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Post-disaster damage and loss assessment in the Iranian healthcare sector: a qualitative interview study

Javad Miri¹, Golrokh Atighechian², Hesam Seyedin³ and Ahmad Reza Raeisi^{4*}

Abstract

Background Accurate post-disaster damage and loss assessment is critical for the success of subsequent recovery programs. A comprehensive and systematic damage and loss assessment process involves evaluating the physical damage and financial impact of an event on individuals, communities, and assets. To ensure effective recovery, the various components and entities included in the program must be developed appropriately and efficiently. This study aimed to identify the components and entities of the Iranian healthcare sector's post-disaster damage and loss assessment program.

Methods A qualitative study employing purposive sampling and semi-structured individual interviews was conducted with 18 participants between October 2022 and July 2023, with continuing until data saturation was achieved. Data collection involved semi-structured interviews and observational notes with experts, including representatives from the National Disaster Management Organization (NDMO), the Iranian Red Crescent Society, and the Disaster Risk Management Department of the Ministry of Health and Medical Sciences Universities. The interviews were conducted in the workplace of the participants. Thematic analysis, a conventional qualitative method, was employed for the analysis of the data. Following the transcription of the recorded interviews, the initial codes were extracted, reviewed for accuracy, and classified.

Results The results of this study are based on the insights and experiences of a diverse group of qualified experts in their respective fields. The findings were analysed and classification into ten main themes, 29 sub-themes, and 1,058 codes. The main themes were key concepts and principles of assessment; assessment stages; health system measures in assessment; roles and responsibilities; team composition; information and communication; coordination and collaboration; data collection and analysis; assessment tools and methods; and reporting, documentation, and recommendations.

Conclusion An understanding of key concepts and principles enables stakeholders to respond effectively to disasters, make informed decisions, and facilitate recovery and reconstruction efforts.

Keywords Damage assessment, Loss assessment, Health sector, Disasters, Qualitative study, Reconstruction

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Background

The damage and financial consequences of disasters caused by natural hazards have been increased in recent decades. This can be primarily attributed to increased population and economic growth in regions vulnerable to such events, as well as the ongoing effects of climate change. It is anticipated that future losses from disasters will rise in line with the ongoing expansion of vulnerability and the effects of climate change [1–5]. Infrastructure systems, including lifelines and critical infrastructure, are indispensable for uninterrupted functioning of governments and businesses [6]. However, the functionality of this urban infrastructure system is adversely impacted by disasters, and these consequences significantly influence the daily lives of residents. Furthermore, the efficacious operation of the healthcare system is indispensable to the maintenance of social stability, thereby guaranteeing citizens the capacity to enjoy a customary standard of living [7]. In addition to their impact on human health, disasters also have a detrimental effect on health-related institutions, reducing their capacity to respond and recover. This in turn leads to increased mortality and morbidity [8, 9]. Disasters can directly impact the physical infrastructure of hospitals, clinics, and other health facilities; they may also indirectly impact the health sector owing to the destruction of community infrastructure, such as water, electricity, fuel, transportation, and telecommunications [10–12].

Healthcare facilities must prepare resources and plans for common disaster risks [13]. It is of utmost importance for hospitals to ensure the safety and functionality of their facilities during and after a disaster has occurred. Therefore, it is imperative that hospitals develop disaster plans that allow them to remain operational during and in the aftermath of any event [14].

It is imperative to prioritize post-disaster damage and loss assessments to ensure the security and well-being of healthcare facilities and their patients [15]. Post-disaster data collection on damage and loss is critical for obtaining essential disaster information, particularly after events such as hurricanes, earthquakes, and tsunamis [16, 17]. In the aftermath of disasters, the healthcare system is confronted with numerous challenges. To mitigate and overcome the adverse effects of such events, healthcare planners must adopt effective strategies and take prompt, decisive actions. In Low- and middle-income countries, insufficient financial and material resources affects their healthcare systems and are more vulnerable to damage caused by disasters [18].

