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Health worker's knowledge, attitude, and practice regarding household preparedness based on the DART program: A cross-sectional study

Hamzeh Zarei, Mohammad H. Yarmohammadian¹, Nikoo Yamani², Golrokh Atighechian³, Fatemeh Rezaei¹

Department of Health in Disasters and Emergencies, Isfahan University of Medical Sciences (MUI), Isfahan, Iran, ¹Department of Health in Disasters and Emergencies, Health Management and Economic Research Center (HMERC), Isfahan University of Medical Sciences (MUI), Isfahan, Iran, ²Medical Education Research Center (EDC), Isfahan University of Medical Sciences (MUI), Isfahan, Iran, ³Department of Health in Disasters and Emergencies, Social Determinants of Health Center (HDHC), Isfahan University of Medical Sciences (MUI), Isfahan, Iran

Address for correspondence:

Dr. Mohammad H. Yarmohammadian,
Department of Health in Disasters and Emergencies, Health Management and Economic Research Center (HMERC), Isfahan University of Medical Sciences (MUI), Isfahan, Iran.
E-mail: hossyar74@gmail.com

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Abstract:

BACKGROUND: In Iran, the assessment and preparedness of households for disasters is managed by primary health care (PHC) staff through disaster risk reduction management programs (DRRMPs), particularly the disaster assessment of readiness and training (DART) program. This study aimed to evaluate the knowledge, attitudes, and practices of health workers regarding household preparedness within this framework.

MATERIALS AND METHODS: This cross-sectional study included 423 health workers from Isfahan Medical Sciences University in 2023. Participants from various levels of health care attended training workshops and completed the household disaster preparedness index (HDPI) questionnaire, the (Federal Emergency Management Agency) FEMA questionnaire, and a knowledge, attitude, and practice (KAP) questionnaire. Targeted sampling was used for respondent selection, and data analysis was conducted using Spearman, Chi-square, and Mann Whitney U tests with SPSS 27.0.

RESULTS: The mean age of participants was 38.31 years, with 64.5% being female. About 70.1% had a bachelor's degree, and 44.2% had less than 10 years of work experience. Only 2.1% and 0.9% of respondents were classified as "Most Prepared" according to the HDPI and FEMA questionnaires, respectively. Knowledge was negatively correlated with attitude ($r = -0.366$). Statistically significant differences were found between practices and home ownership, education level, age, and work experience (all $P < 0.05$).

CONCLUSION: The findings reveal that health workers lack sufficient positive attitudes and performance regarding household preparedness in emergencies. Thus, a systematic framework is needed to enhance their knowledge, attitudes, and practices related to disaster preparedness (DP) for policy making in this area.

Keywords:

Attitudes, community health workers, disaster planning, health knowledge, practice

Introduction

Health workers, as employees in district health network (DHN), have many job titles and various tasks that perform a wide range of actions related to public health, four levels of prevention, and first-level health services.^[1-5] Some of these included disaster risk reduction management

programs (DRRMP) in Iran's health system.^[6] One of these programs – which had a close relationship with the people – was the disaster assessment of readiness and training (DART).^[7]

DART as one of the five DRRMP is the only disaster risk management program in Iran's ministry of health and medical

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education (MOHME) that in direct contact with the people in PHC system.^[6] (Health Care Providers) HCPs is responsible for providing training and assessments. The main audience of HCPs are the heads Iranian households (HIH), who were actually the women of the family or mothers who were introduced as the heads and were considered the main and final recipients of trainings and evaluations.^[7] Annual disaster assessment and education of Iranian households is one of the important components of the integration program of DRRMP in the health system. The basis of evaluation in this program is the HDPI. The education/training of this program is based on three tools: Drawing a participatory risk map at home, frequent questions and answers, and triple educational boards. All the training of this program to HIH is done verbally and by asking 15 questions for risk assessment.^[8]

Households are the basic unit of society and they need to be prepared for disasters.^[9] Preparedness for disasters is noted as one of the most effective ways to adapt and increase resilience to floods, wildfires, and earthquakes and like these.^[10] Understanding and improving individual and community preparedness can lead to more effective disaster response, reduced loss of life, mitigated economic damage, increased community resilience, better resource allocation, and improved long-term recovery processes.^[11] Since DP needs to engage all stakeholders within communities, households should be at the core of efforts to promote DP activities.^[12] Households in low- and middle-income countries are particularly vulnerable as they often lack resources and capacities to adapt to and cope with environmental hazards and shocks. Their ability to adequately prepare against, respond to, and cope with hazardous events is often limited.^[13] Effective household and individual DP can minimize physical harm and property damage during catastrophic events.^[14] Therefore, it is crucial to evaluate a household's preparedness for disasters and the factors that affect it.^[15]

Education plays a significant role in disaster risk reduction and achieving human security in an effort to accomplish sustainable development].^[16] As well as education on disaster and emergency is a crucial factor^[17] and indicates beneficial outcomes in disaster risk management.^[16] Disaster education was defined as education on disaster risk, mitigation, and preparedness, which was aimed at reducing the negative consequences of disasters.^[18,19]

According to the ministry of health in Iran, the average level of DP of Iranian households is estimated to be 9.3%.^[8] In some studies in Iran, the level of household preparedness was investigated in different statistical samples.^[20-25] Ardalan *et al.*^[20] suggest that to be

sustainable, community disaster reduction programs must be integrated into routine public health service delivery. Najafi *et al.*^[21] showed that to promote DP behavior in Tehran, disaster specialists should focus on improving low-income and unemployed people, and individuals who live high risk districts, especially those who have not experienced disasters. Other similar studies have been conducted to investigate and evaluate the level of household readiness.^[22-25]

Many studies have been conducted in the field of examining the level of knowledge, attitude, and performance of health workers in DP.^[5,26-36]

Some studies have been conducted in the field of household preparedness assessment and others have been conducted in the field of KAP in health workers, however, there is a research gap in the field of primary health care worker preparedness assessment in Iran. Since these employees are the only educators of households in the field of preparedness against accidents and disasters, the purpose of this research was to determine the knowledge, attitude, and performance of health workers regarding family preparedness based on the DART program.

Materials and Methods

Study design and setting

This cross-sectional analytical descriptive study was conducted to employ the use of a self-completed survey and evaluate household preparedness by HDPI and FEMA questionnaire and the level of KAP of health workers to prepare for disasters. This study was conducted at Isfahan Medical Sciences University, Iran in 2023.

Study participants and sampling

Members of network health departments (PHC workers/health workers/health staff) were asked to complete the survey before attending household preparedness and DRRMP training workshops. These education courses were part of the ongoing household preparedness training occurring in the health department emphasizing the DART program. Five sessions were held, with 85 or more members attending each workshop. Data was gathered from the participants of each workshop before the commencement of household preparedness training. A total of 423 health workers were studied from 78 healthcare facilities after excluding those study participants who did not fulfill the eligibility criteria. For this study, an entire population sampling technique (survey) was employed. This sampling technique was used because the number of the study population in each HCF was small (1–5 health workers) which is manageable for data collection and analysis.

