ROLE OF SELF-INSTRUCTION MODULE IN IMPROVEMENT OF KNOWLEDGE OF DISASTER PREPAREDNESS

Nursing

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ABSTRACT

Background: Incessant rains in the Kolhapur region has led to disastrous flood situations in the past. Disaster preparedness is therefore necessitated to counter the loss suffered by the residents and is closely linked to knowledge improvement. Self-instruction Module (SIM) has been extensively used as a learning tool in healthcare and has proven its effectiveness in knowledge improvement.

Aim: To evaluate the effectiveness of SIM on disaster preparedness among the residents of the flood prone areas of Karveer taluka, Kolhapur and to determine the association between the knowledge scores and the socio-demographic variables.

Methods: Consenting participants from Karveer taluka were recruited to evaluate the efficiency of SIM through a structured knowledge tool using pre-test-post-test design. Both—SIM and knowledge tool, were sent for expert evaluation. Data were collected during specific periods between January and February 2019. Improvement in knowledge score was determined through qualitative and evaluative approach.

Results: Significant improvement in knowledge scores was observed between pre-and post-test scores ($P < 0.001$) of 100 consenting participants. Association was lacking between the knowledge scores and the socio-demographic variables.

Conclusion: SIM developed in the study was effective in improving knowledge score, across all age groups, and could be used to improve the disaster preparedness of the residents of flood-prone areas.

KEYWORDS

Structured-information module, SIM, Disaster preparedness, Knowledge, Risk perception

INTRODUCTION

Devastation caused by flood has increased in the Kolhapur region; one of the most disastrous flood-related events in Kolhapur was recorded in 2005 where 107 villages were heavily affected, with 27 villages completely inundated. Unheeded warnings of high flood risk in the regions of Kolhapur including Karveer in 2017 led to great losses incurred by the region in 2019^[1]. While natural disasters are inescapable to avert, the repercussions can be mitigated. Disaster preparedness plays a crucial role in protecting lives, especially in an unpredictable situation such as floods. In India, there are numerous reports on disaster preparedness in mitigating losses incurred by floods^[2,3,4]. Socio-demographic variables are significant in determining the disaster preparedness of the affected region, including attachment to the residing place^[5,6].

The key element of disaster and risk management is knowledge improvement. Approaches such as awareness workshops^[7], teaching modules, and education tools have a positive impact on disaster management. The Government of Maharashtra has advocated disaster preparedness through a conjugal effort of public and private initiatives involving education through telecasts^[8]. Educating the public on disaster management skills is challenging and demands multi-level approach. A customizable tool to increase knowledge on disaster preparedness is Self Instruction Module (SIM). SIM is an assimilable collection of systematically organized information in the form of a booklet which provides specific information on the topic of study.

SIM has been widely used as an effective module of knowledge improvement in education, healthcare, and social causes^[9-13]. However, there are no reports on the use of SIM as a readily available knowledge tool for disaster preparedness. Therefore, this study aims to evaluate the effectiveness of SIM on disaster preparedness among people residing in flood prone areas of Karveer taluka and to determine the association between the knowledge scores and the socio-demographic variables.

METHODS

Preparation, validation and reliability testing of structured knowledge questionnaire and SIM

Structured knowledge questionnaire on disaster preparedness, hereafter referred to as the tool, was designed through combined literature reviews and expert discussions. Items in the tool were analyzed according to Gilbert's classification^[14]. SIM, on disaster preparedness, was developed through expert consultation and literature review. Both, the tool and SIM, were validated by 14 experts from Community Medicine Nursing, MD community medicine,

officials from Department of Geology, and District Disaster officer. Reliability of the tool and SIM was determined using split-half method through Karl Pearson's coefficient of correlation formula and Spearman's Prophecy Browns methods.

Study design, data collection, and pilot study

Design of the study was pre-test-post-test. Collection of data commenced after receiving Institutional Ethical Committee clearance and local permission. Quantitative and evaluative approach determined the improvement in knowledge regarding disaster preparedness by comparing pre-experimental and post-interventional knowledge score using the tool; the intervention being SIM. Pre-experimental knowledge evaluation was conducted by providing the study participants with the tool and arbitrarily grading the response as: good knowledge (19-27), average knowledge (10-18), and poor knowledge (1-9), based on the number of correct answers. Post-interventional knowledge score was evaluated, and response was graded similar to the pre-experimental evaluation. The difference between pre-and post-intervention set up was the time of response collection: the former was on the day of SIM administration and the latter was after 8 days. Time allotted to respond for each set up was 30 min.

Pilot study was conducted in the Ambewadi district of Kolhapur on 10 willing participants. The tool was distributed to the participants and the results were recorded for pre- and post-intervention response. For the main study, participants were selected through non-probability, convenience sampling technique. Sample size was maintained as minimum 100.

