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Enhancing Disaster Management by Integrating Mental Health for Workforce and Community Support

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Abstract

Natural disasters are a major source of property and infrastructure destruction, hindering sustainable development and obstructing social and economic progress. They cause widespread damage, injuries, health issues, and fatalities, particularly in low-income communities that are highly vulnerable due to physical, social, and economic inequities. Furthermore, these traumatic events often exceed individuals' coping abilities, threatening their psychological well-being and leading to adverse mental health (MH) outcomes. Effective disaster management is key to providing timely and adequate responses. As such, it is crucial to develop a skilled disaster management workforce (DMW) that is educated and trained to understand and respond to the devastating impacts of natural disasters. This education should be holistic and include MH and well-being components to support both victims and the workforce itself, as exposure to extensive destruction and human suffering can have a profound impact on their well-being. However, despite the importance of such education, there is minimal research that addresses the MH impact of disasters on the DMW and how to better prepare them to support victims while protecting their own MH. To address this gap, this study surveyed architecture, engineering, and construction (AEC) professionals as well as civil engineering (CE) and construction management (CM) students with the goals of (1) understanding the impact of natural disasters on MH; (2) investigating the importance of integrating MH knowledge and skills into disaster management practices to promote a holistic, effective, and well-being-focused approach, including equipping the DMW with these skills; (3) identifying the MH resources that are most beneficial for supporting communities and prioritizing their MH and well-being during disaster management; and (4) exploring the importance of incorporating disaster management education, including MH components, into civil engineering and construction (CEC) curricula. The results of this study highlight the critical importance of equipping the DMW with MH knowledge and skills to ensure a more holistic and effective approach that prioritizes sustainable recovery efforts. This includes not only relief, recovery, and reconstruction but also the well-being of affected individuals and the workforce itself. The findings of this study benefit both the DMW and affected communities by providing a framework for integrating MH knowledge and skills into holistic, resilient, and sustainable disaster management practices.

Keywords: Disaster Management Workforce, Disaster Response Management, Education, Mental Health, Natural Disasters, Resilience, Sustainability, Well-Being, Workforce Development

Background and Motivation

Natural disasters are a major cause of infrastructure damage, loss of life, and social and economic disruption, creating substantial barriers to sustainable development [1], [2], [3], [4], [5], [6]. These destructive events result in widespread damage, injuries, health crises, homelessness and fatalities [7], [8], [9], [10], [11]. Low-income communities are disproportionately affected due to physical, social, and economic inequities, leading to extensive

destruction and disaster-related death rates four times higher than those in high-income areas [1], [3], [4], [12], [13]. These communities often face delayed disaster response and recovery as well as limited access to resources, further intensifying the impacts of disasters [14], [15], [16]. The increasing frequency and intensity of disasters further exacerbate these challenges [5], [17], [18].

Beyond physical destruction and income loss, disasters often exceed individuals' coping abilities, threatening their psychological well-being and leading to adverse mental health (MH) outcomes. Key MH challenges post-disaster include trauma, anxiety, depression, post-traumatic stress disorder (PTSD), and grief [7], [11], [19], [20], [21], [22], [23]. In addition to affected individuals and communities, the disaster management workforce (DMW) experience high levels of stress, trauma, and psychological tolls as they respond to the devastation [24].

Despite the significant MH impacts of disasters, this aspect if often overlooked in disaster response management (DRM). Effective disaster management is key for providing timely and adequate responses, safeguarding vulnerable populations and critical infrastructure while reducing the overall negative effects of disasters [18], [25]. An effective response requires a holistic approach that prioritizes MH and well-being to foster resilience, support recovery, and protect vulnerable populations, as well as the DMW themselves. Proactive and preventive MH strategies are essential to mitigate long-term psychological effects and improve disaster management outcomes [11], [26]. As such, it is crucial to develop a skilled DMW that is educated and trained to understand and respond to the devastating impacts of natural disasters. This education should be holistic and include MH and well-being components to support both victims and the DMW.

