

# **Integrated Disaster Nursing Response for Public Healthcare Settings in Pakistan: A Sequential Mixed Method Approach Study Protocol**

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Centre of Excellence and Trauma Emergencies, Aga Khan University, Pakistan, has been  
acknowledged in this study for its significant contribution.

## 23 **Abstract**

## 24 **Background**

25       Natural disasters such as floods, earthquakes, and hurricanes pose significant threats to  
26 human lives and infrastructure, particularly in low-lying regions of Pakistan. Among the most  
27 vulnerable areas are Sanghar and Dadu in the Sindh province, which experience recurrent flooding.  
28 These disasters often overwhelm healthcare systems and underscore the urgent need for adequately  
29 trained healthcare professionals capable of providing timely and effective disaster response.  
30 Nurses play a pivotal role in emergency care, yet there remains a gap in their formal preparedness  
31 for disaster situations.

## 32 **Aim**

33       The purpose of this study would be to bridge the identified gap by developing and  
34 implementing a context-specific integrated disaster nursing response curriculum for healthcare  
35 providers in Sanghar and Dadu, Pakistan.

## 36 **Materials and Methods**

37       A sequential explanatory mixed-methods design will be employed. In Phase 1, a quasi-  
38 experimental pre-post intervention will be conducted with 310 healthcare providers (155 per  
39 district). Participants will undergo a disaster response training program, with effectiveness  
40 assessed using a self-developed tool. Quantitative data will be analyzed using SPSS 27 through  
41 paired t-tests or ANOVA after normality testing. Phase 2 will involve qualitative focus group  
42 interviews in both districts, analyzed using inductive thematic analysis to explore participant  
43 experiences and perceptions.

## 44 **Discussion**

The intervention is expected to improve healthcare providers' competencies in disaster response and management. By incorporating co-teaching and fostering self-efficacy among participants, the program also promotes knowledge dissemination and peer training within local healthcare systems.

## **Conclusion**

This study is poised to significantly enhance the preparedness of healthcare professionals in responding to disaster emergencies. Beyond building essential capacity, a key highlight of this project is its emphasis on co-teaching and fostering individual confidence, empowering participants to train others effectively. This ripple effect of knowledge transfer will ultimately strengthen the overall resilience of our healthcare system in the face of future crises.

## Introduction

A "disaster" is an unforeseen and frequently sudden event that causes catastrophic damage, devastation, and human suffering, overwhelming local capacity, and necessitates a call for national or global support(1). Over the past decade, natural disasters such as earthquakes, floods, hurricanes, and other natural calamities, have affected over 2.6 million people around the world (2). According to the 2020 Inform Risk Index, among the countries facing elevated disaster risk levels, Pakistan ranks 18th out of 191 countries. Pakistan is particularly susceptible to various types of flooding, including riverine, flash, and coastal, and it also faces some exposure to tropical cyclones and drought, as well as conflict-related emergencies(3). Amongst many of Pakistan's cities, extreme flood-affected areas are Sanghar and Dadu (4). These disasters can result in significant human and infrastructural losses, severely impacting the healthcare system's capacity to respond effectively. The ability of healthcare providers to manage disaster situations and provide critical medical assistance is important in saving lives and reducing the long-term consequences of these emergencies on human life.

Natural disasters threaten lives hence causing a lot of fear and psychological distress. Physical effects such as the loss and destruction of properties, life, and social infrastructure, including schools, hospitals, and community centers, are among the many consequences of natural disasters. Health workers in such circumstances are encountered with many issues which include psychological and physiological problems of survivors. Moreover, various populations that healthcare workers deal with adolescents and elderly people, and sensitive populations who are already undergoing many psychological and physiological changes and disasters may exacerbate their problems, making the situation challenging to be catered by healthcare workers (5). The impact of these natural disasters is homogeneous. Factors like age and gender also