Previous similar studies,^[37] selected a sample size with this method. These health workers were subgroups at Isfahan University of Medical Sciences and the study was conducted in 2023 (from May to February). The entry criteria included full attendance in the training course and complete satisfaction with completing the questionnaire. The exit criteria included not attending the workshop for at least 1 day, confusing the answers, completing the questionnaire at an unscheduled time, and in difference to the correct completion of the questionnaire at the time of answering.

Data collection tool and technique

The survey instrument was designed to collect information in six areas: Demographics, preparedness index, emergency preparedness, knowledge, attitudes, and practice disaster preparedness (PDP). General demographic information was collected on gender, age, marital status, number of individuals in the household, home ownership, type of residence, educational level, Job title, and work experience.

1. HDPI of the DART program was one checklist that comprised 15 items regarding household readiness. In Najafi, *et al.*^[38] study, the rate of HDPI internal consistency was calculated at 0.786 that was within an acceptable range rate, also HDPI stability was computed at 0.98 using the test-retest method that was also within an optimal level. Therefore, it can be stated that the HDPI enjoys the required reliability. Cronbach's alpha for the HDPI index about DP in the present study was 0.733.
2. The Emergency preparedness checklist (EPC) developed by the Federal Emergency Management Agency, has been included in other papers^[39,40] and modified by Blessman *et al.*^[26] it was the second research tool. For this, the Kuder-Richardson was 0.82 in the Kim study which was closer to our study.^[27] Cronbach's alpha in the present study for the FEMA checklist was 0.708.
3. For knowledge of disaster preparedness (KDP), used from Alkalash *et al.*^[41] questionnaire. It was (16 items) adapted "correct or not correct" questions with one point assigned to each question. Cronbach's alpha for the knowledge about DP in the Alkalash study was 0.79. Cronbach's alpha for the knowledge about DP in the present study was 0.874.
4. For attitudes disaster preparedness (ADP), used from Mohamed *et al.* questionnaire^[28] that was 11 statements in all for the Likert scale questions. Cronbach's alpha for the attitude toward DP in Mohamed's study was 0.83. Cronbach's alpha for the knowledge about DP in this study was 0.721.
5. For PDP, adapted from Moabi,^[42] and included three questions and two researcher-made questions about disaster drills done at the workplace of applied medical sciences setting and experience of attending

a disaster-related event. Cronbach's alpha for the practice regarding DP in this study was 0.796.

HDPI index checklist comprises 15 items regarding household preparedness. According to DART guidelines, this checklist was completed by experts of the Deputy of Minister of Health and sanitary and therapeutic centers. A score of 1 is given for each answer of "yes" and a score of 0 for each answer of "no", and then the sum of the scores is calculated. In the present study, the experts of the disaster DRR unit were responsible for distributing questionnaires, and with the initial and final explanations of the disaster unit manager, this questionnaire was completed by the participants and finally collected. The preparedness level of HDPI was described using two methods: The first was a modified method according to the category of preparation percentage based on the Blessman *et al.* study.^[26] In this method, Considering the preparation percentage and the number of questions, the cut-off point was considered into five groups: Not prepared (0–3 items), minimally prepared (4–6 items), medium prepared (7–9 items), better prepared (10–12 items), and most prepared (13–15 items). In the second method a raw score was calculated for preparedness questions by summing of all scores (maximum score = 15 and minimum score = 0), preparedness raw scores were normalized on a 100-point scale (score 15 = 100%). Those who scored $\geq 60\%$ were deemed to be prepared, those who fell this percentage were deemed to not prepared. this method was based on Jonidi Jafari *et al.* and Ardalan *et al.* study.^[8,9]

EPC or FEMA checklist comprises 21 items regarding family emergency contacts, emergency kits, and emergency food boxes. All items are yes (1) or no (0) questions. A higher summed score indicates greater household DP. The participants were asked about 21 preparedness items with "Yes" or "No" responses. When members answered "No," they were to indicate one of four choices of why they had not completed that particular item. The choices were as follows: 1) feel no need to accomplish the task, 2) feel the need to accomplish the task but was not clear on what to do, 3) is clear on what to do but is having trouble getting it done due to time or resource constraints, or 4) I have completed the task at one time, but I have not maintained/updated this task. These four levels were chosen to reflect the nodes between the five stages of change (precontemplation, contemplation, preparation, action, and maintenance) as described in the transtheoretical model of behavior change.^[43] The preparedness level was described using three methods. The first method was to divide the 21 preparedness question items into four groups: Not prepared (0–5 items), minimally prepared (6–10 items), better prepared (11–15 items), and most prepared (16–21 items).

The second method was to arrange the 21 preparedness questions into three categories with 7 items in each group, reflecting the importance and level of organization needed to accomplish these tasks. These groups were labeled as basic, intermediate, and advanced. The basic group (items 7–11, 13, and 16) included common household items such as candles that are helpful in a minor emergency. The Intermediate group (items 14, 15, and 17–21) represented tasks that suggested extra effort was needed to prepare but without formal planning, such as having a radio that does not require batteries. The group labeled advanced (items 1–6 and 12), represented tasks that involved formal preparedness planning such as having a written disaster plan. These methods were according to the category of preparation percentage based on the Blessman *et al.* study.^[26] In the third method a raw score was calculated for preparedness questions by summing all scores (maximum score = 21 and minimum score = 0), preparedness raw scores were normalized on a 100-point scale (score 21 = 100%). Those who scored $\geq 60\%$ were deemed to be prepared, and those who fell this percentage were deemed to not be prepared.

The KDP questionnaire comprises 16 items regarding knowledge of DP. Each question is categorized as incorrect = (0) and correct = (1). Scoring of knowledge are: Health workers who scored less than 60% correct answers (up to 9 questions) were considered unsatisfactory knowledge, and more than 60% of the correct answer (more than 9 questions) satisfactory level.

ADP questionnaire comprises 11 items regarding attitudes toward DP. Each question was categorized as (2) points for agreeing, (1) point for unsure, and (0) points for disagreeing person who scored $\geq 60\%$ was

deemed to have a positive attitude, those who fell this percentage were deemed to have a negative attitude.

PDP questionnaire comprises 5 items regarding PDP. Each one answers yes = (1) and no answer = (0). The person who scored $\geq 60\%$ was considered as having satisfactory practice, whereas those who performed at a lower rate were viewed as having unsatisfactory practice.

Considering that the DRRMP training workshops were held in series, taking into account research ethics, the HDPI checklist was completed by the participants on the first day of the workshop. On the second day, the EPC checklist and on the last day of the workshop, a questionnaire in three sections with the content of KDP, ADP, and PDP were presented and completed by the subjects. The research design is shown in Figure 1.

Data analysis

The survey results were analyzed using SPSS v27. Mean and standard deviation were used to convey quantitative data, and absolute numbers and percentages were used to express qualitative data. When appropriate, the Chi-square test or Fisher's exact test was used to compare categorical variables. Spearman test and Mann Whitney U test of correlation were used to assess the association between the study variables. To evaluate the scales' internal consistency and reliability, the Cronbach's alpha coefficient was determined. Statistical significance was considered at $P < 0.05$.