Data collection was undertaken at specific time and dates from January–February 2019. Participants of both gender present at the time of data collection, willing to participate in the study, and who could read/write Marathi, were included in the study. Those who were ill at the time of data collection were excluded. Demographic information such as age, occupation, education, flood experience was collected from the tool.

STATISTICAL ANALYSIS

Difference in the pre- and post-test scores were compared using Wilcoxin's sign rank test with significance at $P < 0.001$. Influence of demographic variables on post-test was assessed through Pearson's Chi-square test.

RESULTS

Difficulty index on item analysis of the tool revealed 0, 27, and 09 as

difficult, good and easy questions, respectively. Discriminative index indicated that the number of excellent, good, marginal and poor questions were 12, 08, 0, and 15 respectively. Of the 35 items analysed, the final tool contained 27 questions and its effectiveness was tested in the pilot study. The tool consisted of 2 parts: Part A containing six items for obtaining demographic information; and part B being the structured questionnaire on knowledge on disaster preparedness (Table 1)

Table 1: Knowledge tool designed for the study, Part B

Sr. No.	content	Total number of questions
1.	General flood information	3
2.	Cause of Flood	1
3.	Consequences of Flood	2
4.	Management of flood	20
5.	Mitigation	1
	Total no. of question	27

SIM consisted of the following sections: introduction, what is flood, causes of flood, types of flood, consequences of flood, preparedness of flood, during a flood alert, after the flood, mitigation and references; with appropriate illustration to understand the concept of flood.

Experts (n = 11) validated the tool and SIM, they were from community health nursing (6), MD Community Medicine (2), Professor from Department of Geography (2), and District Disaster office (1). Reliability of the tool was computed as $r=0.73$.

Socio-demographic distribution of the participants and knowledge score

Majority of the participants were men between the age of 20 and 30 years, with an education of higher secondary school and were employed. In most cases, previous knowledge on disaster preparedness was divulged by family members from their previous flood experience (Table 2).

Table 2: Sociodemographic variables

Variables	Number
Age in years	
20-30	41
31-40	26
41-50	17
51-60	12
60 above	4
Gender	
Male	64
Female	36
Education	
Secondary school	26
Higher secondary school	38
Bachelor's degree	28
Professional degree	8
Occupation	
Student	8
Employee	62
Unemployed	28
Retired	2
Flood experience in years	
1-10	23
11-20	29
21-30	21
31-40	8
40 above	19
Any previous knowledge regarding disaster preparedness	
Family members	50
Mass media	12
Gram panchayat	34
Training of disaster management	4

In the pre-test scores, good knowledge score was low among all demographic variables. Participants in the age group of 20-30 years had the highest average score, followed by those of 31-40 years. Men scored higher as compared to women in average score (57 and 28, respectively). Average knowledge score was higher in participants with HSC followed by bachelor's degree (32 and 23, respectively). Employed participants had a higher average knowledge score of 53. Flood experience of 30-40 years reflected the highest average knowledge score of 24. Knowledge source on flood preparedness for

maximum average score was through family member's experience, 41. An erratic pattern was detected in poor knowledge score in the studied demographics (Fig 1). However, there was no significant association between pre-test knowledge score and age, gender, education, flood experience, occupation, and previous knowledge on disaster preparedness.

Fig 1: Pre-test scores across sociodemographic variables studied

Paired Wilcoxin's t-test demonstrated a significant difference between pre- and post-test scores ($P<0.001$). Good scores increased from 11 to 40; average knowledge scores from 85 to 60; and poor scores reduced to 0 from 4 (Fig 2). Yet, there was no significant association between the post-test scores and the demographic variables.

Figure 2: Distribution of pre-test and post-test knowledge scores on disaster preparedness

DISCUSSION

This study aimed at evaluating the pre-test and post-test knowledge scores regarding disaster preparedness among people residing in flood prone areas of Karveer taluka and to determine the association between the knowledge scores and the socio-demographic variables. While there was a significant improvement in the post-test scores, there was no association between the socio-demographic variables and the scoring pattern. However, it is interesting to note that there was no association between previous flood experience with the pre-test scoring or improvement, thereof. This could be explained by the inference drawn by Mishra et al. (17) that previous experience diminished disaster preparedness and weakened awareness-preparedness link.

The SIM used here was validated by experts and improvement in knowledge scoring was solely attributed to the same distributed to the participants at the beginning of the study. Most importantly, information retention through this SIM module was impressive as evidenced by the improvement in the post-test, conducted after 8 days. Risk perception plays a crucial role in preparing for disaster. Residents in flood prone areas were more highly likely to perceive a magnified risk into that which can be faced with preparedness. This has been previously established by Mishra and Saur (2007) who ascertained that realistic disaster education containing scientific basis could shape risk perception in people to initiate preparedness activities when needed.

Further studies on the perception and preparedness activities in forthcoming disaster will provide true insight into effectiveness of SIM on flood disaster management. Nevertheless, the positive improvement in knowledge on disaster preparedness observed in one region, Karveer, could be extrapolated to the entire flood prone regions of Kolhapur.

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