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Development and Validation of a Clinical Guideline for Reproductive Health in Natural Disasters: A Mixed Methods Study

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ABSTRACT

Background & aim: Preparing to deal with natural disasters, is important for the health of the society, and a valid clinical guideline which fits the country's conditions can lead to a reduction in complications caused by the aforementioned disasters. Therefore, the present study was conducted to develop and validate the clinical guidelines for reproductive health in natural disasters.

Methods: This mixed methods study was carried out in three phases. The first phase was a structured review of literature which systematically reviewed the articles and clinical guidelines related to the reproductive health in disasters. In the second phase, a qualitative study was conducted with the content analysis approach in order to identify the needs related to women's reproductive health in disasters, and a draft clinical guide was prepared. In the third phase, the validation of the prepared draft was carried out by a group of experts using the (RAND) Research and Development technique.

Results: The themes obtained included the consequences of facing a disaster and the need to provide comprehensive services. The clinical guideline consists of 5 chapters including an introduction on the importance of reproductive health in natural disasters, general clinical guidelines, prevention of physical and mental injuries in a crisis, access to reliable sources of information and the availability of the health services provider team.

Conclusion: Correct management of crisis, empowering information skills and access to service providers in crises are of particular importance. Therefore, support of health care providers and training of service providers to learn about evidence-based performance in crises and their use is a necessary step to implement the clinical guidelines prepared in the country.

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Introduction

Despite scientific advances, natural disasters and crises are the main causes of death in the world. According to the Red Cross Organization, a crisis or disaster is an event that results in the death of at least 10 people and the injury of at least 100 people and makes them need the help of others (1). Iran is one of the 10 most vulnerable countries in the world (2) and the number of natural disasters in Iran is significant due to its climatic conditions and geographical location (3). Due to being located on the earthquake belt, Iran is always threatened by internal crises caused by the activation of earthquake faults (4). In the last 2 decades, about 950 earthquakes have occurred in Iran,

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which have resulted in the death of more than 120,000 people (5).

Flood is also one of the most important natural disasters in Iran, and statistics show the increasing occurrence of this phenomenon during the last 4 decades, which has led to macro-economic damages and high mortality rates (6). In different countries of the world, after the occurrence of natural disasters, the health and treatment team is sent to the crisis-affected areas to reduce casualties and damages, and midwives are one of the members of this team and they are responsible for providing services related to reproductive health (7). Paying attention to reproductive health is important for the health of society and future generation (8). In case of critical situations, people's health is endangered and it is absolutely necessary to pay attention to public health and fertility (9) because the survival of the crisis-affected region is dependent on a healthy and powerful generation, and such a generation depends on paying special attention to reproductive health in crises (10).

In the last decade, the issue of women's reproductive health has become the focus of most non-governmental organizations (11) and is defined as complete physical, mental and social well-being and not just the absence of disease or disability in all matters related to the reproductive system and its functioning (12). One of the factors affecting reproductive health is the occurrence of natural disasters (13) and paying attention to this issue in such a situation has a double necessity (14) that can reduce mortality and prevent diseases and help the vulnerable groups (10). natural disasters attack both rich and poor groups without discrimination, but vulnerable populations are more affected than others (15-16). One of the vulnerable groups in events is women, whose level of vulnerability has no relation with the type of event (17).

Failure to pay attention to the needs of this group, as half of the population of affected societies, will lead to the increasing vulnerability of societies, especially in developing countries, which is largely related to cultural and social structures (18-19). Lack of access of women as vulnerable groups to services due to age, physical, physiological and psychological conditions can expose them to irreparable injuries and as a result endanger the health of future generations (20). Research shows that in war and crisis-affected areas, issues related to women's and girls' reproductive health are threatened; in this regard, we can point to an increase in the incidence of violence and sexual abuse, unwanted pregnancy, short intervals between births, abortions and unsafe births; timely actions during disasters will prevent many injuries (21-22).

