availability of EBP champions and mentors among managers, physicians, nurse and midwifery educators, and clinical nurses and midwives at all levels; the use of librarians to search for evidence; outcome measurement and sharing of outcomes; and fiscal support.

Organisations, both clinical and academic, need to make EBP part of their cultural DNA (Melnyk, 2016b). This can be expedited by shining a spotlight on EBP in the organisational mission, philosophy and strategic plan. The following approaches have proven successful in other jurisdictions. The inclusion of EBP competencies in job descriptions and performance evaluations signifies an expectation that an EBP approach to care will be taken (Melnyk *et al.*, 2016; Orta *et al.*, 2016; Milner, Bradley and Lampley, 2018). Supporting the education and development of nurses and midwives in EBP demonstrates that EBP is valued in the organisation and that nurses’ and midwives’ role in EBP is also valued and encouraged (Hauck, Winsett and Kuric, 2013; Fineout-Overholt, Giggleman, *et al.*, 2019). Building a core of EBP mentors has been shown to significantly improve the success of EBP implementation among nurses and midwives (Abdullah *et al.*, 2014; Magers, 2014b; Warren *et al.*, 2016b; Melnyk *et al.*, 2017; Fineout-Overholt and Melnyk, 2018). Investing the necessary time and funding to realise these priorities is a crucial step on the journey to system-wide integration of EBP (Friesen *et al.*, 2017; Melnyk and Fineout-Overholt, 2019).

As advocated by the WHO in their report on facilitating EBP in nursing and midwifery (Jylhä *et al.*, 2017), a national focus on the promotion of EBP across the healthcare and academic settings is required in order to optimise patient outcomes, minimise the geographical variation of care, enhance job satisfaction for healthcare professionals, and improve cost and time efficiencies of healthcare provision. Consultation and collaboration with expert groups such as Evidence-Based Practice Ireland, or the CEBM at the University of Oxford will afford expert guidance and help with practical measures to facilitate capacity building for EBP, and enhance EBP education and implementation. Continued growth of EBP-Ireland and its regional networks is encouraging and a welcome opportunity to accelerate the achievement of EBP healthcare nationally through the establishment and regular provision of EBP education and training to healthcare clinicians locally.

Nurse and Midwife Manager Readiness

Nurses and midwives in management roles have the influence and authority to impact EBP implementation among their staff, both in terms of ensuring an environment and resources conducive to EBP, and with regard to their influence as EBP role models and sources of EBP knowledge and competence (Gerrish *et al.*, 2012; Hauck, Winsett and Kuric, 2013; Linton and Prasun, 2013; Gallagher-Ford, 2014; Caramanica and Spiva, 2018; Schaefer and Welton, 2018). They are in a position to actively seek resources for their staff that facilitate EBP, such as time to undertake EBP activities in practice, relevant EBP training and the provision of EBP mentors, as examples (Schaefer and Welton, 2018). Involvement of nurse and midwife managers and leaders in direct clinical practice is essential to consider how the identified organisational strengths, opportunities and challenges can be addressed in order to advance their organisation's readiness for EBP. Based on the findings reported by this cohort, the preparation of these organisations and their staff for sustainable EBP implementation requires interventions that will nurture EBP champions and mentors among managers, physicians, nurse and midwifery educators, and clinical nurses and midwives at all levels; encourage the assistance of librarians to search for evidence; promote outcome measurement and sharing; and enhance fiscal support for EBP activities.

Nurse and midwifery managers' knowledge and competence in EBP should also set them apart as clear champions, mentors and role models of EBP for their staff. However, this relies on their possession of such attributes and this may not be the case currently for many nurse and midwifery managers. EBP programmes designed specifically for this group to ensure that they are prepared and ready for this responsibility are imperative and would potentially yield far-reaching results (Melnyk and Fineout-Overholt, 2019; Shuman *et al.*, 2019). The establishment of competencies for nurses and midwives in management or leadership roles would be a constructive step. Just as advanced

nurse and midwife practitioners require EBP competencies that are supplementary to those required by registered nurses and midwives (Melnyk *et al.*, 2014), nurse and midwifery managers would similarly require additional competencies to reflect their roles and responsibilities in the enculturation of EBP.

Shared Governance

Limited involvement in decision-making was apparent in all three cohorts. This is not an uncommon finding among nursing populations (Al-Hamdan *et al.*, 2016; Gerard, Owens and Oliver, 2016; Ugur *et al.*, 2017). A more devolved approach to decision-making, seeking input from nurses and midwives at all levels, in clinical and academic settings alike, is more likely to generate greater understanding and ownership of decisions taken and therefore greater commitment to organisational change (Graham-Dickerson *et al.*, 2013). It can also contribute to a more positive and supportive work environment, greater job satisfaction, improved retention of staff, and improved patient outcomes (Houser *et al.*, 2012; Bina *et al.*, 2014; Al-Hamdan *et al.*, 2016). Decision-making regarding health and organisational policy should be underpinned by evidence (Loversidge and Boyd, 2018). Enhancing the EBP knowledge and skills of nurses and midwives will therefore empower them to contribute confidently and competently to clinical and organisational decision-making. Organisational management, including nurse and midwifery managers, should create opportunities to solicit the views and input of nurses and midwives to inform decision-making at all levels. It has been posited that frontline nurses and midwives have a very real view of the challenges and processes that need to be tackled, yet their input in decision-making regarding these issues is frequently not sought (Lacey, Olney and Cox, 2012; Friesen *et al.*, 2017).

In order to empower nurses and midwives to participate in EBP decision-making, it is imperative that the healthcare systems in which they work support their education and development in EBP both in terms of time to attend courses/workshops/conferences and funding to pay for participation on courses/workshops/conferences. National funding bodies such as the Health Research Board, Evidence Synthesis Ireland, and the Irish Research Nurses Network, for example, provide funding opportunities at various levels for clinical nurses and midwives in the areas of systematic reviewing, conference and course/workshop sponsorship, and PhD studentships. However, such funding opportunities are not particularly plentiful, not always known by, or targeted at, clinical nurses and midwives, and are often highly competitive and difficult to obtain. Greater collaboration between healthcare organisations and funding bodies in the prioritisation and provision of more funding opportunities to support more clinical nurses' and midwives' participation in EBP workshops, courses and conferences would be very beneficial. It would help to build the EBP knowledge, competence

and capacity of clinical nurses and midwives. In the short term this would ensure the delivery of evidence-based nursing and midwifery care and begin to yield all the positive outcomes of such care for patients, the nurses and midwives themselves and for the healthcare organisations. In the long term, it would generate a critical mass of EBP mentors who, in turn, would support and build the EBP knowledge, competence and capacity of their nursing and midwifery colleagues and students. Investment of this nature now will produce a self-sustaining capacity of EBP integration among the nursing and midwifery professions, eventually leading to a diminishing need for such investment in the future. This, coupled with the time- and cost-savings that EBP has been shown to produce (Brooks *et al.*, 2009; Prendergast, Kleiman and King, 2013; Tuffaha *et al.*, 2014; Xu *et al.*, 2017; Cheng *et al.*, 2018; Stevens, Milner and Trudeau, 2018), would be an investment that would not only recoup its own costs, it would also go on to substantially reduce the out-goings of healthcare organisations in the future.