Ethical consideration

Ethical approval for this study was obtained from the ethics committee of Isfahan University of Medical Science (IR.MUI.NUREMA.REC.1402.007). Also, all participants gave their written informed consent to take part in this study.

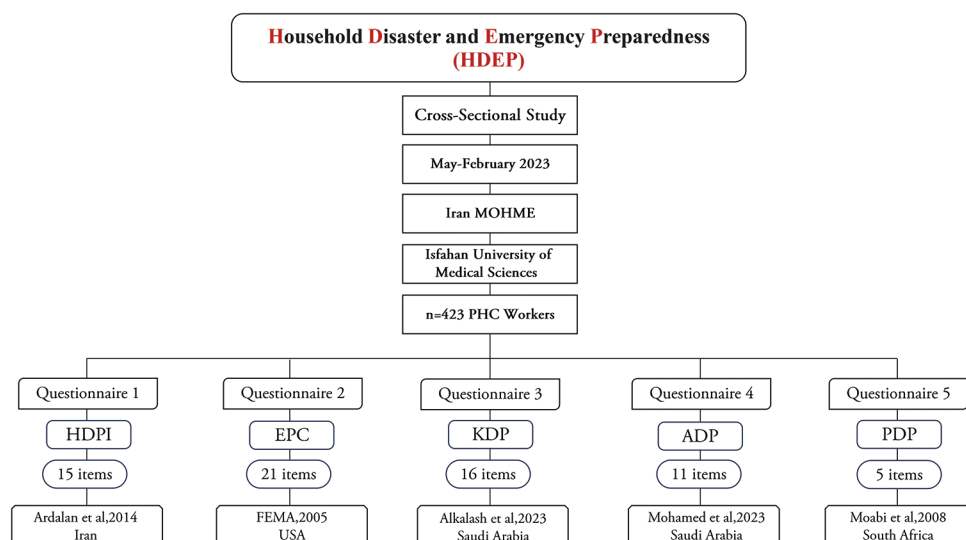


Figure 1: Research design

Results

Health workers' general characteristics

In total, 423 Health workers, participated in the current study. Table 1 provides information about the demographics of participants. The mean age of health workers was 38.31 (SD = 8.61) years and 37.6% of them their age ranged between 40 and 49 years old. About 64.5% of the health workers were females, 88.6% of them were married, 51.3% were home owner, 63.1% were HCP. In terms of the educational level, about 70.1% were bachelors and 44.2% of them have less than 10 years of work experience.

Health workers' HDPI regarding DP

Rates of preparedness are listed in Table 2. Only 1 respondent had completed 15 items. Overall, 2.1% of the respondents were classified as "Most Prepared";

Table 1: General demographics characteristics of study sample (n=423)

Variable	Category	Frequency	Percentage
Gender	Male	150	35.46
	Female	273	64.54
Age (years)	20–29	95	0.22
	30–39	128	0.30
	40–49	159	0.38
	50–59	41	0.10
Marital Status	Unmarried	48	11.35
	Married	375	88.65
Number of individuals in the household	1–2	205	48.46
	3–4	200	47.28
	≥5	18	4.26
Home ownership	Home owner	217	51.30
	Tenant	206	48.70
Type of residence	House	216	51.06
	Apartment	207	48.94
Level of education	Under diploma	5	1.18
	Diploma	31	7.33
	Bachelor	324	76.60
	Masters	21	9.96
	PhD or Dr	42	9.93
Job title	Doctor	40	9.46
	Nurse	17	4.02
	HCP	267	63.12
	Behvarz	41	9.69
	Midwife	42	9.93
	Health Expert	16	3.78
Work experience (year)	>10	187	44.21
	11–20	153	36.17
	21–30	75	17.73
	<31	8	1.89

Table 2: HDPI regarding disaster preparedness

N=423 15 items	Not prepared (0–3 items)	Minimally prepared (4–6 items)	Medium prepared (7–9 items)	Better prepared (10–12 items)	Most prepared (13–15 items)
HDPI	313 (74.0%)	47 (11.1%)	40 (9.5%)	14 (3.3%)	9 (2.1%)

they completed more than 12 of the 15 items. Total 3.3% were classified as "Better Prepared"; they completed more than 9 items. 9.5% were classified as "Medium Prepared"; 11.1% as "Minimally Prepared" and 74.0% as "Most prepared".

Health workers EPC (FEMA checklist) regarding DP

Table 3 shows the results of the EPC questioner. Overall, 0.9% of the respondents were classified as "Most Prepared"; they completed more than 15 of the 21 items. 2.1% were classified as "Better Prepared"; they completed more than 10 items. 52.0% were classified as "Minimally Prepared" and 44.9% as "Most prepared". When the 21 items were broken down into groups representing advanced, intermediate, and basic, the percentages representing those "Most Prepared" were 0.71%, 0.95%, and 0.71%, respectfully. Figures 2 and 3 show the rate of FEMA checklist preparedness regarding four types of groups and the percentage of barriers by group (category of members when they answered "no").

Health workers KDP, ADP, and PDP regarding DP

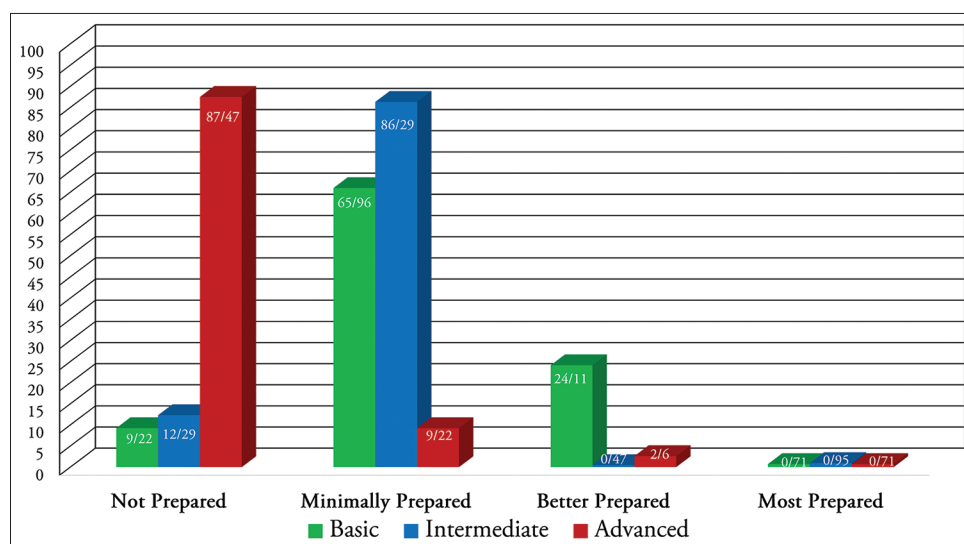
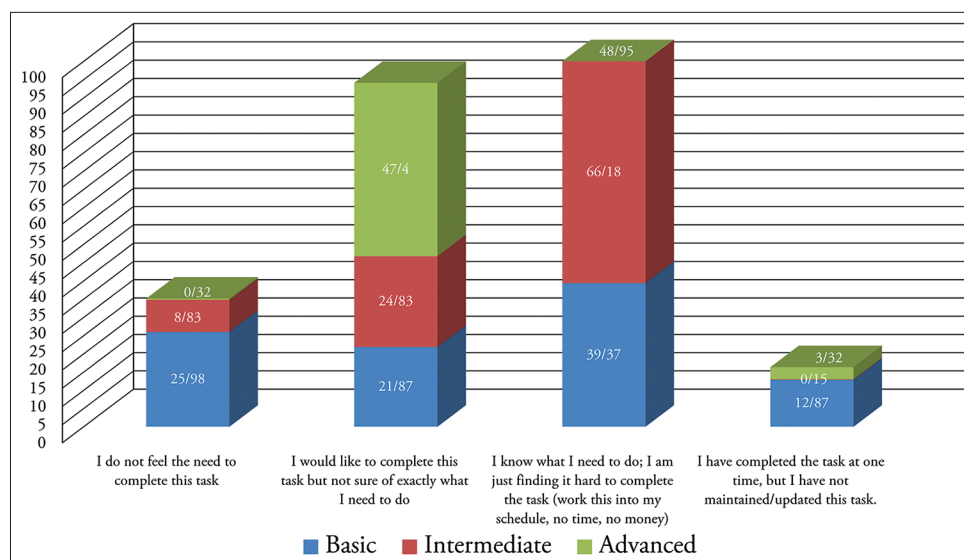
In terms of the correlations between KAP, Table 4 indicates that the knowledge of health workers was statistically significantly negatively correlated with their attitude ($r = -0.366$).

