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Original Article

Community Section

Insights into Disaster Management among Emergency Paramedical Staffs: A Cross-sectional Study at a Tertiary Care Hospital in Tamil Nadu, India

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ABSTRACT

Introduction: Disasters can be natural (e.g., cyclones and earthquakes) or man-made (e.g., chemical spills). Unpredictable disasters and multifaceted damage necessitate that healthcare providers be prepared to manage victims with varying skills and care to mitigate the impact of these disasters.

Aim: To assess various aspects pertaining to disaster preparedness and management among paramedical staff in the emergency department of a tertiary care hospital.

Materials and Methods: A cross-sectional study was conducted in a tertiary care hospital in Chengalpattu, Tamil Nadu, India. Seventy paramedical staff members in the emergency department were included in the study and given a pretested semistructured questionnaire. The collected data was entered into Excel, and the associations between demographic factors and insights were measured using the Chi-square test in Statistical Package for the Social Sciences (SPSS) Version 27.0.

Results: In this study, 44 (62.9%) participants were female. This study showed that 91.4% of the staff had adequate knowledge, while 82.9% demonstrated adequate practice. In the knowledge domain, there were no significant differences across demographic variables. However, in the practice domain, there was a significant difference based on gender (p-value<0.05). A significant association was found between knowledge and practice adequacy (χ^2=26.91, p-value<0.001), indicating that staff members with adequate knowledge are more likely to practice adequately.

Conclusion: This study concluded that the levels of knowledge and practice regarding disaster preparedness are adequate among the majority of staff. Management should organise medical education and training programs frequently to achieve standardised levels of preparedness.

Keywords: Disaster medicine, Disaster response, Emergency preparedness, Health workforce, Triage

INTRODUCTION

"A serious disruption of the functioning of a community or society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts" is the definition of a disaster, as recognised by the United Nations Office for Disaster Risk Reduction [1]. Emergencies can be caused by natural hazards (e.g., earthquakes, hurricanes, floods, landslides, wildfires and droughts), technological hazards (e.g., chemical spills, disruption of infrastructure), complex situations (e.g., conflict), or outbreaks. All of these can result in health-related diseases that affect people in various circumstances. Natural catastrophes such as earthquakes, hurricanes, tsunamis and floods are becoming more frequent and intense due to climate change [2]. Because hospitals provide essential medical care to victims, they are considered the safest places for people to seek assistance during and after natural disasters. To mitigate the effects of unforeseeable disasters, healthcare practitioners must be prepared to handle victims with varying levels of knowledge and compassion. The emergency room is an essential component of hospital wards for crisis response, as it plays a crucial role in providing acute care services to inpatients, outpatients and individuals in immediate need, available around the clock. Staff members in the emergency room are often the hospital's first responders to crises and therefore, they must be adequately prepared [3].

The aim of disaster preparedness is to ensure that suitable mechanisms, protocols and resources are established to provide disaster victims with efficient and timely aid, thereby expediting relief efforts and service restoration. If every member of the healthcare team understands their roles and collaborates under the guidance of an integrated management system, disaster management can be effectively accomplished. Data suggests that nurses are not adequately equipped to handle a crisis, even in light of increased efforts to prepare them for disasters [4]. Research indicates that to enhance nurses' understanding and practice of crisis management, healthcare administrators should implement training programs [5].

Planning in advance and responding effectively to emergencies is essential during disasters. Inadequate planning and response during emergencies can have detrimental, long-term effects on a community and may lead to increased fatalities. Nurses should possess a minimum level of disaster management knowledge and skills to provide support during a crisis. Additionally, they should demonstrate their commitment to their careers by participating in training sessions and disaster preparedness drills, both within and outside the workplace. This will help bolster individual and community readiness [6].

Healthcare workers need to be well-equipped with sufficient knowledge, skills and training to respond effectively in crisis management, as good disaster preparedness reduces susceptibility and threats to individuals' lives and property [7]. Evaluating preparedness knowledge for disasters will enhance the quality of hospital and patient care. There have not been many studies conducted among paramedical workers in a tertiary care hospital in Tamil Nadu to assess their knowledge and practices regarding disaster preparedness and management [8,9]. Thus, the aim of the current study was to assess various aspects pertaining to disaster preparedness and management among paramedical staff in a tertiary care hospital in Tamil Nadu, India.

MATERIALS AND METHODS

A cross-sectional study was conducted at SRM Medical College Hospital and Research Centre in Chengalpattu district of Tamil Nadu, India, during the period from April 2023 to May 2023. Ethical clearance was obtained from the host institution (Ethics clearance number: IECST0323 332).

Inclusion criteria: Paramedical staff members who work in the emergency department and are at least 20-years-old, involved in managing patients during their treatment and have been employed for more than three months. All those who met the above criteria and gave consent to participate in the study were included in the study.

Exclusion criteria: Those who were under 20 years old or who had been employed for less than three months, those who declined to take part in the study were excluded from the study.

