Voices from the frontline: a review of EMS first responders' experience of COVID-19 in Ireland

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Abstract

Purpose – This study explored the experiences of Irish emergency medical services (EMS) first responders during the first nationwide restrictions to curb the spread of COVID-19.

Design/methodology/approach – A systematic literature review (SLR) of research into healthcare workers' and first responders' experiences during the COVID-19 and 2003 SARS pandemics was performed. The SLR informed the content of an online questionnaire distributed via the Irish Pre-Hospital Emergency Care Council to 2,092 first responders on its live register. Data analysis used both descriptive and content analysis.

Findings – EMS first responders faced many challenges including PPE quality, training on its use, issues with decontamination facilities, and organisational effectiveness. Emotional challenges included the anxiety experienced, the impact on families, and ethical dilemmas confronted related to patient care. Positive findings also emerged, such as first responders' dedication to working through the pandemic, collegiality, and the community goodwill displayed.

Originality/value – While investigations of the impact of the COVID-19 pandemic on healthcare workers have been undertaken globally, studies focussing exclusively on the experiences of EMS first responders have been rare. This study addressed this knowledge gap, providing an insight into the challenges and successes experienced by first responders and identifying opportunities for learning that can be applied to future public health emergencies.

Keywords COVID-19, EMS first responder, Coronavirus, Pandemic, Emergency medical services

Paper type Research paper

1. Introduction

On 30th January 2020, the World Health Organisation (WHO) declared the COVID-19 pandemic a Public Health Emergency of International Concern (WHO, 2020). During public health emergencies, professional and volunteer medical first responders are responsible for the preliminary treatment of suspected cases.

Infectious disease emergencies "will always create challenges for a health service, both in terms of the scale of added clinical activity and increased demands on the workforce and available resources" (McMullan *et al.*, 2016, p. 6). In 2017, prior to the current COVID-19 pandemic, infectious disease was one of the highest rated risks on the National Risk Assessment for Ireland (NRA) (McMullan *et al.*, 2018). Within three years this risk was realised and plans activated to deliver a national level response. This study focuses on the experiences of Irish emergency medical services (EMS) first responders during the first period of COVID-19 restrictions in Ireland. These restrictions were commonly referred to as a lockdown and ran

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from midnight, 27th March 2020, until midnight, 17th May 2020. They included a national stay-at-home order (except for those working in essential services), the closure of non-essential shops, community centres, and a ban on all gatherings (Citizens Information, 2020).

A systematic literature review (SLR) covering EMS first responders' experiences during the COVID-19 pandemic and the previous 2003–2004 SARS pandemic, both respiratory pathogens from the coronavirus family, was undertaken. Primary data was collected using an online survey distributed to 2,092 EMS first responders. For this study, the term EMS first responder includes advanced paramedics, paramedics, emergency medical technicians (EMT), and specialist, cardiac, and first aid responders who were recognised by the Irish Pre-Hospital Emergency Care Council (PHECC). The SLR informed the survey and provided essential background knowledge against which to contextualise the study findings.

2. Systematic literature review

The SLR was undertaken using, Academic Search Complete, Emerald Management Xtra, Google Scholar, SAGE journals, Web of Science, and the Wiley search databases, in compliance with the PRISMA methodology (Moher *et al.*, 2009). Papers were selected based on the keyword string:

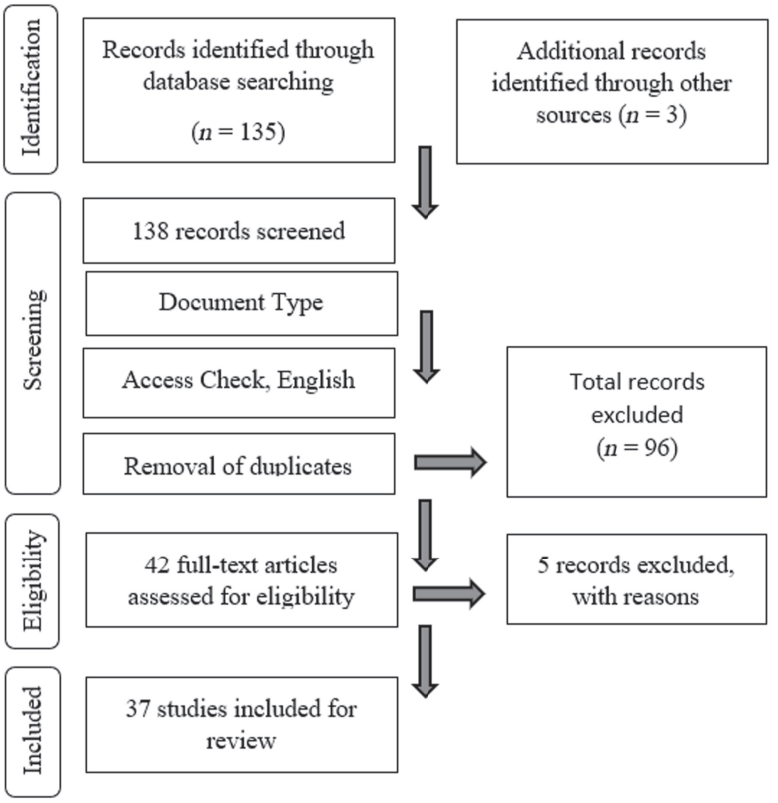
> allintitle: ("SARS" OR "COVID-19" OR "Coronavirus" OR "Corona virus") AND ("frontline" OR "First responders" OR "healthcare workers" OR "lessons learned").

Given that the COVID-19 pandemic was in its infancy at the time this study began in April 2020, with only a small number of papers covering COVID-19 published, the term SARS was included to capture any findings that could inform the design of this study. Other keyword combinations were also considered during the planning phase of the SLR. The terms paramedic, EMS and EMT were included but these produced no additional relevant results. The SLR was subsequently expanded to include the term healthcare workers as related findings were considered most applicable to informing the study design. The SLR keyword string identified 135 articles published between 2003 and May 2020. An alert query remained in place for four weeks until mid-June to capture additional relevant papers due to the fluid nature of the pandemic. This resulted in the inclusion of three further papers. These 138 papers were reviewed according to the criteria illustrated in Figure 1, producing a final set of 37 articles. Papers were excluded if their results, on closer inspection, had no bearing on the current study: e.g. sometimes the findings related to anaesthesiology or human rights.