Post-disaster damage and loss assessment is an essential part of the recovery and reconstruction process, providing decision makers with the information they need to plan, monitor, and manage recovery and reconstruction effectively and efficiently [19]. To facilitate an appropriate

recovery and reconstruction process, it is essential to ensure the availability of sufficient resources to enable the effective implementation of an appropriate assessment methodology. The methodology employed in post-disaster damage and loss assessments is a valuable tool in the field of disaster management. Extant international guidelines and standards for post-disaster damage and loss assessment concentrate on the collation of data pertaining to a multitude of sectors that have been impacted by the disaster in question. This information is utilized to quantify the economic impact and assist in determining the financial resources required for reconstruction. Furthermore, the collected data are utilized to prevent a similar disaster from causing further devastation in the future [20].

Iran is one of the most disaster-prone countries in the world and is exposed to a wide range of natural and human-made disasters. Iranian healthcare facilities can play a significant role in providing lifesaving measures [21]. In response to disasters, Iran has robust institutional and technical arrangements for disaster management at the national level; however, there is a lack of disaster studies in terms of content or themes and return to better conditions with a particular focus on sustainable development [22]. The Iranian health sector lacks detailed guidelines and supporting tools for damage and loss assessment, making it challenging to identify the impacts on service delivery and infrastructure, prioritize recovery and reconstruction efforts, and measure the effectiveness and efficiency of these activities [23]. However, the program outlined here provides a foundation and framework for guiding the principles, concepts, and methodologies for assessing damage and loss to health facilities and services. This will support the development of sector-specific assessment tools and implementation of assessment activities with confidence and authority in the future.

Study aims

Despite historical precedents of post-war and post-disaster reconstruction in Iran, substantial challenges persist with respect to damage and loss assessment. The health sector is among the most severely impacted by disasters. Given the pivotal role of the health sector in reducing the consequences of disasters, this study aimed to identify the entities and components of a post-disaster damage and loss assessment program in Iran's healthcare sector. This study constituted the second phase of a research project aimed at the development of a post-disaster damage and loss assessment program in the Iranian health sector. The study protocol was published in *BMJ Open* in 2023 [24].

Materials and methods

Study design

Numerous post-disaster assessments have demonstrated the inherent challenges associated with ambiguity and confusion arising from disparate assessment methodologies. This study proposes the implementation of a standardized and comprehensive approach to post-disaster assessment within the Iranian health sector. This approach is intended to facilitate more integrated and holistic recovery planning, with particular emphasis on the concept of 'building back better'. This study was conducted between October 2022 and July 2023, following approval from the Vice Chancellor for Research at the Isfahan University of Medical Sciences. The study protocol was registered on the Open Science Framework on June 4, 2022 [25] and subsequently published in *BMJ Open* in 2023 [24].

Semi-structured interviews were conducted with experts in Iranian health sector disaster management in accordance with the Consolidated Criteria for Reporting Qualitative Research checklist (COREQ) to ensure methodological rigor and transparent reporting of qualitative research results. (See Supplemental Table).

The purposive sampling technique was used to select participants who could provide comprehensive and pertinent data for the research interview questions. Various methods were employed to facilitate the coordination of the interviews. Contact was made with the relevant organizations and individuals via an official letter of introduction from the Vice Chancellor of Research and Technology of Isfahan University of Medical Sciences and Health Services. This was performed to demonstrate the authority and credibility of the research team in the field. The participants were furnished with an interview protocol that provided a summary of the study objectives and the initial questions. Prior to the commencement of the interviews, participants were asked to provide their consent to participate in the study.

The interviews were conducted in various settings, including in-person, via telephone, and via video calls using Skype. It should be noted that, due to the circumstances that have arisen subsequent to the pandemic caused by the Covid-19, and the challenges associated with accessing the participants, one interview was conducted via telephone, and another was conducted via video call using Skype. A total of 16 interviews were conducted in person.

