Research Paper
Tehran Volunteers' Participation Model for Urban Disaster Management: A Grounded Theory Approach

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ABSTRACT

Background: Tehran, the capital of Iran, is one of the most hazard-prone cities in the world, facing a complex array of disaster risks. Managers need well-defined theories and models to mobilize and utilize their staff and volunteer resources effectively. We aimed to develop a substantive theory to explain the process of volunteer participation in disaster risk management in Tehran.

Materials and Methods: We employed a grounded theory approach as recommended by Corbin and Strauss (2014), conducting semi-structured, in-depth interviews with 23 experts and residents of Tehran from December 2023 to February 2024. Constant comparative analysis was performed alongside data collection. The data were analyzed to extract codes, which were then integrated to identify concepts, categories and subcategories, leading to the developing of a related theory.

Results: The analysis revealed four main themes: The need for volunteer participation planning, influencing factors, volunteer organization, and the nature of volunteer participation. These themes emerged from 11 categories, 32 subcategories and 438 initial codes. Tehran's vulnerabilities, limited staff and existing volunteer capacities underscore the necessity for effective planning. The primary influencing factors include participation requirements and individual characteristics.

Conclusion: Managing known volunteers, one-time volunteers, online volunteers and Non Governmental Organization (NGO) volunteers is crucial. Central to the proposed model are cultivation, planning, recruitment, organization, and education, all of which contribute to the effective deployment of volunteers. Proper planning and clear communication with beneficiaries based on key influencing factors are essential for successful implementation. Additionally, leveraging virtual spaces and media can enhance risk communication.

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Introduction

Urban disasters pose significant risks to communities worldwide and challenge their resilience and safety. As cities grow and face increasing hazards, community engagement becomes crucial for effective disaster management [1]. Volunteers play a vital role in this process by offering their time and skills to support emergency response efforts and contribute to disaster risk reduction. Their participation enhances community resilience and strengthens the capacity of local organizations to address vulnerabilities. From risk communication to stakeholder participation, these individuals materialize the backbone of community-based organizations working to improve preparedness and response efforts [2]. Tehran, the capital of Iran, is particularly susceptible to natural hazards due to its geographical location and concentrated population. The city also faces significant technological hazards and climate-related disasters. As urbanization accelerates globally, the number of people at risk increases exponentially, highlighting the need to improve residents' knowledge and planning in this area [3, 4].

Titko showed that the proactive behavior of respondents against disasters is partially affected by some of their personality and socioeconomic characteristics, especially with younger respondents currently more inclined towards adopting protective measures. Additionally, negative past experiences with disasters also influence preparedness [5]. It has been demonstrated that knowledge acquisition and trust development could improve community resilience and that different volunteer resources could help managers make appropriate decisions [6-8].

Spontaneous unaffiliated on-site volunteers (SUVs) have become valuable resources for mitigating disasters in both planned and unplanned situations. However, their self-coordination can also lead to harm or put themselves in danger [9]. Access to volunteer opportunities varies significantly, and there are notable differences in access to volunteer roles across occupational sectors [10].

The areas in which volunteers are typically needed include community services, damage assessment, childcare, communication, education, training, and counseling [11]. Research by Ma et al. indicates that volunteer participation in disaster preparedness activities is still low and social background and organizational and attitudinal factors, such as femaleness, belonging to organizations, providing accidental life insurance and training, affect volunteers' willingness to participate [12]. Stud-

ies have identified effective variables in this field; for instance, Smith demonstrated that participation is significantly influenced by contextual, social background, personality, attitude and situational variables [13]. These findings have been further emphasized in recent studies [14]. Kojima also noted that greater social participation can be fostered through friendships [15].

Volunteers may vary in their personality traits, particularly in terms of assertiveness and a combination of these traits contributes to a volunteering disposition [16]. Kragt and Holtrop identified several characteristics of volunteers, including age, social connections, employment status, residence location, volunteer expectations, and commitment levels. They demonstrated that volunteer motivation evolves, with stress, work-family conflict, and interpersonal interactions potentially leading to volunteer withdrawal. Volunteering is associated with improved psychological well-being and increased social and human capital [17]. A crucial aspect of volunteering is perceived satisfaction and performance in fulfilling tasks, where characteristics such as sociodemographic background, capabilities and knowledge of volunteering tasks serve as predictors of successful volunteering. Some of these factors, such as knowledge, can be enhanced through training to improve volunteer satisfaction and performance [18].