Most COVID-19 papers included primary research completed in China, the USA or the UK. None utilised Irish datasets. The remaining eight were review articles focused on SARS. The 37 articles primarily concerned healthcare workers (HCWs) such as doctors and nurses in clinical settings. While the findings were not directly applicable to EMS first responders, the papers were used to inform the design and analysis of the study. The impact of COVID-19 on the broader group of emergency services personnel, such as police, was acknowledged in editorials and commentaries (Lusher *et al.*, 2020; Sim, 2020). This paper addresses an identified gap in the literature by soliciting the opinions of EMS first responders. The SLR is categorised thematically, and the outputs presented in sections 2.1 to 2.3.

2.1 Need for information

The need for HCWs to have access to relevant, reliable information to perform their duties without compromising their own safety was highlighted by several authors (Delgado *et al.*, 2020; Key *et al.*, 2020; Sim, 2020; Bhagavathula *et al.*, 2020; Hasnain *et al.*, 2020). In an online



Source(s): Adapted from PRISMA (Moher *et al.*, 2009)

Figure 1.
SLR flow diagram

survey of 936 physicians, nurses and allied health professionals, Delgado *et al.* (2020) reported that 24.5% lacked access to workplace safety policies/procedures while 38.9% lacked access to telemedicine resources. However, in a similar online questionnaire of doctors, nurses and other healthcare professionals, over 80% showed high awareness of government and health PPE guidelines relevant to their clinical area (Key *et al.*, 2020). Hasnain *et al.* (2020) recommended harnessing digital technology to constantly update HCWs on evolving standards of practice through big data and machine learning, concurrent with dialogue between policymakers, HCWs and medical researchers. Changes must be communicated in a manner which can be clearly understood (Walton *et al.*, 2020; Semaan *et al.*, 2020).

2.2 Mental health

Mental health was a prevalent theme throughout the SLR. Lai *et al.*'s (2020) investigation of the mental health of Chinese HCWs in February 2020 found that out of 1,257 physicians, nurses and other healthcare professionals, 71.5% reported symptoms of distress, 50.4% described depressive symptoms, 34.0% suffered insomnia and 44.6% experienced anxiety. While factors such as marital status and parental status did not have a statistically significant relationship with HCWs' risk perception (Koh *et al.*, 2005), Souadka *et al.* (2020) described how additional childcare responsibilities due to crèche and school closures

contributed to HCWs' stress. Colleagues' perception of those with families as more likely to carry COVID-19 also increased stress levels (Souadka *et al.*, 2020), while HCWs performed a delicate balancing act between attending to patients at work and caring responsibilities in the home (Aghili and Arbabi, 2020).

The overarching fear among HCWs was of becoming infected or infecting relatives and friends (Aghili and Arbabi, 2020; Angelos, 2020; Cai *et al.*, 2020; Collado-Boira *et al.*, 2020; Huynh *et al.*, 2020; Misra, 2020; Semaan *et al.*, 2020). Collado-Boira *et al.*'s (2020) thematic analysis of 62 interviews with final-year Spanish nursing and medical students revealed over 45% feared becoming a source of contagion. There were instances of HCWs abandoning their hospital duties to "isolate and quarantine themselves alleviating their worries despite their social responsibility and altruism as a member of the medical society" (Aghili and Arbabi, 2020, p. 2).

Contagion fears were often aggravated by a lack of PPE or guidance on its use (Chan-Yeung, 2004; Collado-Boira *et al.*, 2020; Santarone *et al.*, 2020; Aghili and Arbabi, 2020; Jin *et al.*, 2020; Walton *et al.*, 2020). Even when supply and instruction on use was not an issue, many HCWs were unprepared for the physical exertion of the persistent donning and doffing of PPE (Gan *et al.*, 2020).

Many studies emphasised the need to manage HCW's stress, anxiety and fear levels (Tam *et al.*, 2004; Maunder, 2004; Alsahafi and Cheng, 2016; Aghili and Arbabi, 2020; Cai *et al.*, 2020; Angelos, 2020; Sasangohar *et al.*, 2020; Pappa *et al.*, 2020; Santarone *et al.*, 2020; Hu *et al.*, 2020; Chersich *et al.*, 2020; Hasnain *et al.*, 2020; Zhu *et al.*, 2020; Jin *et al.*, 2020; Pothiawala, 2020; Chung *et al.*, 2020; Aksoy and Koçak, 2020). Safeguarding HCWs' mental well-being had both a practical and ethical dimension: Key *et al.* (2020) noted that high anxiety levels could lead to increased absenteeism through sick leave, jeopardising duty of care to patients, while Santarone *et al.* (2020, p. 1531) observed that aiding the mental health and resilience of HCWs was "imperative to ensure global recovery from the COVID-19 pandemic". Proposals to support the mental health of HCWs included providing informal workplace counselling sessions for staff (Key *et al.*, 2020; Walton *et al.*, 2020) and promoting mental health education to enable HCWs to seek psychological help without stigma (Santarone *et al.*, 2020; Walton *et al.*, 2020).

2.3 PPE and infection control

Gan *et al.* (2020) highlighted the example of Singapore which, following SARS, founded the National Centre for Infectious Diseases to stockpile PPE in anticipation of future outbreaks. However, issues with PPE extended beyond adequate supply: with infection control measures such as handwashing and coughing/sneezing etiquette (Gudi and Tiwari, 2020), appropriate training in the donning and doffing of PPE was identified as crucial. In a cross-sectional survey of over 2,000 nurses based in hospitals in Wuhan, China, almost all (94.8%) reported the development of PPE-induced skin lesions, with 15.7% of these nurses stating they did not know how to manage these conditions (Hu *et al.*, 2020). This could have consequences for infection control as Yassi *et al.* (2005) found HCWs were less likely to wear poorly designed PPE that caused them discomfort. Sasangohar *et al.* (2020) related how training videos on donning and doffing used by a Texan hospital were not updated to reflect the specific PPE used at the onset of COVID-19, nor were the instructions provided intuitive for less experienced personnel. They called for the provision of structured training on large-scale disaster management and response. Following SARS, Suwantarat and Apisarnthanarak (2015) advocated for a designated staff member to supervise HCWs in the proper donning and doffing of PPE. Empowering individual HCWs to monitor infection control in their department (Chersich *et al.*, 2020) or nominating "PPE champions" as points of contact for colleagues offering advice and reassurance on PPE (Key *et al.*, 2020) were proposed strategies to achieve compliance with PPE good practice standards.

In a survey of 58 Nepalese HCWs, 81% favoured splitting the emergency department into COVID and non-COVID emergencies to reduce the risk of becoming infected (Acharya *et al.*, 2020). They also highlighted that fear of infection was leading to overuse and wastage of PPE: "Health care workers working in non-COVID emergencies felt that providing full PPE would increase their level of safety. However, we need to use PPE rationally, as per uninterrupted supply ... At this point all patients with respiratory problems should be considered as COVID-19. However, making this decision before time will consume resources unnecessarily" (Acharya *et al.*, 2020, p. 45). Faster assessment to distinguish COVID and non-COVID cases was also endorsed by Cheng *et al.* (2013, p. 415), who called for "provision of personal protective equipment and [early] isolation of patients". The challenge, however, is that these infection control measures require budgetary investment along with dedicated resources (Cooper *et al.*, 2020).