Each interview lasted from 30 min to two hours. The main researcher conducted the interviews and recorded them for analysis. Prior to the interviews, participants were informed of the interviewer's name and affiliation, objectives of the study, importance of confidentiality, and voluntary participation. The interviews were conducted in Persian, the native language of participants.

The interview began with a broad question and then proceeded with focused and specific questions directly related to the objectives of the study, taking into account the experience and knowledge of the interviewees. Once data saturation was reached, the data collection process was considered complete. All the interviews were transcribed in their entirety. Thereafter, the transcripts were imported into the Maxqoda 2020 software for coding and data management. Field notes were also taken by the main researcher during the interviews, who were subsequently consulted during the data analysis process.

Research community

The research community involved in the interviews included key informants and experts with experience and history of damage and loss assessment and activities in the Iranian Ministry of Health and Medical Education and related institutions.

Inclusion and exclusion criteria

The inclusion criteria stipulated that participants must be professors in the field of health in disasters and emergencies, or experts in post-disaster damage and loss assessment. Furthermore, applicants were required to possess a minimum of five years of work experience and demonstrate familiarity with the Iranian health system. In accordance with ethical considerations, including failure to provide informed consent, the applicants were excluded from the study.

Validity, transferability, and reliability

To ensure the dependability of the qualitative research, the research process was meticulously delineated to facilitate the theoretical reproduction of the study and the attainment of analogous results. A selection of quotes was included in the [Results](#) section to provide further confirmation of the study's reliability. The study was conducted in accordance with the research regulations at the University of Isfahan University of Medical Sciences, which serves to enhance the reliability of the study. The credibility of the study was enhanced by the inclusion of a diverse range of participants representing various job positions, who provided observations from different points of view, thereby increasing the study's transferability. Moreover, the reliability of the findings was enhanced by the incorporation of quotations from experts. To guarantee the veracity and legitimacy of the study, the researcher took measures to ensure the trustworthiness and acceptability of the data. This entailed maintaining prolonged and continuous involvement with the environment and participants. The complete transcript of the interviews and the full data analysis process were subjected to expert review. To enhance the transferability of this research, the researchers employed

Table 1 Sample questions included in the interview guide

Questions
1. What is your general opinion regarding the post-disaster damage and loss assessment? <ul style="list-style-type: none"> o What is your overall assessment of the methodology utilized for post-disaster damage and loss assessment in Iran? o What is your overall assessment of the methodology utilized for post-disaster damage and loss assessment in Iranian health sector?
2. What methodology should be employed to conduct a post-disaster damage and loss assessment in the Iranian health sector? <ul style="list-style-type: none"> o What measures should be taken at each stage of the assessment?

Table 2 The demographic characteristics of participants in qualitative interviews

The participants number's	work experience average (years)	Age average (years)	Gender's	N	Degree's	N
18	19.5	52	Men	14	PhD	16
			Women	4	Masters	2

a variety of techniques, including concurrent data collection and analysis. These techniques ensured coherence between the research questions and the methods employed, thereby enabling a comparative analysis of the results with those of other studies. Moreover, a detailed report was provided for each research phase, and the participants involved in the study represented a diverse range of backgrounds. The trustworthiness of the empirical material and interpretation was enhanced through a discussion with other authors.

Data collection tool and method

Interviews were one of the most common methods of data collection. Semi-structured in-depth interviews are used in qualitative research and are widely recognized as an essential source of qualitative data in health services research [26, 27].

The interview topic guide was developed through a scoping review during the initial phase of the research and a few focus group discussions. It included main and probing questions that explored participants' knowledge and experiences with damage and loss assessment programs following a disaster. The interview commenced with a general question, followed by targeted and detailed questions about the study, based on the information and experience of the participants. The sample interview questions are listed in Table 1. All interviews were transcribed verbatim. The transcripts were then imported into Maxqda 2020 software for coding and data management. During the interviews, the interviewer made field notes, which were consulted during data analysis.