Forrest et al. found that volunteer roles involve traditional interactions, creative and dialogical approaches to citizen engagement, and collaboration with authorities [19]. Jones and Berry demonstrated that programs focusing on behavioral changes in participants, job satisfaction, turnover intention among team members, training and applying self-determination theory positively impact volunteer retention [20]. Penner highlighted significant relationships among personality traits, religiosity, and volunteer activities, emphasizing that how an organization treats individuals is a direct and influential factor in these differences [21]. Psychological dispositions encompass a model of personality and various forms of volunteering, including online volunteering. Predicted probabilities for informal volunteering vary with agreeableness and employment levels, with open individuals showing a preference for online volunteering due to its flexibility and innovation. These individuals also dedicate significant effort to their voluntary work, especially when active in clubs or associations [22]. A supportive legal framework and a culture of volunteering are essential for enhancing volunteer retention, motivation, and monitoring of volunteers' physical and mental well-being [23]. Xin argues that efficient volunteer service requires improvements in legalization, incentive systems,

participation channels, professional training, and collaborative governance [24]. Effective communication with volunteers is crucial. In other words, planning regular, informative and supportive communications that express appreciation for volunteers' contributions is vital [25, 26]. Social media serves as a valuable tool for informing, guiding, and registering informal volunteers, making disaster response more efficient when proper procedures for engaging these volunteers are in place [27]. A review of related studies indicates that effective planning for volunteer participation in disaster management necessitates relevant theories and models. Therefore, this study aims to develop a substantive theory and representative model for the Tehran community based on its specific conditions and components.

Materials and Methods

We utilized grounded theory as an inductive qualitative approach to identify and describe the meaning and understanding of human experiences and behaviors, ultimately aiming to develop a substantive midrange theory [28]. A purposive sampling method, followed by theoretical sampling, was employed to select 23 participants, including 9 urban disaster managers, 5 university faculty members, and 5 citizens of Tehran.

The Ahmad Soltani conducted in-depth, semi-structured face-to-face interviews with the participants at their workplaces from December 2023 to February 2024. The initial interviewees were selected from well-known experts in disaster risk management to ensure capturing foundational insights. Subsequent participants were identified through professional networks using snowball sampling, enabling us to access a broader range of perspectives and experiences. Interviews continued until theoretical saturation was reached—a critical point in qualitative research where no new significant themes or insights emerged from the data.

Considering the research focus, participants were selected based on their expertise and first-hand experience in disaster risk management, particularly those with volunteer experience. This condition was especially relevant given the community-driven aspects of disaster management in urban contexts.

Participants shared their experiences and perceptions of disaster risk management, providing rich, deep insights into the challenges and opportunities in the field. Probing questions, such as "what are the main concerns in Tehran's disaster risk management regarding human resources and volunteers?" And "what plans are in place to address these concerns?" Were utilized to elicit detailed responses. This approach facilitated a deeper understanding of participants' views and ensured that the discussion remained focused on pertinent issues, enhancing the overall relevance and depth of the collected data.

Our goal was to achieve theoretical saturation regarding the properties and dimensions of the explored concepts, ensuring that the findings would be robust and comprehensive. Participants were informed about the study's objectives and rationale, provided their informed consent and agreed to have their interviews recorded. This transparency was crucial for fostering trust and facilitating open discussions. The recorded interviews were transcribed verbatim to maintain accuracy and fidelity to the participants' responses. These transcripts were then analyzed using constant comparative analysis, as recommended by Corbin and Strauss (2014), with the assistance of MAXQDA software, version 10. This qualitative data analysis software aids in organizing and interpreting complex data sets.

Data analysis

We conducted constant comparative analysis throughout the data collection process. The coding process involved three stages: Open coding, axial coding and selective coding, focused on microanalysis. The research team analyzed the transcribed interviews line by line to extract codes, which were then integrated to develop concepts, categories and subcategories. This iterative process created a conceptual model for systematically studying the phenomenon representing the explored theory.