In order to correctly face unexpected events, preparation of the health care system of countries in the correct and scientific provision of reproductive health services is one of the basic elements that require the clinical guidelines compatible with the climatic, social, economic and cultural conditions of societies (23). Until recently, attention to reproductive and sexual health in crises had a low priority (24). On the other hand, review of the relevant guidelines of the World Health Organization, Asian countries, the Pacific region (Fiji and Tonga), India and Canada shows a major gap between the recommendations in the published guidelines and their implementation during crisis (8). Also, the guidelines available in each country are appropriate to the type of crisis common in that country and are influenced by geographical conditions, economic development, and support and readiness of the involved health organizations (25-27).

Various studies have shown that implementation of clinical strategies prevents the provision of non-standard clinical measures and by helping to make appropriate clinical decisions, it reduces the differences in service provision and leads to the provision of safe services to clients and improvement of care results (28). The World Health Organization's National Crisis Management Department has requested countries to design priority packages and clinical guidelines related to reproductive and sexual health in crises according to their local and cultural needs in order to reduce mortality and complications (29). Since the compilation of clinical guidelines has always been a challenge for the health system of countries (30), the present study was conducted with aim to prepare and validate the clinical

guidelines for reproductive health in natural disasters in Iran.

Materials and Methods

This research is a mixed methods study that was conducted in three phases including structured review, qualitative study and RAND technique.

The first stage was a structured search and review with aim to identify the clinical guideline(s) and determine the content as well as the structure of the clinical guideline for reproductive health in natural disasters and crisis which were publishing and published between 2010 and 2022 in order to be used to prepare the initial draft of clinical guideline. The reason for choosing this period of time was the review of recent articles of the last decade and the growing popularity of the reproductive health doctoral field in Iran. This stage was performed by the research team. The inclusion criteria of the studies included systematic review or meta-analysis studies, English or Persian language, access to the full text and focus on reproductive and sexual health needs of women and girls.

The search was performed in the reliable databases of organizations that prepare and register clinical guidelines, including the National Health (NHS) Service, International Center for Not-for-Profit Law (ICNL), National Contact Point (NCP) and available international databases including Web of Science, Pubmed, Science direct, Google scholar and SID Persian article database. A combination of English keywords based on MeSH including Standards, Sexual Health, reproductive health, Guideline, Health Planning Guidelines, Research Design, Research Report, practice guideline, Reproductive health, Disasters and their Persian equivalents was searched. Language other than Persian or English and lack of access to the full text of the articles were considered as the exclusion criteria of the studies.

After collecting the available guidelines, the initial screening form was completed based on the criteria of proper organization of the guideline, availability of the full version of the clinical guideline and its being up-to-date. The grading of the selected guidelines was done based on the Persian version of the Appraisal of Guidelines, Research and Evaluation (AGREE) scoring system, which examines the probability of success of the clinical guidelines to achieve the desired behavioral outcomes, evaluates the quality of the way the content is presented, and examines the quality of some aspects of the recommendations. The predictive validity of the guideline was also evaluated. This tool has 23 criteria which evaluates the methods used to prepare the guideline and the quality of its reporting.

The criteria of this tool are classified in 6 areas: 1) vision and purpose, 2) participation of stakeholders, 3) accuracy and quality of development method, 4) expressiveness and clarity of presentation, 5) applicability and 6) independence in development. The scoring of the criteria is based on a 4-point Likert scale (completely disagree (score 1), disagree (2), agree (3) and completely agree (score 4)), and the score of each section is obtained by the sum of the scores given to the criteria of that section and the standardization of the total score according to the maximum score obtained in that section. The standardized score is obtained by dividing the difference of the minimum possible score from the obtained score by the difference of the minimum possible score from the maximum possible score (31). The reliability and validity of the AGREE tool have been examined in various studies (32) and Rashidian et al. (2011) in Iran translated it into Persian and confirmed its validity (31).

In the second stage, an exploratory descriptive study was conducted with the traditional qualitative content analysis approach in order to identify the needs of women in natural disasters, and a draft clinical guideline was prepared according to the themes resulting from the qualitative stage and literature review. After obtaining permission from Shahrekord University of Medical Sciences, the process of data collection related to the qualitative section began in health care service centers and hospitals. The inclusion criteria at this stage were the willingness to participate in the study and the ability to understand and express experiences and knowledge of at least one component of reproductive health and a history of attending in an event or a history of physical, psychological, or social and economic damage from an event.