Data analysis method

Thematic analysis is a qualitative research method that identifies, analyses, organizes, describes, and reports the main themes found across the collected data, providing detailed, complex, and reliable findings that are rich in content and depth [28].

In this study, a thematic analysis was employed as the method of data analysis. This method permits flexibility in the analysis output, which may be subject to

modifications throughout the coding process. A code was assigned to identify specific statements and descriptions that were reiterated. Subsequently, the codes were grouped into concepts, which were then organized into themes. The preliminary analysis of the interview transcripts was conducted by Miri and Raeisi, with a dual focus on both preconceived research questions and emergent themes. The research questions were designed to encompass beliefs about, experiences with, and attitudes toward entities and components of post-disaster damage and loss assessment programs in the health sector. Notes taken during and after the interviews on non-verbal aspects of communication and the general atmosphere of the interview proved invaluable in elucidating the significance of contradictions. Subsequently, the other authors reviewed the analysis and provided feedback based on their independent readings of the transcripts. Through discussion, the authors achieved a consensus regarding the interpretation and representation of the participants' narratives.

Ethics approval

This study was approved by the ethics committee of Isfahan University of Medical Sciences. Prior to their participation in the study, all participants received comprehensive information concerning the content of the interviews through an interview protocol and email. Participants were informed that their involvement was entirely voluntary and that their identities would remain anonymous. The participants were then asked to read and sign a consent form. The participants were permitted to withdraw from the study at any point.

Results

Qualitative interviews were conducted with 18 participants. The demographic characteristics of the participants in the qualitative interviews are presented in Table 2.

The majority of the participants were from Tehran and Isfahan. The participants were primarily faculty members from the universities of medical sciences and training

Table 3 The organizational positions of the interview participants

No	The role of the participants	N
1	A coordinator of one of the United Nations country team in Iran	1
2	Deputy of the University of Medical Sciences	2
3	The head of the Pre-hospital Emergency Medical Services of the country's universities of medical sciences	2
4	Member of the faculty of medical sciences universities	8
5	The academic staff of the Iranian Red Crescent Institute of Higher Education	3
6	Expert of the National disaster management organization	1
7	Expert of Technical Office of Medical Sciences Universities	1

Table 4 Summary table of themes and sub-themes

Main themes	Subthemes
Key concepts and principles of assessment	Damage assessment Loss assessment
Assessment stages	First stage: Assessment to elicit an effective response Second stage: Assessment to Business Continuity
Health system measures in assessment	Mitigation activities in disaster damage assessment Preparedness activities in disaster damage assessment Responses activities in disaster damage assessment Recovery activities in disaster damage assessment
Roles and responsibilities	An overview of the organizational structure of assessment in Iran Disaster damage assessment team position within the organization Post-disaster intersectoral assessment approach in healthcare sectors Post-disaster damage assessment capability Post-disaster health assessment key stakeholders
Team composition	Disaster damage assessment team composition Post-disaster damage assessment team composition according to the assessment stages
Information and communication	Comprehensive information system Disaster information integrated approach Disaster risk communications Information needed in disaster assessment
Coordination and collaboration	Disasters risk understanding Comprehensive disaster management system Inter- and intra-sectoral coordination and collaboration in post-disaster assessment
Data collection and analysis	Data collection Data analysis
Assessment tools and methods	Equipment and supplies Assessment tools and methods
Reporting, documentation, and recommendations	Assessment report: integrated structure Documentation of the assessment process Lessons learned

centers affiliated with the Iranian Red Crescent. The organizational positions of the participants are listed in Table 3.

The interview findings were categorized into ten main themes, 29 sub-themes, and 1058 codes. A summary of themes and subthemes is presented in Table 4.

Key concepts and principles of assessment

Understanding the concepts of damage and loss assessment is of paramount importance in fields such as disaster management, insurance, and risk assessment. A focus on the key principles of these terms serves to enhance understanding and perception of disaster risk.