3. Methodology

3.1 Research design

The data focuses on the early response to COVID-19 and was collected during the Irish "lockdown" between 30th of April and the 17th of May 2020. Closing the questionnaire before May 18th was critical as on this date the Irish Government eased COVID-19 restrictions. To survey the EMS first responders within this narrow timeframe, an online questionnaire was deemed the most appropriate method to collect quantitative and qualitative data.

This quantitative and qualitative data were collected and analysed concurrently, and a comprehensive understanding of participant experiences was possible due to the extensive comments provided by participants (Creswell and Plano Clark, 2011). Nonetheless, a limitation of this method, compared to interviews or focus groups, is that it was not possible to follow up with the participants and probe more deeply into their responses.

Participants provided quantitative responses via a combination of Likert scales, sliders, multiple-choice and binary yes/no answers, including "How did your level of worry change during the response to COVID-19 in Ireland? (Increased, Decreased or Stayed the Same)", "My organisation has provided me with adequate Personal Protective Equipment" (1 = Strongly Disagree up to 7 = Strongly Agree) and "On reflection, do you feel you were professionally prepared for COVID-19?". Participants also completed 15 open-ended questions explaining their responses. A selection of question types from the online questionnaire is included in Figure 2. The study was undertaken in line with the University research ethics policy and was approved by the Research Ethics Committee.

3.2 Data collection

The questionnaire was pilot tested with EMS first responders and emergency management researchers, and subsequently amended to ensure questions were correctly understood (face validity) and that questions addressing different concepts were indeed distinct from each other (content validity) (Taherdoost, 2016). PHECC distributed the survey to all members (2,092 of the 5,398 EMS first responders) who indicated, under GDPR protocols, a willingness to participate in research projects.

The 58-question questionnaire was hosted on Qualtrics. The SLR informed the questions, which elicited respondent experiences by recording socio-demographic data; participants' perceived and actual levels of risk, impact and worry; perceived preparedness; and experiences regarding staff safety, health and well-being both in relation to COVID-19 and more generally.

3.3 Data analysis

Descriptive analysis was accomplished using the STATA software package (StataCorp; Release 14.1/SE) to provide an overview of the quantitative data. This was accompanied by

Figure 2.
A selection of question types taken from the online questionnaire

Please indicate your level of satisfaction with respect to your organisations provision of:

	Extremely displeased	Moderately displeased	Slightly displeased	Neither pleased nor displeased	Slightly pleased	Moderately pleased	Extremely pleased	N/A
PPE	○	○	○	○	○	○	○	○
Handwashing facilities	○	○	○	○	○	○	○	○
Uniform washing facilities	○	○	○	○	○	○	○	○
Social distancing measures	○	○	○	○	○	○	○	○
Staff hygiene facilities	○	○	○	○	○	○	○	○
Clinical guidelines	○	○	○	○	○	○	○	○
Clinical directives	○	○	○	○	○	○	○	○
Cleaning guidance for Ambulances/Vehicles	○	○	○	○	○	○	○	○
Health & Well-being Advice	○	○	○	○	○	○	○	○

When was the last time you received training in the techniques for Donning & Doffing of Personal Protective Equipment (PPE).

- During the COVID-19 response
- within the past 6 months
- within the past year
- between 2 to 5 years ago
- 6 years ago or greater

What do you see as a particular issue(s) of concern during this pandemic response?

Has a friend/family member (who does not live in your home) contracted COVID-19?

- Yes
- No

content analysis of qualitative responses as detailed by Krippendorff (2018). The eight-phase analytical process is summarised below:

(1) *Phase 1:* Qualitative submissions and associated socio-demographic information were organised into a single table for import into NVivo R1.

(2) *Phase 2:* An initial set of codes were formed through "open coding". These were labelled according to themes identified by participants themselves to "conceptualise their own experiences and world view" (Lincoln and Guba, 1985, p. 334).

(3) *Phase 3:* The initial codes generated in Phase 2 were allocated to different categories, enabling further data analysis. Categories were revised via distilling, re-labelling, and merging to ensure their labels accurately reflected coded content.

(4) *Phase 4:* The newly-restructured categories were divided into sub-categories, facilitating more in-depth understanding of the data.

(5) *Phase 5:* Data reduction involved consolidating and refining codes into a final framework of codes.

(6) *Phase 6:* Analytical memos were created synopsising each categories' content.

(7) *Phase 7:* Analytical memos were validated by substantiating findings through evaluation of the relationships across and between categories and the effect of participant demographics on these, supported by textual quotes within the data.

(8) *Phase 8:* Analytical memos were combined and refined into clear findings.

4. Results and discussion

815 questionnaire responses were received (response rate = 39%). The key organisations represented were the ambulance services (65.7%), fire service (17.83%) and civil defence (9.79%). The primary roles undertaken by the EMS first responders were advanced paramedics (22.2%), paramedics (40.21%), EMTs (23.95%), specialist first responders (6.47%) including mountain rescue and civil defence, and others (7.17%) which included cardiac first responders, first aid responders and a small number of doctors and nurses. It should be noted that each cohort's exposure to COVID-19 and caseloads would have varied. For example, those in specialist first responder roles were more likely to be involved in intermediate care and staffing COVID-19 testing centres while paramedics responded to 112/999 emergency dispatches. Respondents' professional experience ranged from less than one to 44 years, with a median of 10 years. All nine healthcare regions were represented. 78% of survey respondents were male, and 54% had at least one child. The experiences, challenges, and perspectives of these EMS first responders' are presented in the subsequent sections.

4.1 Organisational effectiveness

47.51% of respondents agreed or strongly agreed that they felt adequately trained by their organisation to respond to the pandemic, extending to 72.40% when those who somewhat agreed were included. However, tensions were evident, with 19.06% disagreeing or strongly disagreeing that their organisation looked after their basic needs. This figure rose to 27.71% when those who somewhat disagreed were included. Some expressed frustration with the lack of standardisation of safety procedures and inadequate communication contributed to this problem:

> At a later stage, guidelines for PPE and cleaning were changed regularly (e.g. at one point there was a poster in the ambulance stating that even with a confirmed case no goggles were required unless aerosol generating procedures were part of care, this was changed 3 weeks later to a case-to-case base). (R329)

> Getting emails sent to a [work] email address which I cannot access from home and may not be able to access prior to being sent off to an emergency is not good enough. Especially not when information and policies change frequently. (R329)

Such coordination issues support Hasnain *et al.*'s (2020) identification of the need for efficient ICT-based knowledge dissemination to keep pace with changing developments.