Recommendations for Future Research

Research to measure nurses' and midwives' EBP knowledge and skill, using an objective measure would be beneficial. Intervention research that would implement and evaluate a programme of education designed to deliver EBP knowledge and skills to clinical nurses and midwives would be a constructive step in the journey towards system-wide EBP integration. A similar research endeavour with under- and post-graduate nursing and midwifery programmes would help to initiate and evaluate EBP advancement among the student cohort. In addition a scoping exercise/review to establish core EBP competencies for nurses and midwives in management or leadership roles would support and enhance their capacity for and contribution to system-wide EBP integration.

Limitations of the Study

With any research study it is important to consider its limitations in terms of their potential to impact on the generalisability or utility of the findings produced. The following are the limitations of the current study.

Research Design

A survey design was employed to collect data in this study. While this method can facilitate data collection from a vast number of people in a reasonably cost-effective and expedient manner, it can suffer some drawbacks. A flavour of these has been discussed in the methodology chapter. The response rate yielded by survey design can be poor (McLaren, 2013; Polit and Beck, 2017), and the current study did not escape this limitation. In all three cohorts of participants the response rate was less than ideal (student nurses and midwives, 19.4%; nurse and midwifery lecturers, 22.3%; clinical nurses and midwives, 7%). This can impact the representativeness and generalisabilty of findings. Data collection sites were selected randomly in an attempt to enhance the representativeness of the sample and lessen the potential impact of the low response rates on the findings.

Sampling Strategy

Stratified random sampling and simple random sampling were used to select the HEI and hospital sites, respectively. However, selection of participants in each of the three cohorts was facilitated by convenience sampling. Those who were interested and willing to participate completed the survey. There is no way of knowing that those who elected not to participate would have scored differently on the EBP scales and produced different findings. This can diminish the generalisability of the findings. Random sampling and a more direct approach may have overcome this to some extent. In addition, stratified random sampling according to level or stage of career may have resulted in greater representation of clinical nurse or midwife managers including directors of nursing and midwifery, clinical nurse or midwife specialists, and advanced nurse or midwife practitioners.

Nine HEIs and seven hospitals were involved in the study. Nine hospitals (one partner service per HEI) were invited to participate. However, as previously discussed, due to administrative delays, two hospitals had to be excluded from the study. This has the potential to affect the generalisability of the findings, as the responses from these hospitals may have differed from the other seven. Therefore the findings produced by the study may not necessarily represent the situation regarding EBP in these two hospitals.

Data Collection Instruments

The seven data collection instruments used in this study produced findings that offer insight and utility. However, the instruments used are self-report measures of EBP knowledge, beliefs, implementation, and organisational culture and readiness for EBP, rather than direct measures. As such, participants reported their own perceptions of these variables. An objective assessment of these variables was not obtained. Self-report measures can fall foul of socially desirable and embellished responses, and can therefore correspond poorly with objective measures (Leung, Trevena and Waters, 2014; Hagedorn Wonder *et al.*, 2017; Snibsøer *et al.*, 2018). They may portray a different reality from what is actually happening in practice and they frequently yield higher results than objective measures of the same variables (Snibsøer *et al.*, 2018). Therefore, an objective measure of EBP knowledge and competency may have yielded different, more accurate, findings. However, the findings produced by the instruments used revealed poor knowledge and very low implementation of EBP in the study sample. It is unlikely, therefore, that responses were embellished or significantly altered by the self-report aspect of the data collection methods, as, arguably, if that were the case, the results yielded are likely to have been better.

It is useful to note that the instruments used were developed in the context of nursing in the United States of America. As such, it is possible that there may have been some difficulty by some participants in recognising a few of the terms such as “nurse scientists”, “deans” or “National Guidelines Clearinghouse”. These scales have been used previously by the researcher, in the Irish context and did not appear to present difficulty. Nonetheless, content validity indexing in advance of the study may have revealed any language/terminology issues that may have arisen, and could enhance interpretation of the findings.

Exposure to EBP

Inconsistent exposure to EBP, as can occur across institutions, may have affected participants’ responses in all three cohorts. This could potentially have raised or lowered their knowledge, understanding and implementation of EBP, affect their beliefs and attitude towards EBP, and their perception of their organisations’ culture and readiness for EBP. In order to identify and measure the impact of this, it would have been necessary to establish the nature and extent of EBP education in each of the 16 data collection sites. This was beyond the scope of this study.

Researcher Influence

As articulated in the methodology chapter, I am passionate about and have been invested in EBP for many years. I teach EBP to under- and post-graduate nursing students as a nurse lecturer and to healthcare professionals in my work with EBP Ireland and the North East EBP Network. I believe fervently that it is the optimal approach to nursing and midwifery practice, generating positive outcomes for patients, healthcare professionals and healthcare organisations alike. From my experience as a nurse educator and researcher, and from the professional literature, I believe that many nurses and midwives (in both clinical and education settings) believe that they know what EBP is, and that their practice is evidence-based. I suspect that there is a dearth of knowledge and understanding of what EBP actually is among some nurses and midwives and that in many cases they are conflating EBP with research utilisation. I don't perceive this as a flaw, rather a challenge that is surmountable. I conducted this study in an attempt to either support or refute my suspicions so that my beliefs and practice going forward would be based on evidence. In the planning and undertaking of this study I endeavoured to remain open to the findings. I did not at any point furnish participants with information or an opinion on EBP. They were invited to provide in their own words what EBP meant to them. This open-ended question was positioned at the start of the survey in advance of the EBP scales, in order to avoid items on the scales influencing participants' responses to the open-ended question. It is through this lens that I interpreted the findings of this study.

Overall Study Conclusion

EBP is an approach to healthcare decision-making and delivery that combines the best available evidence, clinical expertise, and patient preferences and values to ensure the delivery of patient-centred best care. Despite the well-established positive outcomes that EBP consistently produces for all key stakeholders in the healthcare system, patients/clients, healthcare professionals, and the healthcare organisations alike, the support for and implementation of EBP in healthcare has been variable at best. This is a global challenge. Nurses and midwives comprise one of the largest groups of healthcare professionals in the system and as such are an obvious choice to facilitate system-wide EBP integration. Prior to embarking on any new strategy or organisational change, it is essential to take stock of the current situation, which prompted the genesis of the current study. This study explored the EBP knowledge, beliefs and implementation among clinical nurses and midwives, nurse and midwifery lecturers, and students in the Republic of Ireland, along with the culture and EBP readiness of the organisations in which they work and study. Its findings revealed limited EBP knowledge and low EBP implementation among the participants involved. Reasons for these findings were proffered in the discussion chapter. In addition, organisational strengths, opportunities and

challenges to the successful and sustainable implementation of EBP were identified. In particular, findings revealed a clear need to amass a core group of healthcare professionals who are competent in and committed to EBP implementation to lead the way in EBP implementation in both the educational and clinical organisations. Greater utilisation of available resources such as skilled librarians must be encouraged. Organisational encouragement and facilitation of nurses and midwives in terms of time and fiscal support is necessary to enable their participation in EBP workshops, training opportunities, and conferences, which will help advance system-wide integration of EBP. It is expected that these findings will provide the basis for crafting a way forward that will foster EBP knowledge, beliefs and competencies among clinical nurses and midwives, nurse and midwifery lecturers, and students; encourage and engender EBP implementation in daily practice; and ensure the availability of the necessary resources and supports to sustain EBP implementation in nursing and midwifery practice for generations to come.