According to Table 5 the relationship between the levels of household preparedness, KAP and some variables of the study was investigated. Only those results were given that were significant and had an interpretation based on the initial hypothesis of the research. Statistically significant difference in relation was found between health workers practice and their home ownership ($P = 0.006$); workers who had home ownership, had adequate practice. Also, a statistically significant relation between health workers HDPI preparedness and their level of education ($P = 0.007$); workers who had higher education level had preparation in term of HDPI checklist.

Table 6 shows the relationship between the levels of household preparedness and KAP with age and work experience. Statistically significant difference in relation was found between health workers practice and their age ($P = 0.017$); health workers who had higher age, had adequate practice. Also, a statistically significant relation between health workers practice and their work experience ($P = 0.017$); health workers who had higher work experience had adequate practice.

Table 3: FEMA check list regarding disaster preparedness (n=423)

FEMA check	Not prepared (0–5 items)	Minimally prepared (6–10 items)	Better prepared (11–15 items)	Most prepared (16–21 items)
All 21 items	190 (44.9%) (0 or 1 item)	220 (52.0%) (2 or 3 items)	9 (2.1%) (4 or 5 items)	4 (0.9%) (6 or 7 items)
Basic	39 (9.22%)	279 (65.96%)	102 (24.11%)	3 (0.71%)
Intermediate	52 (12.29%)	365 (86.29%)	2 (0.47%)	4 (0.95%)
Advanced	370 (87.47%)	39 (9.22%)	11 (2.6%)	3 (0.71%)

**Figure 2: Percentage prepared by group of FEMA checklist****Figure 3: Percentage of barriers by group (category of members when they answered "no")**

Discussion

Considering the importance of household preparedness in reducing the effects of disasters and emergencies in the country and the special and undeniable role that health workers have in informing and educating household heads, it is very important that they themselves have sufficient mastery over how to train household

preparedness. Also, they should have acceptable criteria for DP in attitude and behavior.

Health sector workers including all those who are present in DHN and provide basic health services (especially HCPs), are among the most important and largest providers of health services to people.^[2-4] Also, they are providers of training and assessing of DRRMP in Iran's

PHC,^[6,7] but they are still on the way their jobs have various challenges that overshadow their activities.^[44] Anyway, as Iran continues to evolve its health system, addressing challenges and building upon successes, the history of its primary health care system serves as a valuable lesson in the pursuit of accessible and equitable health care for all.^[29]

In our study, we aimed to investigate the health workers' KAP regarding DP of subgroups at Isfahan University of Medical Sciences. The study findings indicated

Table 4: Spearman correlation coefficient score of knowledge, attitude, and practice (n=423)

Variables	Knowledge	Attitude
Attitude	$r=-0.366$ $P=0.001^*$	-
Practice	$r=-0.016$ $P=0.746$	$r=0.021$ $P=0.671$

*Significant ($P<0.05$) Spearman's test for correlation

that more than 90% of the participants had adequate knowledge and a negative attitude toward DP. Also, most of them had inadequate practice. Hence, the results of the current study provide evidence of health workers' KAP regarding DP in a sample of Isfahan University of Medical Sciences subgroups health workers and would help in the development of education and assessment activities and policies of DRRMP in Iran's PHC for health workers.

Results of this study showed that health workers' average level of knowledge about DP was (14.47 out of 16), (SD = 2.30), (DP = 91.63%) which represents a high level of knowledge about DP. This finding was higher than that of Mohamed *et al.*^[28] study (11.5 out of 16), (SD = 3.45), (DP = 68.93%). Similarly, a study by Janizadeh *et al.*^[33] who conducted their study in Iran and found that 74.5% of hospital staff have good knowledge about DP. Also, Thapa *et al.*,^[34] in a study

Table 5: Correlation between health workers' knowledge, attitude, practice, HDPI preparedness, and FEMA preparedness and some their characteristics (level of education and home ownership)

Variable	Home ownership				X ² (P)	
	Home owner		Tenant			
HDPI preparedness						
Not prepared	194	50.5	190	49.5	1.013	
Prepared	23	59.0	16	41.0	(0.314)	
FEMA preparedness						
Not prepared	213	51.0	205	49.0	1.668	
Prepared	4	80	1	20	(0.373)	
Knowledge						
Inadequate	15	55.6	12	44.4	0.209	
Adequate	202	51.0	194	49.0	(0.648)	
Attitude						
Negative	203	50.9	196	49.1	0.504	
Positive	14	58.3	10	41.7	(0.478)	
Practice						
Inadequate	210	53.0	186	47.0	7.433	
Adequate	7	25.9	20	74.1	(0.006) *	
Variable	Level of education					X ² (P)
	Under diploma	diploma	Bachelor	Masters	PhD or Dr	
HDPI preparedness						
Not prepared	2 (0.5)	27 (7.0)	295 (76.8)	20 (5.2)	40 (10.4)	10.719
Prepared	3 (7.7)	4 (10.3)	29 (74.4)	1 (2.6)	2 (5.1)	(0.007)*
FEMA preparedness						
Not prepared	5 (1.2)	30 (7.2)	320 (76.6)	21 (5.0)	42 (10.0)	3.019
Prepared	0 (0.0)	1 (20.0)	4 (80.0)	0 (0.0)	0 (0.0)	(0.567)
Knowledge						
Inadequate	1 (3.7)	2 (7.4)	21 (77.8)	2 (7.4)	1 (3.7)	3.728
Adequate	4 (1.0)	29 (7.3)	303 (76.5)	19 (4.8)	41 (10.4)	(0.375)
Attitude						
Negative	4 (1.0)	30 (7.5)	306 (76.7)	19 (4.8)	40 (10.0)	3.524
Positive	1 (4.2)	1 (4.2)	18 (75.0)	2 (8.3)	2 (8.3)	(0.423)
Practice						
Inadequate	4 (1.0)	30 (7.6)	303 (76.5)	20 (5.1)	39 (9.8)	2.528
Adequate	1 (3.7)	1 (3.7)	21 (77.8)	1 (3.7)	3 (2.7)	(0.589)