Asked if their organisation had provided adequate PPE, 56.59% agreed or strongly agreed, rising to 74.36% when those somewhat agreeing were included, while 46.24% agreed or strongly agreed that their organisation had provided appropriate PPE to enable them to do their work safely (extending to 68.95% when those who somewhat agreed were included). However, PPE remained a concern raised by over 1 in 4 responders, especially its quality and suitability:

> PPE particularly the goggles fogging up is causing a lot of safety issues when dealing with the busier calls. People cannot clearly see what they are doing. (R109)

> PPE equipment, why do we think droplets from sneezing and coughing won't land on our hair and shoes?? (R254)

For other respondents it was not simply about the provision of appropriate high-quality PPE, but its use among health professionals that caused concern:

> Hospital staff making fun of you for being properly suited up in PPE. It really bugs me that does. (R29)

> Initially, I suppose, PPE, the supply of it . . . now from HCW perspective I hope that we don't become complacent with PPE (R15)

As found in the SLR, it was not only the effectiveness of PPE but its comfort and usability that influenced HCWs' adherence to wearing it (Yassi *et al.*, 2005).

450 participants responded to the open question: "If you could change one thing about the pandemic response, what would it be, and why?". The three most-common themes were: (1) the need for an earlier, speedier "lockdown", mentioned in 122 comments; (2) earlier education, training and communication (69 comments); (3) the need to maintain a stockpile of PPE (59 comments). In addition to these common themes, the word "earlier" emerged in almost 50% of responses. Similarly, though used less often, the words "sooner", "quicker", and "faster" were included when discussing PPE. The frequency and use of such words suggest pace of implementation is a key consideration for future pandemic responses. It is worth noting that overall it seemed respondents were not critical of the actions taken, but of the time which elapsed before these actions were embedded in policy, communicated, and implemented.

Satisfaction with the quality of organisational facilities varied considerably (Figure 3). Satisfaction was highest for PPE, with 55.32% of respondents rating it moderately or extremely good, rising to 68.34% when those rating it slightly good were included. Uniforms and uniform storage facilities were highly criticised, with only 42.09% and 42.17% respectively rating these items as at least good. Elaborating on the reasons for their ratings, most described poor workplace facilities as a longstanding problem:

> My ambulance station has 1 shower for 8 coming on duty/going off duty staff, no relief staff lockers, no sluice, no wash bay, no station cleaner, no sight of any of this changing in the foreseeable future even with current pandemic. (R415)

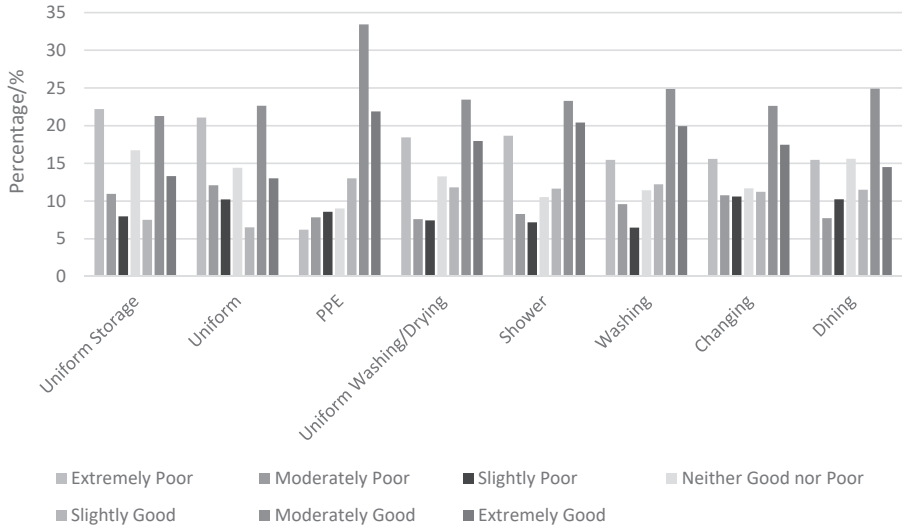


Figure 3.
Satisfaction with facilities

4.2 Worry and familial impact

91.5% of respondents believed their occupation placed them at higher risk of contracting COVID-19, mainly due to regular contact with infected or asymptomatic patients. Participants recorded their level of worry as the virus spread from China to Italy to Ireland, on a five-point scale from "not at all" to "a great deal" (Figure 4). When cases were first reported in China, 38.64% were moderately or more than moderately worried, with 21.15% not at all worried. Reported levels of worry increased further when cases were reported in Italy, with 78.07% moderately worried or higher. When cases were reported in Ireland 94.09% were at least moderately worried with 33.96% reporting they worried 'a great deal'. Respondents were also asked how their level of worry changed during the response to

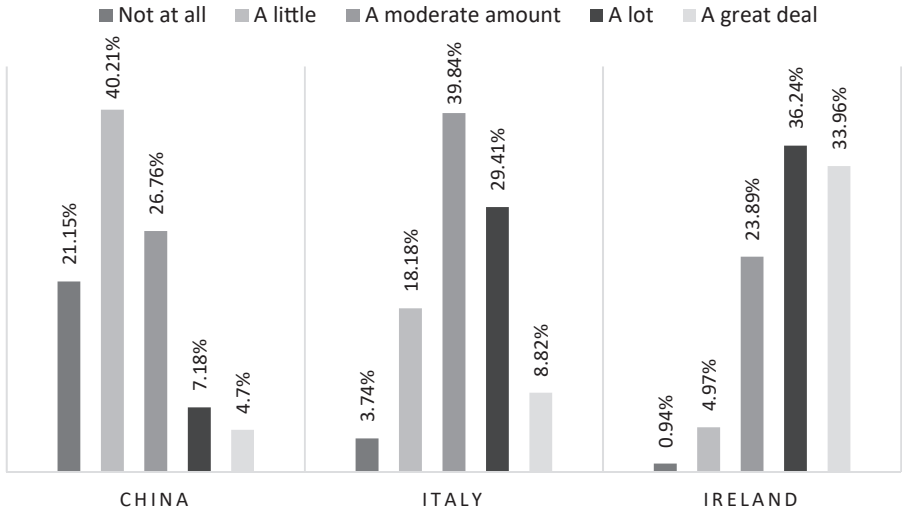


Figure 4.
Level of worry as COVID-19 spread

COVID-19 in Ireland, most (42.35%) stated that their worry levels were unchanged while 17.68% reported decreased worry and 39.97% recorded increased worry.

