

INVESTIGATION OF FACTORS AFFECTING DISASTER PREPAREDNESS BELIEFS AMONG PUBLIC INSTITUTION EMPLOYEES: A CROSS-SECTIONAL STUDY

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ABSTRACT

Objective: Disasters affect the whole society, may cause great loss of life and property and may threaten public health at a significant level all over the world. The aim of this study is to reveal the disaster preparedness beliefs of public employees and effective factors.

Methods: This study was conducted with a total of 322 public employees. The data were collected face-to-face between June-September 2023 with the General Disaster Preparedness Belief scale developed based on the Health Belief Model and a descriptive form.

Results: The total score of general disaster preparedness belief was 106.80 ± 17.42 . There was no significant difference was found between the socio-demographic characteristics of the employees and the total scale score, and the disaster preparedness belief, motivation and obstacles to disaster preparedness were found to be high in those who were not prepared for disaster, did not have an emergency/disaster kit and did not receive disaster training.

Conclusion: General Disaster Preparedness Belief score of public employees is close to the middle level. Public employees have high perceptions of obstacles related to disaster preparedness. The perception of barriers should be reduced and the perception of benefits should be increased in this group with high level of education.

Keywords: Disasters, disaster preparedness, health belief models

INTRODUCTION

The term "disaster" has many definitions. The Centre for Research on the Epidemiology of Disasters (CRED) defines a disaster as "an unexpected and often sudden event that causes great damage, destruction and human suffering, exceeding local capacity to the extent that it requires external assistance at national or international level"(1). According to the disaster classification in the International Emergency Events Database (EM-DAT), disasters are divided into two groups: natural

and technological. Approximately two-thirds of the disasters registered in the database are natural disasters(2). The EM-DAT report states that in 2022, 387 natural disasters were recorded. These events affected 185 million people, and 31 thousand lost their lives, resulting in an estimated economic loss of 223.8 billion(1).

The diversity and significance of natural disasters vary across countries. Turkey ranks third worldwide in human loss from earthquakes and eighth in the number of people affected (3). Due to its location,

technological structure, geological structure and climate characteristics, natural disasters occur more frequently than technological disasters(4). According to the records in the EM-DAT database, 208 natural disasters occurred in Turkey between 1923 and 2023, resulting in approximately 136 thousand lives lost and 85 billion dollars of damage(5).

In recent years, the number, magnitude and impact of disasters on society have increased worldwide due to global climate change and human-induced factors. To reduce the negative impact of disasters, countries should establish strategies for the prevention, preparation, response and recovery phases of disaster management(6). It is crucial to take necessary measures in the risk reduction phase before the disaster and carry out activities to prevent losses in the preparation phase(5). Disaster preparation is the responsibility of every individual(7). Making the necessary preparations to reduce the damages caused by disasters and taking precautions increases a society's resilience against disasters (8). Disaster preparedness is a dynamic and ongoing process that includes education and training, development of plans and policies, recruitment of volunteers, equipment, public training, exercises and evaluation(9,10). Being prepared is essential to reduce the effects of disasters and save lives, especially in countries with high disaster risk(11). Health professionals are integral in disaster preparedness; in particular, nurses assume a critical role at every stage of the disaster management process. In disaster preparedness studies, nurses are essential in determining the needs and resources of society, creating and maintaining the disaster nursing workforce, using nursing roles, and providing cooperation (6). However, studies show that nurses in our country are not competent in disaster management (12).

Major disasters in recent years have made the deficiencies in disaster planning and preparedness even more evident(9). The COVID-19 outbreak and the physiological, economic and psychological losses from the earthquake of June 2023 in Kahraman Maraş, Turkey, have shown the necessity of disaster preparedness. The Health Belief Model (HBM) is important in increasing the awareness and motivation of individuals and explaining healthy behaviors. The measurement tool for general disaster preparedness based on this model addresses disaster preparedness beliefs(13).

Previous studies show that disaster belief is generally at a moderate level(14,15). Individuals with different socio-demographic characteristics may change their approach to disaster preparedness activities. This study aims to contribute to the literature by revealing the disaster preparedness beliefs of highly educated public employees and the associated determinants.

MATERIALS AND METHODS

Type of Research

This descriptive and cross-sectional study examined the disaster preparedness beliefs of individuals working in a public institution and the factors affecting them.