*Significant ($P<0.05$) χ^2 =chi-square test

Table 6: Correlation between health workers' knowledge, attitude, practice, HDPI preparedness, and FEMA preparedness and some their characteristics (age and work experience)

Variable	Questionnaire	Preparedness	n	Mean Rank	Sum of Ranks	U	P
Age	HDPI	Prepared	39	201.86	7872.50	7092.50	0.586
		Not Prepared	384	213.03	81803.50		
	FEMA	Prepared	5	206.40	1032.00	1017.00	0.918
		Not Prepared	418	212.07	88644.00		
	Knowledge	Adequate	396	213.23	84438.00	4860.00	0.429
		Inadequate	27	194.00	5238.00		
	Attitude	Positive	24	199.04	4777.00	4477.00	0.593
		Negative	399	212.78	84899.00		
	Practice	Adequate	27	157.89	4263.00	3885.00	0.017*
		Inadequate	396	215.69	85413.00		
Variable	Questionnaire	Preparedness	n	Mean Rank	Sum of Ranks	U	P
Work experience	HDPI	Prepared	39	212.92	8304.00	7452.00	0.960
		Not Prepared	384	211.91	81372.00		
	FEMA	Prepared	5	221.80	1109.00	996.00	0.857
		Not Prepared	418	211.88	88567.00		
	Knowledge	Adequate	396	213.24	84447.00	4851.00	0.420
		Inadequate	27	193.67	5229.00		
	Attitude	Positive	24	202.38	4857.00	4557.00	0.691
		Negative	399	212.58	84819.00		
	Practice	Adequate	27	157.80	4260.50	3882.00	0.017*
		Inadequate	396	215.70	85415.50		

*Significant ($P < 0.05$) Mann Whitney U test

titled: “knowledge, attitude and practice of disaster preparedness among health care workers in a tertiary care center of Central Nepal” reported almost all the participants (80.7%) knew the definition of disaster. It means they had high knowledge about DP. In the same line, another study conducted by Shabbir *et al.*,^[45] focused to determine the Nurses' KAP on disasters management and emergency preparedness at Faculty of Allied Health Sciences, in University of Lahore. This study found that the health workers' knowledge on DP was obtained 65.4% that it was satisfactory. Acabado^[46] using the descriptive research design, determined the levels of KAP on emergency and DP of health care professionals in Davao city. Results showed that respondents had an extremely high knowledge of emergency and DP. And finally, this finding is in harmony with those of the Kucuk *et al.* study^[5] in a sample of health working in a university hospital in the Eastern Black Sea Region of Turkey, which found that most of the participants had acceptable knowledge toward DP.

A descriptive and analytical cross-sectional study was conducted by Walles *et al.*^[29] among 94 HCPs toward disaster and emergency preparedness in Mtwara, Tanzania to improve their knowledge and attitude toward DP. This study found that more than half (53.2%) of the participants had adequate knowledge, which is considered an average amount of preparation. Also, as per the study by Suparni *et al.*^[47] among 216 hospital health care workers in West Java Province, Indonesia showed exactly same the amount (53.2%, $n = 115$) of

participants' knowledge. Another study that found HCPs' readiness to be average belongs to Habte *et al.*^[48] The results of this study also showed that the amount of knowledge among Tikur Anbessa specialized hospital HCPs was (50.8%).

On the other hand, a study by Tassew^[30] in a systematic review and meta-analysis in Ethiopia found that only 48.58% of health professionals had good understanding of DP, while the remaining 51.42% lacked DP knowledge. Similarly, Sharma *et al.*^[31] found that only 16.5% had good awareness about the DP. Furthermore, a study conducted by Getenet *et al.*^[32] in Addis Ababa, Ethiopia on Frontline HCPs to disaster risk management in private general hospitals reported of the participants, 64% had poor level of knowledge about DP. Additionally, Nigerian study by Adenekan *et al.*^[49] have found limitations in knowledge of DP.

Despite adequate knowledge of our study participants about DP, in terms of health workers' attitudes, showed that most of the health staff had a negative attitude toward DP (94.3%), with mean attitude score (4.58 out of 11), ($SD = 1.16$). More than 90% of HCPs were not sure whether their workplace is less prone to disasters. In addition, 95.27% of them were hesitant whether only health and medical personnel need disaster management. Also, the majority of the participants did not show interest in carrying out disaster simulation exercises in the workplace or did not show interest in carrying out specialized disaster exercises in their workplace.

This finding is in harmony with those of Patel *et al.* study^[35] in a sample of healthcare workers toward disaster management practices in a hospital in Gujarat which found that most of the participants had not a favorable attitude toward DP. Total 39.3% of health workers believe that the DP in the hospital is sufficient, 22% say it is insufficient while 38.8% have a neutral response. Similarly, Tassew *et al.*^[36] who conducted a similar study in South Gondar Zone hospitals, Ethiopia found that HCPs had a negative attitude (55%) toward DP.

This finding is incongruent with the study by Getenet *et al.*^[32] who found that 93.6% of the health workers had a positive attitude toward DP. Moreover, a study conducted by Janizadeh *et al.*^[33] found that 89.5% of the participants had an adequate disaster management attitude. Additionally, Walles *et al.*^[29] found that 79.8% of participants had a positive attitude; Sharma *et al.*^[31] reported that 84.3% study sample had a favorable attitude; Nakachew^[50] showed that 91.9% of health workers had a positive attitude; Suparni *et al.*^[47] found attitude toward emergency preparedness was generally positive as most of the HCPs (75.9%, $n = 164$); Habte *et al.*^[48] indicated that 64.8% of respondents had favorable attitude; Adenekan *et al.*^[49] found that positive attitude of health staffs was 93.2%.

As far as the health workers' practice regarding DP, the current study findings demonstrated that most of the health workers had inadequate practice, with a mean score of 0.98 out of 5 ($SD = 1.16$). Additionally, our study findings revealed that all aspects of practice regarding disaster preparedness were inadequate. Total 44.04% of health workers have not participated in special trainings for natural disasters; 95.74% have not undergone continuous training to prepare for natural disasters; 95.51% have not updated their household disaster preparedness plan; 92.20% were not voluntarily present during disasters or emergencies; and finally, 95.74% stated that they do not have the proper ability to be a health volunteer in future disasters and emergencies. These results showed that functional and operational educational interventions are urgent needs of health workers. Holding disaster preparedness training workshops and providing practical training and focusing more on operationalizing educational programs in the workplace can be considered as one of the future implementation priorities. Among the other reasons that can be attributed to these results is that the employees of the health department do not have a positive view of the training workshops and they have serious problems with the repetitive formatting and theory that has been going on for several years. Creating hopeful conditions and real and targeted motivational stimuli can help with this issue.