The current blend of poor knowledge, understanding and implementation of EBP among clinical nurses and midwives, and a non-sustainable culture of EBP in clinical practice will continue to limit their ability to deliver evidence-based patient care, role-model EBP to their colleagues, or mentor their students in this approach to patient care delivery. This in turn will lead to potentially poorer patient outcomes, and limited capacity to sustain growth of real-world applied EBP in students when they are in clinical practice. Poor knowledge, understanding and implementation of EBP among lecturers will contribute to limited capacity to embed EBP in nursing and midwifery curricula, to consistently educate students in EBP, or to collaborate with their clinical colleagues on EBP initiatives. The students of today are the registered nurses and midwives of tomorrow. If students are not exposed to EBP knowledge and skills in college and in their clinical placements, they will not be empowered to engage in EBP as registered nurses and midwives. The cycle of low EBP implementation will therefore be perpetuated, potentially depriving patients of better outcomes, clinicians of enhanced job satisfaction, and healthcare organisations of time- and cost-savings for generations.

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Appendices

Appendix 1: Demographic Questions

Clinical Cohort

Which branch of nursing are you registered in? *(Tick more than one option if applicable)*

- RGN
- RCN
- RM
- RNID
- RNPY
- RNT

Which age bracket represents your current age?

- 20 – 24
- 25 – 34
- 35 – 44
- 45 plus

How many years since you first qualified in nursing?

- Less than 2 years
- 2 – 5 years
- 6 – 10 years
- Greater than 10 years

What is the highest level of nursing qualification you hold?

- Certificate
- Diploma
- Degree
- Higher Diploma / Post Graduate Diploma
- Master's degree
- PhD / Doctorate

What is your previous exposure to Evidence Based Practice? *(Tick more than one option if applicable)*

- Pre-registration education programme
- Post-registration nursing education programme
- Through my workplace
- Read about it myself
- Do not know much about EBP.
- Other _____

What is your current nursing role?

- Staff Nurse
- Clinical Nurse Manager 1
- Clinical Nurse Manager 2
- Clinical Nurse Manager 3
- Clinical Nurse Specialist
- Advanced Nurse Practitioner
- Clinical Practice Co-Ordinator
- Other_____

Student Cohort

Are you studying to be a:

- General Nurse (BNGN)?
- Children's/General Nurse (BNCG)?
- Midwife
- Intellectual Disability Nurse (BNID)?
- Psychiatric Nurse (BNPY)?

Which age bracket represents your current age?

- 18 – 24
- 25 – 34
- 35 – 44
- 45 plus

What year of nurse education are you currently in?

- Year 1
- Year 2
- Year 3
- Year 4
- Year 5 (BNCG)

Where have you learned/heard about EBP? *(Tick all relevant options)*

- College
- Clinical placement
- Read about it myself
- Other – please explain.
- Do not know much about EBP.

Lecturer Cohort

Which division of the Nursing and Midwifery Board of Ireland's register are you registered on? *(Tick more than one option if applicable)*

- RGN
- RCN
- RM
- RNID
- RPN
- RNT

Which age bracket represents your current age?

- 20 – 24
- 25 – 34
- 35 – 44
- 45 plus

How many years have you been working in nurse / midwifery education?

- 2 years or less
- 3 – 5 years
- 6 – 10 years
- 11 – 15 years
- 16 years or more

What is the highest academic qualification you hold?

- Bachelor's Degree
- Higher Diploma / Postgraduate Diploma.
- Master's Degree
- PhD / Doctorate
- Post – Doc qualification

What branch of students do you predominantly teach? *Tick more than one option if applicable*

- BNGN
- BNID
- BNPY
- BNCG
- Midwifery

Appendix 2: Evidence-Based Practice Beliefs Scales

EBP Beliefs Scale (EBPB): Melnyk and Fineout-Overholt, Copyright 2003

Below are 16 statements about evidence-based practice (EBP). Please circle the number that best describes your agreement or disagreement with each statement. There are no right or wrong answers.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1. I believe that EBP results in the best clinical care for patients.	1	2	3	4	5
2. I am clear about the steps of EBP.	1	2	3	4	5
3. I am sure that I can implement EBP.	1	2	3	4	5
4. I believe that critically appraising evidence is an important step in the EBP process.	1	2	3	4	5
5. I am sure that evidence-based guidelines can improve clinical care	1	2	3	4	5
6. I believe that I can search for the best evidence to answer clinical questions in a time efficient way.	1	2	3	4	5
7. I believe that I can overcome barriers in implementing EBP.	1	2	3	4	5
8. I am sure that I can implement EBP in a time efficient way.	1	2	3	4	5
9. I am sure that implementing EBP will improve the care that I deliver to my patients.	1	2	3	4	5
10. I am sure about how to measure the outcomes of clinical care.	1	2	3	4	5
11. I believe that EBP takes too much time.	1	2	3	4	5
12. I am sure that I can access the best resources in order to implement EBP.	1	2	3	4	5
13. I believe EBP is difficult.	1	2	3	4	5
14. I know how to implement EBP sufficiently enough to make practice changes.	1	2	3	4	5
15. I am confident about my ability to implement EBP where I work.	1	2	3	4	5
16. I believe the care that I deliver is evidence-based.	1	2	3	4	5

EBP Beliefs Scale for Educators (EBPB-E): Fineout-Overholt and Melnyk Copyright 2010

Below are 22 statements about evidence-based practice (EBP). Please circle the number that best describes your agreement or disagreement with each statement. There are no right or wrong answers.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1. I believe that EBP results in the best clinical care for patients.	1	2	3	4	5
2. I am clear about the steps of EBP.	1	2	3	4	5
3. I am sure that I can implement EBP.	1	2	3	4	5
4. I believe that critically appraising evidence is an important step in the EBP process.	1	2	3	4	5
5. I am sure that evidence-based guidelines can improve clinical care	1	2	3	4	5
6. I believe that I can search for the best evidence to answer clinical questions in a time efficient way.	1	2	3	4	5
7. I am sure that I can teach how to search for the best evidence					
8. I believe that I can overcome barriers in implementing EBP.	1	2	3	4	5
9. I am sure that I can implement EBP in a time efficient way.	1	2	3	4	5
10. I am sure that implementing EBP will improve the care that my students deliver to patients.	1	2	3	4	5
11. I am sure about how to measure the outcomes of clinical care.	1	2	3	4	5
12. I believe that EBP takes too much time.	1	2	3	4	5
13. I am sure that I can access the best resources in order to integrate EBP in the curriculum	1	2	3	4	5
14. I believe EBP is difficult.	1	2	3	4	5
15. I know how to implement EBP sufficiently enough to make curricular changes.	1	2	3	4	5
16. I am confident about my ability to implement EBP where I work.	1	2	3	4	5
17. I believe the care that I deliver is evidence-based.	1	2	3	4	5
18. I am sure that I can teach EBP in a time efficient way.	1	2	3	4	5
19. I am sure that integrating EBP into the curriculum will improve the care that students deliver to their patients.	1	2	3	4	5
20. I am sure that I can teach EBP	1	2	3	4	5
21. I am sure that I can teach how to develop a PICOT question	1	2	3	4	5
22. I know how to teach EBP sufficiently enough to impact students' practice.	1	2	3	4	5

 Validity of this scale has been established and Cronbach's alphas have been $\geq$.85 across various samples.