To enhance the study's trustworthiness, we implemented several strategies outlined by Guba and Lincoln [29, 30]. focusing on credibility, dependability, transferability, and confirmability. To improve credibility, we employed maximum variation in sampling and utilized techniques such as constant comparison, active listening, prolonged engagement with the data, immersion, and investigator triangulation. We meticulously documented all analytic activities for dependability to create an audit trail. Additionally, we used member-checking and peer-review methods to strengthen the confirmability and transferability of our findings. By integrating these validation techniques into our methodology, we aimed to ensure the scientific rigor of our findings and their relevance to disaster management.

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Results

Table 1 presents the demographic characteristics of the 23 participants in our study. Following an analysis of the interviews, we identified four key themes: The significance of planning for volunteer involvement, factors influencing participation, the organization of volunteers, and the nature of volunteer engagement. Using the grounded theory approach, we derived 11 categories and 32 subcategories from the data, starting with 438 initial codes. This process culminated in the conceptual model depicted in Figure 1 (see Table 2 for details).

The need to plan for volunteer participation

Tehran faces significant challenges that urban managers must address, underscoring the need for well-trained and prepared staff to manage these risks. Despite the city's limited availability of well-trained personnel, the potential of voluntary services offers a valuable resource to mitigate this shortfall. Our study participants emphasized the importance of strategic planning for volunteer engagement, drawing on their experiences. The city is exposed to various hazards and demonstrates a relatively high level of vulnerability.

One faculty member highlighted this vulnerability: "The city's development under challenging economic conditions has resulted in the neglect of urban development standards, which has become the city's most significant vulnerability." Furthermore, the unbalanced and rapid development of Tehran, coupled with the limited capacity of relief organizations and the inadequate prioritization of disaster management within society, has created a situation where essential human resources are lacking. This shortage hinders responsible organizations from effectively implementing disaster management programs across all phases, including prevention, mitigation, preparedness, response, and recovery.

As one rescue worker expressed (participant [P5]): "I always pray that an earthquake doesn't happen because there is no one to save us—not even ourselves." He also noted, "In the current situation, we lack new recruits, and even our retirees are not being replaced." Fortunately, there is a high sense of altruism among the Iranian people, and significant capacities exist in helping others. Some Non Governmental Organization (NGO)s have been established and have provided substantial assistance during previous disasters in the country. Therefore, the motives for performing voluntary services, the existence of volunteer-oriented structures, and the develop-

Table 1. Distribution of interviewees' demographic information

	Variables	No. (%)
Educational status	Diploma	1(4.35)
	Bachelor's degrees	4(17.39)
	Master's degrees	10(43.48)
	PhD	8(34.78)
Work experience (y)	<10	2(8.7)
	11–15	7(30.4)
	16–20	6(26.1)
	>20	8(34.8)
Job status	Citizen	5(21.74)
	NGO manager	4(17.39)
	Disaster manager	9(39.13)
	Faculty	5(21.74)

Table 2. Categories and subcategories extracted from expert interviews on volunteers' participation in Tehran disaster management