Sample size: Using universal sampling method, all 76 paramedical workers in the emergency department were approached to participate in the study. Out of 76 workers, 70 met the inclusion criteria and were included. After being informed about the study, the workers were required to sign a consent form indicating their willingness to participate. Six workers did not satisfy the inclusion criteria and were therefore excluded from the study.

Data collection tool: A semistructured questionnaire comprising 16 questions on knowledge, 18 questions on practicing disaster preparedness and management, and demographic questions was used to interview each participant. The questionnaire was developed based on a comprehensive review of relevant literature and guidelines [10-12] on disaster preparedness and management, specifically focusing on paramedical staff in emergency departments.

A pilot study conducted among 30 paramedical staff members in the emergency department demonstrated that the questionnaire is a valid and reliable tool (Cronbach's alpha > 0.7) for assessing disaster preparedness among paramedical staff in the emergency department. In-person interviews were performed to gather data. To maintain confidentiality, each interview was held in a private environment and lasted approximately 10 minutes.

In the knowledge domain questions, each correct answer was assigned a score of 1 mark. Out of a total of 16 marks, participants with scores of 8 or higher were deemed to have adequate knowledge, while those with scores below 8 were considered to have inadequate knowledge.

In the practice domain questions, each correct answer was also assigned a score of 1 mark. Participants who answered all 18 questions correctly, thereby scoring 18, were deemed to have practiced disaster preparedness adequately, while those with a score less than 18 were regarded as having practiced it inadequately.

STATISTICAL ANALYSIS

The data collected was entered into Microsoft Excel (Microsoft Corporation, Redmond, Washington, USA) and analysed using IBM SPSS Statistics for Windows, Version 27.0 (Released 2019; IBM Corp., Armonk, New York, USA), with variables measured as frequency and percentage. Associated factors were measured using the Chi-square test, and a p-value of <0.05 was considered significant.

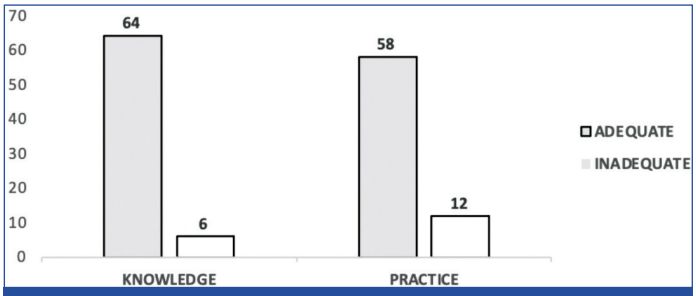
RESULTS

[Table/Fig-1] displays the demographic information for the study participants. Approximately 50 (71.4%) of paramedics were between the ages of 20 and 25, with females accounting for 44 (62.9%). Qualified BSc nurses make up approximately 48 (68.6%) of the paramedical personnel, with trauma care personnel accounting for 22 (31.4%). The majority, 48 (68.6%), work as nurses, while 22 (31.4%) work as emergency care technicians.

[Table/Fig-2] demonstrates that 64 (91.4%) of the staff have adequate knowledge, while 6 (8.6%) have inadequate knowledge. Additionally,

Variables	Categories	N (%)
Age (years)	20-25	50 (71.4)
	26 and above	20 (28.6)
Gender	Male	26 (37.1)
	Female	44 (62.9)
Educational qualification	B.SC nursing	48 (68.6)
	Trauma care	22 (31.4)
Position in organisation	Nurse	48 (68.6)
	Emergency technician	22 (31.4)

[Table/Fig-1]: Demographic distribution of study participants (N=70).



[Table/Fig-2]: Knowledge and practice assessment among participants.

this study found that 58 (82.9%) of paramedical staff showed good practice, while 12 (17.1%) demonstrated poor practice.

[Table/Fig-3] indicates that in the knowledge domain, there were no significant differences across age, gender, qualification, or position in the organisation. In contrast, in the practice domain, there was a significant difference based on gender (p-value<0.05). [Table/Fig-4] shows a significant association (χ^2=26.91, p-value<0.001) between knowledge and practice adequacy, suggesting that staff members who possess adequate knowledge are more likely to exhibit adequate practice.

Domains	Variables	Adequate (N)	Inadequate (N)	χ^2, p-value
Knowledge	**Age (years)**			
	20-25	27	23	0.006, 0.939
	26 and above	11	9	
	Gender			
	Male	11	15	2.391,0.122
	Female	27	17	
	Qualification			
	B.Sc nursing	29	19	2.313, 0.128
	Trauma care	9	13	
	Position in organisation			
	Nurse	29	19	2.313, 0.128
	Emergency technician	9	13	
Practice	**Age (years)**			
	20-25	42	8	0.161, 0.688
	26 and above	16	4	
	Gender			
	Male	25	1	5.149, 0.021
	Female	33	11	
	Position in organisation			
	Nurse	39	9	0.278, 0.598
	Emergency technician	19	3	

[Table/Fig-3]: Association between various domains and demographic variables.