Appendix 3: EBP Beliefs Scales – Reliability

EBPB-E© Reliability Statistics

Cronbach's Alpha	N of Items
.907	22

EBPB© (Student Cohort) Reliability Statistics

Cronbach's Alpha	N of Items
.893	16

EBPB© (Clinical Cohort) Reliability Statistics

Cronbach's Alpha	N of Items
.900	16

Appendix 4: Evidence-Based Practice Implementation Scales

EBP Implementation Scale: Melnyk and Fineout-Overholt, Copyright 2003

Below are 18 questions about evidence-based practice (EBP). Some healthcare providers do some of these things more often than other healthcare providers. There is no certain frequency in which you should be performing these tasks. Please answer each question by circling the number that best describes **how often each item has applied to you in the past 8 weeks**.

In the **past 8 weeks**, I have:

	0 times	<3 times	5 times	>5<8 times	>8 times
1. Used evidence to change my clinical practice…	0	1	2	3	4
2. Critically appraised evidence from a research study…	0	1	2	3	4
3. Generated a PICO question about my clinical practice…	0	1	2	3	4
4. Informally discussed evidence from a research study with a colleague...	0	1	2	3	4
5. Collected data on a patient problem...	0	1	2	3	4
6. Shared evidence from a study or studies in the form of a report or presentation to more than 2 colleagues…	0	1	2	3	4
7. Evaluated the outcomes of a practice change…	0	1	2	3	4
8. Shared an EBP guideline with a colleague…	0	1	2	3	4
9. Shared evidence from a research study with a patient/family member…	0	1	2	3	4
10. Shared evidenced from a research study with a multi-disciplinary team member…	0	1	2	3	4
11. Read and critically appraised a clinical research study…	0	1	2	3	4
12. Accessed the Cochrane database of systematic reviews…	0	1	2	3	4
13. Accessed the National Guidelines Clearinghouse, National Institute for Clinical Excellence or other source of healthcare guidelines…	0	1	2	3	4
14. Used an EBP guideline or systematic review to change clinical practice where I work…	0	1	2	3	4
15. Evaluated a care initiative by collecting patient outcome data…	0	1	2	3	4
16 Shared the outcome data collected with colleagues…	0	1	2	3	4
17. Changed practice based on patient outcome data…	0	1	2	3	4
18. Promoted the use of EBP to my colleagues…	0	1	2	3	4

EBP Implementation Scale for Educators (EBPI-E) Fineout-Overholt and Melnyk, Copyright, 2010

Below are 18 questions about evidence-based practice (EBP). Some health professions educators do some of these things more often than other health professions educators. There is no certain frequency in which you should be performing these tasks. Please answer each question by circling the number that best describes **how often each item has applied to you in the past 8 weeks**.

In the **past 8 weeks**, I have:

	0 times	1-3 times	4-5 times	6-8 times	>8 times
1. Used evidence to change my teaching...	0	1	2	3	4
2. Critically appraised evidence from a research study…	0	1	2	3	4
3. Generated a PICO question about my teaching/practice specialty …	0	1	2	3	4
4. Informally discussed evidence from a research study with a colleague...	0	1	2	3	4
5. Collected data on a clinical/educational issue...	0	1	2	3	4
6. Shared evidence from a study or studies in the form of a report or presentation to more than 2 colleagues…	0	1	2	3	4
7. Evaluated the outcomes of an educational change...	0	1	2	3	4
8. Shared an EBP guideline with a colleague…	0	1	2	3	4
9. Shared evidence from a research study with a student …	0	1	2	3	4
10. Shared evidenced from a research study with a multi-disciplinary team member…	0	1	2	3	4
11. Read and critically appraised a clinical research study…	0	1	2	3	4
12. Accessed the Cochrane database of systematic reviews…	0	1	2	3	4
13. Accessed the National Guidelines Clearinghouse, National Institute for Clinical Excellence or other source of healthcare guidelines…	0	1	2	3	4
14. Used an EBP guideline or systematic review to change educational strategies where I work…	0	1	2	3	4
15. Evaluated an educational initiative by collecting outcomes...	0	1	2	3	4
16 Shared the outcome data collected with colleagues…	0	1	2	3	4
17. Changed curricular policies /materials based on outcome data...	0	1	2	3	4
18. Promoted the use of EBP to my colleagues…	0	1	2	3	4

Appendix 5: EBP Implementation Scales – Reliability

EBPI-E© Reliability Statistics

Cronbach's Alpha	N of Items
.933	18

EBPI© (Student Cohort) Reliability Statistics

Cronbach's Alpha	N of Items
.904	18

EBPI (Clinical Cohort) Reliability Statistics

Cronbach's Alpha	N of Items
.954	18

Appendix 6: Organisational Culture and Readiness for EBP Surveys

Organizational Culture & Readiness for System-wide Integration of Evidence-based Practice (OCRSIEP): Fineout-Overholt and Melnyk, 2005.

Below are 19 questions about evidence-based practice (EBP). Please consider the culture of your organization and its readiness for system-wide implementation of EBP and indicate which answer best describes your response to each question. There are no right or wrong answers.

Item	None at All	A Little	Some-what	Moderately	Very Much
• To what extent is EBP clearly described as central to the mission and philosophy of your organization?	1	2	3	4	5
• To what extent do you believe that EBP is practiced in your organization?	1	2	3	4	5
• To what extent is the nursing staff with whom you work committed to EBP?	1	2	3	4	5
• To what extent is the physician team with whom you work committed to EBP?	1	2	3	4	5
• To what extent are there administrators within your educational organization committed to EBP (i.e., have planned for resources and support [e.g., time] to initiate EBP?	1	2	3	4	5
• In your organization, to what extent is there a critical mass of nurses who have strong EBP knowledge and skills?	1	2	3	4	5
• To what extent are there nurse scientists (doctorally prepared researchers) in your organization to assist in generation of evidence when it does not exist?	1	2	3	4	5
• In your organization, to what extent are there Advanced Nurse Practitioners who are EBP mentors for staff nurses as well as other ANPs?	1	2	3	4	5
• To what extent do practitioners (e.g. nurses, doctors etc) model EBP in their clinical settings?	1	2	3	4	5
• To what extent do staff nurses have access to quality computers and access to electronic databases for searching for best evidence?	1	2	3	4	5
• To what extent do staff nurses have proficient computer skills?	1	2	3	4	5
• To what extent do librarians within your organization have EBP knowledge and skills?	1	2	3	4	5
• To what extent are librarians used to search for evidence?	1	2	3	4	5
• To what extent are fiscal resources used to support EBP (e.g. education-attending EBP conferences/workshops, computers, paid time for the EBP process, mentors)	1	2	3	4	5