determine the impact of the disaster on victims. Studies have shown that women as compared to men are more likely to develop Post-Traumatic Stress Disorder (PTSD) in response to natural disasters and calamities (10-14%) On the contrary the chances of men developing PTSD are 5-6% (5) these people confront include sadness, helplessness, and hopelessness. According to literature (6, 7) this can leave victims in a state of profound despair and shock. In the aftermath of the disaster, individuals also face a lack of optimism and disruption in their roles within the community. The loss of resources, disruption to one's daily routine, loss of control over one's property, and loss of social support were all linked to heightened levels of acute psychological distress in the after-effects of a disaster. These mental health outcomes resulted in a variety of psychological symptoms, including severe stress following the traumatic experience, uncontrollable stress, feelings of grief and sadness for an extended period of time, substance abuse, and adjustment issues, all of which affect the proper functioning of the individual as well as the community, resulting in family conflicts (8). The risk of conflict and violence following a natural disaster frequently increases as populations struggle to meet basic needs. If a person is struggling to fulfill their basic physiological needs such as the need for food and shelter, the focus on psychological needs such as the need for belonging, love, esteem, and self-actualization will be naturally quite less or nonexistent. Such is the case for victims of natural disasters. Their key focus is not on how to reduce fear, anxiety, and depression that come along with these calamities but rather on how to provide safety and security for themselves and their loved ones (5). The frustration caused by the not having needs met, and loss of identity and power may emerge with another notable challenge faced by community health care providers and workers is the significant increase in gender-based violence in households as a result of natural and manmade disasters.

## **Gender-Based Violence**

Data regarding the prevalence of Gender-based violence (GBV) is alarmingly high among families that go through disasters and displacements (9). The literature on gender and disasters appears to indicate an increase in GBV in the aftermath of sudden-onset disasters. Typically, displacement situations, family member separation, and frustration resulting from the loss of family assets and income have been highlighted as the most prominent reasons for the increase in violence. Chaotic events and a lack of public safety, which frequently characterize the early stages of a disaster, can also contribute to increasing lawlessness and impunity, as well as feelings of fear and insecurity, creating the circumstances for GBV to emerge. Researchers from Aga Khan University have conducted interviews with frontline health workers from districts of Pakistan that were previously impacted by floods. These interviews have revealed a notable rise in GBV in those areas (10). GBV in disaster-affected areas, notably domestic and sexual violence. When a household is struggling with lost assets, housing, jobs, and so on, there is a likely increase in relationship stress. Men may be frustrated by their inability to care for and protect their families and may resort to negative coping techniques such as drinking and substance abuse, while masculinity standards may limit their ability to seek assistance (11). In a separate study published in 2020, the results of interviews conducted with 20 women residing in flood-prone regions of Sindh, Pakistan, indicated that the majority of these women encountered multiple forms of violence. These acts of violence included both physical and emotional abuse, carried out by partners as well as strangers. It was observed that the frequency of such violence increased notably when women were displaced from their homes and were living in temporary shelter facilities during the aftermath of a disaster (12).

## **Resilience**

Studies have looked at emotional aspects as an individual protective factor. Internal control may be strengthened by a person's willingness to control their emotional extremes, self-regulation of their emotions, instilling hope and courage, having a positive outlook and acceptance of the situation, caring about themselves and their family members, and having the capacity to mentally prepare for effects. They investigated the cognitive realm and focused on cognitions and their relatability to post-disaster intervention. The cognitive aspect assisted an individual in becoming more aware of and recollecting potential risks associated with previous disaster experiences (13). Coping with post-disaster experiences requires the use of supportive techniques, which include both material and emotional ones. Emotional supportive strategies include stress-reduction programs, transforming and modifying maladaptive behavior to socially acceptable behaviors, and educating people on how to react to emotionally stressful situations (13). Resilience is a key protective factor that fosters physical, social, and emotional well-being (14). Resilience is regarded as a critical component of positive psychology that significantly raises one's self-esteem and improves one's quality of life. Therefore, studying resilience, which is a dynamic process of sustaining and recovering psychological well-being after adversity, is one of the fundamental strategies for preparing for future calamities.

## **Adolescents Health**

In addition, during disasters and floods, the most vulnerable yet ignored population is adolescents. Adolescents are at a critical point in their biological, emotional, and social development, with various factors determining their well-being. Ross and colleagues (15) propose five domains for adolescents' well-being: good health and optimal nutrition; connectedness, positive values, and contribution to society; safety and a positive environment; learning, competence, education, skills, and employability; and agency and resilience. The