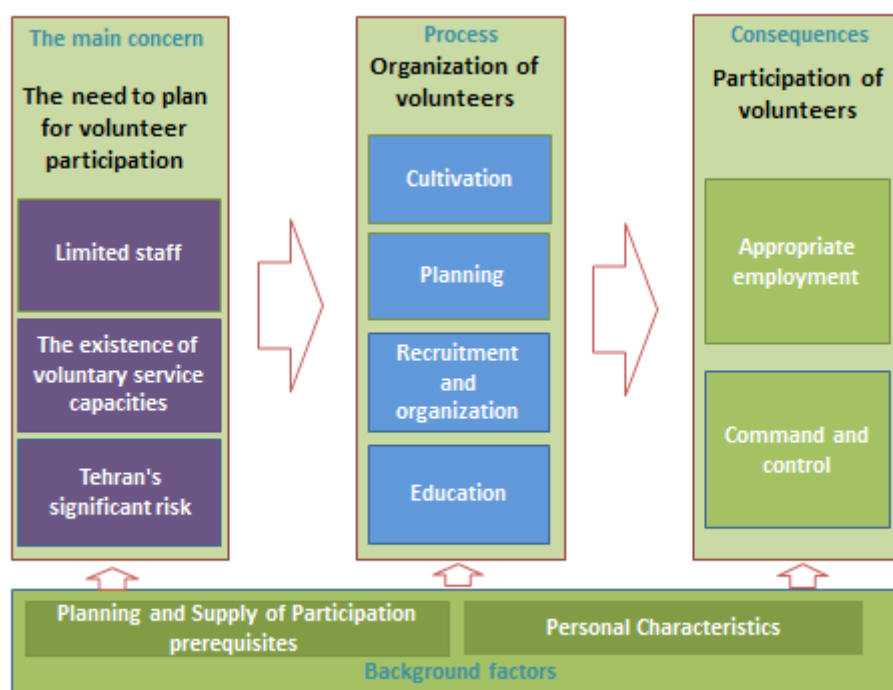| Theme	Category	Subcategory
The need to plan for volunteer participation	Tehran's significant risk	Multiple hazards, significant vulnerability
	Limited staff	Unbalanced and extensive development of Tehran City Limited structure of relief organizations Inappropriate priority of disaster management category in society
	The existence of voluntary service capacities	Motives for performing voluntary services existence of volunteer-oriented structures development of the discourse of voluntary service
Background factors	Planning and supply of participation prerequisites	Reforming and improving community infrastructure Capacity Building Financing
	Personal characteristics	Personality characteristics Individual characteristics
Organization of volunteers	Cultivation	Improving people's knowledge and awareness, Improving people's attitudes
		Improving managers' performance
		Knowledge-oriented programs
	Planning	Planning models
		Planning considerations
		Create and improve motivation
	Recruitment and organization	Recruitment and retention of volunteers
		Organizing volunteers
	Education	General and specialized education
		Empowerment
Participation of volunteers	Appropriate employment	Management of specialized NGOs
		Management of occasional volunteers
		Management of individual volunteers
		Motivational considerations and application
		Invitation
		Coordination
	Command and control	Command and leadership
		Monitoring and evaluation

ment of the discourse surrounding voluntary services are available assets for managing disasters in Tehran.

When asked about human resources, one participant (P13), a manager from the Red Crescent Society, stated: "The spontaneous response and presence of Tehran's off-road riders during the Kermanshah earthquake was shocking to me. I never expected them to join us every step of the way. "

Organization of volunteers

Utilizing such capacities necessitates careful planning to organize volunteer efforts effectively. Insights from the experts suggest that organizing voluntary resources requires a comprehensive approach that includes culture-building, strategic planning, recruitment, organization and relevant training.

Improving public knowledge and awareness, changing attitudes, and enhancing managerial performance were

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Figure 1. The participation model of Tehran City volunteers in urban disaster management

emphasized in the interviews, highlighting the need for cultivation. One participant (P12) remarked, "If people know that participating in risk management could benefit them one day, they will be more motivated to take action. Therefore, it is essential to inform and raise awareness about this issue."

In addition to public outreach, officials must possess appropriate knowledge, attitudes, and performance levels in this field. One participant (P18) stated, "Relevant officials should understand how to work with volunteers, believe in this mission, and actively support it. If the responsible person lacks compassion, how can we expect volunteers to come and help?"

Planning in this area should be knowledge-oriented and tailored to fit the context of Tehran, considering various considerations. One participant, a leader of an NGO (P20), pointed out, "A key aspect of planning to recruit volunteers is to avoid political entanglements. Whenever politics become involved, progress may be made, but we lose many potential volunteers."

In addition to planning, effective recruitment and organization are crucial for fostering volunteer participation. Proper recruitment should follow an effort to generate motivation among individuals and must be coupled with effective retention strategies. Organizing people based

on the specific needs for collaboration is the next step and should conclude with clear guidance on work requirements and ongoing cooperation.

In this context, a participant (P11) noted, "A volunteer who helps others should not have to worry about their family's safety. The responsible organization must ensure necessary protections to encourage people to continue volunteering. Otherwise, we risk a significant drop in volunteer numbers."

Specific training and empowerment programs must be established to harness volunteers' potential fully. Recruitment and organization efforts without adequate training will not yield effective outcomes. It is vital that training and empowerment initiatives address the fundamental needs of both volunteers and the managers and employees involved in volunteer coordination.

One participant (P19) commented on the issue of inadequate training: "Some managers are not familiar with the concepts of volunteering and participation. They not only fail to attract volunteers but also discourage those who are willing to work with organizations."