• To what extent are there EBP champions • • (i.e., those who will go the extra mile to advance EBP) in the environment among: a. Administrators (Management)? b. Physicians (Consultants)? c. Nurse Educators? d. Advanced Nurse Practitioners? e. Staff Nurses?	1 1 1 1 1	2 2 2 2 2	3 3 3 3 3	4 4 4 4 4	5 5 5 5 5
• To what extent is the measurement and sharing of outcomes part of the culture of the organization in which you work?	1	2	3	4	5
Item	None	25%	50%	75%	100%
• To what extent are decisions generated from: a. Direct Care Providers (such as nurses)? b. Upper administration (Upper management)? c. Physician or other health care provider groups?	1 1 1	2 2 2	3 3 3	4 4 4	5 5 5
Item	Not ready	Getting Ready	Been Ready but Not Acting	Ready to Go	Past Ready & onto Action
• Overall, how would you rate your organization in readiness for EBP (how ready is it)?	1	2	3	4	5
Item	None at All	A Little	Somew hat	Moderatel y	Very Much
• Compared to 6 months ago, how much movement in your organization has there been toward an EBP culture.	1	2	3	4	5

Organizational Culture & Readiness for School-wide Integration of Evidence-based Practice Survey (OCRSIEP-E): Fineout-Overholt, E. and Melnyk, B.M., Copyright 2010

Below are 19 questions about evidence-based practice (EBP). Please consider the state of our educational organization for the readiness of EBP and indicate which answer best describes your response to each question. There are no right or wrong answers.

Item	None at All	A Little	Somewhat	Moderately	Very Much
• To what extent is EBP clearly described as central to the mission and philosophy of your educational agency?	1	2	3	4	5
• To what extent do you believe that evidence-base education is practiced in your organization?	1	2	3	4	5
• To what extent are the faculty with whom you work committed to EBP?	1	2	3	4	5
• To what extent are the clinical partner services with whom you work committed to EBP?	1	2	3	4	5
• To what extent are there administrators within your educational organization committed to EBP (i.e., have planned for resources and support [e.g., time] to initiate EBP?	1	2	3	4	5
• In your organization, to what extent is there a critical mass of faculty who have strong EBP knowledge and skills?	1	2	3	4	5
• To what extent is there ongoing research by nurse scientists (doctorally prepared researchers) in your organization to assist in generation of evidence when it does not exist?	1	2	3	4	5
• In your organization, to what extent are there faculty who are EBP mentors?	1	2	3	4	5
• To what extent do faculty model EBP in their educational and clinical settings?	1	2	3	4	5
• To what extent do faculty have access to quality computers and access to electronic databases for searching for best evidence?	1	2	3	4	5
• To what extent do faculty have proficient computer skills?	1	2	3	4	5
• To what extent do librarians within your organization have EBP knowledge and skills?	1	2	3	4	5
• To what extent are librarians used to search for evidence?	1	2	3	4	5
• To what extent are fiscal resources used to support EBP (e.g. education-attending EBP conferences/workshops, computers, paid time for the EBP process, mentors)	1	2	3	4	5
• To what extent are there EBP champions (i.e., those who will go the extra mile to					

• advance EBP) in the environment among: a. Administers / Management? b. Clinical Partner Services? c. Clinical Skills Nurses? d. Lecturers? e. Senior Lecturers?	1 1 1 1 1	2 2 2 2 2	3 3 3 3 3	4 4 4 4 4	5 5 5 5 5
• To what extent is the measurement and sharing of outcomes part of the culture of the organization in which you work?	1	2	3	4	5
Item	None	25%	50%	75%	100%
• To what extent are decisions generated from: a. Lecturing Staff? b. School administration? c. University / Institute administration?	 1 1 1	 2 2 2	 3 3 3	 4 4 4	 5 5 5
Item	Not ready	Getting Ready	Been Ready but Not Acting	Ready to Go	Past Ready & onto Action
• Overall, how would you rate your institution in readiness for EBP (how ready is it)?	1	2	3	4	5
Item	None at All	A Little	Somewhat	Moderately	Very Much
• Compared to 6 months ago, how much movement in your educational organization has there been toward an EBP culture.	1	2	3	4	5

Organizational Culture & Readiness for School-wide Integration of Evidence-based Practice for Students (OCRSIEP-ES): Copyright Fineout-Overholt, E. and Melnyk, B.M, Copyright 2011

Below are 19 questions about evidence-based practice (EBP) in your organisation / school of nursing. They relate to your school's readiness for EBP. Please indicate which answer best describes your response to each question. There are no right or wrong answers.

Item	None at All	A Little	Some what	Moder ately	Very Much
• To what extent is EBP clearly described as central to the mission and philosophy of your educational agency?	1	2	3	4	5
• To what extent do you believe that evidence-base education is practiced in your organization?	1	2	3	4	5
• To what extent are the faculty who teach you committed to EBP?	1	2	3	4	5
• To what extent are the clinical partners in which you have clinical practice committed to EBP?	1	2	3	4	5
• To what extent are there administrators within your educational organization committed to EBP (i.e., have planned for resources and support [e.g., time] to teach EBP across your courses)?	1	2	3	4	5
• In your educational organization, to what extent is there a critical mass of faculty who have strong EBP knowledge and skills?	1	2	3	4	5
• To what extent is there ongoing research by nurse scientists (doctorally prepared researchers) in your educational organization to assist in generation of evidence when it does not exist?	1	2	3	4	5
• In your educational organization, to what extent are there faculty who are EBP mentors?	1	2	3	4	5
• To what extent do faculty model EBP in your didactic and clinical settings?	1	2	3	4	5
• To what extent do students have access to quality computers and access to electronic databases for searching for best evidence?	1	2	3	4	5
• To what extent do students have proficient computer skills?	1	2	3	4	5
• To what extent do librarians within your educational organization have EBP knowledge and skills?	1	2	3	4	5
• To what extent are librarians used to search for evidence?	1	2	3	4	5
• To what extent are fiscal resources used to support EBP (e.g. education-attending EBP conferences/workshops, computers, paid time for the EBP process, mentors)	1	2	3	4	5
• To what extent are there EBP champions (i.e., those who will go the extra mile to					

advance EBP) in the environment among: a. b. Deans/ Professors? c. Associate Deans / Associate Professors? d. Lecturers? e. Clinical Skills Nurses? e. Students?	1 1 1 1 1	2 2 2 2 2	3 3 3 3 3	4 4 4 4 4	5 5 5 5 5
• To what extent is the measurement and sharing of outcomes part of the culture of your educational organization?	1	2	3	4	5
Item	None	25%	50%	75%	100%
• To what extent are decisions generated from: a. Faculty / Lecturing Staff? b. Dean / Professor? c. Students?	1 1 1	2 2 2	3 3 3	4 4 4	5 5 5
Item	Not ready	Getting Ready	Been Ready but Not Acting	Ready to Go	Past Ready & onto Action
• Overall, how would you rate your educational organization in readiness for EBP (how ready is it)?	1	2	3	4	5
Item	None at All	A Little	Somewhat	Moderately	Very Much
• Compared to 6 months ago, how much movement in your educational organization has there been toward an EBP culture.	1	2	3	4	5