The participants in this stage consisted of 21 women aged 15-48 years with experience of facing earthquakes and floods or suffered from physical, psychological, social and economic damage. There were also 14 health care providers who were present in the affected areas of Chaharmahal and Bakhtiari province during the recent earthquake and flood and were in contact with the affected women. The participants were first selected based on the goal-based method and the inclusion criteria. Among the regions of the above province, the regions which were more damaged and the health infrastructures were destroyed during the event and providing reproductive health services before the event were desirable in these areas were chosen to better and deeper meet the reproductive health needs of the affected population.

Ethical considerations, such as obtaining ethical approval from Shahrekord University of Medical Sciences, obtaining informed consent, and confidentiality of participants' information were observed in the research. After obtaining informed consent of participate in the research, continue cooperation and, if necessary, conduct further interviews and allow recording, the time and place of the interview was determined by the opinion of the participants. The semi-structured interviews were conducted individually in a quiet and private environment. All interviews were recorded and transcribed verbatim after obtaining permission from the participants. Sampling continued until reaching data saturation and repeating inferential codes. The duration of each interview varied from 45 to 120 minutes. Data analysis was done simultaneously and manually by Granheim and Lundman method (33). Primary codes were extracted from the text of the interviews and were categorized into more abstract subcategories based on conceptual similarities, and finally themes were formed. To ensure the accuracy and reliability of the data, 4 factors of acceptability, reliability, verifiability and transferability were used (34).

To obtain acceptability, the participants' review was used to confirm the correctness of the data and codes. To ensure reliability, primary codes and examples of how to extract categories, themes and items from the text of the interviews for each category were provided to the external observer. To obtain verifiability, the text of a number of interviews, extracted codes and categories were provided to the researcher's colleagues and three reproductive health specialist, gynecologist and clinical psychologists who did not participate in the research and they were asked to verify the accuracy of the data coding process. To obtain transferability, it was tried to present the quotes of the participants objectively.

In the third stage, the validation of the clinical guideline draft was done by a group of experts and in a targeted manner from different specialties in the health system according to the research objectives (reproductive health specialist, gynecologist and clinical psychologists). The inclusion criteria in this stage of the research were faculty members with at least 3 years of work experience who had the willingness and time to cooperate, and were invited to the specialized panel for the external review of the clinical guideline. The research environment at this stage was the Faculty of Nursing and Midwifery of Shahrekord University of Medical Sciences. The data obtained from the results of the qualitative content analysis of the participants' opinions, the content of the basic clinical guidelines and the findings of the evidence in the field of reproductive health care needs in natural disasters were combined and the initial draft of the clinical guide was written.

In line with the external review of the draft of the clinical guideline, the researcher formed 2 groups of experts and the guideline draft was provided to the members of the group for review. In the first expert panel, the RAND (RAM) technique was used for the consensus of the experts. The main steps in using this method are as follows: In the first step, a detailed review of information sources was conducted in order to review the latest available scientific evidence. At the same time, a list of desired items (indicators) was prepared in a table. Then the prepared table was sent to all the panel members.

For each index, the members of the panel scored according to the ratio of benefits to disadvantages of the desired index on a scale of 1 to 9, where 1 means "the disadvantages of the

index are expected to be much greater than its benefits" and 9 means "the benefits of the item are expected to be much greater than its disadvantages". An average score of 5 indicated that "disadvantages and benefits of the index are equal" or the experts can make a judgment for the index described in the statement (35). At this stage, after collecting the questionnaires, the parts of the program with an average score above 7 will remain unchanged, and for the parts with an average score equal to or less than 6 based on recommendations, major corrections were made. Finally, in a meeting, the research team made a decision on how to deal with the suggestions related to these parts based on the corrections and the expertise of the proposers.

