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Unheard voices: The critical role of nurses and midwives in climate resilience and disaster preparedness in Small Island Developing States

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ABSTRACT

Island nations such as Barbados, Jamaica, and Tonga face rising threats from climate change, including hurricanes, flooding, and sea-level rise. Nurses and midwives are crucial frontline responders, leading disaster preparedness, emergency care, and community recovery. This paper highlights their leadership, resilience, and innovation in addressing the health impacts of climate-related disasters. Drawing on real-world examples, it shows how these professionals bridge clinical care with public health strategies, ensuring vulnerable populations receive timely, culturally appropriate interventions. Through education, emergency planning, and clinical support, they foster resilience and recovery. The experiences from these islands emphasize the urgent need to strengthen nursing and midwifery leadership within climate adaptation efforts. Recognizing and investing in their role is vital to building sustainable, climate-resilient health systems in Small Island Developing States (SIDS). The paper calls for increased policy support, funding, and capacity-building to empower nurses and midwives as essential agents of change.

Introduction

Small Island Developing States (SIDS), comprising 39 low-lying nations and over 1,000 islands, are home to approximately 65 million people (United Nations, 2022). These nations face unique vulnerabilities stemming from geographic isolation, limited landmass, and constrained financial and technical resources, which heighten their exposure to external shocks, including climate change, economic instability, and public health emergencies (World Health Organization [WHO], 2024). Intensifying climate threats, rising sea levels, extreme weather, and more frequent natural disasters, further exacerbate social and health inequalities, placing immense pressure on already fragile healthcare systems (Intergovernmental Panel on Climate Change [IPCC], 2022).

Climate change is among the most pressing public health challenges of the 21st century, with consequences for disease epidemiology, air and water quality, mental health, and food and water security (WHO, 2020a). These effects are particularly severe in SIDS, where rising sea levels displace coastal populations, and climate-sensitive illnesses place additional burdens on under-resourced health systems (Al-Harthi et al., 2020; Pan American Health Organization [PAHO], 2011, 2023). An estimated 25% of the global disease burden is attributable to early environmental exposures (Landrigan et al., 2018), including heat-related illness, vector-borne and respiratory diseases, and mental health disorders linked to climate-induced displacement and environmental loss (Romanello et al., 2022). Marginalized groups, such as indigenous communities and low-income households, bear the brunt of these risks, compounding existing health disparities (WHO, 2022).

Despite these challenges, many SIDS have demonstrated global leadership in climate adaptation. Governments have pursued ambitious policies, including commitments to net-zero carbon emissions and transitions toward renewable energy, while embracing digital technologies to strengthen disaster preparedness and healthcare delivery (United Nations Development Programme [UNDP], 2024; United Nations Framework Convention on Climate Change [UNFCCC], 2021). Nonetheless, these efforts are constrained by geographic and economic limitations, such as dependence on tourism and fisheries, high coastal population densities, and vulnerability to supply chain disruptions, all of which impede sustainable health and development goals (Caribbean Community [CARICOM], 2023).

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Economically, climate-related disasters frequently disrupt agriculture, tourism, and fisheries, key industries in SIDS, leading to prolonged recovery periods and economic volatility (World Bank, 2024). Health systems, often operating with minimal resources, struggle to absorb the cumulative impacts of extreme weather, including infrastructure damage, medical supply shortages, and the displacement of health workers and patients (United Nations Office for Disaster Risk Reduction [UNDRR], www.undrr.org/gar; 2022b, 2024). These disruptions heighten the risk of disease outbreaks and amplify long-term health system vulnerabilities.

Globally, the integration of climate resilience into healthcare education and planning remains inconsistent. Countries such as China and Saudi Arabia report ongoing difficulties aligning health training and infrastructure with climate risk (WHO, 2022). A critical gap persists in defining and embedding the competencies nurses and midwives need to respond effectively to climate-related health threats, particularly in SIDS (International Council of Nurses [ICN], 2022). Furthermore, scientific literature on the specific contributions of nurses and midwives in SIDS disaster response remains sparse, limited by underfunded research capacity and the under representation of SIDS nurse and midwife leaders in global policy discussions (PAHO, 2023).