Participation of volunteers

All efforts in the field of volunteering aim to utilize capacities effectively to achieve organizational goals. This aim is accomplished by aligning each volunteer's expertise with the organization's needs at the appropriate time. Another important aspect is the presence of impulsive volunteers who come forward to help during emergencies, driven by their emotions. Additionally, managing NGOs that specialize in this area is crucial. The best approach is clearly explaining how to cooperate during the preparation phase. In all cases, planning to control and coordinate these efforts is essential for their effective utilization.

One participant (P9), a manager from the Iranian Red Crescent, noted: "One of our problems during disasters is that a group of people, influenced by news of the incident and heightened emotions, rushes into the area without a proper understanding of the operational process. Not only do they fail to assist, but they also create challenges for the operational teams. This situation harms the teams' effectiveness and negatively impacts the community's mental state by spreading non-expert opinions."

Background factors

Based on expert opinions, successfully implementing proposed processes, addressing key concerns, and achieving desired outcomes requires fulfilling a series of prerequisites and considering individual characteristics. A crucial aspect involves improving social infrastructures, clarifying relevant documents and laws, planning support programs, and securing financial resources. Notably, developing the capacity to utilize voluntary services effectively is essential.

One participant (P6) emphasized this: "In a society with poor economic conditions, expecting people to participate voluntarily is unrealistic. Many individuals seeking to get involved are unemployed and view relief efforts as a means to secure income and resources, anticipating financial compensation."

Discussion

Based on our findings, Tehran faces significant vulnerabilities, limited staffing, and the availability of voluntary service capabilities, highlighting the need for planning voluntary assistance during disasters. The steps involved in this process include cultivation, planning, recruitment, organization and education. We identified that establishing participation prerequisites and understanding personal characteristics are crucial factors affecting this process. Effective integration within a command and control structure can ultimately enhance volunteer participation. Volunteering has deep roots in Iran and the Tehran Crisis Prevention and Management Organization has made progress in establishing a volunteer system known as DAVAM [31].

In the current context, several important questions arise regarding urban disaster management. A central question, aligned with an all-hazards approach, is how to effectively harness the potential of volunteers to manage disasters in the complex environment of Tehran. This question served as the foundation for our study, in which we utilized grounded theory methodology to develop a substantive theory for planning volunteer participation in disaster management within the city. Our findings indicate that disaster managers in Tehran face significant challenges, including an increasing variety of hazards that elevate both risks and the need for preparedness planning.

A well-trained and prepared workforce is a crucial resource for managing disaster risks. Given the limited available staff, volunteer participation could effectively supplement these resources, creating mutual benefits for both volunteers and the community. It is vital to communicate these mutual benefits to the citizens of Tehran, as doing so may foster greater participation. This communication is particularly important, as individuals or organizations are always willing to engage in disaster management efforts.

In addition to spontaneous and organized volunteers, we identified voluntary service capacities as a key finding and a major concern. Addressing this issue is crucial for explaining resolution methods and presenting a planning model. This model will aid city managers in organizing volunteer participation and maximizing the benefits of their involvement. The nature of the work and the conditions volunteers face significantly influence their roles, which we call "application and control." Our findings show that volunteers come from diverse backgrounds and bring various personalities, expertise, expectations and availability. This diversity necessitates a tailored approach to managing them, distinct from that used for mandatory staff. Other researchers, including Paek et al. [6] and Ma et al. [12] and Smith [13], Kojima [15], Koolen et al. [7] and Elshaug et al. [16] and Li & Lin [8] have also highlighted this issue [6-8, 12, 13, 15, 16].

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As a first step toward effective participation, it is essential to consider foundational issues such as having legal support. Researchers Salmani et al. and Lu also emphasized the importance of related upstream documents [23, 24].

The results of this study indicate that an effective plan for optimal participation and appropriate employment involves four main processes: Cultivation, recruitment, organization and education. These aspects were mentioned separately and without coherence in other articles [6-8, 17, 18, 19, 21]. To begin the cultivation process, it is essential to enhance people's knowledge and awareness, promote positive attitudes, and improve managerial performance. This emphasis on cultivation was not identified in other related studies. Furthermore, we found that every plan must be knowledge-oriented, considering various planning aspects and employing different models—a significant point reported in some associated studies [10, 26].