This finding is consistent with Getenet *et al.* study^[32] who found that health workers reported weak skills (89.10% poor level of practice) on DP. Similarly, a study by Tassew *et al.*^[36] found HCPs had inadequate practice disaster/emergency preparedness (67.5%). Additionally, Janizadeh *et al.*^[33] found that the health workers were generally not well prepared for disasters practice regarding disaster preparedness was (29.2%). Furthermore, Sharma *et al.*^[31] reported that only 11.6% of health workers attended any mock drill for disaster preparedness in the past 1 year and less than one-fifth (18.7%) received training in disaster preparedness. Also, Habte *et al.*^[48] indicated that low practice (8.3%) of DP was observed. Similarly, Shabbir *et al.*^[45] demonstrated that health workers' practices were poor of DP. Finally, Adenekan *et al.*^[49] showed that only a minority (35.1%) of the respondents knew that emergency drills are done in their DP. On the other hand, a study by Thapa *et al.*^[34] found that the health care workers in a tertiary care center's practices regarding DP were satisfactory.

Although in general, the level of preparedness for emergencies and disasters among health system employees was low, it was tried as much as possible in the courses of training workshops that were held on a 3-day basis, so that the level of preparedness of the household can be evaluated by several methods of health workers. These findings show importance of health workers' attitudes and performance, because the sample was not part of the general population, but a group of health workers whose skills are likely to be essential in specialized situations and in large-scale disasters. This concern stems from the observation that in times of need, employees who are distracted by the need to care for their family members may not show up for their duties.^[26] On the other hand, these employees significantly need to increase their preparation and have neglected this issue; so, they should be successful in disaster training and provide this training to other families, while they themselves need basic and simple training and do not even show good results in the evaluations. It seems that personal, psychological, socioeconomic, and cultural factors are also influential in health workers. Personal characteristics such as sex, age, marriage, level of education, personal knowledge, and personal disaster experiences like: psychological factors and mental images (beliefs, attitudes) are also influential.^[47]

This can justify the attitude and poor performance of health workers according to the results of this study, as follows: Preparedness operations have tended to be considered as "information transmission" rather than educational activities. Diverse preparedness methods such as warning signs, leaflets, school curricular, broadcasting, and social media involve learning, given they aim to change 'individual conditions concerning emergencies', including

behaviors, emotions, and perceptions. Moving beyond 'advertising or public relations models', pedagogies of preparedness "engage individuals in learning about emergency situations whether in preparation, response or recovery from a disaster".^[28]

The KAP of health system workers are very different in the field of disasters.^[51-59] One of the important roles of health workers is dealing with public health emergencies. Although there have been some studies on the KAP of medical staff in emergency rescue, there is still a gap in the research on occupational exposure prevention. One of the important roles of health workers is dealing with public health emergencies. Occupational exposure, especially to real and specific conditions in disasters, can have an important effect on the level of awareness and attitude and especially the behavior of health workers.^[51] For this reason, in the practice questions section, two questions were added regarding previous exposure to disasters and attending disaster preparedness exercises, and despite the fact that the practice section was weak, the results showed that: those who had a higher age and work experience were likely to increase their life experiences and job encounters, had better practice. It is recommended that the use of guided booklets and posters is necessary in order to increase KAP among health sector employees.^[52]

The simultaneous comparison of two types of questionnaires HDPI and FEMA showed that in many cases, the level of preparedness of employees toward disasters, emergencies, and especially household preparedness is similar. However, the different cut points in the FEMA questionnaire and its category, according to the Blessman *et al.*^[26] study, differentiate another type of interpretation of the results for the readers. In this category, it is clearly seen that the employees are extremely different in some levels of basic or advanced preparation, and the more important components are considered for preparation, the more their preparation level decreases. Even the category of those who answered "no" was significant. This method based on the Prochaska study,^[43] showed that even among the health sector staff and those who are themselves responsible for the evaluation and training of households, there are those who constantly postpone self-evaluation and provision and preparation of equipment related to disasters and emergencies. In fact, it can be said that for themselves – in many cases – it does not matter if they are ready or not. In the context of the relationship between KAP, the results showed that as the knowledge of health workers increases, their attitude decreases. In fact, the level of knowledge and attitude had an inverse relationship.

Finally, the results of this study and the comparison with other results lead us to the conclusion that to

achieve effective knowledge and skills about DP, household preparedness training and implementation of educational programs for health workers about DP are essential. In addition, there is a fundamental need to change the implementation process and the traditional training method in the field of DP for health workers. Such measures can have positive effects, improving the preparedness of health workers against disasters at all levels and their ability to respond. It is also important to point out that the training and implementation section of DRRMP in Iran's health system, especially the DART program, needs to be revised and modified. This means that these programs are not effective in terms of education for the employees of the health system, and it will not be possible to transfer knowledge and create attitudes, and change the behavior of households without establishing and strengthening the main educational and executive infrastructures.

Strengths and limitations

Our review of the literature revealed that the study on the preparation of health workers in the field of disasters and emergencies has not been done considering disaster preparedness in the household in Iran. The other strength of the present study is simultaneous use of several questionnaires was used to examine all aspects of health workers' preparedness in disasters and emergencies. However, the study had a limitation.

One of the limitations of this study was the short daily time, which affected the interval between two meetings with the participants. The presentation of before-after training and the effects of interventional training were considered as limitations of this research. For this reason, it brought some drops in the prototype.

This study was a cross-sectional study that did not provide cause-and-effect relationships between variables. Furthermore, at the same time, several methods were used to evaluate the level of preparedness of health workers, which can be examined in a wider dimension at the appropriate time and under better conditions in the future. The study was conducted on health workers from only Isfahan University, which might limit the generalizability of its findings. So, it is recommended to repeat this study using a well-designed research design with larger representative samples from different universities in Iran to grant a higher level of evidence and effective results.

Conclusion

Our results explained that the participants do not have enough positive attitudes and good performance for household preparedness in emergency situations. The level of education and age of the participants was a factor that

had an effect on improving their performance. More efforts are needed to strengthen their KAP to improve disaster preparedness, at least for those responsible for providing assessment services and training in DRRMP programs.

Such results may encourage managers and health policy makers to pay more attention to training programs for the preparedness and empowerment of health workers, especially basic disaster risk reduction management programs.

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Ethical considerations

The Ethics Committee of Isfahan University of Medical Sciences approved the research protocol.

Author's contributions

HZ: Designing the study, data analysis. All authors: Drafting the manuscript, Final Approval.

Code of ethics

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Conflicts of interest

There are no conflicts of interest.