Nurses and midwives comprise the largest segment of the global health workforce and are strategically positioned to address the health impacts of climate change (WHO, 2020b). Their roles span direct care, public health education, prevention, and policy advocacy, making them pivotal to climate resilience and disaster risk reduction (ICN, 2022). In SIDS, where limited resources and frequent natural disasters amplify health vulnerabilities, Global Chief Nurse and Midwifery Officers (GCNMOs) are central to system resilience (PAHO, 2021). GCNMOs lead climate-responsive healthcare strategies. They facilitate early detection of climate-sensitive diseases, such as dengue, cholera, and wildfire-related respiratory illnesses (Centers for Disease Control and Prevention [CDC], 2021), while community-based surveillance enables rapid containment (WHO, 2024). During disasters, including cyclones and tsunamis, GCNMOs ensure care continuity, emergency triage, maternal and mental health services, and infrastructure adaptation (Pusporini et al., 2024; UNDRR, 2024).

As the frequency and severity of climate-related disasters escalate, the leadership of nurses and midwives in disaster preparedness will be pivotal to ensuring health system resilience across SIDS. Their capacity to lead, mobilize communities, and sustain care delivery in crisis contexts will be essential to national and regional adaptation strategies. This article calls for targeted investment in nursing and midwifery education, climate-informed training, health workforce research, and the integration of disaster risk reduction into health policy, positioning GCNMOs as essential leaders in shaping climate-resilient health systems in SIDS.

This article addresses these gaps by profiling three GCNMOs from SIDS who bring deep, lived experience in disaster preparedness, health systems leadership, and community resilience. Drawing on case studies from Barbados, Jamaica, Tonga, and other SIDS, the paper highlights the leadership and frontline contributions of nurses and midwives in emergency response, maternal health protection, and climate adaptation at the community level.

The Role of GCNMOs in SIDS

GCNMOs in SIDS play a pivotal role in shaping health system resilience in the face of climate change and disasters. Their leadership extends beyond clinical domains into policymaking, where they actively advocate for climate-resilient infrastructure, emergency preparedness training, and strategic investment in health workforce capacity (UNFCCC, 2021). Through collaborative efforts with governments and communities, they ensure that disaster preparedness is embedded within national health strategies, aligning policy directives with frontline realities. While these efforts reflect strong leadership, existing studies reveal both strengths and systemic gaps. In high-income countries, nurse leaders have shown emphasis on preparedness and policy advocacy (American Nurses Association [ANA], 2023; Carter & Williams, 2021). Conversely, evidence from Turkey, Rwanda, China, and Egypt highlights ongoing knowledge deficits among healthcare providers and the public in relation to disaster readiness and climate-linked health risks (Jia et al., 2023; Kaya et al., 2023; Radwan et al., 2025). Although there is a lacunae of empirical literature exploring nursing leadership in this domain, valuable and transferable lessons from SIDS provide scalable, context-sensitive models for global disaster preparedness and response.

A defining feature of SIDS nursing and midwifery leadership lies in their contribution to building disaster resilience across systems. GCNMOs play a crucial role in integrating disaster risk reduction into clinical practice, leading emergency response planning, and promoting interprofessional training for disaster response teams (ICN, 2022; PAHO, 2023). Community engagement forms a core component of their leadership, with initiatives focusing on public health education, strengthening early warning systems, and advancing culturally responsive emergency planning, all of which enhance the adaptive capacity of local populations (UNDP, 2025). These efforts ensure that leadership is not confined to top-down directives but translated into rapid and coordinated frontline action during crises (WHO, 2022).

Targeted training has been another hallmark of effective preparedness. GCNMOs support educational programs that include triage, psychological first aid, and environmental health, aimed at enhancing the readiness of the health workforce (CDC, 2021; National Academies of Sciences [NAS], 2021). However, in many SIDS, persistent gaps in education and faculty capacity remain, limiting the full integration of climate adaptation content into nursing curricula (Sufri et al., 2019). GCNMOs are at the forefront of advocating for reforms in nursing education to embed climate competencies and disaster management as core components, while also investing in leadership development to ensure long-term system resilience (WHO, 2020b).