This study addresses a critical gap in research regarding the MH impacts of disasters on both victims and the DMW, while exploring the importance of equipping the DMW with MH knowledge and skills to support victims and protect their own well-being. To bridge this gap, the research surveyed 83 architecture, engineering, and construction (AEC) professionals from Peru as well as 102 civil engineering (CE) and construction management (CM) students from Florida International University (FIU), one of the largest minority-serving institutions (MSIs) in the United States (U.S.). The study aimed to: (1) understand the MH impacts of disasters on both victims and the DMW; (2) examine the importance of integrating MH knowledge and skills into disaster management practices to promote a holistic, effective, and well-being-focused approach, including equipping the DMW with these skills; (3) identify the MH resources that are most beneficial for supporting communities and prioritizing their MH and well-being during disaster management efforts; and (4) explore the significance of incorporating disaster management education, including MH components, into civil engineering and construction (CEC) curricula.

Surveying experts from Peru provides critical insights into DRM within a developing country context that faces frequent exposure and high vulnerability to natural disasters due to socioeconomic challenges such as widespread poverty and limited resources [27], [28]. Surveying at an MSI in the U.S. allows for the exploration of cross-cultural and transferable strategies for disaster management, given its diverse student population, including individuals from developing countries, minority populations, and underrepresented communities who may share socioeconomic similarities with low-income communities globally. Furthermore, surveying CE and CM students provides valuable insights into the preparedness of the future DMW.

Combining insights from Peru and an MSI in the U.S. captures the shared and differing challenges faced by vulnerable communities and the DMW across both developing and developed countries.

Methodology

The goals of this study are to: (1) investigate the MH effects of disasters on victims and the DMW; (2) evaluate the importance of integrating MH knowledge and skills into disaster management practices to foster a holistic, effective, and well-being-centered approach, including training the DMW in these competencies; (3) determine the most beneficial MH resources for supporting communities and enhancing their MH and well-being during disaster management efforts; and (4) examine the importance of incorporating disaster management education, including MH components, into civil engineering and construction (CEC) curricula. To achieve these goals, this study surveyed 83 AEC professionals from Peru as well as 102 CE and CM students from one of the largest MSIs in the U.S.

A purposive sampling approach, also referred to as judgmental sampling, was employed to collect data, enabling the authors to select participants based on their perceived relevance or representativeness within the population. The study utilized an online survey developed on the Qualtrics platform, comprising a demographic section and seven questions.

The first question, a Likert scale question (1=not at all important to 5=very important), assessed the level of knowledge students and experts had about MH in the context of disaster management. The second question, a yes/no format, evaluated perceptions and awareness of MH issues and strategies in DRM. The third question, a multiple-choice question with an option for open-ended responses, aimed to understand the impact of disasters on MH. The following two questions were Likert scale questions (1=not at all important to 5=very important) that investigated perceptions regarding the importance of MH in DRM practices and the significance of the DMW having knowledge and skills in MH. The sixth question, also a Likert scale (1=not at all beneficial to 5=very beneficial), evaluated the perceived benefits of integrating disaster management education, including MH components, into CEC curricula. Finally, the last question, a Likert scale question (1=not at all important to 5=very important), sought to identify the MH resources deemed most beneficial for supporting communities and prioritizing well-being during disaster management.