References

1. Yazdi-Feyzabadi V, Bazayr M, Ghasemi S. District health network policy in Iran: The role of ideas, interests, and institutions (3i framework) in a nutshell. *Arch Public Health* 2021;79:212.
2. Malekafzali H. Primary health case in Islamic Republic of Iran. *J Sch Public Health Inst Public Health Res* 2014;12:Pe1-10.
3. Moghadam MN, Sadeghi V, Parva S. Weaknesses and challenges of primary healthcare system in Iran: A review. *Int J Health Plann Manag* 2012;27:e121-31.
4. Lankarani KB, Alavian SM, Peymani P. Health in the Islamic Republic of Iran, challenges and progresses. *Med J Islamic Repub Iran* 2013;27:42.
5. Kuçuk U, Sari C, Demirbağ BC. Nurse perceptions of knowledge and preparedness for disasters. *Disaster Med Public Health Prep* 2023;17:e519.
6. Iran MOHME: Guideline of "Disaster risk management programs in network health system (level one)"; 2014. Available from: <https://health.sbm.u.ac.ir/disaster-risk-management>. [Last accessed on 2014 Sep 16].
7. Ardalan A, Yousefi H, Yamani T, Valafar Shahrzad MT. Guideline of monitoring "Disaster Assessment of Readiness and Training for Households" Plan. 2014. Available from: <https://health.behdasht.gov.ir/shabake>.
8. Jonidi Jafari A, Seyedin H, Baba M, Moslehi S, Sakahei FS, Dowlati M. Study of households' preparedness for disasters and emergencies in West Regions of Tehran Province, Iran. *Health in Emergencies and Disasters Quarterly (HEDQ)* 2020;5:183-92.
9. Ardalan A, Yusefi H, Rouhi N, Banar A, Sohrabzadeh S. Household disaster preparedness in the Islamic Republic of Iran: 2015 estimation. *East Mediterr Health J* 2020;26:382-7.
10. Cook F, Howe P. Geographic variation in household disaster preparedness in the United States. *Ann Am Assoc Geographers* 2024;114:314-33.
11. Fazeli S, Haghani M, Mojtahedi M, Rashidi TH. The role of individual preparedness and behavioural training in natural hazards: A scoping review. *Int J Disaster Risk Reduct* 2024;105:104379. doi: 10.1016/j.ijdrr. 2024.104379.
12. Han Z, Wu G. Why do people not prepare for disasters? A national survey from China. *NPJ Nat Hazards* 2024;1:1.
13. Freiburger, Michael, Roman Hoffmann, and A. Fürnkranz-Prskawetz. "Should I stay or should I go: Modelling disaster risk behaviour using a dynamic household level approach." (2024).
14. Jiang Z, Chen Y, Yang T-Y, Ji W, Dong Z, Ji R. Leveraging machine learning and simulation to advance disaster preparedness assessments through FEMA national household survey data. *Sustainability* 2023;15:8035. doi: 10.3390/su15108035.
15. Priyanti RP, Hung C-H, Asri A. Determinants of household flood disaster preparedness. Available from: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4816742. [Last assessed on 2024 Jul 04].
16. Pal I, Raj V, Pal A, Sukwanchai K. Disaster risk reduction education (DRRE) and resilience in Asia-Pacific. *Disaster Resilience and Sustainability: Elsevier*; 2021. p. 667-83.
17. Torani S, Majd PM, Maroufi SS, Dowlati M, Sheikhi RA. The importance of education on disasters and emergencies: A review article. *Journal of education and health promotion*. 2019;8(1):85.
18. Mulyasari F, Takeuchi Y, Shaw R. Chapter 7 Implementation Tools for Disaster Education. *Disaster education: Emerald Group Publishing Limited*; 2011. p. 137-51.
19. Sakurai A, Sato T, Murayama Y. Impact evaluation of a school-based disaster education program in a city affected by the 2011 great East Japan earthquake and tsunami disaster. *Int J Disaster Risk Reduct* 2020;47:101632. doi: 10.1016/j.ijdrr.2020.101632.
20. Ardalan A, Mowafi H, Ardakani HM, Abolhasanai F, Zanganeh A-M, Safizadeh H, et al. Effectiveness of a primary health care program on urban and rural community disaster preparedness, Islamic Republic of Iran: A community intervention trial. *Disaster Med Public Health Prep* 2013;7:481-90.
21. Najafi M, Ardalan A, Akbarisari A, Noorbala AA, Jabbari H. Demographic determinants of disaster preparedness behaviors amongst Tehran inhabitants, Iran. *PLoS Curr* 2015;7. doi: 10.1371/currents.dis.976b0ab9c9d9941cbbac3775a6c5fbc6.
22. Najafi M, Ardalan A, Akbarisari A, Noorbala AA, Elmi H. The theory of planned behavior and disaster preparedness. *PLoS Curr* 2017;9. doi: 10.1371/currents.dis.4da18e0f1479bf6c0a94b29e0dbf4a72.
23. Rostami-Moez M, Rabiee-Yeganeh M, Shokouhi M, Dosti-Irani A, Rezapur-Shahkolai F. Earthquake preparedness of households and its predictors based on health belief model. *BMC Public Health* 2020;20:1-8. doi: 10.1186/s12889-020-08814-2.
24. Taghizadeh AO, Hosseini M, Navidi I, Mahaki AA, Ammari H, Ardalan A. Knowledge, attitude and practice of Tehran's inhabitants for an earthquake and related determinants. *PLoS Curr* 2012;4:e4fbbbe1668eef. doi: 10.1371/4fbbbe1668eef.
25. Parsizadeh F, Azizi G, Zafarani H. Study of Pakdasht preparedness in an earthquake and identifying the most appropriate methods for transferring the concepts of safety measures in this city. *J Strateg Manag Stud* 2017;8:127-49.
26. Blessman J, Skupski J, Jamil M, Jamil H, Bassett D, Wabeke R, et al. Barriers to at-home-preparedness in public health employees: Implications for disaster preparedness training. *J Occup Environ Med* 2007;49:318-26.