Resource development is another critical area where nurse leaders contribute significantly. By creating and disseminating culturally appropriate emergency kits, clinical decision tools, and preparedness guides, GCNMOs support the timely delivery of evidence-based care in disaster contexts (Rumsey et al., 2014; United Nations, 2013; WHO, 2022). These resources not only improve provider confidence and capability but also empower communities to participate in preparedness efforts, reinforcing collective response capacity.

Strategic partnerships and community collaborations further amplify the impact of nursing leadership. GCNMOs have successfully fostered networks with governments, nongovernmental organizations, and grassroots groups to improve coordination, reduce duplication, and optimize resource use during emergencies (WHO, 2020c). The Paediatric Environmental Health Specialty Units (PEHSU) initiative, for example, exemplifies how multisector collaboration can address environmental health threats through an inclusive and sustainable model (CDC, 2021). These alliances contribute to community trust and culturally relevant interventions, which are especially critical in disaster-prone settings (ICN, 2022; WHO, 2023).

In terms of policy development, GCNMOs ensure that the voices of nurses and midwives are integrated into national emergency and disaster planning frameworks. Their advocacy has been instrumental in securing resources for training, infrastructure upgrades, and health system reforms that embed disaster risk reduction as a central tenet (PAHO, 2023; UNDRR, 2022a). Their proactive engagement supports legislation that formally recognises and empowers nursing

leadership in disaster governance and crisis decision-making (ICN, 2022; WHO, 2020c).

Research and evidence-based practice are also central to their role. GCNMOs lead efforts to use health data and risk assessments to guide interventions, prioritize vulnerable populations, and update emergency protocols in line with emerging climate risks (PAHO, 2023; WHO, 2020a). Evidence-based training enhances frontline disaster preparedness, and ongoing research ensures that policies remain relevant and responsive (ICN, 2022; UNDRR, 2022a). However, despite the centrality of research to disaster planning, the availability of funding to evaluate and scale effective nursing and midwifery interventions remains limited. This is often exacerbated by gaps in educational infrastructure and constrained research capacity in SIDS settings.

During active emergencies, GCNMOs step into critical leadership roles, providing strategic direction, coordinating multiagency responses, and managing resources to ensure continuity of care. Their leadership facilitates rapid response, seamless policy-to-practice translation, and holistic postdisaster recovery (Iserson, 2025; WHO, 2020b). In doing so, they champion resilient, equitable, and sustainable health systems capable of absorbing the shocks of future climate-related crises (Greaves, 2016; Harris-Glenville & Cloos, 2024; Harris et al., 2022).

A paradox persists, however. Despite the frequency of climate-related disasters affecting SIDS and the sustained leadership of GCNMOs in preparing for and responding to these events, the full scope of their impact and the vital contributions of their teams often remain under-recognized and insufficiently documented in academic and policy literature. Elevating the visibility of this leadership is crucial, not only to strengthen the voice of nurses and midwives in global health dialogs but also to catalyze investment in context-appropriate, equity-driven, and nurse-led models for disaster preparedness and climate resilience.

Challenges and Opportunities Experienced for Nursing and Midwifery Leadership in Disaster Preparedness in SIDS

Nurses and midwives in SIDS face an array of complex and intersecting challenges that limit their capacity to address the health impacts of climate change and to lead disaster preparedness efforts. Many health systems in SIDS function with constrained financial resources, inadequate training materials, and a chronic shortage of skilled professionals. These limitations greatly restrict the ability of nursing and midwifery leaders to implement and sustain comprehensive disaster preparedness strategies. For instance, following Hurricane Maria, Puerto Rico's healthcare response was severely impeded by a lack of resources (Caribbean Disaster Emergency Management Agency [CDEMA], 2018; De Freitas et al., 2023). Similar conditions have been reported in Jamaica and the Bahamas, where workforce shortages and limited training have compromised effective disaster management (International Federation of the Red Cross and Red Crescent Societies, 2022; Rolle et al., 2020; World Bank, 2024). These persistent systemic issues point to an urgent need for increased investment in workforce development, educational capacity, and resource optimization.