Results and Discussion

This section presents the results associated from the responses of 102 CE and CM students and 83 AEC experts. The recorded sociodemographic data represent a diverse group of participants, including (a) 57 females, 105 males, 2 non-binary/gender fluid individuals, and 21 individuals who preferred not to disclose their gender; (b) participants with varying educational levels, including Bachelor's, Master's, Doctoral, and professional degrees; and (c) individuals representing multiple races and ethnicities.
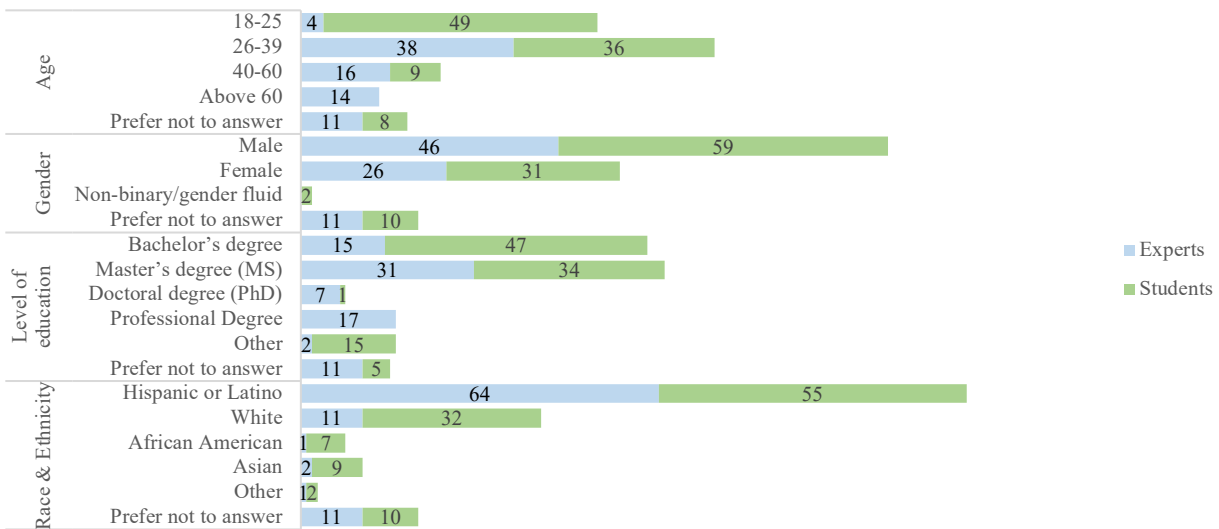
Figure 1. Sociodemographic background (n=185)

The first question sought to assess the level of knowledge students and experts had about MH in the context of disaster management. The results indicate that (a) 17 students and 19 experts had no knowledge; (b) 31 students and 29 experts had basic knowledge; (c) 36 students and 26 experts had moderate knowledge; (d) 12 students and 6 experts had advanced knowledge; and (e) only 5 students and 3 experts had expert knowledge. These findings, shown in Figure 2, highlight overall limited knowledge levels.
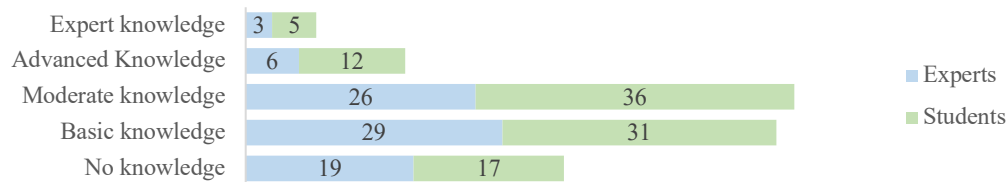

Figure 2. Level of knowledge about MH in the context of disaster management

The second question aimed to evaluate perceptions and awareness of MH issues and strategies in DRM. The results, presented in Figure 3, reveal the following:

1. **Perceptions of MH Issues Post-Disaster**
   - An overwhelming majority of participants (93%, 172 individuals) believe that MH issues increase after disasters. This underscores the critical psychological toll disasters have on individuals and communities, making MH a paramount concern in DRM.
   - Similarly, 84% (155 participants) agree that neglecting MH in DRM leads to negative consequences, highlighting the urgent need to prioritize MH as an integral component of disaster response and recovery efforts.
2. **Awareness of MH strategies and Support Systems**
   - A total of 75% of participants (139 individuals) reported being unaware of MH strategies used in DRM, highlighting a significant knowledge gap in this area.
   - Additionally, 72% of participants (133 individuals) indicated the absence of MH support systems in their communities post-disaster, underscoring a critical deficiency in disaster response.

