**Understanding Pre-Hospital Emergency Response: A Socioecological Mixed-Methods Study of Israeli Nurses**

**Abstract**

**Background:** Nurses play a vital role in disaster response during emergencies. Nevertheless, limited attention has been given to exploring the factors that influence nurses’ response and challenges, particularly in pre-hospital settings. These issues became especially evident during the terror attack on October 7 in Israel, when no organized nurse-led initiative provided emergency care in the pre-hospital setting.

**Aims:** (1)To examine the factors associated with nurses' intentions to response to emergency situations, in terms of their attitudes, knowledge, resilience, and altruism. (2) To identify discrepancies between the perceived and actual roles of nurses in emergencies and potential strategies for addressing these gaps.

**Methods:** A mixed methods design was employed during February and December, 2024. A self-reported questionnaires were distributed among nurses over Israel (n=315) followed by an open-ended questionnaire survey who was answered by local nurses who actively involved in providing medical care, and healthcare stakeholders in emergency response (n=10). Descriptive and inferential statistics and qualitative content analysis were used to analyze the data. We applied the Socio-Ecological Framework to organize the results from both phases.

**Results:** Personal resilience (β=0.115, p=0.031), sense of readiness (β=0.154, p=0.025), attitudes (β=0.412, p<0.001), self-efficacy (β=0.238, p<0.001), and hesitancy (β=-0.119, p=0.013), and settlement type (β=-0.108, p=0.018) significantly predicted nurses' intention to provide prehospital emergency care. Qualitative analysis revealed four key themes related to nurses' prehospital roles: (1) Individual barriers and facilitators; (2) Interprofessional relationships and teamwork; (3) Nurses' roles within the community; and (4) Organizational and policy challenges. Findings from both phases were synthesized using the socio-ecological framework for advancing prehospital nursing care during emergencies.

**Conclusion:** Nurses' intention to respond in emergency situations is influenced by nurses' perceptions and competencies, and the broader environmental factors, as interprofessional collaboration, community dynamics, and organizational policies. Enhancing education and clearly defining nurses' roles in disaster response are key to improving team effectiveness and patients' outcomes.

**Key words:** Disaster nursing, Mixed-methods, Prehospital emergency care, Socio-ecological framework.

1. **Introduction**

One of the most important components in emergency response in natural and man-made disasters is the health system (Ceferino et al., 2020). The role of healthcare systems during emergencies extends beyond the provision of medical treatment; sustaining healthcare services is critical for ensuring public safety and enhancing the resilience of affected communities (Wang, Li, & Huang, 2023; Cohen et al., 2019). As the largest segment within the healthcare workforce, nurses are central to disaster response and recovery efforts (Veenema et al., 2016; Wong et al., 2023). Their strong presence in the community and the trust they command position them as key players in disaster preparedness, emergency response, recovery, and mitigation, while simultaneously managing chronic diseases (e.g., Wang and Huang, 2023).

Disaster nursing is a specialized field in healthcare, necessitated by the increasing frequency and intensity of disasters in recent decades (IFRC, 2022; Hutton et al., 2016). Over the years, disaster nursing has shifted from a reactive practice to a proactive field centered on preparedness, integrated policy, and competency-based education. The International Council of Nurses (ICN) laid the groundwork for these efforts by defining competencies spanning mitigation, preparedness, response, and recovery (Hutton et al., 2016; ICN, 2022; ICN, 2019). Recent work has placed disaster nursing within broader policy frameworks, calling for structured guidelines on leadership, ethical protocols, and adaptations in preparedness policies. Historical analyses (Fletcher et al., 2022) trace the shift from short-term crisis response to proactive disaster risk management while highlighting gaps in workforce training and advocacy. According to them, further research, and representation of the profession at a strategic and political level could enhance the effectiveness of nurses’ roles in emergencies.

On October 7th, Israel experienced its deadliest attack in the last 50 years by fatalities per capita. Around 3,000 Hamas-led terrorists infiltrated the southern border from Gaza, targeting soldiers and civilians in homes, an outdoor music festival, and military bases. The terrorists invaded 20 communities, and several Israel Defense Forces bases, using assault rifles and explosives, which resulted in hundreds of casualties (Goldman et al., 2024). The music festival, attended by about 4,000 people, saw 364 killed and hundreds more injured (Jaffe et al., 2024). In total, nearly 1,200 people were killed through firearms, explosives, decapitation, mutilation, and burning. Additionally, hundreds were abducted, and thousands were injured. According to Goldman et al. (2024), the National Center of Forensic Medicine was tasked with identifying nearly 1,200 victims in a single day. Over October 7th and 8th, around 2,000 injured individuals were treated at emergency departments (West et al., 2024, Jaffe et al., 2024).

As indicated by the Division of Nursing in the Ministry of Health (Nursing Division, 2024), on the first day of the attack, about 10 local nurses provided heroic medical treatment to numerous casualties, exposing themselves to an existential threat. Another nurse, who was at a military base, treated injured soldiers while sustaining injuries herself. One nurse who was taken hostage in Nir Oz, continued to care for fellow hostages during a 54-day captivity underground in Gaza, most of whom were elderly kibbutz members.

However, based on a review of professional experiences and reports from healthcare personnel during this period, no evidence was found of an organized nurses-led initiative that provided emergency care in the pre-hospital phase.