Creating and improving motivation requires an understanding of the individual and social conditions of the target community. This understanding is also crucial for recruiting and retaining volunteers, as noted by Forner [25]. While attracting people may seem straightforward, it is, in fact, quite challenging; the key aspect is retaining them. Our findings indicate that successful recruitment and retention of volunteers depend on a thorough understanding of the relevant conditions, along with the implementation of effective and up-to-date solutions. Proper organization of volunteers is essential for making optimal use of their capabilities and is one of the foundational elements of recruitment. Volunteers can be categorized into two main groups: Organized and spontaneous. Designing programs that cater to these groups can significantly impact future initiatives. Furthermore, education and empowerment should be prioritized in these programs. The productivity of volunteers increases when they are effectively utilized and have received the necessary training for their specific activities. Therefore, there is a pressing need to plan and provide timely general, specialized, and empowerment training programs. Such planning and implementation can be carried out by volunteers who either collaborate with volunteer organizations or work for non-governmental organizations.

The effective organization of volunteers is essential for maximizing their potential and is considered a fundamental aspect of recruitment. Volunteers consist of diverse individuals who generally fall into organized and spontaneous categories. Programs can be developed based on these two groups, influencing subsequent initiatives. Education

and empowerment are particularly crucial in this context. The productivity of volunteers increases significantly when they are appropriately utilized and have undergone relevant training for their specific activities. Therefore, it is essential to promptly plan and implement general, specialized and empowerment training programs. This planning and execution can be managed by volunteers working in collaboration with volunteer organizations or non-governmental organizations.

It is essential to understand that calling in too many volunteers can exacerbate issues during an emergency. Therefore, it is crucial to enlist the correct number of volunteers with the necessary expertise. Lindner also emphasized that the unplanned presence of volunteers can create complications [9]. Service delivery improves by employing volunteers appropriately and managing costs and crowding in the operational environment, and motivation to participate in trustee organizations increases.

Detailed planning is essential for recruitment, training, management, and deployment to maximize the benefits of volunteer participation. This coordination should occur under the oversight of both headquarters and field managers. Careful monitoring and evaluation of specific programs in this area are necessary to ensure continuity and improvement. Forrest et al. have also reported that the interaction between managers plays a significant role in this process [19].

Based on current conditions, it is essential to consider utilizing the capacity of online volunteers, as highlighted in Ackermann's report [22]. Additionally, effectively managing volunteers by leveraging the expertise of specialized non-governmental organizations should be a top priority to maximize their potential in all areas. Lastly, as noted by Amiresmaili, Nahkur, and Forner, managers in this field should also consider leveraging the capabilities of mass media [32].

Conclusion

This study presents a conceptual model for volunteer participation in disaster risk management in Tehran, the capital of Iran. Adopting an all-hazards approach for all disaster risk management plans in the city is essential. A significant challenge is the lack of specialized human resources; however, this issue can be addressed through effective models and strategies that leverage the capabilities of volunteers.

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Our findings indicate that a well-structured plan for optimal volunteer participation and deployment should focus on four key processes: Cultivation, recruitment, organization and education. These processes are central to the model and should be supported by foundational elements, including relevant policy documents, volunteerism promotion, community infrastructure improvements, capacity building and securing adequate funding.

Personality characteristics and individual traits are crucial in determining the effectiveness of volunteers. When planning for volunteer engagement, it is essential to consider factors such as personality traits, expertise, expectations, and availability. Additionally, identifying specific roles for online volunteers, delegating responsibilities to specialized non-governmental organizations, and utilizing virtual spaces and media can significantly enhance the benefits derived from voluntary services.

Finally, we recommend that urban managers in Tehran, in collaboration with other volunteer-oriented organizations, establish a coherent structure for planning the operational organization of volunteers and their training, as well as the training of executive managers.

Study limitations

In this research, we did not encounter any specific limitations.

Ethical Considerations

Compliance with ethical guidelines

This study was approved by the Ethics Committee of University of Social Welfare and Rehabilitation Sciences in Tehran, Iran (Code: IR.USWR.REC.1402.228). All participants were informed about the study's purpose and provided their informed consent to participate. They were informed that the conversations would be recorded, and they could withdraw from the study at any time. Confidentiality was prioritized through the secure storage of recorded interviews, the removal of identifiable information from transcripts and the assignment of participant codes. The research adhered to institutional confidentiality guidelines, and participants were encouraged to skip any questions they found uncomfortable.

