Original Article

Insights into Disaster Management Scenario among Various Health-Care Students in India: A Multi-Institutional, Multi-Professional Study

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Abstract

Background: The frequency of occurrence of disasters is on the rise all over the world. Workforce shortage can be a major impediment toward efficient disaster management. Incorporation of other health-care workers along with conventional medical personnel might be critical for efficient and effective management of disasters. **Objective:** The objective of this study was to assess various aspects pertaining to disaster management among various health-care students in India. **Methods:** Final-year students pursuing medicine, dentistry, nursing, physiotherapy, pharmacy, Ayurveda, and homeopathy at various institutions in Mangalore, India, were the study participants. Participants' willingness to partake in disaster management and knowledge, attitude, behavior, and perceived effectiveness pertaining to disaster management was ascertained by a questionnaire method. Their previous history of training and familiarity with standard operating procedures was assessed. **Results:** A total of 437 students belonging to seven health-care institutions participated in the study. Overall, 98.40% of the participants were willing to partake in disaster management. The mean knowledge, attitude, behavior, and perceived effectiveness scores were 49.19%, 81.75%, 47.28%, and 66.20%, respectively. Step-wise multiple linear regression analysis revealed that course ($\beta = 0.247$, $P < 0.001$), attitude ($\beta = 0.154$, $P = 0.001$), and behavior ($\beta = 0.284$, $P < 0.001$) were significant predictors of perceived effectiveness. **Conclusions:** Participants in the present study revealed that they were willing to partake in disaster management. The participants also reported poor behavior and knowledge scores but appropriate attitude scores. The present study highlights the need for curriculum changes and policy implications for effective integration of various sectors for disaster management, particularly in developing nations such as India, which have a definite scarcity of resources.

Keywords: Curriculum changes, health-care professionals, public health emergencies, willingness to participate

Introduction

Disasters have been defined as "any occurrence that causes damage, ecological disruption, and loss of life or deterioration of health and health services on a scale sufficient to warrant an extraordinary response from outside the affected community or area."[1] The frequency of incidence of disasters has increased tremendously in the past few years. These disasters are classified as natural and human made, with the former including cyclones, floods, and earthquakes and the latter including wars, military conflicts, and terrorist assaults employing chemical, biological, radiological, nuclear, and explosive devices.[2,3]

Substantial loss of lives and property, population displacements, and bereavement and its psychological implications can be observed in the wake of disasters.[4] They eventually impede the progress and development of the country.[5] Disasters will cause fatalities and a sudden escalation in individuals who require care from medical professionals. Conventionally, medical workforce will be employed in disaster management. This may culminate in dearth of personnel who are proficient in disaster management. This has been termed as surge environment,[3,6] which can be a major deterrent in effective and timely disaster management.

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Inclusion of health-care workers other than the traditional medical workforce in disaster management has been suggested by researchers.[2,3] Hence, it becomes imperative to consider the involvement of dentists, nursing professionals, physiotherapists, pharmacists, and practitioners of alternative medicine in effective disaster management. The involvement of dentists in disaster management has been well documented in scientific literature.[2,7-11]

Dentists and other health-care professionals can be employed in activities such as history taking, obtaining radiographs, data management, and record maintenance of patients. They can be involved in prescribing drugs and distribution of medicines, immunization procedures, infection control, suturing, and wound and infection management. They can participate in dissemination of information to patients and community members, management of triage and overall care of injured people.[2,8-11] Health-care professionals are considered as respected members of the society and are bound by obvious ethical implications to work toward the general well-being of the society.

It has been reported that India was among the top five nations which was affected by disasters in the year 2012.[12,13] A report by the Government of India has reported that overall, 80% of India's expanse is prone to natural calamities.[14] There has been a major increase in the number of institutions providing training in oral health care in India in the recent past. Health-care workers other than the traditional medical workforce might constitute a valuable pool of workforce, who can contribute toward effective and meaningful disaster management.

Researchers have identified low knowledge scores coupled with high attitude scores among Indian dental students.[15-17] However, there are no studies which have explored various issues related to disaster management among different health-care professional students in India. Universities and academic institutions can play a critical role in effective disaster management. Such endeavors will offer valuable baseline data pertaining to curriculum changes regarding disaster management across different health-care disciplines in India. It could lead to effective disaster management in developing countries with a paucity of resources. Thus, the current study was conceived with to investigate several aspects pertaining to disaster management among medical, dental, nursing, physiotherapy, pharmacy, Ayurveda, and homeopathy students in India. The objective of the present study was to assess willingness to partake in disaster management, knowledge, attitude, behavior, perceived effectiveness, and prior training in disaster management among various health-care students in India.