Despite the nurses’ pivotal role in disaster response, exploring factors affecting their preparedness, motivation and challenges remains limited (Mert & Koksal, 2024). Tas and Cakir (2022) found in their review that nurses are not sufficiently prepared for disasters and are not confident in responding to disasters effectively. Farokhzadian et al. (2024) highlight the insufficient ability of nurses to respond to disasters. Mert & Koksal (2024) found that moral obligation, insufficient experience, balancing responsibilities, and preparation challenges influence challenges and motivation. To bridge this gap; the aims of this study are:

1. To examine the factors associated with nurses' intentions to response to emergency situations, in terms of their attitudes, knowledge, resilience, and altruism.
2. To identify discrepancies between the perceived and actual roles of nurses in emergencies and to examine potential strategies for addressing these gaps.
3. **Materials and methods**
   1. **Design**

An explanatory sequential mixed-methods design was employed, where quantitative data were collected and analyzed first, followed by qualitative data to further clarify and deepen the understanding of the quantitative findings (Creswell & Clark, 2017). The quantitative phases of the study used a cross-sectional design with an anonymous online survey, while the qualitative phase used an open-ended online questionnaire distributed to key characters in the field of pre-hospital emergency care.

* 1. **Participants and setting**

A quantitative phase: Nurses from across the country were invited to participate in a survey conducted between February to July 2024. Participants were recruited using an online snowball convenience sampling method. Eligibility criteria required participants to be actively employed as nurses for at least one year. Nurses who were temporarily not working in the period of the event due to medical or personal reasons were excluded.

A qualitative phase: The open-ended survey conducted between August to December, 2024 and targeted two groups of participants:

1. Nurses who were actively involved in providing medical care during and after the October 7th attack.
2. Healthcare stakeholders, including policymakers, and emergency response coordinators, who influence nursing roles and emergency preparedness.

Participants were purposefully selected to ensure representation of the two groups population. Eligibility criteria required that participants had direct experience in emergency medical response or relevant decision-making authority within the healthcare system.

**2.3 Measures**

In the quantitative phase, a self-reported questionnaire was used to measure participants' attitudes and intentions towards response to an emergency, resilience and altruism. In addition, participants reported their personal characteristics, including previous experience and training received in emergency response.

*Perceptions and intention:* Cognitive factors influencing nurses' intention to participate in pre-hospital treatment under local disaster, based on the Theory of Planned Behavior (Ajzen 1991), were measured using a valid and reliable measure (Xing et al., 2022). This tool includes 19 Likert scale items ranging from 1 = strongly disagree to 5 = completely agree, examining (1) attitudes toward the role of nurses in emergency (Knowledge – two items, readiness – two items, and cognitive attitudes – three items); (2) subjective norms – three items which evaluating the perceptions of participants about their close persons expect them to react in emergency situation; (3) self-efficacy – five items, and hesitancy to react in an emergency situation – two items; and (4) intention to react in future emergency situation – two items.

*Personal resilience* was measured through the CD-RISC questionnaire (Connor & Davidson, 2003). Individual resilience refers to the individual’s ability to successfully deal with difficult events and return to previous functionality in the shortest possible time. In our research we used a shortened version of this questionnaire that includes ten items which indicate a sense of individual resilience in the face of difficulties. The items are rated on a Likert scale ranging from 0 = not true at all to 4 = almost always true.

*Community resilience* was measured through the CCRAM (The Conjoint Community Resilience Assessment Measure) questionnaire (Leykin et al., 2013). Community resilience refers to one's trust in local leadership, collective efficiency, emergency preparedness, place attachment and social trust. In our research we used a shortened version of this questionnaire that includes ten items (out of 21). These items are rated on a Likert scale ranging from 1 = I don’t agree at all to 5 = I very much agree.

*Altruism* was measured using the Self-Report Altruism Scale (9-SRA) (Manzur & Olavarrieta, 2021). Altruism refers to human behavior characterized by unconditional generosity and placing others' needs before one's own. We used the shortened version of the SRA, which includes nine items rated on a 5-point scale ranging from 1 = Never to 5 = Always. We differentiated between two subscales: (1) Altruism – Helping Others (6 items) and (2) Altruism – Charitable Donations (3 items), with each subscale calculated as an average score.

Personal and professional characteristics were also collected and included age, gender, country district, settlement form (urban or rural), academic and professional education level, seniority in the nursing profession, previous experience in caring patients during an emergency, and actual treatment on October 7.

In the qualitative phase, the open-ended online survey comprised three questions designed to elicit detailed and reflective responses. Participants were encouraged to share insights based on their personal experiences and professional perspectives.

1. How do you perceive the role of the nursing profession in responding to emergency situations such as accidents, disasters, and terrorism during the occurrence of the event in the field? In your opinion, what are the unique aspects of the nursing profession in such events? Our intention is to go beyond the medical care provided in healthcare institutions such as hospitals.
2. Do you identify any gaps between your perception of the nursing role in emergencies and the current reality?
3. What is required to bridge these gaps and fully realize your vision of nursing in emergency situations in terms of education and training, workforce preparedness, and systemic support?
   1. **Data collection**

Data collection took place between February and December 2024. The self-reported surveys in both phases were distributed through social media platforms. In the quantitative data collection, the questionnaire was distributed specifically within nurse-related groups on Facebook and WhatsApp. Participants who were interested provided informed consent before completing the survey. In the qualitative phase, we approached relevant participants and received their oral consent followed by sending them the open-ended questionnaire which they anonymously completed online**.**

* 1. **Data analysis**

In the quantitative phase, participants' characteristics and main study variables were descriptively analyzed using frequencies and proportions or means and standard deviations, depending on the type of variable. Group comparisons were performed using independent t-tests. Pearson’s correlations were used to analyze associations between main study variables. Multiple linear regression was employed to analyze the factors associated with intention to provide emergency pre-hospital care. Statistical significance was defined as P<0.05.