Infrastructural vulnerability adds another layer of risk. Health facilities in SIDS are often ill-equipped to withstand extreme weather events such as hurricanes, flooding, and rising sea levels. In countries like Bermuda and Tonga, disasters have led to widespread facility damage, power outages, and disrupted transportation networks, all of which severely hinder the continuity of healthcare services during crises (PAHO, 2023). Ensuring the physical resilience of healthcare systems, through improved structural design, reliable energy supply, and robust transportation infrastructure, is essential for maintaining essential services in the face of such threats.

Communication gaps and weak interdisciplinary collaboration further complicate disaster response. Coordinated action among healthcare providers, government agencies, and community organizations is often stymied by fragmented communication systems and diverging institutional priorities. This fragmentation limits the efficiency and effectiveness of disaster interventions (UNDRR, 2022b). Strengthening communication infrastructure and fostering cross-sector partnerships are crucial to enabling timely, coordinated, and effective responses to emergencies.

Beyond the physical and operational challenges, the emotional and psychological toll on nurses and midwives in SIDS is profound. Recurrent exposure to disaster situations places immense stress on these professionals, often resulting in burnout and trauma. Compounding this is the responsibility to address the mental health needs of affected populations, creating a dual burden (WHO, 2022). Providing structured psychosocial support for healthcare workers and integrating mental health services into emergency planning are essential to maintaining the resilience and wellbeing of the workforce.

Educational gaps remain a critical barrier. In many SIDS, nursing and midwifery education does not sufficiently address disaster preparedness, climate adaptation, or emergency health response. Consequently, many professionals are ill-equipped to manage the complex and evolving health threats posed by climate change (ICN, 2022; WHO, 2021). Reforming curricula to incorporate these elements into both pre-service education and continuing professional development is a vital step towards building a future-ready health workforce.

Despite these considerable challenges, there are important opportunities that nurse and midwifery leaders in SIDS are increasingly leveraging to advance disaster preparedness and health system resilience. Context-specific training and capacity-building initiatives are showing promising results (Fox et al., 2019). In the Bahamas, for example, nurse leaders have successfully implemented disaster-focused training programs, enhancing emergency response capabilities (WHO, 2024). Scaling such efforts across the region will ensure that healthcare workers are equipped with the necessary competencies to respond effectively to emergencies.

Nurses and midwives also play a vital role in engaging communities and promoting grassroots resilience. Their position as trusted community figures allows them to effectively communicate risk, educate the public, and mobilize local resources for preparedness. In Jamaica, collaborations between nurses and community organizations have strengthened local disaster readiness (Jamaican Ministry of Health, 2019; Johnson-Campbell et al., 2007), demonstrating the value of community-based approaches in health emergency planning.

Policy advocacy is another growing area of influence. Nurse leaders in countries like Tonga have successfully lobbied for the formal integration of nursing roles into national disaster response frameworks (WHO, 2020b, 2023). Their continued involvement in policy development is essential for ensuring that disaster preparedness is adequately prioritized within national health strategies. Advocating for appropriate funding, inclusive policy design, and recognition of the leadership role of nurses and midwives in climate and health governance remains an urgent priority (ICN, 2022).

Technological innovation offers new pathways to overcome geographic and logistical constraints. Telehealth platforms, mobile health applications, and data analytics tools have been used in SIDS such as Bermuda to facilitate remote care and real-time coordination during emergencies. Integrating these technologies into routine disaster preparedness and response planning can enhance decision-making, resource deployment, and communication during crises (International Telecommunication Union [ITU], 2021; Meessen et al., 2024).

Interdisciplinary collaboration continues to be essential. Integrated systems that link healthcare services with emergency response agencies have proven effective in improving outcomes, as

seen in Bermuda (Government of Bermuda, Ministry of Health, 2019). Nurses and midwives can play a bridging role in these systems, ensuring that clinical, public health, and emergency services are aligned for holistic and timely interventions.

Finally, nurses and midwives are critical advocates for sustainable and climate-resilient health systems. By promoting green practices in healthcare delivery, championing sustainable infrastructure, and integrating environmental health into education and practice, they can help build long-term resilience. Investing in sustainability not only mitigates the health impacts of climate change but also strengthens the capacity of health systems to withstand future shocks (ICN, 2024).