3. **MH Awareness and Interventions for Enhanced DRM and Improved Well-Being**
   - A significant majority (94%, 173 participants) agree that MH awareness contributes to improved well-being.
   - Furthermore, 90% (167 participants) believe that MH support aids disaster recovery, highlighting the importance of integrating MH resources into recovery efforts to support communities' well-being.
   - A total of 86% of participants (159 individuals) consider MH interventions to be effective in improving DRM outcomes, reinforcing the value of incorporating MH strategies into DRM practices to enhance their overall effectiveness.
4. **MH Education and Knowledge for Preparedness**
   - Most participants (90%, 167 individuals) believe that MH education and training enhance the effectiveness of disaster management practices.
   - Additionally, 94% (174 participants) agree that communities should have basic MH knowledge as part of disaster preparedness, while 95% (176 participants) consider that the DMW should also possess this knowledge. These results highlight the importance of providing affected individuals and the DMW with MH knowledge and skills.
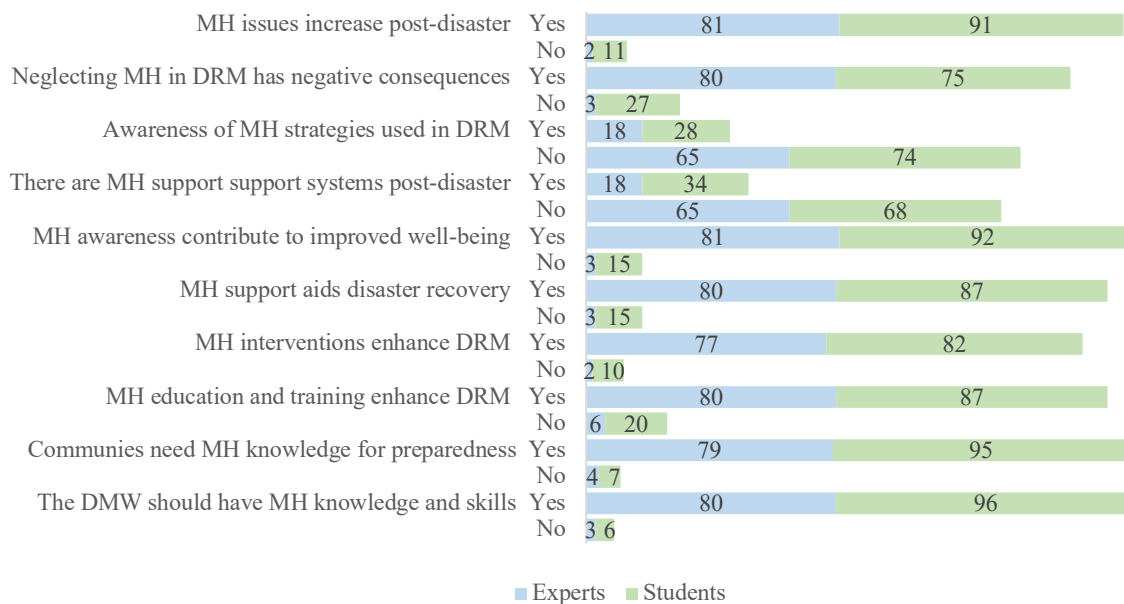

Figure 3. Perceptions and awareness of MH issues, strategies, and education in DRM

The third question aimed to understand the impact of disaster on MH. The results, reflected in Figure 4, highlight the significant psychological toll of disasters, with 86% of participants (159 individuals) reporting increased stress and anxiety, 61% (113 participants) identifying challenges in community recovery, 68% (125 participants) noting high rates of PTSD, and 57% (105 participants) reporting decreased well-being.

In addition to the quantitative data, qualitative responses shed light on further MH concerns, including paranoia, fear, social anxiety, worsening pre-existing MH conditions, coping with loss of home or family, greater social inequality, and a rise in violence, particularly affecting vulnerable populations such as women and children.