climate crisis poses risks to all five domains and indeed threatens the fundamental rights of adolescents. A study conducted in Pakistan explored the effects of a flood on adolescents' mental health and found that girls experienced higher levels of depression and anxiety than boys. The study also highlighted the need for psychosocial interventions to support adolescents in coping with the aftermath of a flood(16). Similarly, a study (17) in Bangladesh showed that adolescent girls affected by floods had poor knowledge about pubertal changes. The study suggested that interventions should focus on educating adolescents on the importance of seeking appropriate healthcare services. Another study (18) in Kerala, India, found that adolescent girls affected by floods had limited knowledge about menstruation, which resulted in poor menstrual hygiene practices, health issues, and stress related to developmental changes in humanitarian settings. Another study from India showed that adolescents affected by floods had poor knowledge about sexual and reproductive health, which resulted in high rates of issues such as infections, stress, post-traumatic stress, lack of communication, and poor health-seeking behaviors. The study recommended that interventions should focus on educating adolescents about sexual and reproductive health and strengthening the quality of healthcare services for adolescents in humanitarian settings (19). Adolescents experience significant increases in rates of PTSD, anxiety, and depression following a climate-related disaster (20). These outcomes are major risk factors for suicide, the third leading cause of death in older adolescents aged 15-19 (21, 22). Extreme weather events can also evoke negative feelings of distress, helplessness, and increased aggression and violence, as well as exacerbate psychotic illnesses, such as bipolar disorder and schizophrenia, illnesses which most commonly emerge in late adolescence. Furthermore, climate-induced forced migration can further amplify negative psychological impacts due to trauma and difficulties in adjustment (23).

## **Nursing Skills**



Nursing is the most prominent healthcare profession. In the event of disasters and catastrophic conditions, emergency nurses are the first line of care, and these healthcare professionals are critical in limiting the aggravation of such conditions. Disaster nursing is a crucial specialty that nursing schools must consider training nurses with adequate knowledge and abilities to cope with disasters as well as effectively manage injuries. Nurses with the proper knowledge and skills in counselling, wound care, administering medication, and emergency management can help to reduce the negative consequences of catastrophes and provide protection for their communities.

As a result, there is a need for a curriculum integrated with nursing skills, resilience, and gender-based violence response, as well as catering for adolescent and pubertal health issues through participation in practical exercises to control unforeseen catastrophic circumstances. The current literature suggests that integrated post-disaster nursing capacity-building interventions can significantly improve the preparedness and response of healthcare providers during disasters (24). However, most of these studies have been conducted in different settings (25, 26), and little attention has been given to the specific needs and challenges faced by healthcare providers in regions like Sanghar and Dadu. The increasing frequency of natural and environmental disasters, along with public health emergencies, highlights the critical importance of having a nursing workforce prepared with the knowledge, skills, and abilities to respond in emergencies. In Pakistan, where disaster-prone regions like Sanghar and Dadu face such challenges, an integrated post-disaster nursing response is crucial to strengthen healthcare providers' preparedness and response capabilities. The purpose is not only to educate the population in affected areas about the impact of disaster but also to provide them with the required skillset in order to combat the situation.

Our research will focus on the proposed integrated post-disaster nursing response curriculum and its implementation in the regions of Sanghar and Dadu in Sindh, Pakistan. This project is part of a larger project in collaboration with the government of Sindh. This proposal outlines the methodology and objectives of the research, with a particular emphasis on enhancing the capabilities of healthcare providers in these areas through a comprehensive intervention that includes nursing skills (wound care, administering medication, and management of fractures), pubertal health for adolescents, gender-based violence, and resilience. Considering the past occurrences of disasters in these regions, which have undergone the strain of numerous calamities, it is crucial to establish a strong disaster preparedness and response strategy in the public healthcare facilities within these areas.

## **Significance**

Pakistan is vulnerable to a wide range of natural disasters, including earthquakes, floods, and droughts. Strengthening the capacity of the health system, especially the nursing workforce, in disaster preparedness and response can save lives and reduce the impact of disasters on public health. By focusing on integrated nursing disaster response, the health system can enhance its ability to deploy nurses rapidly to affected areas, thereby saving lives and reducing suffering.

Disasters can overwhelm healthcare facilities and disrupt regular health services. By investing in capacity building and integrating disaster response training into nursing education, the health system can become more resilient, maintaining essential health services even during challenging times. Disaster response requires seamless coordination between various healthcare professionals. Integrated nursing disaster response training fosters better collaboration between nurses, doctors, paramedics, and other healthcare workers, leading to more effective and efficient disaster response. Nurses play a critical role in disaster response, as they are often the first point

of contact for patients. Strengthening their capacity through training and education empowers them to handle emergencies confidently, which can positively impact their job satisfaction and performance. Integrated nursing disaster response training can extend beyond hospital settings to community outreach programs.