Methods

The present study is an exploration of various issues related to disaster management among seven institutions belonging to different professional streams in Mangalore, India. Ethical approval for the present study was taken from the institutional ethics committee. A list of all institutions providing training in the fields of medicine, dentistry, nursing, pharmacy, physiotherapy, and Ayurvedic and homeopathic medicine in Mangalore was prepared. Random sampling was employed, and one institution belonging to a profession was selected.

Inclusion criteria included students who were undergoing training in their corresponding streams in their respective institutions and respondents not present during the period of study. Exclusion criteria included institutions and students who were unwilling to take part in the study. Permission was sought from the heads of the institutions of the participating institutions, and informed consent was obtained from the students participating in the current study.

The knowledge, attitude, and behavior of the respondents were evaluated by a questionnaire containing 42 items, with 26 items pertaining to knowledge and 8 each related to attitude and behavior. The questionnaire items were obtained from theory, previous articles, observation, and inputs from subject experts.[15-18] Information regarding age and gender of the respondents was collected. Information pertaining to prior training and willingness to assist in disaster management was also included in the questionnaire.

A 5-point Likert scale was utilized to assess attitude and perceived effectiveness, while behavior was assessed by employing the response items at < 1 month, 1–6 months, 6–12 months, >1 year, and never. Overall, 26 questions were employed to assess objective knowledge. Questions included respondents' knowledge about frequently occurring disasters in the area, triaging, tagging, and identifying victims. Park has defined attitude as "a relatively enduring organization of beliefs around an object, subject or concept which predisposes one to respond in some preferential manner."[19] Questions pertaining to attitude probed if professionals need to partake actively in disaster management, should they work together with other health-care workers in disaster management. Items related to the behavior of the study participants included how often they read articles and the Internet for information related to disaster management and did they preserve appropriate records of their patients. Perceived effectiveness was assessed by items which inquired whether participants believed that they can respond effectually during calamities and believed that they are adept at identification and recognition of acts of bioterrorism.

A score of "1" was given to right answers to questions related to knowledge, while a score of "0" was assigned to an incorrect answer. Likert scale scores for attitude and perceived effectiveness were from 1 (definitely no) to 5 (definitely yes). The scores for behavior ranged from 1 (never) to 5 (<1 month). The scores for objective knowledge, attitude, behavior, and perceived effectiveness ranged from 0 to 26, 8 to 40, 8 to 40, and 3 to 15, respectively. A pilot study was conducted prior to the main study. Internal consistency was assessed by employing Cronbach's alpha and split-half reliability.

The data entry was performed in Excel Sheet (MS Excel, MS Office), and the statistical software SPSS 16.0 (SPSS Inc., Chicago, IL, USA) was employed for data analysis. The knowledge, attitude, behavior, and perceived

effectiveness among age, gender, and residence of the study participants were analyzed by Mann–Whitney test. Pearson's correlation analysis was employed to ascertain the correlations of socioeconomic factors with knowledge, attitude, behavior, and perceived effectiveness scores of respondents.

Results

Overall, 437 students belonging to medicine, dentistry, nursing, physiotherapy, pharmacy, Ayurveda, and homeopathic colleges took part in the current study. The number of students from medicine, dentistry, nursing, physiotherapy, pharmacy, Ayurveda, and homeopathic colleges was 114, 86, 42, 53, 58, 23, and 61, respectively. The response rate ranged from 83.33% (Ayurveda students) to 96.63% (dental students), with an overall response rate of 89.94%. Results of the pilot study indicated that the Cronbach's alpha and split-half reliability values were 0.72 and 0.86 for knowledge; 0.86 and 0.91 for attitude; and 0.82 and 0.87 for behavior, respectively. A majority of 68.19% of the participants were females, and the mean age was 22.55 years. Overall, the mean (± standard deviation) knowledge, attitude, behavior, and perceived effectiveness scores were 12.79 (±3.99), 32.70 (±5.02), 18.91 (±9.31), and 9.93 (±2.47), respectively.

A majority of 98.40% of the participants were willing to take part in disaster management, whereas 8.24% of them were familiar with the standard operating procedures (SOP) document of the Government of India. Overall, 13.04% of the study participants stated that they attended training programs in disaster management [Table 1].