As identified in the literature, the chief cause of increasing worry was the fear of contracting and spreading COVID-19 (Aghili and Arbabi, 2020; Angelos, 2020; Cai *et al.*, 2020; Collado-Boira *et al.*, 2020; Huynh *et al.*, 2020; Misra, 2020; Semaan *et al.*, 2020). Awareness of high transmission rates, concerns for family members with underlying conditions/vulnerabilities, and lack of public adherence to safety regulations contributed to these fears.

Concerns about family safety resulted in 82.64% of respondents reporting that COVID-19 had altered their family interactions. 387 participants related how COVID-19 impacted on their family life, with the five most-common themes being: Practice Social Distancing in the Home (coded 158 times); Social Isolation from Extended Family (coded 83 times); Sanitising Before and After Contact (coded 79 times); Social Isolation from Immediate Family (coded 74 times); Decontaminate Clothes (coded 62 times). The burden this placed on responders was exemplified by responses such as:

> I work in a hospital but had to move out of my family home because I was working in the hospital and am at risk to giving it to my family. (R99)

> Having to keep a distance, not able to fully relax at home, worry about infecting family, they worry about me at work. Mealtimes are affected as we now eat apart. (R109)

> I minimise my time spent in their company. All my clothing is washed separately. All my ware (as in cups, cutlery, plates, and bowls) are washed and stored separately. The main bathroom has now become my bathroom only due to work for showering. (R189)

> I no longer hug my family when I get home. (R198)

> Sent my two sons to stay somewhere else, one of them is a severe asthmatic and I would not take the chance of me bringing the virus home to him. BREAKING MY HEART! (R534)

> Sleeping alone in spare room . . . keeping away from vulnerable family members. Total social distancing and more awareness of hand hygiene and general disinfection use at home. (R607)

Despite these barriers to responding, the large majority desired to continue working during the COVID-19 response, with 83.48% either disagreeing or disagreeing strongly with the statement "I am not willing to work on the COVID-19 response". 72.44% reported agreement or strong agreement to being prepared to work extended hours/days as required, with the figure rising to 84.27% when those who agree somewhat were included.

Caring and childcare responsibilities were the most cited reasons affecting willingness to work on the COVID-19 response, in line with Aghili and Arbabi's (2020) observation that HCWs were shouldering the burden of caring for COVID-19 patients at work then returning to look after their family at home:

> I have 5 kids at home, plus a mum who relies on me to do her weekly shopping and take care of her wounds, so I would not be available as much as I would like. (R78)

Nonetheless, on a five-point scale from very low to very high impact, more respondents perceived COVID-19 as having a high or very high impact on the nation (86.81%) than on individual households (41.69%).

Respondents were asked to reflect on how prepared they felt for the COVID-19 pandemic across three categories: professionally, domestically, and nationally. Respondents rated their level of preparedness on a scale from 0% (not at all prepared) to 100% (fully prepared), with intervals of 10%. Respondents reported a higher level of professional preparedness (mean of 52.02%) than in their household (mean of 49.82%) or nationally (mean of 40.38%). Table 1 presents a further breakdown of mean preparedness by role. It highlights a marked difference

between paramedics and EMTs, with EMTs reporting higher levels of perceived preparedness across all three measures.

4.3 Ethical dilemmas

29.2% of respondents encountered ethical dilemmas, mainly in deciding whether to advise a patient to attend hospital where there was an increased risk of contracting COVID-19. Some were quite affected by the scenes they witnessed, describing feeling conflicted about their role and being unprepared to have to make such ethical decisions in the changed circumstances of the pandemic:

> Nursing home patient's family waiting outside at the ambulance to say goodbye for last time knowing their parents will die, I know they'll die, why am I transporting someone to an ED to die. Patient died 4 hours later in a busy resus room. (R412)

Overall, 86.42% reported "Yes" that they were providing appropriate care to patients. Those who did not often felt that PPE limited their ability to convey emotion to reassure patients, and slowed response times through cumbersome donning and doffing:

> The PPE means we cannot provide that smile that makes the patient feel better, even for a second! The PPE makes everything more difficult and sweaty. (R147)

> Cardiac arrests–we cannot use normal gold standard techniques and we are unable to respond immediately due to having to put on PPE, both of these are difficult for us as it gives our patients a lesser chance of survival (R211)

Those who responded to 112/999 emergency calls during COVID-19 were more likely to report experiencing ethical dilemmas during the pandemic (see Table 2):

4.4 Collegial and community support

Respondents were aware of their vital role in the COVID-19 response. When asked if they had considered leaving their profession during the response phase of the pandemic, 80.7% answered "No". Describing their desire to remain, 77.5% of comments were coded as the participant describing themselves as a "Fully Committed Professional" or underlining their "Desire to Play my Part". The most recurring words in the text assigned to the "Fully Committed Professional" code were "love" and "job". "Job" occurred in 110 of the 125 comments coded, and in conjunction with the word "love" in 50 of these comments. The word cluster in Figure 5 encapsulates this relationship:

Role	Professional preparedness	Household preparedness	National preparedness
Advanced paramedics	49.87%	48.30%	39.03%
Paramedics	49.71%	47.69%	36.69%
EMTs	56.68%	52.81%	46.73%
Specialist first responders	53.72%	52%	38.04%

Table 1. Mean preparedness by role

Role	Experienced ethical dilemmas
Advanced paramedics	38%
Paramedics	35%
EMTs	18%
Specialist first responders	15%

Table 2. Experienced ethical dilemmas by role

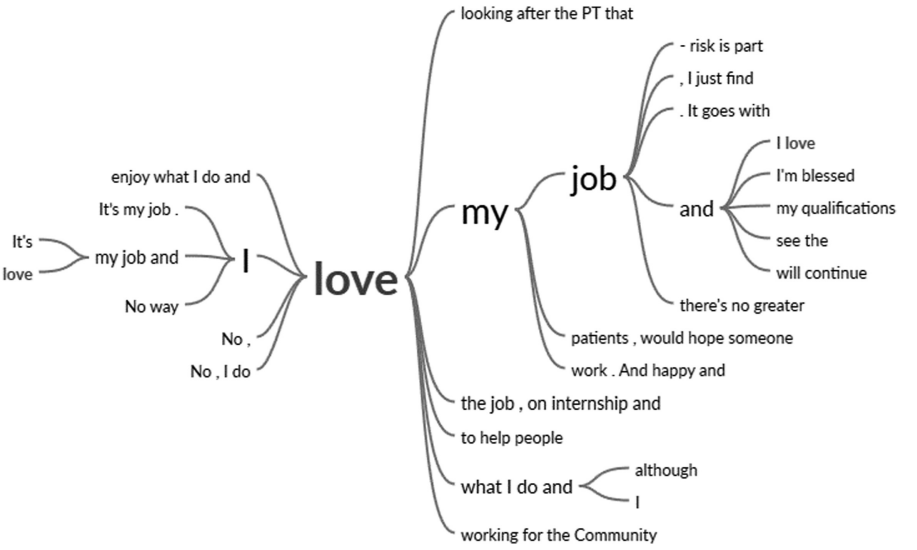


Figure 5.
Relationship between love and job in participants' responses

Respondents felt obliged not to abandon their co-workers, with 86.23% reporting a sense of duty to their colleagues and organisation to make themselves available to work during the response. Respondents' loyalty to their workmates was evident, as the camaraderie of being "all in it together" emerged as the dominant theme in the reasons given for their sense of duty to co-workers:

> We are all in this together. They are my second family. (R240)

> When retired friends are returning to work, I am not going to turn my back on the situation. We are all needed to play our part. (R245)

Their dedication was recognised by a public outpouring of support, and respondents identified this gratitude and community spirit as the two major sources of strength spurring them on. 73.86% stated they had experienced acts of kindness during the COVID-19 response, ranging from general moral support and community goodwill to boost their spirits, to donations of food and drink, to more personalised gestures such as childminding and collecting and delivering shopping or medication:

> Clapping, candles being lit, flags hanging out. (R166)

> Lots of community support. Was delivering PPE in a marked vehicle and a person came up to us and gave us lotto tickets and thanked us. (R131)

> Words of thanks, allowed to skip queues in uniform, [grocery store] healthcare worker shopping (very thankful), free coffee at [service station] makes a huge difference, [fast food restaurant] feeding us, etc. It was an outpour of support. (R359)

5. Conclusion

The findings revealed Irish EMS first responders faced many challenges while operating during the strict COVID-19 restrictions. The ever-present risk their work brought in terms of the contraction and passing of COVID-19 to loved ones and colleagues emerged as a

fundamental concern. A lack of facilities and the equipment needed for protection and sanitisation also caused distress. Participants felt a compelling duty of care to their patients, the public, colleagues and their employers. Duty of care created tensions with care for their families, especially around the increased risk of contracting COVID-19. They faced a range of ethical dilemmas including advising people to remain at home when they would typically have advised they attend hospital and bringing patients to hospital knowing this increased their risk of infection. Balancing the wearing of PPE for protection with the desire to deliver personal reassurance and care was a source of professional unease for respondents.

However, positive aspects during the response were also identified. Balancing their dedication to working during the pandemic with their personal commitments and fears of infecting loved ones revealed fundamental humanitarianism among EMS first responders. Likewise, the community goodwill shown to them acted as a motivator in unprecedented circumstances.

This study is not without its limitations, and further research is recommended. First, EMS first responders' perceptions and experiences may have evolved over the past two years. A follow-up study is advised. Second, the learning and challenges experienced by other emergency services, such as police, should also be captured to inform emergency management. Third, this paper does not cover similarities and differences between those in different regions, ranks, roles and organisations, thus providing further opportunities for further analysis.

Concerning pandemic planning, this study highlights where action is needed to ameliorate EMS first responders' worry and demotivation. Furthermore, it confirms a need for enhanced planning in areas such as communication, psychological support, PPE/uniforms, uniform storage and decontamination and changing facilities. There is also a need for greater training and support in managing ethical dilemmas and the challenge of balancing professional and home life.

References

Acharya, S., Ghimire, A., Dongol, D. and Maharjan, K. (2020), "Non-COVID and COVID emergency department healthcare workers' perception of COVID-19 at Patan Hospital, Nepal", *Journal of Patan Academy of Health Sciences*, Vol. 7 No. 1, pp. 42-47, doi: 10.3126/jpahs.v7i1.28862.

Aghili, S.M. and Arbabi, M. (2020), "The COVID-19 pandemic and the health care providers; what does it mean psychologically?", *Advanced Journal of Emergency Medicine*, Vol. 4 No. 2, p. e63, doi: 10.22114/ajem.v4i2s.419.

Aksoy, Y.E. and Koçak, V. (2020), "Psychological effects of nurses and midwives due to COVID-19 outbreak: the case of Turkey", Working Paper, Department of Midwifery, Health Sciences Faculty of Selcuk University, Konya, 3 July.

Alsahafi, A.J. and Cheng, A.C. (2016), "Knowledge, attitudes and behaviours of healthcare workers in the Kingdom of Saudi Arabia to MERS coronavirus and other emerging infectious diseases", *International Journal of Environmental Research and Public Health*, Vol. 13 No. 12, pp. 1-8, doi: 10.3390/ijerph13121214.

Angelos, P. (2020), "Surgeons, ethics, and COVID-19: early lessons learned", *Journal of the American College of Surgeons*, Vol. 230 No. 6, pp. 1119-1120, doi: 10.1016/j.jamcollsurg.2020.03.028.

Bhagavathula, A.S., Aldhaleei, W.A., Rahmani, J., Mahabadi, M.A. and Bandari, D.K. (2020), "Novel Coronavirus (COVID-19) knowledge and perceptions: a survey *on healthcare workers", Working Paper, Institute of Public Health*, College of Medicine and Health Sciences, UAE University, Al Ain, 16 March.

Cai, H., Tu, B., Ma, J., Chen, L., Fu, L., Jiang, Y. and Zhuang, Q. (2020), "Psychological impact and coping strategies of frontline medical staff in hunan between January and March 2020 during the outbreak of coronavirus disease 2019 (COVID-19) in hubei, China", *Medical Science Monitor*, Vol. 26, pp. 1-16, doi: 10.12659/msm.924171.

Chan-Yeung, M. (2004), "Severe acute respiratory syndrome (SARS) and healthcare workers", *International Journal of Occupational and Environmental Health*, Vol. 10 No. 4, pp. 421-427, doi: 10.1179/oeh.2004.10.4.421.

Cheng, V.C., Chan, J.F.W., To, K.K.W. and Yuen, K.Y. (2013), "Clinical management and infection control of SARS: lessons learned", *Antiviral Research*, Vol. 100 No. 2, pp. 407-419, doi: 10.1016/j.antiviral.2013.08.016.

Chersich, M.F., Gray, G., Fairlie, L., Eichbaum, Q., Mayhew, S., Allwood, B., English, R., Scorgie, F., Luchters, S., Simpson, G., Haghighi, M.M., Pham, M.D. and Rees, H. (2020), "COVID-19 in Africa: care and protection for frontline healthcare workers", *Globalization and Health*, Vol. 16 No. 46, pp. 1-6, doi: 10.1186/s12992-020-00574-3.