Trained nurses can educate communities on disaster preparedness, basic first aid, and infection control, creating a more informed and resilient population. Initiatives focusing on strengthening health system capacity in disaster response demonstrate the government's commitment to public health and its responsiveness to the needs of its citizens, particularly during times of crisis. By investing in an integrated disaster nursing response, Pakistan can align its healthcare system with international standards, making collaboration-with other countries and organizations easier\_during cross-border emergencies. Capacity-building initiatives have a long-term impact on the healthcare system. As nurses acquire new skills and knowledge, this knowledge dissemination can lead to a more competent nursing workforce, benefiting the healthcare system beyond disaster response scenarios. Strengthening health system capacity building on integrated nursing disaster response in government health settings in Pakistan is crucial for saving lives, reducing suffering, and enhancing the overall resilience of the healthcare system in the face of disasters. It represents a proactive approach toward safeguarding public health and demonstrates the government's commitment to the well-being of its citizens.

Considering the above-mentioned problem statement, the identified research gap and the significance of the study aims, research questions, and objectives have been developed.

## **Study Aim**

The proposed research aims to bridge the identified gap by developing and implementing a context-specific integrated disaster nursing response curriculum for healthcare providers in Sanghar and Dadu.

## Research Questions

Based on the gap identified, the following research questions will be addressed through the study:

1. What is the difference in knowledge regarding integrated disaster nursing response among healthcare providers before and after the implementation of the Integrated Disaster Nursing Response curriculum?
2. What is the difference in the perceived knowledge, attitude and practice changes among healthcare providers who attended disaster nursing response capacity-building intervention?
3. How do master trainers perceive the effectiveness and relevance of the curriculum in preparing healthcare providers for disaster response?
4. How does the supervision and support provided by the research team influence the delivery of training sessions by trained healthcare providers to their peers?

## Research Objectives

1. To estimate the mean difference in knowledge regarding integrated disaster nursing response among healthcare providers before and after the implementation of the Integrated Disaster Nursing Response curriculum.
2. To explore the difference in the perceived knowledge, attitude, and practice changes among healthcare providers who attended a disaster nursing response capacity-building intervention.

- 261 3. To discover master trainers' perceptions related to the effectiveness and relevance  
262 of the curriculum in preparing healthcare providers for disaster response.
- 263 4. To evaluate how supervision and support provided by the research team influence  
264 the delivery of training sessions by trained healthcare providers to their peers.

## 265 **Methodology**

### 266 **Study Design**

267 The research will employ a sequential explanatory mixed methods approach with an  
268 embedded experimental component where quantitative and qualitative data are collected and  
269 analyzed in two distinct phases, respectively. The study would employ a quantitative quasi-  
270 experimental, pre- and post-study design, followed by a qualitative exploratory study design. The  
271 sequential mixed-method design allows for a deeper exploration of the research questions,  
272 combining objective quantitative measurements with subjective qualitative insights to provide a  
273 holistic understanding of the integrated disaster nursing response in the public healthcare settings  
274 in Pakistan.

275 Combining both quantitative and qualitative data, the research seeks to provide a  
276 comprehensive evaluation of the integrated disaster nursing response curriculum's impact on the  
277 disaster preparedness and response capabilities of healthcare providers in Sanghar and Dadu. The  
278 findings of this study have the potential to inform future disaster preparedness initiatives and  
279 contribute to enhancing the overall disaster response strategies in Pakistan and other similar  
280 contexts.

### 281 **Eligibility Criteria**

### 282 **Inclusion Criteria**

283 All healthcare providers who work in Sanghar and Dadu at primary healthcare centers.

## 284 **Exclusion Criteria**

285 Healthcare providers who have been working for less than a year will not be part of this  
286 study.

## 287 **Sample**

288 Universal sampling will be used to recruit a representative sample of 155 healthcare  
289 providers from both settings, i.e., Sanghar and Dadu, to participate in the study. The healthcare  
290 providers would include lady health visitors, physicians, nurses, midwives and community health  
291 workers. Using the confidence interval of 95% confidence level and hypothesized value for  
292 standard deviation that is 20 (since no previous evidence was available to the best of our search).  
293 We kept the margin of error of  $\pm 5$  units ( $E = 5$ ). The following sample size has been achieved:

$$294 \text{ Sample Size } (n) = (Z^2 * \sigma^2) / (E^2)$$

$$295 \text{ Sample Size } (n) = (1.96^2 * 20^2) / (5^2)$$

$$296 \text{ Sample Size } (n) = \mathbf{310} \text{ (155 from Sanghar and 155 from Dadu)}$$

## 297 **Procedure**

298 The recruitment and data collection will begin from 1<sup>st</sup> September 2025 to 31<sup>st</sup> December  
299 2025. The procedure for data collection is divided into phase I and phase II, such as quantitative  
300 and qualitative phases respectively.