Population and Sample of the Study

The population of the study consists of public employees working in a public institution in Denizli, Turkey. There was no sample selection. A total of 400 people working in the public institution were included in the study. The study was completed with a total of 322 people and 80.5% of the sample was reached. The reasons for not participating in the study included employees being on leave (n=14) and not wanting to participate.

Data Collection Tools

The data collection tools included the Public Employees Introductory Information Form (Appendix 1) and the General Disaster Preparedness Belief Scale (Appendix 2).

Introductory Information Form

The researchers prepared this form within the scope of the literature (16,17). The form consists of questions about age, gender, education level, marital status, number of children, income, occupation, previous disaster experience, emergency/disaster preparedness, having a disaster kit, and disaster training.

General Disaster Preparedness Belief Scale (GDPB)

This scale developed by Inal et al. 2018 (8) is based on the Health Belief Model, and it measures people's behaviors, attitudes, and beliefs in preparation for disasters and emergencies. The Health Belief Model (HBM) posits that individuals consider their perceptions of risk, anticipated benefits, barriers, and personal beliefs when making health-related

decisions. This model is also effectively applied to understanding beliefs regarding health behaviors such as disaster preparedness. Therefore, the scale is based on this theoretical framework to assess individuals' beliefs and preparedness levels concerning the measures they would adopt in response to disasters (18). The Cronbach alpha value of the scale, which consists of 31 items and six sub-dimensions, is 0.86. In the same year, İnal and Doğan (2018) aimed to improve and retest the psychometric properties of the scale, adding 14 more items by expanding the same structure. The 45 items and six sub-dimensions of the scale include perceived susceptibility (6 items), perceived barriers (14 items), perceived usefulness (6 items), perceived severity (4 items), self-efficacy (10 items) and enablers (5 items). Cronbach's alpha value of the expanded five-point Likert-type scale is 0.93. Positive statements in the scale are scored as (1) Strongly disagree, (2) Disagree, (3) Undecided, (4) Agree, and (5) Strongly agree, while negative statements are reverse scored. The minimum score is 45 points, and the maximum is 225 points. Questions 4, 6, 8, 9, 17–30, 31, 35, 37, 38, 42, and 44 are reverse scored (13). As a result, the 45-item scale improved on the 31-item scale. Since the 45-item scale is better in terms of validity, reliability and other psychometric properties, it is recommended that researchers use it. In particular, the scale provides more information about behaviors related to disaster preparedness (13). Therefore, it was used in the study, and the Cronbach alpha value was 0.85. The General Disaster Preparedness Belief Scale, developed within the framework of the Health Belief Model, is designed to assess individuals' beliefs regarding disaster preparedness. An increase in both total and subscale scores signifies a strengthened belief in the importance of disaster preparedness, suggesting a heightened awareness of potential risks and an increased likelihood of engaging in preventive behaviors, including health-related actions and psychological readiness. In contrast, a decrease in scores reflects a diminished belief in preparedness, indicating a reduced perception of disaster risks and a lower propensity to adopt preventive measures or cultivate psychological resilience. Higher scores typically denote strong preparedness beliefs and enhanced resilience, while lower scores suggest weaker preparedness beliefs, which may correspond to greater vulnerability in the event of a disaster. Overall, variations in the scores provide critical insights into the efficacy of

preparedness interventions and highlight areas in need of further educational efforts or targeted action (13,18).

Data Collection Method

The study was conducted in a public institution in Denizli, Turkey. The researchers collected the data face-to-face with questionnaires for 12–20 minutes on average. Several visits were made during the data collection period to reach the employees who were on report and on leave. The study data were collected between June and September 2023 using face-to-face interview method.

Ethical Issues

Permission was obtained from the authors for the scale used in the study. The participants were informed about the purpose of the research and the content of the forms, that the collected information would be kept confidential, and that they could exercise their right to withdraw from the research at any time. Their consent was obtained. Ethical permission was obtained from the Non-Interventional Clinical Research Ethics Committee of Pamukkale University (Date: 31.05.2023, Decision No: 374391). The study was kept confidential since the institution did not want to be identified.