27. Kim Y, Kim MY. Factors affecting household disaster preparedness in South Korea. *PLoS One* 2022;17:e0275540. doi: 10.1371/journal.pone.0275540.
28. Mohamed NA, Abdel-Aziz HR, Elsehrawy MG. Nursing students' knowledge, attitude, and practice regarding disaster preparedness: A cross-sectional study. *Risk Manag Healthc Policy* 2023;16:2427-37.
29. Walles S, Chona EZ, Ndile ML, Ramadhani FB. Knowledge, attitude and practices of health care providers towards disaster and emergency preparedness in Mtwara, Tanzania. *Rwanda J Med Health Sci* 2023;6:303-14.
30. Tassew SF, Ayenew T, Nega TD, Bantie B, Feleke DG. Knowledge levels of health professional working in Ethiopia toward disaster preparedness, systematic review and meta-analysis. *Int J Afr Nurs Sci* 2023;100649. doi: 10.1016/j.ijans.2023.100649.
31. Sharma P, Roy N, Verma A, Aparnavi P, Khongsit A. Knowledge, attitude, and practices about disaster preparedness among resident doctors in a tertiary care teaching hospital in Delhi, India: A cross-sectional study. *J Emerg Manag* 2023;21:355-68.
32. Getenet B, Waganew W, Keney D, Yesuf A. Knowledge, attitude and practices of frontline health care workers to disaster risk management in private general hospitals in Addis Ababa, Ethiopia: Multicenter cross-sectional study. *Ethiop J Health Sci* 2023;33:795-804.
33. Janizadeh R, Omidvari F, Motlagh Z, Jahangiri M. Disaster preparedness: Knowledge, attitude, and practice of hospital staff. *Health in Emergencies and Disasters Quarterly (HEDQ)* 2023;8:193-200.
34. Thapa R, Yadav MK, Pokharel M, Chhetri D, Mandal S, Shahi MB. Knowledge, attitude and practice of disaster preparedness among health care workers in a tertiary care center of central Nepal. *J Karnali Acad Health Sci* 2022;5. doi: 10.61814/jkaks.v5i3.732.
35. Patel KK, Ramavat M, Bhojak N, Vora PJ. Attitude of healthcare workers towards disaster management practices in a hospital of Gujarat. *Indian J Public Health Res Dev* 2022;13:106-12.
36. Tassew SF, Chanie ES, Birle TA, Amare AT, Kerebih G, Nega TD, et al. Knowledge, attitude, and practice of health professionals working in emergency units towards disaster and emergency preparedness in South Gondar Zone hospitals, Ethiopia, 2020. *Pan Afr Med J* 2022;41:314.
37. Deress T, Hassen F, Adane K, Tsegaye A. Assessment of knowledge, attitude, and practice about biomedical waste management and associated factors among the healthcare professionals at Debre Markos town healthcare facilities, Northwest Ethiopia. *J Environ Public Health* 2018;2018:7672981. doi: 10.1155/2018/7672981.
38. Najafi M, Khankeh H, Soltani A, Atighechian G. Reliability and validity of household disaster preparedness index (HDPI). *Iran Red Crescent Med J* 2020;22:12.
39. Wirtz PW, Rohrbeck CA, Burns KM. Anxiety effects on disaster precautionary behaviors: A multi-path cognitive model. *J Health Psychol* 2019;24:1401-11.
40. Wirtz PW, Rohrbeck CA. The dynamic role of perceived threat and self-efficacy in motivating terrorism preparedness behaviors. *Int J Disaster Risk Reduct* 2018;27:366-72.
41. Alkalash SH, Alamer EHA, Allihyani AM, Alhazmi AS, Alharthi RM, Bugis AM. Knowledge of and attitude toward disaster preparedness among secondary school students in the western region of Saudi Arabia. *Cureus* 2023;15:e33926. doi: 10.7759/cureus.33926.
42. Moabi RM. Knowledge, Attitudes and Practices of Health Care Workers Regarding Disaster Preparedness at Johannesburg Hospital in Gauteng Province, South Africa. University of the Witwatersrand; 2008.
43. Prochaska JO. Stages of change in the modification of problem behaviors. *Prog Behav Modif* 1992;28:183-218.
44. Doshmangir L, Moshiri E, Mostafavi H, Sakha MA, Assan A. Policy analysis of the Iranian health transformation plan in primary healthcare. *BMC Health Serv Res* 2019;19:1-8. doi: 10.1186/s12913-019-4505-3.
45. Shabbir R, Afzal M, Sarwer H, Gilani SA, Waqas A. Nurses knowledge and practices regarding disasters management and emergency preparedness. *Saudi J Med Pharm Sci* 2017;3:464-76.
46. Acabado RG. Assessment on the emergency and disaster preparedness of healthcare professionals in Davao city: Basis on a proposed enhancement program. *Int J Multidiscip Stud* 2021;3:27-42.
47. Suparni FL, Darmawan ES, Modjo R. Knowledge and attitude regarding disaster and emergency preparedness among hospital health care workers in West Java Province, Indonesia. *Indian J Public Health* 2019;10:2003-7.
48. Habte A, Addisie A, Azazh A. Assessment of knowledge, attitude and practice of disaster preparedness among Tikur Anbessa specialized hospital health care workers, Addis Ababa, Ethiopia. *Am J Nurs Sci* 2018;7:39-48.
49. Adenekan BA, Balogun MR, Inem V. Knowledge, attitude, and practices of emergency health workers toward emergency preparedness and management in two hospitals in Lagos. *J Clin Sci* 2016;13:23-8.
50. Nakachew Y. Knowledge attitude and practice of disaster preparedness among health professionals working in the adult emergency department, at two teaching hospitals of Addis Ababa, Ethiopia. Ethiopia. 2021.
51. Preston J. Disaster Education: 'Race', Equity and Pedagogy. 1st ed. Rotterdam, The Netherlands: Sense Publishers; 2012.
52. Liu Y, Zhang Z, Liu Y. Knowledge, attitude, and practice toward the prevention of occupational exposure in public health emergencies among nurses in Wuhan. *Front Public Health* 2024;12:1289498. doi: 10.3389/fpubh.2024.1289498.
53. Atia B, Zakaria A, Abo Habieb ET. Nurses' role perception and knowledge about the emergency preparedness at disasters. *Mansoura Nurs J* 2024;11:497-510.
54. Ghaljeh M, Doostkami M, Ghaljaei F, Ghiamikeshtgar N, Pishdad F. Operating room technologists' knowledge, attitude, and preparedness for disaster management of a Zahedan: Implications for nursing disaster education. *J Educ Health Promot* 2024;13:81.
55. Nikookar SH, Moosazadeh M, Fazeli-Dinan M, Zaim M, Sedaghat MM, Enayati A. Knowledge, attitude, and practice of healthcare workers regarding dengue fever in Mazandaran Province, northern Iran. *Front Public Health* 2023;11:1129056. doi: 10.3389/fpubh.2023.1129056.
56. Zhang J, Yang L, Cao X, Ren Y, Han X, Zang S, et al. Assessment of disaster preparedness and related impact factors among emergency nurses in tertiary hospitals: Descriptive cross-sectional study from Henan Province of China. *Front Public Health* 2023;11:1093959. doi: 10.3389/fpubh.2023.1093959.
57. Wang Y, Liu Y, Yo M, Wang H, peng C, zhang P, et al. Disaster preparedness among nurses in China: A cross-sectional study. *J Nurs Res* 2023;31:e255. doi: 10.1097/jnr.0000000000000537.
58. Tilahun L, Desu B, Zeleke M, Dagnaw K, Andualem A. Emergency and disaster handling preparedness among front line health service providing nurses and associated factors at emergency department, at Amhara Regional State Referral Hospitals, Ethiopia. *Open Access Emerg Med* 2021;13:221-32.
59. Far SST, Marzaleh MA, Shokrpour N, Ravangard R. Nurses' knowledge, attitude, and performance about disaster management: A case of Iran. *Open Public Health J* 2020;13. doi: 10.2174/1874944502013010441.