Results

A number of 17 clinical guidelines related to the research topic were found in the first stage and 9 were usable according to the AGREE tool criteria. Finally, 65 clinical recommendations were selected from the mentioned guidelines and used in the localized clinical guideline. The general content of the recommendations include having a preparedness plan, all-round support of key decision makers, physical and psychological support of those injured in the crisis, attention to the main functions of reproductive health in natural disasters, providing and strengthening access to reproductive health services, increasing the technical-skills of service providers, providing equipment needed by vulnerable groups, providing minimum basic reproductive health services in disasters, and public education through mass media.

Table 1. Demographic characteristics of participating women in the qualitative section

Age	Job	Marital status	Education	Reproduction status	Duration of interview (min)
33	housewife	Single	Bachelor	-	75
30	Employee	Married	Bachelor	Breastfeeding	90
30	housewife	Married	Diploma	Use of contraception	65
23	housewife	Married	Diploma	Pregnant	95
40	Employee	Single	Bachelor	-	45
41	housewife	Married	Diploma	Giving birth	65
34	housewife	Married	Primary school	Use of contraception	90
27	housewife	Single	Bachelor	-	90
15	Student	Single	Student	-	110
16	housewife	Single	Primary school	-	45
21	Student	Single	Student	-	50
31	housewife	Married	Primary school	Breastfeeding	65
22	housewife	Married	Diploma	Pregnant	85
35	Employee	Married	Master degree	Use of contraception	50
17	housewife	Married	Primary school	Giving birth	50
17	housewife	Single	Primary school	-	50
31	housewife	Married	Primary school	Infertility	65
27	housewife	Married	Diploma	Desire to get pregnant	85
35	Employee	Married	Master degree	Use of contraception	50
17	housewife	Married	Primary school	Giving birth	50
48	housewife	Married	Illiterate	-	40

In the second stage, among 40 women who met the inclusion criteria and were invited to participate in the study, 35 women (21 women with experience of facing natural disasters and 14 service providers) participated in the study. The background characteristics of the participants are presented in Tables 1 and 2. The analysis of 39 interviews resulted 510 inferential codes, that after merging repeated codes, finally 52 inferential codes, 11 subcategory, 5 categories and 2 themes were deduced (Table 3).

Table 2. Demographic characteristics of service providers in the qualitative section

Place of service providing	Education	Gender	Work experience (year)
Midwife of maternity block of educational hospital	Midwifery Bachelor	Female	18
Educational hospital and university faculty member	Gynecologist	Female	10
Comprehensive health center	Public health bachelor	Female	13
Comprehensive health center	Clinical psychologist bachelor	Male	12
Faculty member	Reproductive health specialist	Female	19
Faculty member	Reproductive health specialist	Female	9
Comprehensive health center	Family physician	Male	23
Comprehensive health center	Midwifery Bachelor	Female	23
Comprehensive health center	Midwifery Bachelor	Female	26
Vice-Chancellor of Health University of Medical Sciences	Family and population bachelor	Female	25
Vice-Chancellor of Health University of Medical Sciences	PhD in Sociology	Female	20
Vice-Chancellor of Health University of Medical Sciences	Bachelor in crisis	Female	37
Red Crescent team member	Bachelor	Male	29
Vice-Chancellor of Medicine University of Medical Sciences	Master of Midwifery	Female	25

1-Consequences of facing a disaster:

The statements of women faced with natural disasters indicated the occurrence of physical and psychological injuries following the events. The category of psychological reactions was the result of deducing the subcategories of "psychological reactions when facing a disaster and permanent psychological damage caused by a disaster."

1-A: Psychological injuries

The women who experienced an event in different reproductive age groups, including pregnant women, giving birth women, those who had delivery, and breastfeeding women, showed all kinds of psychological injuries in relation to the event and the conditions after it. One of the reasons for women's fear and concern was the fear of safety after the event due to unfavorable living conditions and the presence of strangers at the site of event. In this regard, participant No. 10 stated "We were afraid to sleep in the tent, we said, God, help us, my husband sat outside the tent until morning, because of the fear of unscrupulous people and the fear of honor, however, we could not trust" (27 years old, married, diploma).