Data Evaluation

Data were evaluated using the Statistical Package for the Social Sciences (SPSS Inc, Chicago, Illinois) 21.0 program. Descriptive statistics were presented as mean \pm standard deviation for continuous variables and frequency and percentage for categorical variables. The normal distribution of the data was determined by the Kolmogorov-Smirnov test. Data were analyzed using independent-samples t-test and one-way ANOVA. A value of $p < 0.05$ was accepted as significant in the analyses.

RESULTS

Table 1 gives descriptive information about public employees. The mean age of the participants was 41.73 ± 0.55 , and 95.0% were undergraduate and master's degrees. Of the public employees, 21.4% had previous disaster experience, and 24.2% had received training.

The total score of the General Disaster Preparedness Belief Scale of public employees was 106.80 ± 17.42 . The mean scores of the sub-dimensions were as follows: Perceived susceptibility 12.26 ± 3.11 ,

Table 1. Socio-demographic and disaster-related characteristics of public employees (n=322)

Variables		n	%
Age	39 years and under	148	46.0
	40 years and older	174	54.0
Mean (SD)		41.73±0.55	
Gender	Male	187	58.1
	Female	135	41.9
Marital status	Married	236	73.3
	Single	86	26.7
Education status	High school	16	5.0
	University	286	88.8
	Postgraduate	20	6.2
Children	Yes	236	73.3
	No	86	26.7
House ownership	Self-ownership	184	56.1
	Renting	138	43.9
Ever experienced any disaster	Yes	69	21.4
	No	253	78.6
6 February 2023 earthquake experience	Yes	11	3.4
	No	311	89.8
Emergency/Disaster preparedness	Yes	42	13.0
	No	280	87.0
Having an emergency/disaster kit	Yes	58	18.0
	No	264	82.0
Emergency/Disasters training	Yes	78	24.2
	No	244	75.8
Subjects trained *n=101	First aid	48	47.5
	Community disaster volunteer	14	13.9
	Basic disaster awareness	32	31.7
	Other	7	6.9

* Since there are multiple responses, the number n exceeds the sample size.

Table 2. Total and subscale mean scores of general disaster preparedness beliefs

Scale and Subscales	Number of items	X ±SD	Min-Max
Perceived Susceptibility	6	12.26±3.11	6-22
Perceived Severity	4	7.78± 2.89	4-19
Perceived Benefits	6	11.86±3.91	6-30
Perceived Barriers	14	33.30±8.91	14-70
Cues to Action	5	14.03±3.68	5-25
Self-Efficacy	10	27.54±5.30	14-46
GDPB	45	106.80±17.42	64-157

GDPB, General Disaster Preparedness Belief. X: Average, SD: Standard Deviation, Med: Median, Min: Minimum, Max: Maximum

Perceived severity 7.78± 2.89, Perceived benefits 11.86±3.91, Perceived barriers 33.30±8.91, Cues to Action 14.03±3.68, Self-efficacy 27.54±5.30 (Table 2).

Table 3 compares the mean scores of public employees in GBDP and its sub-dimensions with various variables. A statistically significant difference was found between public employees aged 40 and older and the sub-dimensions of perceived susceptibility and perceived severity ($p<0.01$). A statistically significant difference was determined between the gender variable and perceived severity ($p<0.01$), perceived benefits ($p<0.05$) and self-efficacy sub-dimensions ($p<0.001$). No significance was found between marital status, presence of children and residence ($p>0.05$).

A statistically significant difference was determined between those who had never experienced a disaster

and perceived susceptibility ($p<0.01$). A statistically significant difference was found between those who were not prepared for emergencies/disasters and the mean scores of perceived susceptibility, self-efficacy ($p<0.01$), perceived barriers ($p<0.05$) sub-dimension and total scale score ($p<0.01$). A statistically significant difference existed between those who did not have an emergency/disaster kit and perceived susceptibility($p<0.01$), as well as between the most recent earthquake and perceived severity sub-dimension score ($p<0.05$). There was a statistically significant difference between the status of receiving disaster training and perceived severity ($p<0.05$), cues to action, self-efficacy sub-dimension scores ($p<0.001$), and total scale score ($p<0.05$). A significant difference was found between the total score of GDBP and those who did not receive disaster

training, were unprepared for disaster and did not have an emergency/disaster bag ($p < 0.05$) (Table 4).