Figure 1 shows distribution of mean knowledge, attitude, behavior and perceived effectiveness scores across participants of different colleges. On applying ANOVA text, these differences were found to be statistically significant for all domains across the participant groups. Correlation analysis revealed that knowledge scores statistically significantly correlated with attitude scores (r = 0.320, P = 0.000) and behavior scores (r = 0.103, P = 0.031), whereas behavior scores statistically significantly correlated with attitude scores (r = 0.100, P = 0.037). The mean perceived effectiveness scores showed statistically significant correlation with attitude (r = 0.216, P = 0.000) and behavior scores (r = 0.368, P = 0.000). It can be observed that there were statistically significant correlations of age with behavior scores (r = −0.205, P < 0.001) and perceived effectiveness (r = −0.107, P = 0.025) and gender with attitude (r = 0.129, P = 0.007) and behavior scores (r = 0.128, P = 0.007), whereas course significantly correlated with knowledge (r = 0.271, P < 0.001) and perceived effectiveness scores (r = 0.238, P < 0.001).

Step-wise multiple linear regression analysis with perceived effectiveness as dependent variable is presented in Table 2. It can be observed that gender (β = −0.138, P = 0.001), course (β = 0.247, P < 0.001), attitude (β = 0.154, P = 0.001), behavior (β = 0.284, P < 0.001), pervious training (β = −0.182, P < 0.001), and familiarity with SOP (β = −0.094, P = 0.034) emerged as significant predictors of perceived effectiveness among the respondents.

Discussion

The current investigation was undertaken to study, comprehensively, several aspects pertaining to disaster management among students from different health-care professions in India. The current study is the first inquiry on disaster management to be conducted among students belonging to the disciplines of medicine, dentistry, nursing, physiotherapy, pharmacy, Ayurveda, and homeopathy.

The number of health-care professionals graduating every year from various health-care institutions in India is considerably high. They might represent a crucial pool of workforce who can work effectually in disaster management.

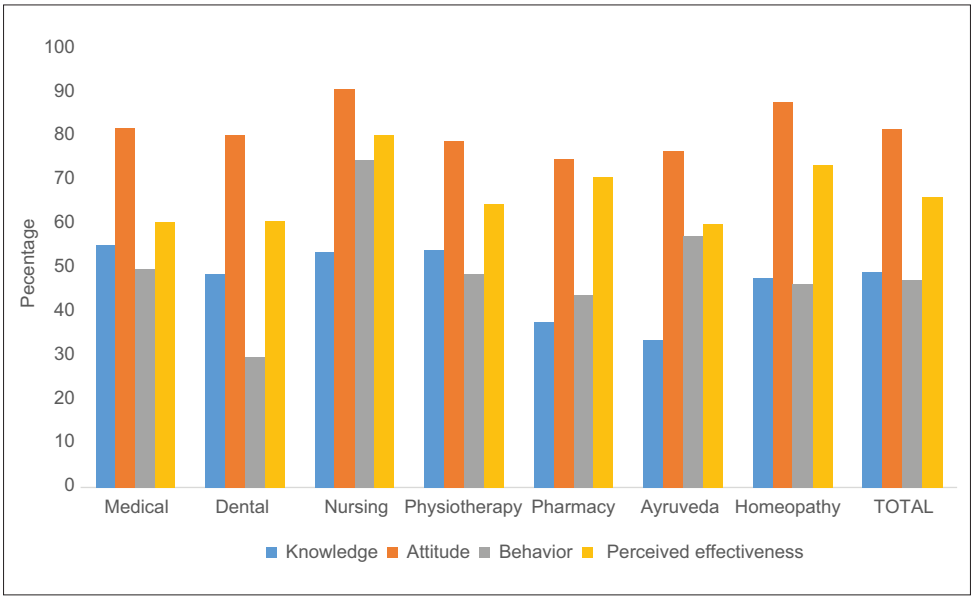

Figure 1: Mean knowledge, attitude, behavior, and perceived effectiveness scores among the study participants

Table 1: Willingness to participate, previous training, and familiarity with national document regarding disaster management among respondents

Variable	Medical (*n*=114)	Dental (*n*=86)	Nursing (*n*=42)	Physiotherapy (*n*=53)	Pharmacy (*n*=58)	Ayurveda (*n*=23)	Homeopathy (*n*=61)	Total (*n*=437), *n* (%)
Willingness to participate	112	85	42	52	55	23	61	430 (98.4)
Previous training	19	3	17	4	8	0	6	57 (13.0)
Familiarity with SOP	14	4	7	4	6	0	1	36 (8.2)

SOP: Standard operating procedures

Table 2: Step-wise multiple linear regression analysis of various variables with perceived effectiveness as dependent factor

	β	*P*	95% CI		β	*P*	95% CI	
			Lower bound	Upper bound			Lower bound	Upper bound
Age	−0.096*	0.041*	−0.368	−0.008	−0.027	0.526	−0.215	0.110
Gender	−0.080	0.086	−0.910	0.060	−0.138***	0.001***	−1.167	−0.296
Course	0.232***	<0.001***	0.165	0.378	0.247***	<0.001***	0.188	0.388
Knowledge scores					0.013	0.771	−0.047	0.064
Attitude scores					0.154***	0.001***	0.032	0.119
Behavior scores					0.284***	<0.001***	0.052	0.098
Willingness to participate					−0.048	0.253	−2.585	0.683
Previous training					−0.182***	<0.001***	−1.985	−0.683
Familiarity with SOP					−0.094	0.034*	−1.615	−0.066