Assessment stages

The participants' opinions were used to divide the disaster damage and loss assessments into two main stages.

1. Primary assessment aimed to identify effective response.
2. Secondary assessment stage aimed to continuing the business.

The primary phase of the assessment process entailed two assessments: an initial rapid assessment and a preliminary assessment. The secondary phase comprised of

comprehensive and detailed assessments. The following quotes are provided for reference:

“The initial stage of the process is to conduct a preliminary assessment of the extent of the damage.” (Participant No. 15).

“The term “process” was employed for that reason. This process commences with the incident and may continue for an indefinite period. Even 20 years after the initial incident, an individual may revisit and conclude that their initial assessment is inaccurate. In such a case, they may undertake a new assessment.” (Participant No. 13).

Health system measures in assessment

The study participants posited that the implementation of efficacious and comprehensive health system measures for disaster recovery is of paramount importance. Health system measures must be credible, meaningful, and holistic to build resilience and reduce the risk of potential disasters. The following quotation highlights this point:

“A considerable proportion of the work will be completed during the preparedness stage.” (Participant No. 2).

“It is my considered view that, whatever course of action is taken in the aftermath of a disaster, it would be prudent to consider what measures were taken before it occurs.” (Participant No. 6).

“A reassessment is required to the continuity of the response.” (Participant No. 16).

Roles and responsibilities

In the context of organizational structures, the term “role” is used to describe the specific position or role that an individual has been assigned within a given team, unit, or department. In contrast, the term “responsibilities” is utilized to describe the duties and tasks that are assigned to a particular role. This theme presents participants’ opinions regarding the roles and responsibilities of the various parties involved in the organizational structure of post-disaster damage and loss assessment in the Iranian health sector. The following statement highlights these findings.

“The responsibility of damage and loss assessment is legally assigned to the country’s crisis management organization.” (Participant No. 3).

“In conclusion, the document is then subjected to summary, confirmation, and subsequent transmission to the governorate. Subsequently, all such reports are delivered to the provincial crisis management team, which is headed by a provincial crisis manager. Subsequently, the information was transmitted to us, after which we undertook a verification process.” (Participant No. 7).

“The issue of damage assessment is more accurately described as a governmental one. In fact, government institutions in different sectors are assessing the damage and providing an overall assessment of it.” (Participant No. 7).

Team composition

There was a divergence of opinion among participants regarding the composition of the team responsible for conducting post-disaster damage and loss assessment in the health sector. These opinions are shaped by the magnitude of the disaster and assessment stage. The following quotes are provided for reference purposes:

“In the same phase of preparing for something like an earthquake, you’d better say, “I’m going to make up a team of these people.” (Participant No. 2).

“The damage assessment team is an interdepartmental team and the communication and information group should be part of the damage assessment team.” (Participant No. 11).

“Non-professionals or semi-professionals carry out the initial rapid assessment.” (Participant No. 9).

Information and communication

The dissemination of information and facilitation of communication in the context of post-disaster damage and loss assessment are of paramount importance. The participants expressed a consensus regarding the role of information and communication technology (ICT) in post-disaster damage and loss assessment within the health sector. The following quotation illustrates these findings.

“The fact that we can provide a platform where both the discussion of information sharing and the exchange of data are important, I think, is a perfect approach.” (Participant No. 1).

“Unfortunately, in our country we do not have a

proper disaster registration system.” (Participant No. 3).

“In the first few days, 80–90% of our data is secondary. It is pre-accident information, it is organization information, it is satellite information.” (Participant No. 3).

“Define the level of access. How much access should the Deputy Minister have? How much access should the Minister have?” (Participant No. 4).

Coordination and collaboration

This study explores the participants’ perspectives on coordination and collaboration in post-disaster damage and loss assessment in the health sector. The following quotes are provided for reference:

“The main problem is that the structure that should be responsible for risk management doesn’t yet have a place in the Ministry of Health.” (Participant No. 4).