DISCUSSION

This study determined the disaster preparedness beliefs of public employees with a scale developed and expanded based on the Health Belief Model. Public employees with high levels of education had middle levels of disaster preparedness beliefs. The GDBP was at a moderate level in studies conducted

in our country involving nurses in a research hospital, (16) parents with a high level of education working at a university (14), individuals participating through social media (15), and academic and administrative staff at a university (19).

In a study conducted in Iran using the cultural adaptation of the scale, earthquake preparedness belief was found to be low (20). Only 20% of the participants were university graduates; the low level of education compared to our study may be the

Table 3. Evaluation of socio-demographic variables according to General Disaster Preparedness Belief Scale scores of public employees

Variables	Susceptibility	Severity	Benefits	Barriers	Cues to Action	Self-Efficacy	GDBP
Age							
39 years and below	11.77±2.9	7.38±2.9	11.79±4.0	32.66±9.5	14.41±3.7	27.56±5.5	105.60±17.5
40 years and above	12.67±3.1	8.13±2.7	11.92±3.8	33.85±8.2	13.71±3.6	27.52±5.1	107.83±17.2
p value	p < 0.01	p < 0.01	0.771	0.302	0.237	0.087	0.253
Gender							
Male	12.47±3.1	8.19±2.8	11.49±3.7	33.93±9.5	13.93±3.8	26.54±4.9	106.56±18.1
Female	11.97±2.9	7.22±2.8	12.37±4.1	32.43±7.8	14.18±3.4	28.94±5.4	107.14±16.4
p value	0.150	p < 0.01	p < 0.05	0.125	0.534	p < 0.001	0.767
Marital status							
Married	12.23±3.0	7.87±2.7	11.94±3.7	33.05±8.1	14.10±3.6	27.41±5.3	106.61±16.8
Single	12.33±3.3	7.54±3.1	11.66±4.3	34.01±11.1	13.86±3.7	27.91±5.2	107.33±19.1
p value	0.800	0.397	0.602	0.460	0.608	0.447	0.757
Education status							
High school	11.87±3.4	7.68±3.8	11.12±3.9	33.62±11.2	12.81±2.9	26.62±4.7	102.75±16.5
University	12.26±3.1	7.79±2.8	11.77±2.9	33.54±9.1	14.25±3.8	27.63±5.2	107.27±17.3
Postgraduate	12.5±3.4	7.85±2.4	13.75±4.9	33.15±11.5	13.65±4.1	26.95±6.3	107.85±23.3
p value	0.834	0.986	0.069	0.983	0.060	0.664	0.599
Children							
Yes	12.33±3.0	7.89±2.8	11.78±3.7	33.22±8.1	14.01±3.6	27.52±5.2	106.89±16.9
No	12.04±3.1	7.50±3.2	12.09±4.3	33.52±10.9	13.80±3.7	27.60±5.4	106.56±18.6
p value	0.464	0.315	0.558	0.820	0.495	0.908	0.888
House ownership							
Self-ownership	12.37±3.2	7.80±2.8	11.70±3.8	32.58±8.7	14.23±3.7	27.70±5.1	106.41±16.9
Renting	12.10±2.91	7.76±2.9	12.07±4.0	34.27±9.0	13.76±3.5	27.33±5.5	107.33±18.1
p value	0.441	0.913	0.402	0.093	0.254	0.537	0.643

Mann-Whitney U was used as a statistical test. $p < 0.05$ and below was considered statistically significant.

Table 4. Evaluation of variables related to disasters according to General Disaster Preparedness Belief Scale scores of public employees