In the qualitative phase, the transcribed survey answers were analyzed by the authors (RA and OC). Content analysis was conducted inductively from text units (Creswell & Clark, 2017). First, we looked for similarities and differences among the participants’ statements. Similar statements were classified under the same category according to their compatibility with the research topic. The collected data were then classified according to themes.

The findings from the quantitative stage were compared and interpreted alongside those from the qualitative phase. All authors actively participated in discussions throughout the integration process. We applied the Socio-Ecological Framework (SEF) (McLeroy et al., 1988) to organize the results from both phases, mapping the levels of influences of individual views, interpersonal and organizational characteristics, and systemic aspects in the provision of pre-hospital emergency care by nurses during emergency situations. The SEF is a theoretical framework used to analyze how different levels of influence i.e., individual, interpersonal, community and organizational—affect behaviors, decisions, and outcomes. In healthcare research, this framework is particularly valuable for understanding the multifaceted factors that shape delivery care (e.g., Litchfield et al., 2021).

* 1. **Ethical considerations**

Approval for this study was obtained from the Institutional Review Board of Ben-Gurion University on the Negev, Approval number #697-2. In both phases, participants were informed of the study's purpose and provided informed consent. Participation was voluntary, responses were confidential, and participants could withdraw without penalty.

1. **Results**

3.1 Quantitative phase

3.1.1 *Characteristics of the Quantitative* *study population.*

Most of the sample consisted of women (91%, n = 287). About 45% of participants from the southern district of the country (n = 141), most of whom held a baccalaureate degree (59%, n = 184), and had advanced training in emergency treatment (58%. N = 182). Approximately half of the participants were employed as hospital nurses (n = 162), while 20% worked as primary care nurses in the community (n = 63). Although over half of the nurses had received emergency training, only one-third had an active role in emergency situations, and just one-quarter responded to the emergency on October 7. Full sociodemographic profile and professions characteristics are presented in Supplementary Table A1.

* + 1. *Main study variables.*

Attitudes (M=4.26, SD=0.733) and intentions (M=4.25, SD=0.671) were rated high, while subjective norms (M=3.80, SD=0.775) and self-efficacy (M=3.67, SD=0.630) were rated lower. Participants reported a medium level of readiness (M=3.28, SD=0.919) and knowledge (M=3.69, DS=0.823), low level of hesitancy (M=2.37, SD=0.784), and a medium level of personal resilience (M=3.75, SD=0.593) which is higher than their community resilience (M=3.38, SD=0.788). Level of altruism – charity was higher than altruism - helping other (M=3.43, SD=0.802, M=2.91, SD=0.744, respectively).

3.1.3 *Comparisons of the main variables between sub-groups.*

Three comparisons were made between sub-groups: responses vs. non-responses, hesitates vs non-hesitates, and training receivers vs. non-receivers.

Nurses who respond during the terror attack at October 7 (n=78) reported higher altruism – helping others (t=-2.06, p<0.05), and had higher perception of Knowledge (t=-2.62, p<0.01), readiness (t=-2.66, p<0.01), and personal resilience (t=-3.30, p<0.01), compared to non-respond nurses (n=223). The full comparisons are presented on Appendix A, Supplementary Table A2.

Hesitant nurses (hesitation level > 3.0; n=96) had lower scores in knowledge, readiness, and personal resilience, as well as less positive attitudes, norms, self-efficacy and intentions (p<0.01), compared to non-hesitant nurses (hesitation level ≤ 3.0; n=219). The differences between groups in community resilience and altruism levels were insignificant (p>0.05). A comparison of nurses with high and low levels of hesitancy (i.e., hesitate to treat in emergency and believe it has not allowed her) in terms of all the main study variables, is presented in Appendix B, Supplementary Table A3.

A comparison between nurses who received training in emergency care to those that did not receive (n=182, n=132, respectively) revealed that trained nurses had higher knowledge and readiness (p<0.001), as well as self-efficacy (p<0.01) and intention to response in disasters (p=0.018). The full comparisons are presented on Appendix A, Supplementary Table A4.

3.1.4 *Factors related to pre-hospital emergency response intention of nurses.* The study aimed to identify the factors that associate with intention to response in pre-hospital emergency event. Table 1 presents the univariate Pearson's correlations between the dependent variable - intention and independent variables. All the correlations were positively associated with intention (p<0.01).

Table 2 presents the multiple linear regression analysis of nurses’ intention to participate in pre-hospital emergency care. Sense of readiness and personal resilience, positive attitudes and self-efficacy and low level of hesitancy were significant predictors of the dependent variable. In addition, nurses who live in rural rather than urban settlements are more intent to response. The model accounts for 60.8% of the variance of nurse's intention (F=26.393, p<0.01).