“We have to create an organization and an office that will coordinate the work, the letters will be confidential, there will be no emails and such, and there will be no Telegram, WhatsApp and such.” (Participant No. 5).

“Collaboration and coordination should be discussed in the preparedness phase and these challenges should be addressed.” (Participant No. 10).

Data collection and analysis

The systematic collection, analysis, and interpretation of post-disaster damage and loss assessment data in the health sector is crucial for the implementation of effective reconstruction and rehabilitation strategies. A diversity of perspectives was observed among participants regarding the optimal methodology for data collection and analysis in the context of post-disaster damage and loss assessment in the health sector. The following quotations serve to illustrate this point:

“If the issue is data collection, it is important that this is part of the preparedness stage.” (Participant No. 10).

“Once the data is collected, how should it be summarized and interpreted? Finally, we should have an output from this raw data.” (Participant No. 10).

“Data generation can occur frequently. It can be magnified and exaggerated.” (Participant No. 12).

Assessment tools and methods

In order to achieve the objectives of post-disaster damage and loss assessment in the health sector, a variety of tools and methods may be employed. The aforementioned tools and methods exhibit a range of characteristics, including their intended purpose, the degree of precision with which data is collected, and the resources required for data collection and processing. Furthermore, there was a divergent of opinion among the participants regarding this theme. The following quotations are provided for reference purposes.

“Previously, not only was the health sector lacking the right tools, but most of the other sectors were the same. So, the reports that came from other sectors were based on evidence. It was not based on a standard checklist. Everybody gave these reports based on their own experience and knowledge.” (Participant No. 1).

“It is neither based on established protocols nor reliant on particular tools.” (Participant No. 4).

“It is recommended that damage assessment be carried out utilizing a variety of methodologies.” (Participant No. 15).

Reporting, documentation, and recommendations

A variety of perspectives were presented regarding reporting procedures, documentation protocols, and recommendations for assessing damage and loss in the healthcare sector in a post-disaster context. The following quotations highlight this point:

“The most significant challenge was the absence of a unified framework for preparing the report. This naturally led to the report being divided into sections for inclusion in various reports. Lack of coherence in the presentation of these reports is a further issue.” (Participant No. 1).

“It is of great importance to document lessons learned and after-action reports. A part of it is related to damages and experiences resulting from the assessment that has been conducted.” (Participant No. 8).

“The assessment frameworks and forms that are

considered the most appropriate for the documentation of results.” (Participant No. 9).

Discussion

The impact of disasters extends beyond the immediate loss of human life to encompass the destruction of critical infrastructures, including healthcare systems, supply chains, logistics, manufacturing, and service industries, this results in disruptions in health services and compromised care for affected populations. The evidence indicates that hospitals are inadequately prepared and lack the necessary resources to respond effectively to disasters such as earthquakes. Damage to hospitals and other health facilities is not a primary consideration in disaster response [29]. The accurate and timely identification of the damage and loss is crucial for the implementation of effective disaster emergency response and loss assessment strategies [30]. Effective post-disaster damage and loss assessment strategies are essential in order to address these challenges. Understanding the primary health care needs of disaster victims is essential, highlighting the importance of immediate and specialized health care [31]. In view of the necessity for the establishment of a comprehensive disaster damage assessment program within the Iranian health sector, this study was devised with the objective of identifying the principal entities and components that are pivotal for the efficacious implementation of such a program.

In the study conducted by Ryosuke Nagasawa and colleagues in 2020, it was determined that for emergency responders to make informed decisions, they require access to accurate and comprehensive data. Furthermore, the data must be acquired and analysed rapidly to ensure an efficacious response. One of the primary responsibilities following a disaster is to conduct an assessment of the damage incurred in the affected region [32]. One of the most significant challenges in the field of disaster damage assessment is the lack of clearly delineated levels of data access for disaster managers, which presents a significant obstacle to the effective and efficient completion of such assessments. This study considers two key aspects: data collection and analysis and the definition of the level of data access for beneficiaries.