Most of the psychological injuries caused to women were reduced or removed after the flood and earthquake. In some women who had suffered severe damages and the event had led to the destruction of all their possessions, and those who had lost their loved ones, post-event stress disorder and mental distress continued. Among the psychological reactions in the return phase were depression, anxiety and blaming oneself and others for the event. One of the male aid workers (Participant No. 27) stated "Some women were very depressed and some were too aggressive. They blamed themselves or their spouses for the financial loss and bereavement of their loved ones, and they always quarreled with each other"(23 years Work experience, Male, Family physician).

Table 3. Extracted categories and concepts

Subcategory	Category	Theme
Psychological reactions when facing a disaster (concern, anxiety, disbelief, bewilderment, confusion, worry, severe fear and stress)	Psychological injuries	Consequences of facing a disaster
Permanent psychological damage caused by disaster		
Complications of pregnancy and childbirth	Physical injuries	
Genitourinary injuries		
Problems related to neonates and infants		
Sexual problems		
Access to information through reliable sources	Access to reliable sources of information	Need to provide comprehensive services
Continuous access to service providers to answer questions		
Inadequate psychosocial support services	Access to support-care services	
Inadequate reproductive and sexual health services		
Lack of information of rescue teams regarding reproductive health needs	Empowering rescue teams in providing services	

1-B: Physical injuries

The category of physical injuries was formed from the subcategories of "pregnancy and childbirth complications, genitourinary injuries, newborn and infant problems, and sexual problems."

The occurrence of the event and the living conditions created after that led to the appearance of numerous urogenital disorders such as urinary infections, various types of vaginitis, especially candidiasis, and menstrual disorders in most women who had experienced a crisis. One of the experts of the vice-chancellor with 25 years of experience (participant No. 16) stated that "Women, especially at night, less used public WC because of their veil and modesty. There were also several mobile bathroom that they used too late and this was a factor for genital and urinary infections.

Injuries during pregnancy, during childbirth and after childbirth were another category of injuries inflicted on women. The complications caused during this period were related to direct physical trauma caused by the event, trauma caused by stress and fear of the event or life conditions after the event. Spotting, bleeding, threatened abortion and miscarriage were among the cases reported by health care providers.

The occurrence of crisis had led to many problems in newborns and infants. Low weight of newborn was one of the cases that women mentioned, and they cited that it is related to premature birth, stress and not eating during pregnancy followed by sadness and limited access to good food. Some breastfeeding mothers mentioned a decrease in milk and even stopping milk. Also, due to the inappropriate living conditions, breast problems including mastitis were also reported, while most of the mothers claimed that they did not have any problems before the event. One of the important and significant problems in women was the impact of the event and inappropriate living conditions on sexual performance, which included changing the sexual performance of couples and the possibility of sexual injuries. Most of the women pointed the reduction and complete cessation of sexual relations following the stress of the event and during temporary accommodation, especially in the tent due to inappropriate accommodation conditions, overcrowding in the tent, family or group life, and the crowding of many people, especially rescue forces, around the tents. Participant No. 7 stated in this regard "Our men were agitated and nervous, and the tents were crowded. There was no way we could be together, there were many workers around the tent, we were embarrassed, we were afraid that someone would hear and understand." "(35 years old, married, master's degree).

2-Need to provide comprehensive services:

Table 4. The Reproductive Health Guidelines in natural disasters

Table of Contents	Summary of the recommended contents of the Reproductive Health Guidelines in natural disasters
Chapter 1: An introduction to the importance of reproductive health in natural disasters	• Introduction of vulnerable groups in natural disasters • Consequences of damage caused by natural disasters • The necessity of developing clinical guidelines for reproductive health during natural disasters
Chapter 2: general clinical guidelines	• Maintaining and promoting physical and mental health during natural disasters in different age groups, including infants, children and teenagers, pregnant and lactating women, middle-aged and elderly. • Duties of the team providing healthcare services to the various groups mentioned
Chapter 3: prevention of physical and mental injuries in a crisis	•Strategies to reduce deaths caused by pregnancy and delivery in crisis •Strategies to reduce the mortality of infants and children in crisis •Strategies to reduce the risks and complications of crisis-related pregnancy Strategies to increase healthcare coverage during pregnancy and breastfeeding in crisis •Strategies to increase health care coverage in infants and children in crisis •Strategies to improve the nutritional status of mothers and infants in crisis •Strategies to reduce unwanted pregnancy and abortion in crisis •Strategies to reduce infectious diseases with special attention to sexually transmitted diseases in crisis •Strategies for reducing violence and sexual assault in crisis and dealing with aggressors •Strategies to reduce stress, anxiety and post-traumatic stress and cope with the loss of loved ones •Strategies to reduce the risk of suicide and addiction in teenagers
Chapter 4: access to reliable sources of information	•Employing skilled health workers as health service providers •Planning for group training (physical, sexual and mental health) to target groups by age groups •Detailed planning for the periodic presence of competent health teams in the region affected by the crisis, in sufficient numbers, familiar with the culture of the region and fluent in the local language of the region
Chapter 5: the availability of the health services provider team	•Determining the duties of the health service provider team •Providing necessary sanitary, pharmaceutical and medical supplies •Continuous and systemic monitoring of reproductive health status