Variables	Susceptibility	Severity	Benefits	Barriers	Cues to Action	Self-Efficacy	GDBP
Ever experienced any disaster							
Yes	11.30±2.8	7.62±3.5	11.78±4.5	32.50±10.1	14.52±4.2	26.86±5.4	104.60±18.5
No	12.52±3.1	7.83±2.7	11.88±3.7	33.52±8.5	13.90±3.5	27.73±5.2	107.40±17.1
p value	p < 0.01	0.645	0.858	0.443	0.270	0.246	0.262
Emergency/Disaster preparedness							
Yes	10.90±3.0	8.66±3.6	11.30±3.5	30.00±11.2	13.07±4.1	25.04±5.3	99.00±20.0
No	12.46±3.1	7.65±2.7	11.95±3.9	33.80±8.4	14.18±3.5	27.92±5.2	107.97±16.7
p value	p < 0.01	0.094	0.289	p < 0.05	0.107	p < 0.01	p < 0.01
Having an emergency/disaster kit							
Yes	11.24±2.9	7.98±2.9	12.32±3.5	30.79±8.4	13.58±3.6	26.62±4.6	102.55±16.4
No	12.48±3.1	7.74±2.8	11.76±3.9	33.85±8.9	14.13±3.6	27.75±5.4	107.74±17.5
p value	p < 0.01	0.581	0.291	p < 0.05	0.302	0.107	p < 0.05
Emergency/Disasters training							
Yes	12.08±3.1	8.38±2.8	11.66±3.7	32.35±9.6	12.87±3.2	25.69±5.0	103.06±19.7
No	12.31±3.0	7.59±2.9	11.93±3.9	33.61±8.6	14.40±3.7	28.13±5.2	108.00±16.4
p value	0.585	p < 0.05	0.593	0.310	p < 0.001	p < 0.001	p < 0.05
6 February 2023 earthquake experience							
Yes	11.81±3.7	11.09±4.3	11.09±3.1	35.18±14.6	14.45±3.7	25.90±4.1	109.45±22.9
No	12.27±3.0	7.67±2.7	11.89±3.9	33.24±8.6	14.02±3.6	27.60±5.3	106.71±17.2
p value	0.700	p < 0.05	0.423	0.672	0.715	0.217	0.703

reason. Efeoğlu et al. 2021 (21), emphasized that the perceived barrier is low, while self-efficacy and perceived benefit beliefs are high in those with more education. Higher monthly income and occupational status were positively associated with GDBP (19).

In our country, disaster preparedness beliefs are insufficient in highly educated individuals. The socio-demographic characteristics of public employees do not explain their GDBP beliefs—only age and gender show differences on some subscales. The subscales in the HBM interact with individuals' disaster and emergency health preparedness levels. The information obtained provides an opportunity to convey messages that inform and educate about protective measures(22).

Workers 40 and older are more likely to have been caught in a disaster or impacted and to have a higher susceptibility to the fear of disaster and its consequences. In terms of gender, while men have a higher perception of severity about disasters, women have a higher belief that disaster preparedness will reduce the risk and be protective, belief in the benefits of being prepared, and belief in being able to do what is necessary. In other words, although men take disasters seriously, women have a more constructive approach to disaster preparedness. Wirtz and Rohrbeck (2017) (23), found that perceived self-efficacy had a moderate effect on starting preparedness activities, but recognizing others taking action had a strong effect. Women are more prominent in disaster preparedness. In other similar studies, age, gender, marital status and earthquake preparedness scores were not correlated (15,21,24). In a study conducted in a different culture, gender and marital status were important determinants of earthquake preparedness(20). Cultural structure is also important in terms of socio-demographic variables in an individual's disaster preparedness beliefs.

In this study, the determinants of general disaster preparedness beliefs were having an emergency/disaster kit and receiving disaster training. Previous disaster experiences were not effective with GDBP. This may be related to the low number of public employees with disaster experience. On the contrary, some studies emphasize that previous experience is a vital determinant increasing the belief in disaster preparedness(19,20, 24). A study of the different effects of disaster experience in Japan found that experience related to disaster damage increases the preparedness of households,

and one of the strongest motivation sources for disaster preparedness is direct and recent disaster experience (25).

This study found that the recent K. Maras (06 February 2024) earthquake disaster increased the fear of disaster and the perception of severity, revealing the belief about the consequences of the disaster on general disaster preparedness. Others who did not directly experience the disaster experienced the sadness and anxiety of this situation but did not turn to preparedness behavior. In order to be prepared, negative experiences such as experiencing disasters and loss of life and property should not be expected.

Within the scope of health protection and empowerment, individuals and policymakers should try to acquire disaster preparedness behavior. Disaster preparedness is a way of life in disaster management (26) and a dynamic approach to health promotion(27). The main goal of the activities in the preparedness phase is to eliminate the negative consequences that may arise by taking precautions in a timely, appropriate and effective manner(28).