Appendix 7: Organisational Culture and Readiness for EBP Surveys – Reliability

OCRSIEP-E© Reliability Statistics

Cronbach's Alpha	N of Items
.908	25

OCRSIEP-ES© Reliability Statistics

Cronbach's Alpha	N of Items
.924	25

OCRSIEP© Reliability Statistics

Cronbach's Alpha	N of Items
.946	25

Appendix 8: Plain Language Statement

Plain Language Statement: Evidence-Based Practice Survey

Dear Participant,

A research study entitled "A Mixed-Methods Study to Explore the Knowledge, Attitudes, Beliefs, Preparedness for and Utilisation of Evidence Based Practice (EBP) among Nurses in the Republic of Ireland" is proposed to be undertaken by Joanne Cleary-Holdforth from the School of Nursing & Human Sciences at Dublin City University (DCU). *[Email: joanne.cleary-holdforth@dcu.ie / Phone: 01-7008522]*. The research study will be supervised by Dr. Donal O'Mathuna from the School of Nursing & Human Sciences at DCU *[Email: donal.omathuna@dcu.ie / Phone: 01-7007808*].

The purpose of this study is to establish the knowledge, attitudes, beliefs, readiness for and utilisation levels of EBP amongst nurses in the Republic of Ireland. Data will be collected using questionnaires and a combination of individual and focus group interviews.

You are invited to participate in the quantitative component of this study about your knowledge, attitudes, beliefs, readiness for and utilisation levels of EBP. Data will be collected by way of hard copy questionnaire or if applicable electronically using Survey Monkey. The questionnaires will take approximately 15 minutes to complete.

By returning a completed hard copy of the questionnaires or responding to this questionnaire online (where applicable), you are providing consent for your responses to be collected, analysed and reported in aggregate. For those completing the questionnaires online, when you reach the end of the survey and click on the "Done" button at the bottom of the last page your completed survey will be automatically submitted.

There are no obvious risks to you from participation in this study. Your participation is voluntary and you may choose to withdraw at any time in advance of submitting your questionnaire. There is no personal remuneration for participating in this study. If you are a student, your education or academic evaluations will not be affected by whether or not you choose to participate. Your responses are strictly anonymous. Only members of the research team will have access to the specific data you provide. Submission (electronically or physically) of the questionnaire is considered your consent to participate in this study.

Hard copies of data will be stored in a locked cabinet in a locked office. Electronic data will be stored on a password protected, encrypted computer. All data will be stored for five years after which it will be destroyed. Findings from this study will be disseminated via professional conferences and journals and only group data will be reported in any public forum.

If you have any questions about your rights as a participant in this research, or if you feel you have been placed at risk and wish to contact an independent person, please contact the secretary of the DCU Research Ethics Committee, c/o Office of the Vice President for Research, DCU at 01-7008000.

Thank you for your participation. I very much appreciate your time in completing this survey.

Yours Sincerely,
Joanne Cleary-Holdforth.

Appendix 9: Post-Hoc Tables

Post Hoc Tests - Academic Qualification on EBP Beliefs Scores in Clinical Cohort

Post Hoc Tests - Multiple Comparisons between Academic Qualifications in Clinical Cohort

Tukey HSD

Dependent Variable	(I) What is the highest academic qualification you hold?	(J) What is the highest academic qualification you hold?	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
EBPB© Score	Certificate (n=37)	Diploma	-4.775	2.121	.164	-10.60	1.05
		Bachelor's Degree	-5.948*	1.661	.004	-10.51	-1.38
		Higher Diploma / Postgraduate Diploma	-7.403*	1.721	.000	-12.13	-2.68
		Master's Degree	-11.484*	2.165	.000	-17.43	-5.54
	Diploma (n=31)	Certificate	4.775	2.121	.164	-1.05	10.60
		Bachelor's Degree	-1.173	1.769	.964	-6.03	3.69
		Higher Diploma / Postgraduate Diploma	-2.628	1.825	.602	-7.64	2.39
		Master's Degree	-6.709*	2.248	.026	-12.89	-.53
	Bachelor's Degree (n=112)	Certificate	5.948*	1.661	.004	1.38	10.51
		Diploma	1.173	1.769	.964	-3.69	6.03
		Higher Diploma / Postgraduate Diploma	-1.454	1.262	.778	-4.92	2.01
		Master's Degree	-5.535*	1.821	.022	-10.54	-.53
	Higher Diploma / Postgraduate Diploma (n=82)	Certificate	7.403*	1.721	.000	2.68	12.13
		Diploma	2.628	1.825	.602	-2.39	7.64
		Bachelor's Degree	1.454	1.262	.778	-2.01	4.92
		Master's Degree	-4.081	1.875	.192	-9.23	1.07
	Master's Degree (n=30)	Certificate	11.484*	2.165	.000	5.54	17.43
		Diploma	6.709*	2.248	.026	.53	12.89
		Bachelor's Degree	5.535*	1.821	.022	.53	10.54
		Higher Diploma / Postgraduate Diploma	4.081	1.875	.192	-1.07	9.23

Post Hoc Tests - Nursing Roles on EBP Beliefs Scores in Clinical Cohort

Post Hoc Tests - Multiple Comparisons between Roles held by Clinical Nurses and Midwives