### 301 **Phase I: Quantitative Phase**

302 The quantitative phase will consist of a pre- and post-test. To assess the effectiveness of  
303 the curriculum, pre-and post-tests will be conducted. Pre-tests will be conducted to assess the  
304 preliminary knowledge of the healthcare providers, which will be followed by the post-tests to  
305 assess the effectiveness of the curriculum, the knowledge gained, and the skills developed by

healthcare providers after the training. Posttests will follow the training to evaluate knowledge improvement. This will allow the research team to measure the curriculum's impact on disaster preparedness and response capabilities.

The research will begin by selecting a representative sample of 25 - 30 healthcare providers in one workshop from both the regions, i.e., Sanghar and Dadu, ensuring a diverse representation of the healthcare workforce. Before implementing the training, a pretest will be administered to both groups to assess their baseline knowledge and skills related to disaster nursing response, adolescents' pubertal health, gender-based violence, and resilience. A selected group of 25-30 healthcare providers from Sanghar and Dadu will undergo intensive training as potential master trainers. These individuals will receive specialized instruction on disaster nursing response and effective training techniques. A post-test will be administered to measure the knowledge gained and skills developed following the training.

## **Phase II: Qualitative Phase**

To complement the quantitative findings, qualitative data will be gathered through in-depth interviews with the key stakeholders and focus group discussions with trained master trainers. The focus groups and interview protocol will be grounded in the statistical tests of the quantitative phase. These focus group discussions and in-depth interviews will provide a deeper understanding of the training's effectiveness, its relevance to the local context, and the challenges faced during its implementation, which will help modify the capacity-building curriculum.

A purposive sampling technique will be used to collect data. This technique will aid in the selection of information-rich cases for the most effective use. This will include the trained healthcare providers and key healthcare stakeholders of districts Sanghar and Dadu, as they will have specialized knowledge about the integrated disaster nursing response curriculum.

For conducting the focus group discussions, 15-20 trained master trainers will be recruited. Two focus group discussions will be held in each district. For in-depth interviews, 5 key healthcare stakeholders, including the people from district health officials and healthcare management, will be selected.

## **Data Collection Tool**

The data collection tools used for the quantitative and qualitative study designs were self-developed by the research team. The quantitative tool comprises 10 items, including true and false questions (n=1), select all and apply questions (n=2) and multiple-choice questions (n=7). These items were based on three themes, including (i) gender-based violence and resilience, (ii) pubertal health and (iii) nursing skills. The qualitative interview guide consisted of 4 objectives related to (i) develop an Integrated Disaster Nursing Response Curriculum, (ii) train Healthcare Providers as Master Trainers in Disaster Nursing Response, (iii) assess the Effectiveness of the Curriculum, and (iv) provide Supervision and Support to Healthcare Providers. The study tools will be reviewed by 8-10 content and methodological experts, and the Content Validity Index (CVI) will be calculated. Pilot testing on 10% of the total population would be conducted before the implementation of the study tool. Modification in the tools will be formulated based on the CVI and Cronbach's alpha results.

## **Educational Intervention and Curriculum Development**

The research team will collaborate with subject matter experts and stakeholders to design a comprehensive disaster nursing response curriculum. The curriculum will address three key areas, such as (i) nursing skills, (ii) adolescents' pubertal health, and (iii) gender-based violence, and resilience, which are identified by the research team and experts during initial assessment and visits to the flood affected sites in Sindh and are considered essential for handling disaster



352 situations (refer to table 1).

## 353 **Nursing Skills**

354 Nurses play a vital role in providing first aid, providing lifesaving medications, assessing  
355 and triaging victims, and monitoring ongoing physical and mental health issues.

356 This part of the training will be purely based on demonstrations and hands-on practices.

357 As per identified needs from those areas, nursing skills focused on the following. These nursing  
358 skills included three stations:

- 359 1. Wound Dressing
- 360 2. Medication Station (Intramuscular injections, Intravenous Injections, and oral)
- 361 and
- 362 3. Patient care with Fractures

## 363 **Adolescent and Pubertal Health**

364 Puberty is considered a sensitive developmental phase of an individual's life. When  
365 adolescents are placed into catastrophic scenarios, adolescence, which is recognized as a phase  
366 marked by rapid physical, emotional, and psychological changes, takes on a deeper level of  
367 complexity. Natural or man-made, such disasters not only disturb daily rhythms but also  
368 intensify the sensitive issues of the pubertal stage.