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Authors' contributions

Conflict of interest

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References

[1] Lv Y, Sarker MNI. Integrative approaches to urban resilience: Evaluating the efficacy of resilience strategies in mitigating climate change vulnerabilities. Heliyon. 2024; 10(6):e28191. [DOI:10.1016/j.heliyon.2024.e28191] [PMID]

[2] Kristian I, Ikhsan OMF. Integrating community-based approaches into national disaster management policies: Lessons from recent natural disasters. International Journal of Law Review and State Administration. 2024; 2(4):115-25. [DOI:10.58818/ijlrsa.v2i4.150]

[3] Soltani A, Nikseresht M, Rajabpour M, Khoundabi B. The knowledge of safe emergency evacuation during an earthquake among the residents of Tehran, Iran. Health in Emergencies and Disasters Quarterly. 2024; 10(1):21-8. [DOI:10.32598/hdq.10.1.135.3]

[4] Ramazani R, Yari A, Heydari A, Hanafi-Bojd AA, Soltani A, Rostami S, Ostadtaghizadeh A. War, displacement, and the best location for temporary sheltering: A qualitative study. BMC Public Health. 2022; 22(1):2066. [DOI:10.1186/s12889-022-14495-w] [PMID]

[5] Titko M, Ristvej J, Zamiar Z. Population preparedness for disasters and extreme weather events as a predictor of building a resilient society: The Slovak republic. International Journal of Environmental Research and Public Health. 2021; 18(5):2311. [DOI:10.3390/ijerph18052311] [PMID]

[6] Paek HJ, Hilyard K, Freimuth V, Barge JK, Mindlin M. Theory-based approaches to understanding public emergency preparedness: Implications for effective health and risk communication. Journal of Health Communication. 2010; 15(4):428-44. [DOI:10.1080/10810731003753083] [PMID]

[7] Koolen-Maas SA, Meijs LC, van Overbeeke PS, Brudney JL. Rethinking volunteering as a natural resource: A conceptual typology. Nonprofit and Voluntary Sector Quarterly. 2023; 52(1_suppl):353S-77S. [DOI:10.1177/08997640221127947]

Soltani A, et al. Volunteer' Participation Model for Tehran Disaster Management. HDQ. 2025; 10(4):237-246

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[8] Li Q, Lin Y. How can community-based organizations improve flood risk communication? A case study of china based on grounded theory. Systems. 2023; 11(2):53. [DOI:10.3390/systems11020053]

[9] Lindner S, Kuehnel S, Betke H, Sackmann S. Simulating Spontaneous Volunteers-A Conceptual Model. Paper presented at: Proceedings of the 15th ISCRAM Conference; 1 May 2018; Rochester, USA. [Link]

[10] Ertas N. How public, nonprofit, and private-sector employees access volunteer roles. Journal of Nonprofit & Public Sector Marketing. 2020; 32(2):105-23. [DOI:10.1080/10495142.2018.1526744]

[11] Chen SQ, Bai J. Data-driven decision-making model for determining the number of volunteers required in typhoon disasters. Journal of Safety Science and Resilience. 2023; 4(3):229-40. [DOI:10.1016/j.jnlssr.2023.03.001]

[12] Ma Y, Zhu W, Zhang H, Zhao P, Wang Y, Zhang Q. The factors affecting volunteers' willingness to participate in disaster preparedness. International Journal of Environmental Research and Public Health. 2021; 18(8):4141. [DOI:10.3390/ijerph18084141] [PMID]

[13] Smith DH. Determinants of voluntary association participation and volunteering: A literature review. Nonprofit and Voluntary Sector Quarterly. 1994; 23(3):243-63. [DOI:10.1177/089976409402300305]

[14] Soltani A, Dehghan H. [Sociological analysis of strategies to increase the social responsibility of the IRCS with an emphasis on people's participation in disasters (Persian)]. Journal of Rescue and Relief. 2023; 15(4):291-8. [DOI:10.32592/jorar.2023.15.4.7]