These findings underscore the profound impacts of disasters on MH, emphasizing the importance of targeted strategies to address these challenges in DRM.
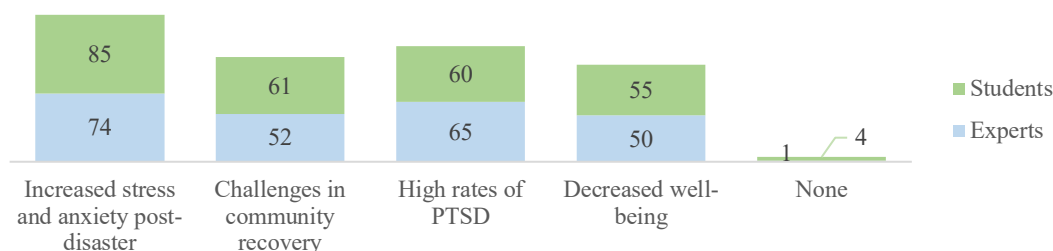

Figure 4. Impact of disasters on MH

The following three questions investigated perceptions of the importance of MH in disaster management practices and the benefits of integrating disaster management education, including MH components, into CEC curricula. The results, presented in Figure 5, show that the majority of participants consider the integration of MH strategies in disaster management practices critical. Specifically, 34 experts and 23 students rated it as "very important", 28 experts and 20 students as "fairly important", and 20 experts and 33 students as "important". Similarly, most participants emphasized the importance of the DMW having knowledge and skills in MH, with 38 experts and 28 students rating it as "very important", 22 experts and 25 students as "fairly important", and 22 experts and 31 students as "important". Furthermore, participants highlighted the benefits of integrating disaster management education with MH considerations into CEC curricula, with 37 experts and 21 students rating it as "very beneficial", 22 experts and 19 students as "fairly beneficial", and 19 experts and 35 students as "beneficial".

These findings underscore the critical need to incorporate MH strategies and education into disaster management practices to strengthen the effectiveness and resilience of response efforts. The significant support for integrating MH considerations into CEC curricula highlights its key role in equipping the future DMW to respond holistically to the devastating impacts of disasters while supporting the well-being of both affected individuals and responders themselves.
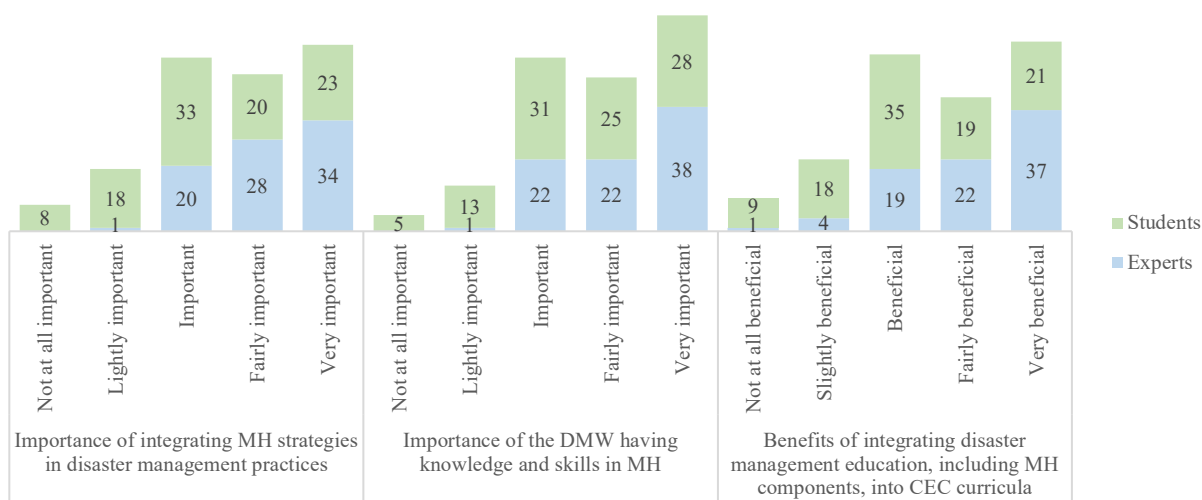
Figure 5. Importance of MH strategies, skills, and education in disaster management practices and curricula

The last question sought to determine the MH resources most beneficial for supporting communities and prioritizing their well-being during disaster management. The results are presented in box plots. The box extends from the first quartile (Q1) to the third quartile (Q3), with the median shown as a horizontal line, the mean marked by an "x," and the whiskers representing the minimum and maximum values.