369 Hence, this component will focus on understanding the importance of addressing pubertal  
370 issues among adolescents in flood-affected areas. Identifying common pubertal issues that affect  
371 adolescents in flood-affected areas and developing strategies to address pubertal issues among

adolescents in flood-affected areas. Moreover, it gives insight to healthcare providers about effective communication while dealing with adolescents.

## Gender-Based Violence

Gender-based violence and natural disasters are current worldwide tragedies as well as long-term problems. emphasized how climate change-related catastrophes might exacerbate community stress, leading to conservative patriarchal practices such as son preference, uneven nutrition, child marriage, and intimate partner violence. Gender-based violence has grown dramatically in recent years.

Gender-based violence has significantly increased in recent years, and it can be attributed to various factors such as the personality and behavior of perpetrators and financial, psychological, and mental crises that a couple or family goes through. As a result of these crises, the victim becomes the target of physical, psychological, and emotional abuse and manipulation. Therefore, it is imperative to educate the masses about gender-based violence, what leads to it, and how we can protect ourselves and our loved ones from it. It's important to know that gender-based violence isn't limited to adults, more often than not, children often become victims of it therefore the goal of training is to focus on all age groups.

Hence, building capacity among healthcare providers to deal with such occurrences in disaster-affected areas is crucial, as they can play a role in building resilience in an individual/victim to overcome such adversity.

**Table 1. Overview of the components of the curriculum**

Module Title	Time	Purpose	Learning Objectives	Teaching Learning Strategies
<b>Nursing skills: A Hands-on practice of oral and I/M and I/V medication, wound</b>	02 hours	By the end of this module health care providers will be able to develop	<ul style="list-style-type: none"> <li>Participants will be able to assess the condition of wounds and apply dressing.</li> </ul>	The module is comprised of Pre-quiz, demonstration through equipment

<b>dressing, fracture care, and preparation on ORS</b>		hands-on expertise in wound dressing, providing oral and Intramuscular medication, and preparation of ORS therapy.	<ul style="list-style-type: none"> <li>Participants will be able to demonstrate the safe administration of medication.</li> <li>Participants will be able to identify the signs of dehydration and prepare for ORS.</li> </ul>	ad checklists, videos, group work for redemonstration and hands –on practice of skills
<b>Understanding and building resilience among gender-based violence victims in flood affected areas</b>	02 hours	To build the capacity of healthcare professionals to identify, support, and refer GBV victims, while promoting resilience through different strategies.	<ul style="list-style-type: none"> <li>Understand and recognize the signs, symptoms, and impacts of gender-based violence and trauma.</li> <li>Screen for GBV using validated tools such as HARK, ICAST, and OVAT.</li> <li>Describe referral pathways and support systems for GBV victims.</li> <li>Understand the concept of trauma and how it affects emotions, thoughts, and behavior.</li> <li>Develop skills to use cognitive behavioral therapy strategies to support GBV victims.</li> </ul>	The module uses interactive discussions, video screening, group work, and role plays to explore trauma, resilience, and GBV. Activities like the <i>Wheel of Life</i> and behavioral worksheets build self-awareness, while hands-on training and case-based learning develop practical skills in screening, support, and communication-based interventions.
<b>Understanding Pubertal Issues Among Adolescents in Disaster Situation</b>	02 hours	To equip healthcare workers with the knowledge and skills to address pubertal and menstrual health issues among adolescents in flood-affected areas, focusing on communication, education, and locally appropriate interventions.	<p><b>Pubertal Changes</b></p> <ul style="list-style-type: none"> <li>Recognize the importance of addressing pubertal health in disaster-affected adolescents.</li> <li>Identify common pubertal issues in flood settings (e.g., malnutrition, sexually transmitted infections).</li> <li>Develop appropriate intervention strategies for adolescent pubertal issues.</li> </ul> <p><b>Menstrual Hygiene Management &amp; Urgencies</b></p>	The module uses interactive discussions, demonstrations, case studies, visual aids, group work, hands-on practice, and assessments to enhance learning on adolescent pubertal and menstrual health in disaster settings.