DISCUSSION

The present study assessed the knowledge and practice of paramedical staff in the emergency department. This study concluded

Knowledge	Practice		χ^2, p-value
	Adequate (N)	Inadequate (N)	
Adequate (N)	58	6	26.91, <0.001
Inadequate (N)	6	12	

[Table/Fig-4]: Association between knowledge and practice among study particpants.

that the 58 staff members who had adequate knowledge were more likely to exhibit adequate practice in disaster preparedness and management. About two-thirds of the emergency paramedical staff were female; this finding was consistent with previous studies [13-15], which revealed that more than two-thirds of the participants were female. Healthcare professionals with a neutral attitude, practice, and familiarity with disaster preparedness demonstrated a sufficient level of knowledge, according to a study by Nofal A et al., on emergency department healthcare practitioners [16].

The findings of the current study showed that there was a lesser association between qualification and knowledge of disaster preparedness among paramedical staff. Specifically, staff members with a BSc in Nursing and trauma care management as their educational qualifications scored without significant difference, which contrasts with a previous study by Khan S et al., that compared the mean knowledge scores with qualification and showed that four-year BSc Nursing graduates scored significantly better than diploma (RN) and post-RN BSc Nursing graduates [17]. Therefore, training programs for emergency department personnel should include courses on disaster and emergency preparedness, encompassing both theories and practices.

Present study observed adequate knowledge among study participants, which was in contrast to another study [18] that showed the knowledge of non physician medical staff was insufficient. Most emergency healthcare workers were not adequately prepared for disasters [19]. According to another study, the hospital's healthcare workers had low practice levels, a largely positive attitude, and only fair awareness of disaster readiness. Furthermore, according to Habte A, the hospital lacked any kind of disaster preparedness strategy or any procedures for the possibility of calamities [20]. Although hospital staff members had a low level of awareness, they were responsive to crisis management. Insufficient knowledge of disaster management by hospital personnel might lead to disastrous consequences [21]. Another study revealed that participants had inadequate behaviour and knowledge scores but sufficient attitude scores [22]. The study also emphasised the need for curriculum reforms and policy implications for the successful integration of different sectors for disaster management. Present study, showed satisfactory knowledge and practice levels, which may be due to healthcare workers attending training programs conducted annually.

According to a study by Ahayalimudin N and Osman NNS, most staff members demonstrated a favourable attitude toward disaster management and had sufficient knowledge and practices [23]. Gender and educational attainment were the socio-demographic variables most strongly associated with higher knowledge and practice scores. This study was similar to the present study's findings, which showed a significant association between gender and practice.

Yadav N et al., and Patel KK et al., argued that factors including age, gender, department and educational qualification are associated with performance and impact behaviour and attitude during a disaster [24,25]. About half of the participants reported that they practiced disaster management adequately. These findings align with other research conducted in Australia by Duong K and in Hawaii by Katz AR et al., which found that healthcare personnel lacked the necessary crisis management abilities [26,27]. This study showed no significant differences in age, gender, qualification, or organisational position; however, a significant difference in gender and practice was observed, indicating that gender might be a factor in determining the adequacy of practice. These findings are inconsistent with another study [28], which found a significant relationship between profession and knowledge perception of disaster management, but no significant relationship between the participants' gender and knowledge perception of disaster preparedness. Another study [29] also demonstrated that respondents with good knowledge were two times more likely to have adequate practices than those with poor knowledge. Readiness to practice was significantly predicted by knowledge and attitude characteristics [30]. Both of these studies were consistent with present study findings, which concluded that participants with adequate knowledge are practicing adequately. There was a notable shift in the participants' level of disaster management knowledge following disaster management training [31]. The study also highlighted the importance of healthcare workers developing their abilities. According to the results of another study, perception and participation had a significant association with disaster readiness [32]. Health professionals should receive ongoing training to improve their preparation for disasters. The findings of study [33] provided evidence in favour of the necessity of expanding nursing emergency preparedness and response-related academic and/or institutional education. Another study showed that participants' knowledge and skills in disaster preparedness were enhanced through disaster training programs and drills [34].

Limitation(s)

The study was conducted over a period of only two months. Furthermore, it was limited to one tertiary care hospital; therefore, the results cannot be generalised to other hospitals. Only paramedical staff in the emergency department were involved in this study.

CONCLUSION(S)

The current study found that most paramedical staff members had adequate knowledge and practice in disaster preparedness. To meet the expectations of a standardised level of preparedness, hospital management should arrange medical education and training programs frequently in the form of lectures and periodic disaster simulation drills for all paramedical staff. Orientation and induction programs must incorporate regular instruction on hospital catastrophe preparedness. In any situation, paramedical workers need to be as prepared as possible for any kind of emergency. These programs will undoubtedly further improve the knowledge, attitudes and practices of paramedical staff regarding disaster management.

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