Tukey HSD

Dependent Variable	(I) What is your current nursing role?	(J) What is your current nursing role?	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
EBPB© Score	Staff Nurse/Midwife (n=185)	Clinical Nurse/Midwife Manager 1	-2.500	1.860	.830	-8.03	3.03
		Clinical Nurse/Midwife Manager 2	-4.804*	1.393	.012	-8.95	-.66
		Clinical Nurse/midwife Manager 3	-9.167	4.866	.493	-23.63	5.30
		Clinical Nurse/Midwife Specialist	-6.346	2.406	.119	-13.50	.81
		Registered Advanced Nurse/Midwife Practitioner	-6.300	3.792	.642	-17.57	4.97
		Assistant Director of Nursing/Midwifery	6.833	3.471	.437	-3.48	17.15
	Clinical Nurse/Midwife Manager 1 (n=26)	Staff Nurse/Midwife	2.500	1.860	.830	-3.03	8.03
		Clinical Nurse/Midwife Manager 2	-2.304	2.133	.933	-8.64	4.03
		Clinical Nurse/midwife Manager 3	-6.667	5.127	.851	-21.90	8.57
		Clinical Nurse/Midwife Specialist	-3.846	2.898	.839	-12.46	4.77
		Registered Advanced Nurse/Midwife Practitioner	-3.800	4.121	.969	-16.05	8.45
		Assistant Director of Nursing/Midwifery	9.333	3.829	.187	-2.05	20.71
	Clinical Nurse/Midwife Manager 2 (n=51)	Staff Nurse/Midwife	4.804*	1.393	.012	.66	8.95
		Clinical Nurse/Midwife Manager 1	2.304	2.133	.933	-4.03	8.64
		Clinical Nurse/midwife Manager 3	-4.362	4.977	.976	-19.15	10.43
		Clinical Nurse/Midwife Specialist	-1.542	2.623	.997	-9.34	6.26
		Registered Advanced Nurse/Midwife Practitioner	-1.496	3.933	1.000	-13.18	10.19
		Assistant Director of Nursing/Midwifery	11.638*	3.625	.025	.86	22.41
	Clinical Nurse/midwife Manager 3 (n=3)	Staff Nurse/Midwife	9.167	4.866	.493	-5.30	23.63
		Clinical Nurse/Midwife Manager 1	6.667	5.127	.851	-8.57	21.90
		Clinical Nurse/Midwife Manager 2	4.362	4.977	.976	-10.43	19.15
		Clinical Nurse/Midwife Specialist	2.821	5.349	.998	-13.08	18.72
		Registered Advanced Nurse/Midwife Practitioner	2.867	6.099	.999	-15.26	21.00
		Assistant Director of Nursing/Midwifery	16.000	5.906	.100	-1.55	33.55
	Clinical Nurse/Midwife Specialist (n=14)	Staff Nurse/Midwife	6.346	2.406	.119	-.81	13.50
		Clinical Nurse/Midwife Manager 1	3.846	2.898	.839	-4.77	12.46
		Clinical Nurse/Midwife Manager 2	1.542	2.623	.997	-6.26	9.34
		Clinical Nurse/midwife Manager 3	-2.821	5.349	.998	-18.72	13.08

		Registered Advanced Nurse/Midwife Practitioner	.046	4.395	1.000	-13.02	13.11
		Assistant Director of Nursing/Midwifery	13.179*	4.122	.026	.93	25.43
	Registered Advanced Nurse/Midwife Practitioner (n=6)	Staff Nurse/Midwife	6.300	3.792	.642	-4.97	17.57
		Clinical Nurse/Midwife Manager 1	3.800	4.121	.969	-8.45	16.05
		Clinical Nurse/Midwife Manager 2	1.496	3.933	1.000	-10.19	13.18
		Clinical Nurse/midwife Manager 3	-2.867	6.099	.999	-21.00	15.26
		Clinical Nurse/Midwife Specialist	-.046	4.395	1.000	-13.11	13.02
		Assistant Director of Nursing/Midwifery	13.133	5.057	.131	-1.90	28.16
	Assistant Director of Nursing/Midwifery (n=7)	Staff Nurse/Midwife	-6.833	3.471	.437	-17.15	3.48
		Clinical Nurse/Midwife Manager 1	-9.333	3.829	.187	-20.71	2.05
		Clinical Nurse/Midwife Manager 2	-11.638*	3.625	.025	-22.41	-.86
		Clinical Nurse/midwife Manager 3	-16.000	5.906	.100	-33.55	1.55
		Clinical Nurse/Midwife Specialist	-13.179*	4.122	.026	-25.43	-.93
		Registered Advanced Nurse/Midwife Practitioner	-13.133	5.057	.131	-28.16	1.90

Post Hoc Tests - Age-groups on EBP Implementation Scores in Clinical Cohort

Post Hoc Tests - Multiple Comparisons between Age-groups

Dependent Variable: **EBPI© Score (Clinical Cohort)**

Tukey HSD

(I) Which age bracket represents your current age?	(J) Which age bracket represents your current age?	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
20 - 24 years (n=8)	25 - 34 years	-12.578	6.516	.218	-29.43	4.28
	35 - 44 years	-6.177	6.336	.764	-22.56	10.21
	45+ years	-6.767	6.348	.711	-23.19	9.65
25 - 34 years (n=50)	20 - 24 years	12.578	6.516	.218	-4.28	29.43
	35 - 44 years	6.401*	2.450	.047	.06	12.74
	45+ years	5.812	2.481	.091	-.61	12.23
35 - 44 years (n=118)	20 - 24 years	6.177	6.336	.764	-10.21	22.56
	25 - 34 years	-6.401*	2.450	.047	-12.74	-.06
	45+ years	-.590	1.959	.990	-5.66	4.48
45+ years (n=116)	20 - 24 years	6.767	6.348	.711	-9.65	23.19
	25 - 34 years	-5.812	2.481	.091	-12.23	.61
	35 - 44 years	.590	1.959	.990	-4.48	5.66

*. The mean difference is significant at the 0.05 level.

Post Hoc Tests - Years Qualified on EBPI© Scores in Clinical Cohort

Post Hoc Tests - Multiple Comparisons - Number of Years Qualified in Clinical Cohort

Tukey HSD

Dependent Variable	(I) How many years since you first qualified in nursing/midwifery	(J) How many years since you first qualified in nursing/midwifery	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
EBPI© Score	Less than 2 years (n=7)	2-5 years	-11.278	6.496	.307	-28.08	5.53
		6-10 years	-2.267	6.163	.983	-18.21	13.67
		Greater than 10 years	-.135	5.711	1.000	-14.91	14.64
	2-5 years (n=20)	Less than 2 years	11.278	6.496	.307	-5.53	28.08
		6-10 years	9.011	4.109	.128	-1.62	19.64
		Greater than 10 years	11.142*	3.393	.006	2.37	19.92
	6-10 years (n=32)	Less than 2 years	2.267	6.163	.983	-13.67	18.21
		2-5 years	-9.011	4.109	.128	-19.64	1.62
		Greater than 10 years	2.131	2.701	.859	-4.85	9.12
	Greater than 10 years (n=232)	Less than 2 years	.135	5.711	1.000	-14.64	14.91
		2-5 years	-11.142*	3.393	.006	-19.92	-2.37
		6-10 years	-2.131	2.701	.859	-9.12	4.85

Post Hoc Tests - Academic Qualification on EBPI© Scores in Clinical Cohort

Post Hoc Tests - Multiple Comparisons between Academic Qualification in Clinical Cohort