The results of the conducted interviews showed people's need for correct information along with a responsive, available and capable service provider team and providing physical-psychological support services. Most needs were placed in this main theme. This theme consisted of categories of access to reliable sources of information, access to support-care services and empowerment of rescue teams in providing services.

2-A: Access to reliable sources of information

Women's experiences were full of unanswered questions. Sometimes, they were not given any information in the field they needed, or the information was provided incompletely and incorrectly, and they needed a reliable source of information. In this regard, Participant No. 1 stated "When I opened the door of the house, the water suddenly came at me with a lot of pressure, so that I was thrown against the wall, and in the afternoon of the same day, I had bleeding from my uterus. I was very afraid that the pressure of the water would harm me. I didn't know who to trust and ask. I was afraid that they would stigmatize me. I'm still stressed that a problem might happen to me" (15 years old, single, student). Continuous access to service providers to answer questions was another case which was mentioned.

2-B: Access to support-care services

The majority of the participants talked about unfulfilled demands and needs, which can only be answered in a comprehensive and all-round service delivery system that takes into account the special needs of each woman. Regarding access to services and care team, one of the mothers (participant No. 11) said "One day after the earthquake, which was Thursday, I was taking care of myself and my baby after giving birth. When we went, it was very crowded, all pregnant mothers and people who had problems during the earthquake came, but there was no doctor or midwife. We wait for two or three hours, but I got tired and my baby was restless, so I had to do the screening of my baby and myself two days late" (41 years old, married, diploma).

2-C: Empowering rescue teams to provide services

The experiences of the participants in the study indicated that their questions and needs were not answered in those circumstances due to the lack of skills and knowledge of the rescue teams, which led to more problems. One of the male doctors with 23 years of work experience (participant No. 27) said "After the earthquake, the situation was so chaotic and confused that everyone did something and gave training without enough information about the needs of women. So that when we were talking to a certain official... about high-risk groups of women, including pregnant mothers, the matter was not very important to him because he did not have enough information."

Finally, in the third part of the research, 74 codes approved by the panel of experts formed the main content of the clinical guideline; based on the summary of the results of the 3 stages of the research, 2 themes including the consequences of facing a disaster and the need to provide comprehensive services formed the dimensions and structure of the present clinical guideline. The structure and content of this clinical guideline consists of 5 chapters including an introduction on the importance of reproductive health in natural disasters, general clinical guidelines, prevention of physical and mental injuries in a crisis, access to reliable sources of information and the availability of the health services provider team (Table 4).

Discussion

The aim of this research was to prepare and validate the clinical guideline for reproductive health in natural disasters. Until recently, attention to reproductive and sexual health in crises had a low priority (24). On the other hand, the review of the relevant guidelines has shown a major gap between the recommendations contained in the published guidelines and their implementation during crises and incidents (8). The recommendations of the global reproductive health guidelines in natural disasters support the most important clinical recommendations extracted in the present study (8). Planning a preparedness program to face crisis (36), providing adequate support to policymakers and decision-makers of health services in disasters (37), providing minimum packages of reproductive health services in disasters (27, 38), preventing sexual violence (39-40), reduction of transmission and complications caused by sexually transmitted diseases (8-9), prevention of complications and maternal-neonatal death (41, 42), prevention of unplanned pregnancies (43), strengthening the performance and improving the knowledge and awareness of service providers in disasters (44), improving the knowledge and awareness of victims through mass media (45), planning for comprehensive reproductive health services (41) and provision of basic health care as soon

as possible (46) are the issues that are agreed upon in most clinical guidelines.