Chung, S., Kim, H.J., Ahn, M.H., Yeo, S., Lee, J., Kim, K., Kang, S., Suh, S. and Shin, Y. (2020), "Development of the Stress and Anxiety to Viral Epidemics-9 (SAVE-9) scale for assessing work-related stress and anxiety in healthcare workers in response to viral epidemics", Working paper, Department of Psychiatry, Asan Medical Center, University of Ulsan College of Medicine, Seoul, 10 June.

Citizens Information (2020), New measures to combat COVID-19 from midnight on 27 March 2020, available at: https://whatsnew.citizensinformation.ie/2020/03/27/new-measures-to-combat-covid-19-from-midnight-on-27-march-2020/# (accessed 01 November 2021).

Collado-Boira, E.J., Ruiz-Palomino, E., Salas-Media, P., Folch-Ayora, A., Muriach, M. and Baliño, P. (2020), "The COVID-19 outbreak"—an empirical phenomenological study on perceptions and psychosocial considerations surrounding the immediate incorporation of final-year Spanish nursing and medical students into the health system", *Nurse Education Today*, Vol. 92, pp. 1-6, doi: 10.1016/j.nedt.2020.104504.

Cooper, S., Wiyeh, A., Schmidt, B. and Wiysonge, C.S. (2020), "Cochrane corner: factors that influence compliance by healthcare workers with infection prevention and control guidelines for COVID-19 and other respiratory infections", *The Pan African Medical Journal*, Vol. 35 No. 23, pp. 2-4, doi: 10.11604/pamj.supp.2020.35.2.23012.

Creswell, J.W. and Plano Clark, V.L. (2011), "Choosing a mixed methods design", in Creswell, J.W. and Plano Clark, V.L. (Eds), *Designing and Conducting Mixed Methods Research*, Sage Publications, pp. 53-106.

Delgado, D., Quintana, F.W., Perez, G., Liprandi, A.S., Ponte-Negretti, C., Mendoza, I. and Baranchuk, A. (2020), "Personal safety during the COVID-19 pandemic: realities and perspectives of healthcare workers in Latin America", *International Journal of Environmental Research and Public Health*, Vol. 17 No. 8, pp. 1-8, doi: 10.3390/ijerph17082798.

Gan, W.H., Lim, J.W. and Koh, D. (2020), "Preventing intra-hospital infection and transmission of coronavirus disease 2019 in health-care workers", *Safety and Health at Work*, Vol. 11 No. 2, pp. 241-243, doi: 10.1016/j.shaw.2020.03.001.

Gudi, S.K. and Tiwari, K.K. (2020), "Preparedness and lessons learned from the novel coronavirus disease", *The International Journal of Occupational and Environmental Medicine*, Vol. 11 No. 2, pp. 108-112, doi: 10.34172/ijoem.2020.1977.

Hasnain, M., Pasha, M.F., Ghani, I. and Jeong, S.R. (2020), "A narrative review on the role and safety challenges of frontline medical staff and emerging technologies during COVID-19 pandemic", Working Paper, School of IT, Monash University, 14 May.

Hu, D., Kong, Y., Li, W., Han, Q., Zhang, X., Zhu, L.X., Wan, S.W., Liu, Z., Shen, Q., Yang, J., He, H. and Zhu, J. (2020), "Frontline nurses' burnout, anxiety, depression, and fear statuses and their associated factors during the COVID-19 outbreak in Wuhan, China: a large-scale cross-sectional study", *EClinicalMedicine*, Vol. 24 No. 100424, pp. 1-10, doi: 10.1016/j.eclinm.2020.100424.

Huynh, G., Nguyen, T.N.H., Tran, V.K., Vo, K.N. and Pham, L.A. (2020), "Knowledge and attitude toward COVID-19 among healthcare workers at district 2 hospital, Ho chi Minh city", *Asian Pacific Journal of Tropical Medicine*, Vol. 13 No. 6, pp. 260-265, doi: 10.4103/1995-7645.280396.

Jin, Y.H., Huang, Q., Wang, Y., Zeng, X., Luo, L., Pan, Z., Yuan, Y., Chen, Z., Cheng, Z., Huang, X., Wang, N., Li, B., Zi, H., Zhao, M., Ma, L., Deng, T., Wang, Y. and Wang, X. (2020), "Perceived infection transmission routes, infection control practices, psychosocial changes, and management of COVID-19 infected healthcare workers in a tertiary acute care hospital in Wuhan: a cross-sectional survey", *Military Medical Research*, Vol. 7 No. 1, pp. 1-13, doi: 10.1186/s40779-020-00254-8.

Key, T., Mathai, N.J., Venkatesan, A.S., Farnell, D. and Mohanty, K. (2020), "Personal protective equipment during the COVID-19 crisis: a snapshot and recommendations from the frontline of a university teaching hospital", *Bone and Joint Open*, Vol. 1 No. 5, pp. 131-136, doi: 10.1302/2633-1462.15.BJO-2020-0027.R1.

Koh, D., Lim, M.K., Chia, S.E., Ko, S.M., Qian, F., Ng, V., Tan, B.H., Wong, K.S., Chew, W.M., Tang, H.K., Ng, W., Muttakin, Z., Emmanuel, S., Fong, N.P., Koh, G., Kwa, C.T., Tan, K.B. and Fones, C. (2005), "Risk perception and impact of severe acute respiratory syndrome (SARS) on work and personal lives of healthcare workers in Singapore what can we learn?", *Medical Care*, Vol. 43 No. 7, pp. 676-682, doi: 10.1097/01.mlr.0000167181.36730.cc.

Krippendorff, K. (2018), *Content Analysis: an Introduction to its Methodology*, 4th ed, Sage, London.

Lai, J., Ma, S., Wang, Y., Cai, Z., Hu, J., Wei, N., Wu, J., Du, H., Chen, T., Li, R., Tan, H., Kang, L., Yao, L., Huang, M., Wang, H., Wang, G., Liu, Z. and Hu, S. (2020), "Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019", *JAMA Network Open*, Vol. 3 No. 3, pp. 1-12, doi: 10.1001/jamanetworkopen.2020.3976.

Lincoln, Y.S. and Guba, E.G. (1985), *Naturalistic Inquiry*, Sage, California.

Lusher, J., Collins, G. and Chapman-Jones, D. (2020), "COVID-19: psychological support for healthcare workers during and after the pandemic", available at: https://rcni.com/nursing-management/opinion/comment/covid-19-psychological-support-healthcare-workers-during-and-after-pandemic-160991 (accessed 23 May 2020).