Table 1. Means, Standard deviations and correlation matrix of main study variables

| **Variable** | **M(SD)** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1. intention | 4.25(.67) | — |  |  |  |  |  |  |  |  |  |
| 2.Knowledge | 3.69(.82) | .48\*\* | — |  |  |  |  |  |  |  |  |
| 3. Readiness | 3.28(.92) | .44\*\* | .76\*\* | — |  |  |  |  |  |  |  |
| 4. Attitudes | 4.26(.73) | .60\*\* | .32\*\* | .28\*\* | — |  |  |  |  |  |  |
| 5. Norms | 3.80(.77) | .57\*\* | .33\*\* | .34\*\* | .54\*\* | — |  |  |  |  |  |
| 6. Self-Efficacy | 3.77(.63) | .59\*\* | .52\*\* | .49\*\* | .50\*\* | .51\*\* | — |  |  |  |  |
| 7. Hesitate | 2.37(.78) | -.41\*\* | -.40\*\* | -.36\*\* | -.30\*\* | -.27\*\* | -.32\*\* | — |  |  |  |
| 8. personal Resilience | 3.75(.59) | .46\*\* | .39\*\* | .37\*\* | .42\*\* | .29\*\* | .46\*\* | -.31\*\* | — |  |  |
| 9. Community Resilience | 3.38(.79) | .15\* | .13^ | .14^ | .20\*\* | .20\*\* | .11 | -.11 | .19\*\* | — |  |
| 10. Altruism charity | 3.43(.80) | .19\*\* | .06 | .07 | .25\*\* | .17\* | .12^ | -.11 | .36\*\* | .22\*\* | — |
| 11. Altruism helping Other | 2.91(.74) | .21\*\* | .22\*\* | .27\*\* | .21\*\* | .21\*\* | .20\*\* | -14^ | .39\*\* | .12^ | .48\*\* |

\*\*p<0.001, \*p<0.01, ^p<0.05

Table 2. Multiple regression analysis of pre-hospital emergency care intention of nurses

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variable | Unstandardized B | Standard Error | Standardized β | t | p |
| Age | -0.003 | 0.002 | -0.055 | -1.258 | 0.21 |
| Training received  (Yes vs. No) | 0.018 | 0.06 | 0.013 | 0.3 | 0.765 |
| Knowledge | 0.014 | 0.06 | 0.016 | 0.232 | 0.817 |
| **Readiness** | 0.119 | 0.052 | 0.154 | 2.261 | **0.025** |
| **Attitudes** | 0.404 | 0.055 | 0.412 | 7.374 | **< .001** |
| **Self-Efficacy** | 0.255 | 0.064 | 0.238 | 3.984 | **< .001** |
| **Hesitate** | -0.107 | 0.042 | -0.119 | -2.511 | **0.013** |
| Gender (N vs. F) | -0.141 | 0.107 | -0.062 | -1.325 | 0.187 |
| **Settlement type**  **(Urban vs. Rural)** | -0.158 | 0.067 | -0.108 | -2.378 | **0.018** |
| **Personal Resilience** | 0.137 | 0.063 | 0.115 | 2.177 | **0.031** |
| Community Resilience | -0.026 | 0.04 | -0.03 | -0.648 | 0.518 |
| Altruism-charity | 0.024 | 0.044 | 0.028 | 0.551 | 0.582 |
| Altruism-helping Other | -0.038 | 0.049 | -0.04 | -0.785 | 0.434 |

* 1. Qualitative phase

3.2.1. *Characteristics of the Qualitative* *study population*

A total of thirteen nurses and stake holders participated in the open-ended online survey. The majority of them were female (77.7%), and their ages ranged from 37 to 68 years. The duration of their role in the current position varied from 8 to 30 years, and most of them had previous experience in emergencies. More detailed characteristics of the participants, alongside description of their previous experience can be found in Appendix B, Supplementary Table B1.

3.2.2. *Themes, categories, and meaning units*

Four main themes emerged from the open survey regarding nurses' role in pre-hospital emergency care: (1) Individual hiders and facilitators; (2) Interprofessional relationships and teamwork; (3) The nurses' role in their community; and (4) Organizational and systematic/policy challenges. We organized the themes and categories according to the Socio Ecological framework, as illustrated in Figure 1.

*Theme 1: Individual hiders and facilitators*

Participants state that the nursing staff are clinically competent in providing care in emergency situations and therefore must be part of the response team and have a formal role in disasters:

*"The uniqueness of the nursing profession in emergency situations lies in their expertise and knowledge in providing life-saving emergency care, as well as in their ability to function effectively under pressure…They [the nurses] bring extensive medical knowledge, enabling them to assist in decision-making processes in complex conditions—such as determining whether intubation is necessary, whether fluid resuscitation is crucial, and more."*

However, nurses don't receive enough training in pre-hospital emergency care, what hold back their ability and intention to take part in trauma and disaster events.

*" I believe that additional and advanced medical knowledge can be beneficial. For example, performing a thoracostomy or intubation. Such skills can enhance field treatment, even in the absence of other medical personnel with the necessary expertise."*

Nurses also have a holistic point of view, which is essential in managing mega events, which can prevent short and long-term complications and influence patients' recovery from the trauma:

*" A nurse could take a holistic view of the event, identify psychological distress, and help prevent PTSD [post traumatic stress disorder] with proper care."*

This was echoed by another participant, that refers also to the responsibility of nurses to important others in the situation, such as family members or friends that are worried about their beloved in the disaster setting:

*"A nurse has a broader role that not only ensures and assists in the physical treatment of the injured but also addresses the wider circles and additional emerging needs."*

*Theme 2: Interpersonal relationships and teamwork*

Participants emphasized how the inherent ability of nurses as a case manager can be used in emergencies.