In a study published in 2020, Bingqing Lu and colleagues posited that information and communication technologies (ICTs) play a pivotal role in the context of disasters. This is particularly evident in the domains of post-disaster damage assessment, data collection, and the dissemination of information. The utilization of ICTs has been shown to reduce casualties and economic losses during the disaster response phase [33]. ICTs occupy a pivotal role in disaster management, facilitating the dissemination of information, data collection,

and post-disaster damage and loss assessment. This study concentrates on the role of ICTs in disaster management, and there was a diversity of opinions among participants.

In the 2020 study by EA Irvin-Barnwell et al., it was noted that the Incident Response Coordination Team's expertise was leveraged in the post-hurricane period to conduct a comprehensive assessment of the damage. It seems reasonable to posit that collaboration, coordination, and data sharing among agencies would result in a reduction of redundancies and an improvement of situational awareness in future responses. Moreover, this was beneficial for healthcare facility administrators, who reported a disruption in communication following Hurricane Maria [34]. Effective coordination and collaboration in post-disaster damage and loss assessment in the health sector are of considerable significance. The objective of this study was to gain insight into the participants' perspectives on the coordination and collaboration in post-disaster damage and loss assessment in the health sector.

In a study published in 2023, Deepank Kumar Singh et al. highlight the importance of preliminary assessment in the aftermath of a disaster, emphasizing that preliminary damage assessments (PDA) are a crucial initial step in ensuring a resilient recovery. Conventional door-to-door inspection practices are time-consuming and may impede the timely allocation of governmental resources [35]. In a study conducted in 2020, Soma Sarkar underscored the importance of rapid assessment as a critical component in expediting the recuperation process and facilitating effective post-disaster reconstruction strategies [36]. In this study, the participants' opinions were used to categorize the disaster damage and loss assessment into two principal stages. The primary stage of the assessment process is designed to identify an effective response and comprises two assessments: an initial rapid assessment and a preliminary assessment. The secondary phase, which is designed to continuing the business, entails comprehensive and detailed assessments.

The effectiveness of post-disaster response and recovery activities depends on accurate and early damage assessment. The tools and methods used for post-disaster damage assessment are typically diverse [37–42]. A comparative analysis of the methods used in post-disaster damage and loss assessment programs around the world reveals significant differences in approaches [43–47]. A variety of tools and methods can be used to achieve the goals of post-disaster damage and loss assessment in the health sector, and there is a wide range of opinions among participants about these tools and methods.

In the aftermath of the Nepal earthquake, a team of engineers conducted an assessment in collaboration with social mobilizers. The assessment teams were heavily reliant on the social mobilizers to navigate the unfamiliar terrain, identify suitable locations for surveys, and

interact with the owners of the selected properties [48]. The findings of our study revealed a diversity of perspectives regarding the composition of the disaster damage and loss assessment team at various stages in the health sector.

In Iran, the health sector faces challenges during disasters caused by natural hazards such as earthquakes [24]. In 2023, Sohrabzadeh et al. recommended the use of economic assessment approaches to illustrate the financial impact of disasters. The results of economic loss assessments can inform the design of effective disaster preparedness and response strategies [49]. These approaches provide a practical framework for disaster management. Further research is needed to identify the benefits and limitations of each health sector assessment method or approach, and to determine their suitability for use in specific disaster scenarios.