[15] Kojima M. Organizational or individual? The effect of social networks on volunteer activities in Japan. International Journal of Voluntary and Nonprofit Organizations. 2024; 35(3):583-96. [DOI:10.1007/s11266-023-00623-6]

[16] Elshaug C, Metzer J. Personality attributes of volunteers and paid workers engaged in similar occupational tasks. The Journal of Social Psychology. 2001; 141(6):752-63. [DOI:10.1080/00224540109600586] [PMID]

[17] Kragt D, Holtrop D. Volunteering research in Australia: A narrative review. Australian Journal of Psychology. 2019; 71(4):342-60. [DOI:10.1111/ajpy.12251]

[18] Jaime D, Martínez P, Contreras D, Bonacic C, Marín M. Volunteers capabilities and their perceived satisfaction and performance in volunteering tasks during socio-natural disasters. International Journal of Disaster Risk Reduction. 2023; 85:103510. [DOI:10.1016/j.ijdrr.2022.103510]

[19] Forrest SA, Trell EM, Woltjer J. Emerging citizen contributions, roles and interactions with public authorities in Dutch pluvial flood risk management. International Journal of Water Resources Development. 2021; 37(1):1-23. [DOI:10.1080/07900627.2019.1701999]

[20] Jones ML, Berry YJ. Enriching leadership of volunteers in the emergency services. East Melbourne: Australian Institute for Disaster Resilience; 2017. [Link]

[21] Penner LA. Dispositional and organizational influences on sustained volunteerism: An interactionist perspective. Journal of Social Issues. 2002; 58(3):447-67. [DOI:10.1111/1540-4560.00270]

[22] Ackermann K. Predisposed to volunteer? Personality traits and different forms of volunteering. Nonprofit and Voluntary Sector Quarterly. 2019; 48(6):1119-42. [DOI:10.1177/0899764019848484]

[23] Salmani I, Seyedin H, Ardalan A, Farajkhoda T. Conceptual model of managing health care volunteers in disasters: A mixed method study. BMC Health Services Research. 2019; 19(1):1-9. [DOI:10.1186/s12913-019-4073-6] [PMID]

[24] Lu X. Research on dilemma and optimization of community. Academic Journal of Humanities & Social Sciences. 2023; 6(21):1. [Link]

[25] Forner VW, Holtrop D, Boezeman EJ, Slemp GR, Kotek M, Kragt D, et al. Predictors of turnover amongst volunteers: A systematic review and meta-analysis. Journal of Organizational Behavior. 2024; 45(3):434-58. [DOI:10.1002/job.2729]

[26] Aminizade M, Nekouei Moghaddam M, Birami Jam M, Shamsi M, Majidi N, Amanat N, et al. [The role of volunteer citizens in response to accidents and disasters (Persian)]. Health in Emergencies and Disasters Quarterly. 2017; 2(3):107-24. [DOI:10.18869/nrip.hdq.2.3.107]

[27] Nahkur O, Orru K, Hansson S, Jukarainen P, Myllylä M, Krüger M, et al. The engagement of informal volunteers in disaster management in Europe. International Journal of Disaster Risk Reduction. 2022; 83:103413. [DOI:10.1016/j.ijdrr.2022.103413]

[28] Corbin J, Strauss A. Basics of qualitative research. New York: Sage; 2015. [Link]

[29] Rubin A, Babbie ER. Research methods for social work. Miaoli: WuNan Book Publishing Co; 2007. [Link]

[30] Khankeh H. [A Applied Qualitative research in healthcare (Persian)]. Tehran: USWR Publications; 2023.

[31] Hosseini KA, Hosseini M, Izadkhah YO, Mansouri B, Shaw T. Main challenges on community-based approaches in earthquake risk reduction: Case study of Tehran, Iran. International Journal of Disaster Risk Reduction. 2014; 8:114-24. [DOI:10.1016/j.ijdrr.2014.03.001]

[32] Amiresmaili M, Zolala F, Nekoei-Moghadam M, Salavatian S, Chashmyazdan M, Soltani A, et al. Role of social media in earthquake: A systematic review. Iranian Red Crescent Medical Journal. 2021; 23(5):e447. [Link]

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Soltani A, et al. Volunteer` Participation Model for Tehran Disaster Management. HDQ. 2025; 10(4):237-246