*" They [nurses] can effectively mediate the situation for patients and those around them, serving as a liaison between the patient and other caregivers in the field."*

Nurses also play a crucial role in organizing and relaying information about the injured to ensure a smooth transition to their next point of evacuation.

*"The nurse's approach to providing initial response in any event…begins with delivering primary life-saving assistance… and communicating information about the injury and the treatment given to ensure continuity of care."*

On the other hand, the prevailing perception among healthcare professionals is that nurses lack the knowledge and skills to provide care in the field, a perception that likely affects their involvement in such events.

*" There is still a perception that nurses are less professionally skilled compared to emergency medical personnel or paramedics. As a result, in the field, there may be a tendency to rely on them less if other medical professionals are present."*

*Theme 3: The nurses' role in their community*

The common perception is that nurses are not part of the active team in pre-hospital emergency events, a notion evident both within and especially outside the hospital.

*"Currently, there is no clear, structured perception of the role of nurses in emergencies, with the gap being most evident outside the hospital setting"*

A participant emphasized the importance of providing targeted training, in collaboration with local emergency response teams, to define the role of nurses in emergencies where they live. This training would ensure that nurses understand their responsibilities and are prepared to respond effectively.

*"In my opinion, there is a lack of training for all nurses to be part of local emergency response teams (such as "Tzahi" – a local emergemcy team) and similar units"*

*Theme 4: Organizational and policy challenges*

Nurses lack authority outside of their institutions and cannot provide medical care without a doctor's orders. This limitation may discourage nurses from acting in emergencies due to concerns about not being legally protected.

*" In emergency situations, there are times when life-saving medication is required. Currently, medical orders are needed, aside from over-the-counter treatments."*

There is no discussion or policy supporting nursing care in emergencies, unlike other healthcare professions that are clearly defined and expected to act in such situations.

*"There is no* *clear definition, or at least none that I am aware of, for the nursing profession in emergencies – unlike other professions such as doctors and paramedics."*

Clarifying the authority of nurses in emergency situations and incorporating these topics into the nursing curriculum from the very beginning could drive change in the current situation.

*"I believe there is a need to develop such a definition and integrate it into the nursing curriculum at the initial training stage."*

To advance this process, internal motivation and drive are essential, with nurses playing a key role in inspiring and leading it, rather than relying on external forces.

*"[It needs] a push from nurses, Parallel training to that of paramedics, and research that will show a clear contribution of the presence of nurses compared to their absence in emergency situations."*

* 1. *The Synthesis of Quantitative and Qualitative Results and practical steps towards a change.* The results from the qualitative phase added insights into the information derived from the quantitative phase to comprehensively understand the determinants of pre-hospital emergency care of nurses. Figure 1 presents the combined results from both phases, in line with the socio-ecological framework. While the illustration emphasizes the factors that influence the intentions and practices of nurses in disasters, some practical suggestions were raised, focusing on operational steps to enhance the role of nurses in emergencies. First, appropriate education and training are needed, including simulation training and practicing advanced emergency situations at least once a year. Second, there is a need to regulate nurses' authorization to provide medical care during emergencies and ensure legal protection. Third, multidisciplinary training should include medical professionals from various fields, all undergoing uniform training to foster a sense of equality. From a broad perspective, a shift in perception is needed to recognize the nursing workforce as an integral part of the potential medical personnel available for immediate emergency response. This paradigm shift will drive the necessary changes to effectively implement this approach.

- Hesitancy, readiness, knowledge and self-efficacy

- positive attitudes and resilience

- Clinical Competence

- Holistic view

- Care for significant other

- Lack of specific training

- Lack of authority

- Lack of role definition

- Lack of curricular

- A led-nurses change

- Settlement type

- Perceived role in the community

- Be a part of the local emergency response team members

- Case management

- Coordination and

- Communication with the next step

- Perceived inadequacy

**Figure 1.** Social Ecological Framework to capture the determinants of pre-hospital emergency care of nurses

**Discussion**

This study aimed to examine the factors associated with nurses' intentions to respond to emergencies, and to identify discrepancies between nurses' perceived and actual roles in emergencies and examine potential strategies for addressing these gaps. We found that participants who received training demonstrated higher knowledge, readiness, self-efficacy, and intention. In addition, responded on October 7 demonstrated higher knowledge, personal resilience, and altruism than non-respondents. Personal resilience, sense of readiness, positive attitudes, self-efficacy, and lower hesitancy significantly predicted nurses' intentions to provide prehospital emergency care. Qualitative analysis identified four key themes related to nurses' prehospital roles: (1) Individual barriers and facilitators; (2) Interprofessional relationships and teamwork; (3) Nurses' roles within the community; and (4) Organizational and policy challenges. Findings from both phases were synthesized using the socio-ecological framework to demonstrate the multilevel factors and potential approach for advancing the prehospital nursing care during emergencies.