The results of the qualitative part of the research showed the experiences of women and service providers faced with natural disasters in 2 dimensions "consequences of facing a disaster and the need to provide comprehensive services". After natural disasters, the prevalence of adverse physical and psychological consequences increases, especially in women (47-50) and may continue for years after the crisis (51). Fear of the crisis, loss of loved ones, worry about the health of family members and the fetus in pregnant women are effective in creating an unstable mental state and psychological disorders in women during crisis. The increase in the occurrence of genitourinary injuries in those exposed to natural disasters (10, 52-53) is mainly due to the use of cloth instead of sanitary pads, the impossibility of changing clothes frequently, especially underwear, lack of water and sanitary facilities, and distance of services from the place of residence is of the reasons for the increase in the prevalence of genitourinary injuries, and it is mainly caused by the lack of planning and necessary preparation before the crisis to meet reproductive health needs (10).

Increased rates of low birth weight (54), gestational hypertension (54-55), anemia (55) and early pregnancy loss or spontaneous abortion (55-57) and intrauterine growth restriction (55) is reported among pregnant women faced with crisis, that with proper management and early access to prenatal care, the severity of these issues can be reduced (54). Most of the adverse outcomes during pregnancy and infancy caused by direct injuries and trauma or mental injuries and stress, lack of access to food or grief and the occurrence of premature birth can be justified and indicate the importance of prevention from physical and mental injuries, need for public education and proper planning and implementation of basic health care in the face of crisis.

The challenges related to breastfeeding in crisis conditions are a global problem and are problematic especially in low and middle income countries such as Iran (58) and include the reduction of breastfeeding self-efficacy, lack of knowledge and resources, and excessive reliance on infant formula (59). Maintaining privacy for breastfeeding, community and family support, adaptation of professional breastfeeding support to the local context and the pre-existing method of breastfeeding in that community are among the facilitators of breastfeeding in crises that should be considered (59). Experiences, behaviors and breastfeeding methods of mothers faced crises have been influenced by gender, socio-cultural, economic and geographical-political factors (58) and the awareness of service providers about these issues will be very effective in reducing neonatal mortality in crises and higher success in breastfeeding. Therefore, it is important to provide adequate support to health service policymakers in disasters, provide minimum reproductive health service packages, strengthen performance and improve the knowledge and awareness of service providers.

Women reported several issues regarding sexual problems, including decreased number of sexual intercourses and the possibility of sexual injuries. Temporary accommodation (tents), overcrowding, family or group life and crowding of many people, especially rescue forces, around the tents, the impact of the crisis on psychological states and sexual desire, and grief over the loss of loved ones are some of the possible causes of sexual problems (60-62) that indicate the importance of paying attention to the provision of minimum reproductive health service packages in disasters, prevention of sexual violence, reduction of transmission and complications caused by sexually transmitted diseases and unwanted pregnancies, strengthening performance and improving knowledge and awareness of service providers regarding sexual issues and psychological support.

Regarding the aspect of access to reliable sources of information and the ability of service providers to respond and provide services, the participants' experiences were full of unanswered or incorrect health questions. Lack of access and insufficient training regarding reproductive health challenges was also reported in the research by Sohrabizadeh (10). Studies in other countries have also shown the need for essential health information in simple and understandable language, access to

appropriate technology in crises and preparation of health service providers in crisis and responding to health problems (63-65), which suggests the importance of strengthening the performance and improving the knowledge and awareness of disaster service providers and also improving the knowledge and awareness of the victims.