			<ul style="list-style-type: none"> <li>• Understand MHM's importance during emergencies.</li> <li>• Identify commonly used menstrual materials in Pakistan's flood situation.</li> <li>• Learn the benefits of reusable, locally sourced menstrual products.</li> <li>• Promote MHM education and practices in emergencies.</li> </ul>	
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**Abbreviations: Intramuscular (IM), Intravenous (IV), Oral Rehydration Solution (ORS), Gender Based Violence (GBV), Humiliation, Afraid, Rape, Kick (HARK), International Child Abuse Screening Tool (ICAST), Ohio Violence Assessment Tool (OVAT), Menstrual Hygiene Management (MHM)**

**Capacity Building**

The trained potential master trainers, who are healthcare providers, will then be assigned to further conduct capacity-building workshops for 135 healthcare providers in both Sanghar and Dadu settings. The train for the trainer's model will consist of four sessions (refer to figure 1). The first session, Learning, will prepare 20 potential trainers. In the second session, Co-teaching, the potential trainers will teach alongside the master trainer. In the third session, Takeover, the potential trainers will teach under the supervision of the master trainer to the rest of the potential healthcare providers. Finally, in the fourth session, Delivery, the prepared potential trainers will implement the curriculum with other students. The impact of the training will be evaluated through pre- and post-tests to measure the knowledge gained and skills developed.



**Figure 1. Framework for capacity building**

## **Supervision and Support**

The research team will provide ongoing supervision and trained healthcare providers while they deliver training sessions to their peers. This process will ensure the fidelity and quality of the training sessions.

## **Data Analysis**

### **Phase I: Quantitative Data Analysis**

This phase will compare the pretest and posttest scores of both groups using appropriate statistical methods to determine the effectiveness of the training on disaster preparedness and response capabilities. Frequencies and percentages will be reported for categorical variables such as gender, designation, department etc. Mean and standard deviation will be reported for continuous variables such as age in years, and knowledge scores etc. Inferential statistics will be computed e.g., paired t-test, for pre-post mean score comparison of the participants and ANOVA to estimate the mean difference across three modules.

### **Phase II: Qualitative Data Analysis**

This research phase will explore the perceptions, experiences, and challenges related to implementing the integrated disaster nursing response curriculum through transcribing and analyzing interviews and focus group discussions. Inductive Thematic Analysis for qualitative analysis will be used to identify common themes, patterns, and insights related to research questions (27).

### **Phase III: Integration and Interpretation**

This phase of data analysis will integrate the findings from the quantitative and qualitative phases to provide a comprehensive understanding of the effectiveness of the integrated disaster nursing response curriculum and its impact on disaster preparedness and response capabilities in Sanghar and Dadu health care professionals. A conclusion would be drawn based on the results of the findings from both phases of the study.

### **Quality Assurance**

Quality assurance of the study will consist of the steps, including the pre-testing of the study tools and training of data collectors before initiating the data collection to ensure the collection of data in a systematic and scientific approach. Data quality will be obtained by ensuring the implementation of the data collection protocol. Senior team members will be supervising the data collectors and field team on and off during the project.

### **Rigor**

According to Lincoln and Guba, “the most common criteria used to evaluate rigor in qualitative research studies are credibility, dependability, transferability, and confirmability”(28). In our study, we will ensure all four components by using multiple data sources, quality checks, descriptions, consistency, reflexivity, and data saturation will be maintained.

The rigor of the study is assured with the prescribed curriculum developed by the team of experts in the field to ensure recent and best evidence-based content is included.

## **Ethical Considerations**

To overcome ethical issues in the study, permission from the Ethical Review Committee (ERC) has been obtained from the ethical review committee of Aga Khan University 2023-9197-27010. Following ethical principles, potential participants will be provided with comprehensive and understandable information about the research objectives, procedures, potential risks, and benefits before they participate in this study. There will be a clear explanation of their rights and the voluntary nature of their participation. Before any data is collected, each participant's written informed consent will be witnessed and acquired. Their anonymity and confidentiality will be strictly protected during the study, and they will be told that they may withdraw at any time without consequence.

The ethical principle of autonomy will be applied to get voluntary consent from the study participants before data collection. The participants will be assured to withdraw from the study at any point in time. Confidentiality will be maintained by securing all the electronic data with a password, and hard copies of the data will be kept locked. The anonymity of the participants will be assured by giving them numbers or pseudonyms. All the participants will not get any direct benefit from participating in the study; however, they will get the opportunity to gain knowledge and skills from the sessions and hands-on practice to improve their clinical skills. Permissions from the Government Office of the District Health Officer, Sanghar and Dadu regions have been acquired for this study.