**A Multi-Level Lens: The Socio-Ecological Approach to Healthcare Analysis**

While the socio-ecological framework (SEF) successfully used to interpret the complex influences on individuals in the public health settings, several studies used this framework for outlining healthcare interventions, exploring essential factors in complicated circumstances in wide range healthcare areas. Employing this framework illuminates how multi-levels factors intersect to shape a selected care setting, offering a structured basis for designing effective, multi-level interventions tailored to diverse healthcare contexts. For instance, Litchfield et al. (2021), explored the factors that would influence safe practice in UK primary care when previous initiatives have failed to deliver the expected improvements. Mace et al. (2024) identified barriers and propose strategies to address them in behavior dementia prevention within the larger contexts influencing risk factors among HCPs. Ude et al. (2022) suggested this framework to explore transitioning care in youth diabetes. Although SEF wasn’t used in the context of disaster nursing, aspects from different levels were discussed widely.

**Intrapersonal level**

Nurses play a vital role in disaster preparedness, encompassing risk identification, risk assessment, strategic planning, conducting drills, participating in training programs, and identifying areas for improvement (Harthi et al., 2021). However, despite their potential to make a significant impact during the response phase, they are often underutilized. Nurses' participation in the disaster response phase is hindered by several critical factors, including inadequate training and insufficient preparedness. Providing emergency care during a disaster is accompanied by concerns related to the security situation. On top of that, many nurses feel unprepared and lack the necessary skills to respond effectively during disasters (Farokhzadian et al., 2024). We found that nurses who hesitate to participate in disaster care had lower intentions to respond. Mert & Koksal (2024) suggest that disaster relief requires a comprehensive and coordinated response from healthcare organizations, government agencies, and support systems, by providing adequate training, ensuring safety protocols, offering mental health support, and fostering a fair and supportive work environment to mitigate the adverse effects on nurses.

Self-efficacy plays a crucial role in shaping nurses' performance in disaster situations, as it reflects their confidence in successfully carrying out essential tasks during emergencies (Ajzen, 1991). Our study aligns with previous research highlighting the positive impact of training on nurses' self-efficacy in disaster response. Choi and Lee (2021) demonstrated that disaster preparedness training enhances both self-efficacy and disaster management skills among nurses. International research has consistently identified self-efficacy as a key determinant of healthcare workers' willingness to act in crisis situations (Ben Natan et al., 2014; Choi & Lee, 2021). The findings reinforce this literature by showing a clear association between self-efficacy and nurses' intention to respond during disasters. Therefore, initiatives aimed at strengthening nurses' self-efficacy are essential for improving their willingness to participate in disaster response. Higher self-confidence in their ability to respond effectively can be fostered through ongoing workplace training and dedicated disaster preparedness education during their formal studies.

**Interprofessional level**

Interprofessional relationships and teamwork in primary care significantly influence healthcare quality, impacting both clinical and humanistic outcomes. Research has demonstrated their effect on medical errors, patient satisfaction, patient and caregiver education, and mortality (Cadet et al., 2023; McCutcheon et al., 2020). Nurses possess essential teamwork skills, including activating disaster plans, triaging patients, and coordinating evacuations and patient transport to medical facilities (Farokhzadian et al., 2024; Karnjuš et al., 2021). Furthermore, nurses play a vital role in addressing the mental health needs of those affected by disasters by providing psychological first aid to patients, families, and significant others (Kiliç Bayageldi et al., 2024). However, due to the infrequent and often undefined nature of their role in disaster response (Paudel & Kanbara, 2023; Shubayr, 2024), their integration into the multidisciplinary team in pre-hospital care remains inadequate.

**Community level**

Our findings suggest that nurses in rural areas demonstrate a greater willingness to respond to disasters within their communities compared to their urban counterparts. This result has several explanations. Rural nurses hold a distinctive role compared to their urban and metropolitan counterparts. In many cases, a nurse may be the only clinician present at a healthcare facility, with other medical professionals accessible only on an on-call basis (Paliadelis et al., 2012). They often have close relationships with their communities prior to a disaster and knowledge of the community in which they served, which allow for easier healthcare assessment and management, as well as the ability to advocate on the community’s behalf (Brewer et al., 2022). Rural nurses’ also have commitment and dedication to continue to provide care to the community in which they served, often despite their personal hardship (Sato et al., 2015). Although community resilience was not a direct predictor of disaster response intention, our findings indicate that rural nurses exhibited higher levels of community resilience compared to urban nurses. Further research is needed to explore the potential indirect relationship between rural nurses and their intention to respond through community resilience.

Another community-level aspect reflected in the study pertains to the social norms within the nursing profession regarding nurses' roles in disaster response. The professional advancement of disaster nursing varies across countries, but the initial stage involves recognizing the necessity of disaster nursing—understanding nurses' skills and their capacity to operate effectively during a disaster—followed by the need for specialized training, role expansion, and leadership in the field (Paudel & Kanbara, 2023). To drive change in this field, nurses should take an active role, advocate for progress, and assume responsibility for the development of their profession.

**Organizational and policy level**

Participants considered several policies and organizational aspects essential to advance nurses' intentions to respond to emergencies. Studies mentioned role ambiguity, coordination deficiencies, and systemic challenges (Al Harthi et al., 2020; Al Thobaity, 2024). Xue et al. (2020) found in a meta synthesis that the lack of clear systems, processes, protocols and guidelines affected nurses’ abilities to form an efficient response. Azizi et al. (2021) highlighted that role ambiguity was one of role stressors among pre-hospital nurses during disasters. Pre-hospital settings are marked by insufficient coordination, resource shortages, understaffing, and unclear responsibilities within interdisciplinary teams (Hugelius & Harada, 2025).