For students, the main MH resources include: (1) emergency helplines for psychological support, reflecting a mean of 3.75; (2) access to free or low-cost MH services, with a mean of 3.69; (3) MH training for the DMW, yielding a mean of 3.54; (4) community-based support groups, reflecting a mean of 3.48; (5) long-term therapy and rehabilitation programs, with a mean of 3.48; and (6) MH resources for individuals and communities, reflecting a mean of 3.45. These results are presented in Figure 6.

For experts, the main MH resources include: (1) access to free or low-cost MH services, reflecting a mean of 4.30; (2) MH training for the DMW, with a mean of 4.22; (3) long-term therapy and rehabilitation programs, yielding a mean of 4.16; and (4) MH resources for individuals and communities, with a mean of 4.13. These results are shown in Figure 7.
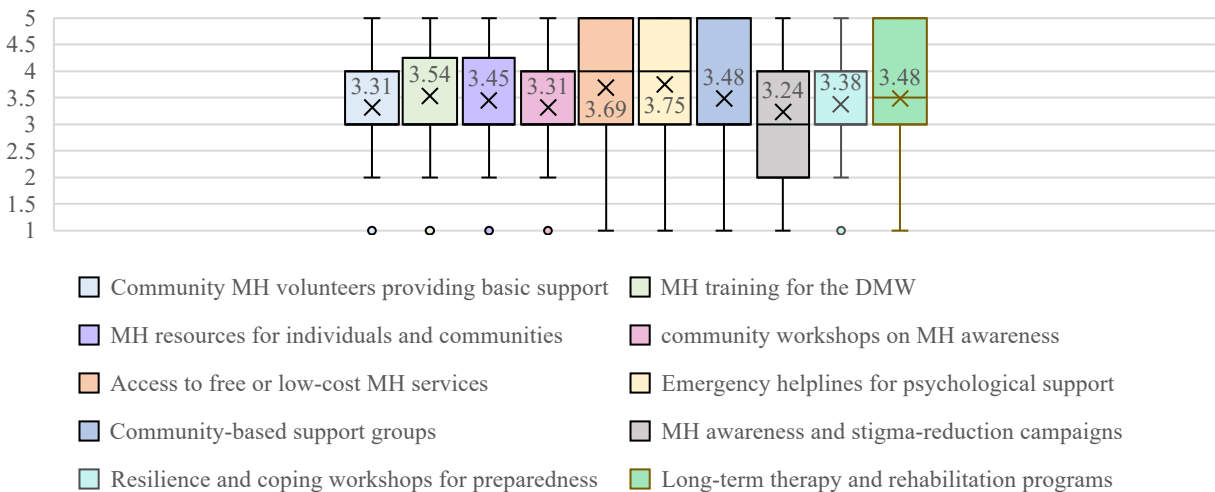