In this study, the number of public employees who stated they were prepared for disaster was low. However, while the general GDBP scores, susceptibility belief, and self-efficacy perception of the employees who were unprepared for disaster were high, the perception of perceived barriers was also high. Public employees who want to be prepared for disaster and transform it into behavior have insufficient belief in its usefulness and face obstacles. Among the cultural barriers to earthquake preparedness in Turkey, a combination of high fatalism, high anxiety and high distrust of the system is linked to a lack of action to mitigate damage(24). It is essential that individuals' perceptions of barriers are low to increase their belief in disaster preparedness.

Perceived self-efficacy is an important motivational factor in disaster preparedness(29). Individuals with high self-efficacy feel more empowered to take better care of themselves and their families during disasters(24). In acquiring a positive behavior, individuals should perceive the benefits of the behavior more than the obstacles. Perceived benefit is the extent to which an individual believes they can prevent the risk if they change their behavior(30). The perception of GDBP, susceptibility and self-efficacy beliefs of public employees who state they are unprepared for disasters can be directed toward

positive health behavior and an increase in perceived benefit belief through planned and effective training. Knowing and understanding the benefits of being prepared for disasters will enable them to be more prepared.

Having an emergency/disaster bag is essential in disaster preparedness. However, this study found that few public employees have a disaster kit. Public employees who do not have a disaster kit adopt this practice more as an enabler, see it as an important motivation in the belief of disaster preparedness and have a higher GDBP. The barrier perception of this highly educated group was also found to be high. In future studies, revealing the obstacles will be beneficial in transforming them into positive behaviors.

Similarly, in this study, public employees who stated they did not receive any disaster training had higher belief in cues to action, self-efficacy and GDBP. Public employees with high levels of education who did not receive any training on this subject think that the training increases the beliefs of cues to action, motivators and preparedness. Still, they believe it does not increase their severity toward disasters. The necessity of training for disaster preparedness cannot be disputed. In a study, it was determined that the training program increased the general disaster preparedness beliefs and psychological resilience of the students in the intervention group. Researchers recommend the development and implementation of training programs(31). Having received disaster training before is positively associated with general disaster preparedness(19). However, training should be persuasive to individuals, provide communication between practitioners and individuals, and ensure active participation in disaster preparation. In this context, emergency and disaster scenario drills involving practitioners and the public, along with skills training approaches, can improve perceived self-efficacy and knowledge of and compliance with response procedures(29). The use of mass media and technology can be important to support disaster preparedness education.

Promoting continuous behavioral change toward disaster preparedness and using cultural factors compatible with individuals' worldviews, values, and norms can effectively reduce individual perceptions of barriers. Research in Portugal and the Netherlands highlighted three main strategies expected to promote a "soft" cultural shift toward disaster preparedness over time. These strategies are

promoting measures built on already existing cultural values and daily routines, organizing preparedness-related activities as part of daily life events, and improving perceived self-efficacy by showing how individuals can use their unique skills in disaster situations(29).

The results of this study can be generalized to the public institution where the data were collected. Our study has shown that although public employees in this institution have high levels of education, their disaster preparedness beliefs are not at the expected level.

Limitations

The study was conducted among public employees with a high level of education. A limitation of the study is that the name of the public institution where the study was conducted was not specified, as it was not requested by the institution. The results of the study can be generalized to this public institution in Denizli province.

CONCLUSION

The GDBP of the public employees with higher education level who participated in our study are close to medium level. The socio-demographic characteristics of public employees were not related to their GDBP. Those who were not prepared for disasters, did not have an emergency/disaster kit, and did not receive disaster training had firm belief and motivation to prepare for disasters but also high barriers to disaster preparedness. This study reveals the necessity of reducing the perception of barriers and increasing the perception of benefits in this group with high education levels.

The results obtained from the sub-dimensions of general disaster awareness based on HBM should be considered by practitioners and policymakers in the preparation of training and intervention programs. An educational approach that motivates individuals more, reduces their perception of obstacles, ensures their active participation and is appropriate for their cultural characteristics should be adopted in disaster preparedness. Nurses who work more with individuals and society should guide the disaster preparedness phase, identification of risks, implementation of interventions and preparation before disasters occur. Behavioral theoretical models related to disaster preparedness are recommended to improve the disaster preparedness behaviors of individuals and organizations.

Abbreviations: CRED, Centre for Research on the Epidemiology of Disasters; EM-DAT, International Emergency Events Database; GDPB, General Disaster Preparedness Belief Scale; HBM, Health Belief Model.

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