Beyond the need for coordinated and effective teamwork, the lack of disaster-specific content in nursing curricula and its consequent impact on preparedness has been widely discussed. Veenema et al. (2016) identified insufficient education as one of the barriers to advancing professional disaster nursing, a concern also raised in several review studies (e.g., Al Harthi et al., 2020; Xue et al., 2020). Furthermore, Al Thobaity (2024) highlights the importance of education in overcoming challenges related to nursing disaster preparedness and response, and Al Harthi et al. (2021) state the limited research and evidence-based practices to support the effectiveness of integrating nurses in disaster response. A recent study suggests that there is an urgent need to improve disaster literacy within the nursing profession to better prepare nurses for disaster situations. The authors identified nine critical dimensions that constitute the disaster literacy of nurses including physical and mental quality, disaster rescue general knowledge, professional and technical competence, professional ethics, teamwork, emotional ability, information literacy, leadership, and knowledge transformation (Zhang et al., 2024). While these reviews do not focus solely on pre-hospital setting, they underscore that the situation is notably weaker than the hospital environment.

**Limitations**

This study has several limitations. Although we asked participants in the quantitative phase if they response on October 7, we could not distinguish between nurses who independently response to those who response in a call from their employee. in addition, the post-event timing of the research as well as the cross-sectional design make it impossible to explore the causal effect of study variables on actual response in the disaster. Thus, we evaluated the participants' intentions to response in future events. Second, we used open-ended survey questionnaire rather than in depth interviews to identify perceptions and gaps regarding nurses role in disasters, what could potentially limit the possibility for elaboration, clarification, or further exploration of the meaning behind their statements. However, we employed a systematic approach to data coding, involving two independent coders, to ensure the reduction of personal biases in the analysis. Additionally, the use of a mixed-methods study allows for cross-referencing insights and assessing the validity of the findings.

1. **Conclusions**

Nurses' intention to respond in emergency situations is influenced by their individual perceptions, competencies, and the broader environmental factors, including interprofessional collaboration, community dynamics, and organizational policies. Enhancing educational programs is crucial to ensuring that nurses maintain the necessary knowledge and skills for emergency situations. Additionally, clearly defining the unique role of nurses in disaster response is essential for optimizing their contribution, that may improve overall team effectiveness and disaster care outcomes. Future research should examine the impact of integrating nurses into the disaster response phase on emergency preparedness and response effectiveness.

1. **Declarations**

Data availability- The data that support the findings of this study are available from the corresponding author, upon reasonable request.

Conflicts of interest- Conflict of interest statement: The Authors declare that there is no conflict of interest.

Declaration of generative AI in scientific writing: No AI and AI-assisted technologies were used.

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Appendix A. Quantitative supplementary analyses