Tukey HSD

Dependent Variable	(I) What is the highest academic qualification you hold?	(J) What is the highest academic qualification you hold?	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
EBPI© Score	Certificate (n=37)	Diploma	-.938	3.546	.999	-10.68	8.81
		Bachelor's Degree	-8.789*	2.771	.015	-16.41	-1.17
		Higher Diploma / Postgraduate Diploma	-6.551	2.870	.154	-14.44	1.34
		Master's Degree	-17.881*	3.510	.000	-27.53	-8.23
	Diploma (n=31)	Certificate	.938	3.546	.999	-8.81	10.68
		Bachelor's Degree	-7.851	2.929	.060	-15.90	.20
		Higher Diploma / Postgraduate Diploma	-5.612	3.022	.343	-13.92	2.69
		Master's Degree	-16.943*	3.636	.000	-26.93	-6.95
	Bachelor's Degree (n=112)	Certificate	8.789*	2.771	.015	1.17	16.41
		Diploma	7.851	2.929	.060	-.20	15.90
		Higher Diploma / Postgraduate Diploma	2.239	2.060	.813	-3.42	7.90
		Master's Degree	-9.092*	2.886	.016	-17.02	-1.16
	Higher Diploma / Postgraduate Diploma (n=82)	Certificate	6.551	2.870	.154	-1.34	14.44
		Diploma	5.612	3.022	.343	-2.69	13.92
		Bachelor's Degree	-2.239	2.060	.813	-7.90	3.42
		Master's Degree	-11.331*	2.981	.002	-19.52	-3.14
	Master's Degree (n=30)	Certificate	17.881*	3.510	.000	8.23	27.53
		Diploma	16.943*	3.636	.000	6.95	26.93
		Bachelor's Degree	9.092*	2.886	.016	1.16	17.02
		Higher Diploma / Postgraduate Diploma	11.331*	2.981	.002	3.14	19.52

Post Hoc Tests - Age Group on OCRSIEP© Scores in Clinical Cohort

Post Hoc Tests - Multiple Comparisons between Age-groups in Clinical Cohort

Dependent Variable: OCRSIEP© Score

Tukey HSD

(I) Which age bracket represents your current age?	(J) Which age bracket represents your current age?	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
20 - 24 years (n=8)	25 - 34 years	-10.474	9.117	.660	-34.10	13.15
	35 - 44 years	-2.813	8.898	.989	-25.87	20.25
	45+ years	1.408	8.924	.999	-21.72	24.53
25 - 34 years (n=50)	20 - 24 years	10.474	9.117	.660	-13.15	34.10
	35 - 44 years	7.662	3.657	.158	-1.81	17.14
	45+ years	11.883*	3.719	.009	2.25	21.52
35 - 44 years (n=118)	20 - 24 years	2.813	8.898	.989	-20.25	25.87
	25 - 34 years	-7.662	3.657	.158	-17.14	1.81
	45+ years	4.221	3.144	.537	-3.93	12.37
45+ years (n=116)	20 - 24 years	-1.408	8.924	.999	-24.53	21.72
	25 - 34 years	-11.883*	3.719	.009	-21.52	-2.25
	35 - 44 years	-4.221	3.144	.537	-12.37	3.93

*. The mean difference is significant at the 0.05 level.

Post Hoc Tests - Years Qualified on OCRSIEP© Scores in Clinical Cohort

Post Hoc Tests - Multiple Comparisons - Number of Years Qualified in Clinical Cohort

Tukey HSD

Dependent Variable	(I) How many years since you first qualified in nursing/midwifery	(J) How many years since you first qualified in nursing/midwifery	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
OCRSIEP© Score	Less than 2 years (n=7)	2-5 years	-21.888	9.758	.115	-47.17	3.40
		6-10 years	-20.892	9.300	.115	-44.99	3.21
		Greater than 10 years	-8.878	8.656	.735	-31.31	13.55
	2-5 years (n=20)	Less than 2 years	21.888	9.758	.115	-3.40	47.17
		6-10 years	.995	6.052	.998	-14.69	16.68
		Greater than 10 years	13.010*	5.006	.049	.04	25.98
	6-10 years (n=32)	Less than 2 years	20.892	9.300	.115	-3.21	44.99
		2-5 years	-.995	6.052	.998	-16.68	14.69
		Greater than 10 years	12.015*	4.042	.017	1.54	22.49
	Greater than 10 years (n=232)	Less than 2 years	8.878	8.656	.735	-13.55	31.31
		2-5 years	-13.010*	5.006	.049	-25.98	-.04
		6-10 years	-12.015*	4.042	.017	-22.49	-1.54

*. The mean difference is significant at the 0.05 level.

Post Hoc Tests - Academic Qualification on OCRSIEP© Scores in Clinical Cohort

Table __: Post Hoc Tests - Multiple Comparisons between Academic Qualifications in Clinical Cohort

Tukey HSD

Dependent Variable	(I) What is the highest academic qualification you hold?	(J) What is the highest academic qualification you hold?	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
OCRSIEP© Score	Certificate (n=37)	Diploma	4.363	6.290	.958	-12.96	21.68
		Bachelor's Degree	-11.651	4.641	.093	-24.43	1.13
		Higher Diploma / Postgraduate Diploma	-12.306	4.838	.085	-25.63	1.02
		Master's Degree	-15.887*	5.664	.044	-31.48	-.29
	Diploma (n=31)	Certificate	-4.363	6.290	.958	-21.68	12.96
		Bachelor's Degree	-16.014*	5.186	.019	-30.29	-1.73
		Higher Diploma / Postgraduate Diploma	-16.669*	5.363	.018	-31.44	-1.90
		Master's Degree	-20.250*	6.118	.010	-37.10	-3.40
	Bachelor's Degree (n=112)	Certificate	11.651	4.641	.093	-1.13	24.43
		Diploma	16.014*	5.186	.019	1.73	30.29
		Higher Diploma / Postgraduate Diploma	-.655	3.277	1.000	-9.68	8.37
		Master's Degree	-4.236	4.405	.872	-16.37	7.89
	Higher Diploma / Postgraduate Diploma (n=82)	Certificate	12.306	4.838	.085	-1.02	25.63
		Diploma	16.669*	5.363	.018	1.90	31.44
		Bachelor's Degree	.655	3.277	1.000	-8.37	9.68
		Master's Degree	-3.581	4.612	.937	-16.28	9.12
	Master's Degree (n=30)	Certificate	15.887*	5.664	.044	.29	31.48
		Diploma	20.250*	6.118	.010	3.40	37.10
		Bachelor's Degree	4.236	4.405	.872	-7.89	16.37
		Higher Diploma / Postgraduate Diploma	3.581	4.612	.937	-9.12	16.28

*. The mean difference is significant at the 0.05 level.

Appendix 10: Search Strategy Examples

Database: Cumulative Index to Nursing and Allied Health Literature (CINAHL) via EBSCOhost
Limits Applied: English language only
Timeframe: 1985 – present day
Search Screen: Advanced search

Search 1

TI (belief* OR perception OR attitude* OR knowledge) AND AB (belief* OR perception OR attitude* OR knowledge)
AND
TI (evidence based practice OR evidence-based practice OR ebp OR evidence based OR evidence-based) AND AB (evidence based practice OR evidence-based practice OR ebp OR evidence based OR evidence-based)
AND
Nurs*

Search 2

TI (belief* OR perception OR attitude* OR knowledge) AND AB (belief* OR perception OR attitude* OR knowledge)
AND
TI (evidence based practice OR evidence-based practice OR ebp OR evidence based OR evidence-based) AND AB (evidence based practice OR evidence-based practice OR ebp OR evidence based OR evidence-based)
AND
Midwif*