In the context of SIDS, where the impacts of climate change and disasters are increasingly pronounced, the leadership of nurses and midwives is essential. With the right support, training, and systemic investment, they can be powerful agents of resilience, driving transformation in disaster preparedness and advancing health equity in the face of climate-related threats.

Nurse and Midwife Leadership in Disaster Response Across SIDS: Profiles From Barbados, Jamaica, Tonga

Nurses and midwives in SIDS are leading disaster response and climate resilience efforts through evidence-based practice, policy advocacy, and direct community engagement (Sufri et al., 2019). Despite limited resources, these professionals continue to shape national strategies and deliver critical care before, during, and after emergencies. Their leadership exemplifies the essential role of nursing and midwifery in building health system resilience in the face of increasing climate threats (Khan & Harnam, 2021; WHO, 2018, 2020, 2021).

The case studies below of Barbados, Jamaica, and Tonga illustrate the depth and diversity of nursing and midwifery leadership in disaster contexts across the SIDS. While each country presents a unique risk profile and response pathway, common themes emerge, nurses and midwives are often the first and most enduring responders, providing clinical care, psychological support, and continuity of maternal services under extreme conditions. These examples strengthen the paper's argument that investing in nursing and midwifery leadership, training, and systemic integration is not only a matter of professional development, but a strategic imperative for national and regional disaster resilience. The inclusion of these case studies serves to contextualize policy recommendations and ground the proposed frameworks in lived, practical experience.

Barbados

Barbados, the easternmost island in the Caribbean, faces significant climate-related hazards including hurricanes, flooding, droughts, and rising sea levels. Hurricane Beryl in 2024, caused severe damage to coastal infrastructure, compounded by power outages and increased mental health burdens (Corvalan et al., 2022; WRI, 2023). Despite personal losses, nurses continued to serve on the frontline, highlighting the resilience and dedication of the profession. Barbadian nursing and midwifery leaders have been central to the national response through:

- Coordinating disaster teams, providing trauma care and managing chronic conditions during Hurricane Elsa in 2021.
- Participating in the "Train the Trainers Programme on Disaster-related Psychological Trauma and Mental Health" in 2022, hosted in Christ Church, which equipped regional nurses with communication, assessment, and self-care skills (GIS Barbados, 2022).
- Partnering with CDEMA to deliver training in emergency and psychological first aid, as well as infection control protocols (CDEMA, 2022).
- Establishing emergency medical stations in evacuation centres and integrating disaster protocols into routine healthcare.

Nurse leaders have advocated for disaster planning to be embedded across health services and have worked to institutionalise this through continuous education and infrastructure reform (CDEMA, 2022; PAHO, 2023).

Jamaica

Jamaica regularly experiences hurricanes and floods, prompting the development of robust disaster risk management strategies. The country launched the Caribbean's first Green Bond to finance climate-resilient projects, including disaster preparedness initiatives (WRI, 2023). Jamaica's Office of Disaster Preparedness and Emergency Management (ODPEM), established in 1980, coordinates risk assessment and response planning across sectors (ODPEM, 2019). A 2005 cross-sectional survey in St. James revealed gaps in disaster preparedness training: only 40% of healthcare workers had received formal instruction, although 68% of nurses had done so (Johnson-Campbell et al., 2007; Meessen et al., 2024). This finding emphasised the need for regular training and simulation drills to maintain readiness.Jamaican nurses and midwives have addressed these gaps through proactive measures, including:

- Developing a Community-Based Disaster Response Plan for Maternal Health in partnership with the Ministry of Health and the Jamaica Midwives Association.
- Providing prenatal and postnatal care via boats and temporary clinics during Hurricanes Gilbert and Ivan.
- Offering mental health support to women affected by disaster-induced stress (Jamaican Ministry of Health, 2005, 2019; UNDP, 2024).
- Advocating for climate-resilient maternal and neonatal services (ICM, 2017).
- Integrating disaster preparedness training into nursing and midwifery curricula, ensuring future generations are equipped with DRR competencies (ICN, 2019, 2022).