*Significant at 5% level of significance; ***Significant at 0.1% level of significance. SOP: Standard operating procedures, CI: Confidence interval

Researchers have highlighted various roles by dentists in disaster management.[2,7-11] Attempts have also been made to include core competencies in disaster management at the level of undergraduate training.[20] Importance of familiarizing oneself with growing literature on disaster management and the importance of activities at the local communities have also been highlighted.[21] The present study has important implications for disaster management involving different professional groups in India.

Respondents in the present study had low knowledge scores, which concurs with the outcomes of Katz *et al*.[10] and Rajesh *et al*.,[15] but differ from those observed by Colvard *et al*.[22] Participants also reported low perceived effectiveness, which concurs with those of Katz *et al*.[10] and Rajesh *et al*.[15] A majority of the participants in the current study have not attended any training programs in disaster management and were not familiar with the Government of India's SOP document. Researchers have identified the need for effective capacity building for disaster management.[23,24] Results of the current study highlight the significance of such initiatives in India. A greater number of the study respondents were willing to partake in disaster management in the current study. This finding coupled with high attitude scores of the respondents augur well for future initiatives on disaster management in India.

Age showed significant correlations with behavior scores, whereas gender was significantly associated with behavior and attitude scores in the present study. There might be an increased sense of social responsibility with increasing age and males might assume a more preemptive role.

One of the biggest advantages of involving various health-care professionals in disaster management in India is that they might require minimal further training. However, there is a definite need for coordination of activities for effective disaster management. There is a need for partnerships across different sectors and also between public and private sectors for effectively combating the impacts of public health emergencies.[25]

The present study highlights the importance of curriculum changes in various health-care professional streams in India. Curriculum changes are fraught with numerous difficulties, as one has to consider restraints in terms of resources such as time and finances.[20] Regional variations in the occurrence of disasters and students from varied backgrounds also will have to be considered. Numerous suggestions and initiatives pertaining to curriculum changes have been reported in literature.[2,3,7,20,22,26] The prescribed competencies might already be present in the current curriculum of various professions.[3,22] Hence, it might be prudent to render the current curriculum more specific to disaster management rather than making drastic changes in them.

Conducting further training programs might be challenging due to regional variations in disasters, personnel with varied cultural and training backgrounds and baseline skills, etc.[27] Defining the exact target audience and providing specific training programs are the need of the hour.[28] In this era of evidence-based practice, we have to incorporate evidence-based practices for effective disaster management.[15,29] Dental professionals who were being trained in disaster management courses by the American Medical Association have shown positive and encouraging results.[22] This might be a positive indication regarding the effective training of health-care workers other than traditional medical workers in disaster management.

Ray-Bennett has highlighted the potential role of class, caste, and gender in disaster management in the Indian scenario.[30,31]

Ray-Bennett has also stressed the importance of complex perspectives in disaster management. This will shift focus from communities at risk to resources, measures, key players, and organizations.[32] Jha *et al*.[33] have reported significant improvements in death toll and economic losses in Odisha due to the cyclone Phalin in 2013, as compared to 1999 super cyclone in the same region. The authors cite improved preparedness and response measures due to policy changes that have positively influenced disaster management. These findings indicate that policy changes can influence disaster preparedness in developing nations like India.

The limitations of the present study are as follows: including few institutions might not be representative of all the institutions. The biases related to the use of questionnaires such as faking good/bad bias and yea-saying bias might have influenced the present study. Biases such as positive skew bias, halo effect, and end-aversion bias will have to be considered while employing a Likert scale.[18]

Conclusions

Respondents belonging to various health-care professions in India showed enhanced willingness to partake in disaster management and high attitude scores related to disaster management. Respondents reported low knowledge and perceived effectiveness scores. Results of multiple linear regression analysis indicate that gender, course, attitude, behavior, pervious training, and familiarity with SOP emerged as significant predictors of perceived effectiveness among the study participants.

The current study highlights the significance of incorporating health-care workers other than traditional medical workers in disaster management. There are definite policy implications regarding curriculum changes in various disciplines pertaining to disaster management in India. Need for periodic training in disaster management for numerous health workers in India is also highlighted by the outcomes of the current study. It is especially relevant in developing nations like India which are exceedingly vulnerable to disasters, but are faced with a definite shortage of resources at its disposal.

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Conflicts of interest

There are no conflicts of interest.

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