Regarding the aspect of access to support-care services, many participants had unsatisfied demands and needs that could be answered mainly by the health system. The need for psycho-social support services is one of the most prominent unmet needs of women in the present study and other studies (66). Weakness in social support affects the severity of psychological complications (51). Appropriate social support and free access to health care for women in affected areas is very necessary (50, 67). Therefore, planning a program to prepare for crisis, providing adequate support to health policymakers, and providing minimum reproductive health service packages in disasters, strengthening the performance and improving the knowledge and awareness of service providers in disasters and planning for comprehensive reproductive health services are essential.

Finally, the clinical guideline was compiled, consisting of 5 chapters of an introduction on the importance of reproductive health in natural disasters, general clinical guidelines, prevention of physical and mental injuries in a crisis, access to providing reliable sources of information and availability of a competent health service provider team. Different challenges of reproductive health management resulting from researches should be considered and included in reproductive health programs and policies of affected areas in Iran. Community participation in all processes of providing reproductive health services, from planning to monitoring, is strongly recommended (10). Reproductive health is of particular importance in crisis, and several studies have emphasized the importance of planning before occurring disasters to provide effective reproductive health services in affected areas (42, 68). The results of some studies show the lack of planning in the provision of reproductive health services in the affected areas (10), while the precise determination of the duties of reproductive health service providers and access to the necessary equipment requires a clear plan (10).

Prevention of physical and mental injuries in crisis is one of the constituent parts of this guide. Training service providers regarding physical and mental injuries caused by the crisis, including unwanted pregnancies, sexual abuse, and sexually transmitted diseases, is essential, and how to deal with rape victims also requires special attention (69). Disaster management has different aspects. In Iran, less attention has been paid to psychological support during disasters (67). Increasing training at all levels, creating responsible structures and planning in dealing with the psychological effects of disasters, especially in developing countries, seems to be necessary.

Unfamiliarity of rescue forces with the basic principles of psychosocial support, lack of relevant experts and insufficient training, lack of attention to the needs of special groups, weakness in organizational communication, interruption of psychological support after the event, lack of familiarity with the native language and culture of the region faced with a crisis, the media's lack of attention to psychological principles in news broadcasting and people's long-term dependence on government aid are major problems in managing the psychological effects of crises (67). Healthcare managers should have the necessary information related to the knowledge of crisis management and use effective information measures in this regard so that they can perform correctly and fulfill their role when natural disasters occur (70).

Access to reliable sources of information is another part of the present guideline. Disasters may provide opportunities to educate individuals about reproductive health issues that were not known or experienced prior to the disaster (71). The positive effects of training on reproductive health management in crisis situations have been reported in several studies (71-72).

The availability of a competent health service provider team is the last chapter of the present guideline. Development and availability of an active monitoring system to track the reproductive health status of all affected people

in crisis areas may increase the effectiveness and coverage of reproductive health services (10).

Access to the participants who had desire to participate in the study, holding panel meetings and conducting numerous interviews was associated with difficulties in the conditions of Covid-19. The researcher tried to overcome these problems by establishing sincere communication and gaining the confidence of the participants and sometimes virtual communication and interviews using social messengers. In the current research, various aspects of reproductive health in crisis were examined in global guidelines and in a panel of experts, and the necessary measures in each of these fields were predicted and designed in order to provide a comprehensive guideline for the stages before the event, during the event, and after the event.

Based on the searches, the present clinical guideline is the first clinical guideline which has been developed in the field of reproductive health in disasters according to the facilities of the country of Iran for the use of the health and treatment staff. It is hoped that its correct application can improve the care situation related to reproductive health in disasters.

Lack of access to the full text of some studies was one of the limitations of this research.

Conclusion

The reproductive health of people affected by crisis with special attention to the consequences of the crisis and how to properly manage it, the informational and skill empowerment of the service provider staff and the availability of a competent team is of particular importance. Therefore, the support of policymakers and training of reproductive health service providers to familiarize with evidence-based practice in crises and the importance of using it is a necessary step for the implementation of clinical guidelines compiled and localized in the country. A clinical guideline for reproductive health in natural disasters resulting from the findings of the present research was prepared updated and localized in a simple and practical method containing necessary standards. It is hoped that it will be effective for increasing awareness and improving the performance of health system employees to provide reproductive health services in natural disasters.

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Conflicts of interest

The authors declared no conflicts of interest.

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