Maunder, R. (2004), "The experience of the 2003 SARS outbreak as a traumatic stress among frontline healthcare workers in Toronto: lessons learned", *Philosophical Transactions of the Royal Society B: Biological Sciences*, Vol. 359 No. 1447, pp. 1117-1125, doi: 10.1098/rstb.2004.1483.

McMullan, C., Brown, G.D. and O'Sullivan, D. (2016), "Preparing to respond: irish nurses' perceptions of preparedness for an influenza pandemic", *International Emergency Nursing*, Vol. 26, pp. 3-7, doi: 10.1016/j.ienj.2015.10.004.

McMullan, C., Brown, G.D., Tully, E. and Craven, T. (2018), "*Methodology, process and outcomes: delivering the national risk assessment* (2017)", *Paper Presented at the EMII Research Symposium: Risk Management in Ireland*, 23 February 2018, Dublin, available at: http://doras.dcu.ie/22278/1/EMII_Research_Symposium_Papers_Feb_2018.pdf (accessed 6 November 2021).

Misra, A., (2020), "Doctors and healthcare workers at frontline of COVID 19 epidemic: Admiration, a pat on the back, and need for extreme caution", *Diabetes and Metabolic Syndrome*, Vol. 14 No. 3, pp. 255-256, doi: 10.1016/j.dsx.2020.03.006.

Moher, D., Liberati, A., Tetzlaff, J. and Altman, D.G. (2009), "Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement", *PLoS Medicine*, Vol. 6 No. 7, pp. 1-6, doi: 10.1136/bmj.b2535.

Pappa, S., Ntella, V., Giannakas, T., Giannakoulis, V.G., Papoutsi, E. and Katsaounou, P. (2020), "Prevalence of depression, anxiety, and insomnia among healthcare workers during the COVID-19 pandemic: a systematic review and meta-analysis", *Brain, Behavior, and Immunity*, Vol. 88, pp. 901-907, doi: 10.1016/j.bbi.2020.05.026.

Pothiawala, S. (2020), "Psychological impact of the COVID-19 on health care workers in the emergency department", *Advanced Journal of Emergency Medicine*, Vol. 4 No. 2, p. e58, doi: 10.22114/ajem.v0i0.397.

Santarone, K., McKenney, M. and Elkbuli, A. (2020), "Preserving mental health and resilience in frontline healthcare workers during COVID-19", *American Journal of Emergency Medicine*, Vol. 38 No. 7, pp. 1530-1531, doi: 10.1016/j.ajem.2020.04.030.

Sasangohar, F., Jones, S.L., Masud, F.N., Vahidy, F.S. and Kash, B.A. (2020), "Provider burnout and fatigue during the COVID-19 pandemic: lessons learned from a high-volume intensive care unit", *Anesthesia and Analgesia*, Vol. 131 No. 1, pp. 106-111, doi: 10.1213/ANE.0000000000004866.

Semaan, A., Audet, C., Huysmans, E., Afolabi, B., Assarag, B., Banke-Thomas, A., Blencowe, H., Caluwaerts, S., Campbell, O.M.R., Cavallaro, F.L., Chavane, L., Day, L.T., Delamou, A., Delvaux, T., Graham, W.J., Gon, G., Kascak, P., Matsui, M., Moxon, S., Nakimuli, A., Pembe, A., Radovich, E., van den Akker, T. and Benova, L. (2020), "Voices from the frontline: findings from a thematic analysis of a rapid online global survey of maternal and newborn health professionals facing the COVID-19 pandemic", Working Paper, Center for Research on Population and Health, Faculty of Health Sciences, American University of Beirut, Beirut, 11 May.

Sim, M.R. (2020), "The COVID-19 pandemic: major risks to healthcare and other workers on the front line", *Occupational and Environmental Medicine*, Vol. 77 No. 5, pp. 281-282, doi: 10.1136/oemed-2020-106567.

Souadka, A., Essangri, H., Benkabbou, A., Amrani, L. and Majbar, M.A. (2020), "COVID-19 and Healthcare worker's families: behind the scenes of frontline response", *EclinicalMedicine*, Vol. 23 No. 100373, p. 1, doi: 10.1016/j.eclinm.2020.100373.

Suwantarat, N. and Apisarnthanarak, A. (2015), "Risks to healthcare workers with emerging diseases: lessons from MERS-CoV, Ebola, SARS, and avian flu", *Current Opinion in Infectious Diseases*, Vol. 28 No. 4, pp. 349-361, doi: 10.1097/QCO.0000000000000183.

Taherdoost, H. (2016), "Validity and reliability of the research instrument; how to test the validation of a questionnaire/survey in a research", *International Journal of Academic Research in Management*, Vol. 5 No. 3, pp. 28-36, doi: 10.2139/ssrn.3205040.

Tam, C.W., Pang, E.P.F., Lam, L.C.W. and Chiu, H.F.K. (2004), "Severe acute respiratory syndrome (SARS) in Hong Kong in 2003: stress and psychological impact among frontline healthcare workers", *Psychological Medicine*, Vol. 34 No. 7, pp. 1197-1204, doi: 10.1017/S0033291704002247.

Walton, M., Murray, E. and Christian, M.D. (2020), "Mental health care for medical staff and affiliated healthcare workers during the COVID-19 pandemic", *European Heart Journal: Acute Cardiovascular Care*, Vol. 9 No. 3, pp. 241-247, doi: 10.1177/2048872620922795.

WHO (2020), "Statement on the second meeting of the International Health Regulations (2005) Emergency Committee regarding the outbreak of novel coronavirus (2019-nCoV)", available at: https://www.who.int/news/item/30-01-2020-statement-on-the-second-meeting-of-the-international-health-regulations-(2005)-emergency-committee-regarding-the-outbreak-of-novel-coronavirus-(2019-ncov (accessed 25 June 2020).

Yassi, A., Moore, D., FitzGerald, J.M., Bigelow, P., Hon, C. and Bryce, E. (2005), "Research gaps in protecting healthcare workers from SARS and other respiratory pathogens: an interdisciplinary, multi-stakeholder, evidence-based approach", *Journal of Occupational and Environmental Medicine*, Vol. 47 No. 1, pp. 41-50, doi: 10.1097/01.jom.0000150207.18085.41.

Zhu, Z., Xu, S., Wang, H., Liu, Z., Wu, J., Li, G., Miao, J., Zhang, C., Yang, Y., Sun, W., Zhu, S., Fan, Y., Chen, Y., Hu, J., Liu, J. and Wang, W. (2020), "COVID-19 in Wuhan: sociodemographic characteristics and hospital support measures associated with the immediate psychological impact on healthcare workers", *EclinicalMedicine*, Vol. 24 No. 100443, pp. 1-11, doi: 10.1016/j.eclinm.2020.100443.

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