|  |  |  |
| --- | --- | --- |
| **Supplementary Table A1**  **Participants characteristics** |  |  |
|  |  |  |
| Variable | Category | N (%) |
| Gender | Women | 287 (91.1) |
| District | South | 141 (44.9) |
|  | Center | 126 (40.1) |
|  | North | 47 (15.0) |
| Settlement form | Urban | 217 (70.1) |
|  | Rural | 97 (30.9) |
| Academic education | BA | 184 (58.6) |
|  | MA | 115 (36.6) |
|  | PHD | 5 (1.6) |
|  | None | 10 (3.2) |
| Professional education | Advanced clinical | 178 (56.6) |
|  | RN | 117 (37.2) |
|  | Nurse practitioner | 16 (5.2) |
|  | Practical Nurse | 3 (1.0) |
| Clinical setting | Hospital | 162 (51.4) |
|  | Primary care clinic | 63 (20.0) |
|  | Else | 90 (28.6) |
| Medic in the army | Yes | 37 (11.7) |
| Do you have previous experience in emergency situation? | Yes | 75 (23.8) |
| Have you received training in emergency treatment? | Yes | 182 (57.8) |
| Are you a part of an emergency team in your institution? | Yes | 93 (29.5) |
| Did you respond on October 7 independently or by a call? | Yes | 78 (24.8) |
| Age | M (SD)  Minimum-Maximum | 42.2 (12.3)  21.0-79.0 |
| Seniority M (SD) range | M (SD)  Minimum-Maximum | 14.5 (12.1)  1.0-50.0 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Supplementary Table A2**  **Comparison between response to non-response nurses** | | | | |
|  | Responded (n=78) | Non-responded (n=223) | T | p-value |
| Knowledge | 3.90 (0.81) | 3.62 (0.82) | -2.62 | 0.009\*\* |
| Readiness | 3.52 (0.95) | 3.20 (0.90) | -2.66 | 0.008\*\* |
| Attitudes | 4.36 (0.72) | 4.23 (0.74) | -1.38 | 0.167 |
| Norms | 3.90 (0.78) | 3.77 (0.77) | -1.22 | 0.222 |
| Self-Efficacy | 3.88 (0.65) | 3.73 (0.63) | -1.79 | 0.074 |
| Hesitancy | 2.30 (0.87) | 2.40 (0.76) | 0.93 | 0.353 |
| Intention | 4.32 (0.67) | 4.22 (0.67) | -1.15 | 0.249 |
| Personal Resilience | 3.95 (0.56) | 3.69 (0.59) | -3.30 | 0.001\*\* |
| Community Resilience | 3.35 (0.82) | 3.39 (0.78) | 0.35 | 0.728 |
| Altruism charity | 3.42 (0.85) | 3.44 (0.79) | 0.15 | 0.881 |
| Altruism helping Other | 3.07 (0.87) | 2.86 (0.69) | -2.06 | 0.041\* |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Supplementary Table A3**  **Difference in main study variables between hesitant and non-hesitant nurses** | | | | |
|  | Hesitant nurses (n=96) | Non-hesitant nurses (n=219) | t | p-value |
| **Knowledge** | 3.27 (0.82) | 3.88 (0.75) | 6.50 | **<0.001\*\*** |
| **Readiness** | 2.88 (0.99) | 3.46 (0.83) | 5.34 | **<0.001\*\*** |
| **Attitudes** | 4.05 (0.79) | 4.35 (0.69) | 3.44 | **<0.001\*\*** |
| **Norms** | 3.60 (0.81) | 3.90 (0.74) | 3.25 | **0.001\*\*** |
| **Self-Efficacy** | 3.55 (0.60) | 3.87 (0.62) | 4.25 | **<0.001\*\*** |
| **Intention** | 3.96 (0.70) | 4.37 (0.62) | 5.23 | **<0.001\*\*** |
| **Personal resilience** | 3.61 (0.60) | 3.81 (0.58) | 2.81 | **0.005\*\*** |
| Community Resilience | 3.34 (0.78) | 3.40 (0.79) | 0.62 | 0.534 |
| Altruism charity | 3.37 (0.76) | 3.46 (0.82) | 0.90 | 0.367 |
| Altruism helping Other | 2.81 (0.72) | 2.96 (0.75) | 1.58 | 0.115 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Supplementary Table A4**  **Comparison between participants who received and not received training** | | | | |
|  | Received training (n=182) | Non-received training  (n=132) | t | p-value |
| Knowledge | 3.82 (0.76) | 3.52 (0.88) | -3.33 | **<0.001\*\*** |
| Readiness | 3.43 (0.91) | 3.08 (0.90) | -3.44 | **<0.001\*\*** |
| Attitudes | 4.32 (0.69) | 4.19 (0.78) | -1.49 | 0.137 |
| Norms | 3.88 (0.74) | 3.71 (0.82) | -1.86 | 0.064 |
| Self-Efficacy | 3.86 (0.61) | 3.66 (0.64) | -2.83 | **0.005\*\*** |
| Hesitancy | 2.31 (0.76) | 2.46 (0.81) | 1.72 | 0.086 |
| Intention | 4.33 (0.63) | 4.15 (0.71) | -2.39 | **0.018\*** |
| Personal Resilience | 3.78 (0.58) | 3.71 (0.61) | -0.97 | 0.331 |
| Community Resilience | 3.33 (0.83) | 3.44 (0.73) | 0.16 | 0.245 |
| Altruism charity | 3.49 (0.80) | 3.36 (0.81) | -1.45 | 0.149 |
| Altruism helping Other | 2.98 (0.76) | 2.83 (0.71) | -1.79 | 0.074 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Appendix B. Qualitative supplementary analyses  **Supplementary Table B1**  **Characteristics of participants of the quantitative phase** | | | | | |
| ID | Gender | Age | Place of work and position | Duration of work in position | Previous experience |
| 1 | Women | 47 | Community nurse in southern Israel | 15 | No defined role. I was at home with my family when injured individuals from the emergency response team were brought to my house. I treated them with the resources I had at home and ensured they were evacuated for medical care as soon as possible. |
| 2 | Men | 37 | Medical Officer IDF | 10 | I commanded 19 medical teams during the Hamas attack on the Gaza Envelope on October 7th. Subsequently, I served as the medical officer for two divisions. |
| 3 | Women | 56 | Management nurse home care | 30 | I made contact with all my patients in the unit to check their condition and willingness to evacuate, and assist in establishing an evacuee clinic at the Dead Sea. |
| 4 | Women | 51 | Hospital nurse | 27 | I experienced terrorism firsthand, as I was shot at on my way to work. Additionally, I worked as a nurse during various terrorist incidents, focusing less on treating injuries and more on providing care in the secondary circle. On October 7 I was an On-call nurse at my kibbutz. We treated survivors of Nova festival who arrived at the kibbutz, providing physical care and attending to their mental well-being. |
| 5 | Women | 42 | Nurse educator in ER | 17 | I was present due to my residence on the Gaza Envelope. I did not function as a professional on October 7th, only as a mother. |
| 6 | Men | 50 | Paramedic in south region and emergency medicine lecturer in a public university | 10 | I was involved in several terrorist incidents, attacks, and wars. On October 7th, I served as a paramedic and treated the injured on the ground. |
| 7 | Women | 44 | Emergency medicine researcher | 8 | No previous experience. |
| 8 | Women | 68 | Physician and researcher | 30 | No previous experience. |
| 9 | Women | 50 | Nurse Coordinator for Emergency Preparedness, Northern region hospital | 24 | In my current role, I participated in the response to the tragedy of a bus overturning involving students at a summer camp in the North, as well as the M'gadell Shams disaster during Iron Swords War. I assisted in managing the reception of the injured and their distribution to treatment sites, provided initial response, facilitated their transfer to other hospitals for continued care, and supported the family information center in locating family members. |