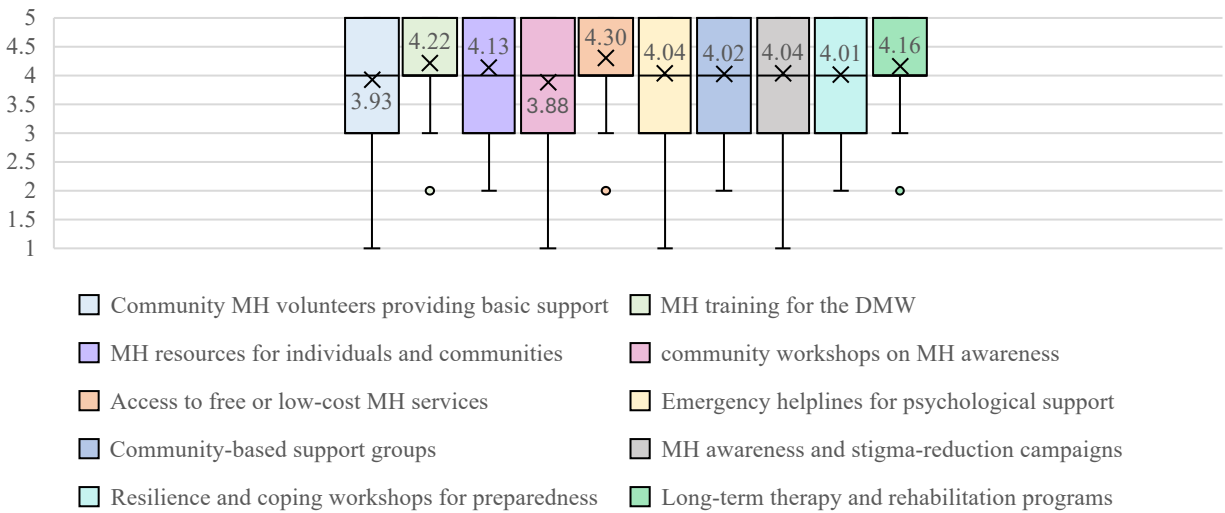**Figure 6.** Main MH resources according to students

Figure 7. Main MH resources according to experts

Limitations and Future Work

This study revealed the importance of MH in DRM for a holistic, resilient, sustainable, and effective approach that prioritizes well-being. One of the study's limitations is that the survey responses may be subjected to self-assessment and biases. Additionally, the study was conducted at an MSI in the U.S. and in Peru, impacting its generalizability. However, this dual focus provided valuable insights into the shared and unique challenges of vulnerable communities and the DMW in both developed and developing contexts, enhancing the study's relevance across diverse settings. Future research should broaden the scope of this study by including additional developing regions and academic institutions worldwide, enabling the exploration of diverse demographics and larger populations. This expansion would deepen the understanding of MH's role in DRM, highlight the importance of equipping the DMW with essential knowledge and skills, and emphasize the integration of disaster management education with MH components in CEC curricula. Additionally, future investigations could focus on identifying effective pedagogical approaches and instructional methods for incorporating this critical education into academic and professional training programs.

Conclusions and Recommendations

This study underscores the urgent need for incorporating MH strategies and resources in disaster management practices to enhance the resilience and effectiveness of response efforts. The findings reveal significant gaps in MH knowledge and highlight the profound MH toll of disasters. As such, there is a pressing need for MH knowledge and skills, as well as targeted interventions and strategies. This integration is paramount for fostering holistic, resilient, effective, and well-being-centered approaches that not only address immediate needs but also prioritize sustainable recovery. This approach encompasses relief, recovery, and reconstruction efforts while also addressing the well-being of both affected individuals and the workforce.

Furthermore, the study emphasized the importance of equipping communities and the DMW with MH knowledge, alongside providing access to critical MH resources such as free or low-

cost services, emergency helplines for psychological support, community-based support groups, long-term therapy and rehabilitation programs, and MH resources for individuals and communities. The strong support for integrating MH considerations into CEC curricula further demonstrates the growing recognition of MH's role in preparing future professionals to respond effectively to disasters.

The findings of this study reflect a shift towards a more holistic approach to disaster management that prioritizes not only physical recovery but also the well-being of affected populations and responders. These results provide valuable insights for integrating MH considerations into disaster management practices, fostering resilience, sustainability, and holistic support for both the workforce and impacted communities. This study benefits communities, disaster managers, and stakeholders by advocating for the integration of MH components into DRM, enabling a more effective approach to strengthen resilience and enhance overall well-being.

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