## **Implications**

This study aims to enhance disaster nursing response capacities within public healthcare settings in Sanghar and Dadu, Pakistan, through a sequential explanatory mixed-methods design. By addressing a critical gap in localized disaster preparedness, the research will inform the development and implementation of a context-specific, integrated disaster nursing response curriculum tailored to the unique sociocultural and infrastructural challenges of these disaster-prone regions.

From a research perspective, this study will generate empirical evidence on the effectiveness and contextual adaptability of disaster response training, providing a foundation for further scholarly exploration in similar low-resource and high-risk settings. In the educational domain, the curriculum will be piloted with healthcare providers to institutionalize it within pre-service and in-service nursing education programs. The initiative also involves the training of master trainers to ensure long-term capacity-building and sustainability, enabling the replication and scale-up of disaster preparedness efforts within hospitals and community health centres.

From a policy and practice standpoint, the findings are expected to guide evidence-informed decision-making for disaster response frameworks at both provincial and national levels, supporting the integration of disaster nursing protocols into routine healthcare services. The study also holds significant social implications, as it empowers local healthcare professionals to respond more effectively to emergencies, ultimately enhancing community resilience and reducing the health impact of disasters on vulnerable populations.

As a baseline study, the proposed research has strong potential for reproducibility and generalizability in other disaster-vulnerable regions of Pakistan and comparable global contexts, contributing meaningfully to the global discourse on disaster nursing and health systems strengthening.

## Discussion



This study is expected to provide an intervention program to enhance healthcare providers' disaster preparedness and response capabilities and to effectively deal with disaster survivors. This study will help identify the existing level of knowledge among healthcare providers regarding disaster preparedness and response in public healthcare settings. Moreover, this study will be a milestone in preparing and implementing the curriculum based on capacity building for healthcare providers. This will also highlight the role of multidisciplinary teams in responding to disasters, making this study highly significant. This study will adopt an interprofessional approach grounded in contextual relevance, engaging participants, trainers, and curriculum developers from diverse disciplines and areas of subject-matter expertise to ensure a comprehensive and collaborative framework. The results are anticipated to have great value for nursing education and practice, especially regarding incorporating disaster nursing response into the nursing curriculum. Furthermore, the execution of this intervention and the dissemination of the knowledge gained will contribute to the broader knowledge base and the development of evidence-based policy recommendations. Overall, the expected outcome of this intervention will be to strengthen the disaster preparedness and response in public healthcare settings, creating more adaptive and resilient healthcare in Pakistan.

## **Strengths**

Its key strength lies in the robust sequential mixed-method design, which integrates both quantitative and qualitative data. This approach enables a comprehensive understanding of the intervention's impact on healthcare providers' disaster response capacities. Moreover, it targets Sanghar and Dadu districts, which are highly susceptible to floods. This ensures that the findings are relevant and directly applicable to regions most affected by natural

disasters. Lastly, the study focuses on building the capacity of healthcare providers, which is critical for improving the overall disaster response and preparedness in these vulnerable areas.

## Limitations

This study also has some limitations, which include the sample size of 310 healthcare providers from two districts. While this is a substantial number, the findings may not be generalizable to all regions in Pakistan or other countries with different healthcare systems and disaster response challenges. Additionally, the study is being conducted in only two districts, Sanghar and Dadu, which can be scaled up later to other districts as well. Furthermore, acknowledging the fact that the participants from Sanghar and Dadu may not be as trained and skilled as healthcare professionals are in Karachi. Lastly, considering the mixed methods being robust and rigorous, it may be time and resource-consuming.

## Conclusion

This study, utilizing a sequential explanatory mixed-method approach, aims to significantly enhance disaster nursing response within public healthcare settings in Sanghar and Dadu, Pakistan. By implementing an intervention program that focuses on training master trainers and empowering them to conduct further capacity building, the research seeks to improve the overall disaster preparedness and response capabilities of the healthcare system in these vulnerable regions. The findings are expected to have a substantial impact on nursing education and practice, contributing to the development and integration of effective disaster nursing response strategies into the nursing curriculum in Pakistan and similar contexts. While the study's scope is currently limited to two districts and acknowledges potential variations in participant skill levels compared to urban centres, its robust mixed-method design underscores its rigor, despite being time and resource-intensive.

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## 616 **Acknowledgments**

617           We would like to thank the Centre of Excellence in Trauma Emergencies and School of  
618   Nursing and Midwifery, Aga Khan University Pakistan for funding this opportunity of research  
619   and providing the assistance.

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