The objective of the present study was to elucidate a conceptual framework for post-disaster damage and loss assessment in Iran's health sector, in accordance with the social, economic, and cultural conditions. The final framework will be developed through a combination of established programs, input from key stakeholders, and experts' opinions. This approach has the potential to enhance our understanding of and to optimize the quality of post-disaster damage and loss assessment of the healthcare sector. It is of the utmost importance that the health sector implements a robust and efficient post-disaster damage and loss assessment program in order to ensure the continued delivery of essential services. Notwithstanding the significance attached to the post-disaster damage and loss assessment field of activity, Iran has yet to implement an official program for this purpose in its health sector. The currently available tools and methods for quantifying basic data and post-disaster damage and losses, as well as the methodology employed to gather data on such damage and losses within the Iranian health sector, are inadequate for providing a comprehensive picture of the impacts of extreme events. In light of these shortcomings, the objective of this study was to identify the key elements of a post-disaster damage and loss assessment program in Iran's health sector.

Conclusion

The implementation of a post-disaster damage and loss assessment program in the Iranian healthcare sector is contingent upon the fulfillment of a number of key factors, including the training of human resources, the establishment of effective communication channels, the clarification of roles and responsibilities, the utilization of standardized assessment tools, and the implementation of reliable data management systems. This study also emphasizes the importance of collaboration with a diverse range of stakeholders, including governmental

agencies, relief organizations, and the private sector. The findings of this study can help government agencies and organizations engaged in emergency management, non-governmental organizations, and countries providing aid as a decision-making resource. Further research is necessary to determine the effectiveness of the model in real-world disasters and to assess the model prior to implementation.

Limitations and problems of research

The most important limitations of this study are as follows.

- Focusing only on damage and loss assessment in the health sector was another limitation of this study. To provide a more comprehensive view, the topic of need assessment should also be included in the program. It is important to consider all parts affected by disasters together.
- The limited generalizability of qualitative studies is a significant constraint, and the practical applications of this study's findings may be restricted.
- The absence of a system for recording the consequences of hazards at the national level and the health system.
- Access to necessary texts and documents inside the country.
- Access to information sources and related external sites.

The most important problems in the implementation of this study are as follows.

- Limited resources regarding the disaster damage assessment program.
- Coordinating with the participants and scheduling interviews proved to be the main problem in implementing the study, which was facilitated by communicating with the participants prior to the interview and coordinating the right time for the interview.
- The participants in this stage of the study were university professors and middle officials of the health sector, because of their busy schedules, coordination in conducting interviews was one of the problems of this stage.
- Dispersion of participants in different provinces was one of the problems of this study.

Suggestions

In the event of a potential future disaster, it is recommended that a comprehensive assessment of damage and loss be conducted in the affected Iranian health sector.

The difficulties inherent in this undertaking should be evaluated in light of the findings of this study. This study is innovative in that it represents a significant departure from previous practices in our country, where only damage reports were made. According to this study, the report should prioritize and make recommendations for the recovery of the health sector. It is further recommended that a comprehensive damage and loss assessment be implemented following the occurrence of different disasters. Additionally, the establishment of a national database for disaster damage assessment is proposed.

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12889-024-19877-w>.

Supplementary Material 1

Supplementary Material 2

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Author contributions

J. Miri and A.R. Raeisi were involved in the titling, conceptualization, and design of the study. They also drafted the manuscript in consultation with G. Atighechian and were in charge of the content analysis design and implementation. G. Atighechian consulted on the manuscript draft and supported the development of the questionnaire. H. Seyedin also supported the development of the questionnaire.

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Data availability

The data that support the findings of this study are available from the first author, [Miri J.], upon reasonable request.

Declarations

Ethics approval and consent to participate

We obtained ethical approval for the study from the ethics committee of the Isfahan University of Medical Sciences (IR.MUI.NUREMA.REC.1400.171)¹. The study was conducted following the principles of voluntary participation, informed consent, and ethical research. Prior to the commencement of the interviews, participants were furnished with a clear and detailed explanation of the study's objectives and how their responses would be utilized. Individuals were included in the survey only upon their consent. Participants were allowed to withdraw from the study at any time. Data obtained were subjected to a rigorous analysis. The results of this study will be presented to the Iranian Ministry of Health, published in a peer-reviewed journal, and disseminated through social media and presentations at national and international conferences related to disaster management and the health sector.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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