These initiatives position Jamaica as a regional leader in embedding disaster resilience into healthcare policy and practice.

Tonga

Tonga, comprising 169 islands in the cyclone-prone South Pacific and located within the Pacific Ring of Fire, faces frequent natural hazards including volcanic eruptions, tsunamis, and tropical cyclones. Rising sea levels and coastal erosion further heighten the country's vulnerability (UNDRR, 2022b). In response, Tonga has adopted an integrated approach to disaster risk reduction (DRR) and climate change adaptation. However, the implementation of national strategies is challenged by limited local capacity and fragmented project coordination.The January 2022 Hunga Tonga–Hunga Ha'apai eruption and tsunami underscored the critical role of nurses and midwives in disaster response. Their contributions included:

- Emergency medical support, including triage, maternal health services, and psychosocial care.
- Mobile health clinics deployed in partnership with the Ministry of Health and international agencies, ensuring access to antenatal and postnatal care for displaced populations (WHO, 2022).
- Continuity of maternal care through makeshift birthing centres and deliveries in emergency shelters.
- Distribution of emergency birth kits, in collaboration with UNFPA, supporting safe deliveries in disaster zones (Sifa et al., 2023).
- Mental health support and psychological first aid for women coping with trauma, reflecting the holistic role of nurses and midwives (WHO, 2020).

The leadership of the Tonga Nursing Division and other local actors in these efforts has been instrumental in advancing DRR and healthcare resilience.

Across Barbados, Jamaica, Tonga, and other SIDS such as Bermuda and the Bahamas, nurses and midwives are:

- Delivering emergency care and continuity of maternal and newborn services.
- Leading community education and health promotion on disaster preparedness.
- Providing psychological first aid and trauma care.
- Advocating for the integration of climate resilience in healthcare planning.

Their leadership is acknowledged by the International Confederation of Midwives (ICM), which calls for midwives' formal inclusion in disaster preparedness and planning. The ICM emphasises midwives' unique understanding of community needs and encourages midwifery associations to take part in emergency

planning, risk assessment, and the integration of DRR into education (ICM, 2023; www.internationalmidwives.org).

Further, a 2023 article (Wong et al., 2023) stresses the need for structural reforms to support nurses and midwives in disaster contexts, highlighting the personal and professional toll of such crises.

Call to Action

Nurses and midwives in SIDS occupy a critical yet frequently under recognized position in advancing disaster preparedness, emergency response, and climate change resilience. As frontline health professionals, they bring unparalleled insight into the intersection of environmental risk and population health, and their leadership is essential for designing responsive, community-centered, and sustainable health systems. Despite persistent challenges, including resource scarcity, infrastructure fragility, lack of funding for nursing and midwifery impact research, and workforce limitations, SIDS nurses and midwives continue to drive transformative change through education, advocacy, community engagement, and policy innovation.

Central to these efforts are the GCNMOs, whose leadership has been instrumental in embedding disaster preparedness and climate responsiveness into national health strategies. Their work, grounded in both scientific evidence and deep contextual understanding, spans workforce development, intersectoral collaboration, systems strengthening, and the strategic use of digital technologies. Yet, their contributions often remain invisible within broader global health discourse.

To ensure that the leadership and expertise of nurses and midwives in SIDS are both recognized and effectively leveraged, a multipronged approach is required (ICN, 2018). This includes sustained investment in disaster and climate health education, support for practice-based research, policy advocacy, and the systematic integration of climate competencies into nursing and midwifery curricula (NAS, 2021). Amplifying the voices of SIDS GCNMOs within international policy forums, particularly at the World Health Assembly, is essential for ensuring their perspectives inform global health governance and disaster risk reduction strategies.

As the global community continues to grapple with the health impacts of climate change and increasingly frequent disasters, the future of resilient healthcare systems in SIDS depends on elevating the leadership of nurses and midwives. Recognizing their contributions, strengthening their capacity, and ensuring their visibility on the world stage are not only matters of equity, they are strategic imperatives for building sustainable, adaptive, and inclusive health systems in the face of an uncertain climate future.

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Declaration of Competing Interest

The authors declare no conflicts of interest.

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