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Impact of a training program on disaster preparedness among paramedic students of a tertiary care hospital of North India: A single-group, before–after intervention study

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Abstract:

INTRODUCTION: Disaster can occur at any time any place. Disaster preparedness plays an important role to reduce the loss of a community/country. The aim of this interventional study was to ascertain the impact of a video-based educational intervention program on improvement in knowledge and attitude of paramedical students in a hospital.

MATERIALS AND METHODS: A pre–post study (interventional study design) was conducted on paramedic students. Our study period was 6 months which was divided into Phases I, II, and III. For administrative purpose, we included all paramedical students, and our sample size was 119. The baseline assessment of knowledge and attitude of paramedic students was done by a pretested questionnaire (Observation 1) with having a baseline scoring. After that, intervention Phase 1 was implemented, and later, end line observation (Observation 2) was made. Changes in knowledge and attitude were observed by the score difference (Observation 2–Observation 1). Descriptive statistics were calculated, and the mean of cumulative score was compared using the Wilcoxon signed-rank test. We applied Mann–Whitney U-test for finding associations between dependent variables with an independent variable using SPSS version 22 (IBM, Chicago, USA) software.

RESULTS: Our baseline results showed that most of our participants had average knowledge (54.6%), followed by poor knowledge (24.4%). Approximately one-fifth (21.0%) of the participants had good knowledge regarding disaster preparedness. A significant improvement was observed in cumulative score ($P < 0.005$). A significant difference was observed in knowledge and attitude with respect to age and courses ($P < 0.05$). Forty percent of the students responded that they would like to get trained by that mock drill, and 26.1% were interested in disaster preparedness workshops in the future.

CONCLUSION: Our present study results indicate that the overall knowledge and attitude level of the students was average and required improvement. A similar result was reported in some studies conducted globally for the same purpose. All of our students perceived that training for disaster preparedness is necessary for all health facilities, and it is important to have an emergency plan and disaster management committee. Regarding training methods, most of our students liked our interactive audiovisual method. However, their preferred methods were mock drill and workshops. It can be arranged in the future for them.

Keywords:

Disaster, educational programs, emergency, preparedness, students, training

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Introduction

Disaster is a serious disruption occurring over a relatively short time of the functioning of a community or a society involving widespread human, material, economic or environmental loss, and impacts, which exceeds the ability of the affected community or society to cope using its own resources.^[1-3]

The Indian subcontinent is among the world's most disaster-prone areas, with almost 85% of its area vulnerable to one or multiple hazards. It is vulnerable to windstorms in the Bay of Bengal and the Arabian Sea, earthquake in the Himalayan mountains, and floods and droughts in arid and semiarid areas. Almost 57% of the land is vulnerable to earthquake (high seismic zones III–V), 68% to drought, 8% to cyclones, and 12% to floods. Indian Ocean tsunami in 2004 was the latest addition to the list. Landslides in North India are another recurrent phenomenon.

The northern part of India is especially vulnerable to disasters due to its geographical construct, e.g., earthquakes in Uttarkashi (1991), Killari (1993), Koyna (1997), Chamoli (1999), and Jammu and Kashmir (2005). It is quite relevant to have an effective disaster preparedness plan for this area.^[4-6]

Timely and efficient health-care interventions are needed to meet the needs of the disaster-affected populations as one of the top priorities.^[1-3,7]

Although multiple sectors play an important role in disaster management, health sector plays a vital role in disaster preparedness and response. Timely and efficient intervention to the health-care needs of the disaster-affected populations is one of the highest priorities in the overall management of disasters.^[1-3,7]

Every medical institution has a vital role to play in the overall improvement of skills, attitude, and knowledge of the students learning in a hospital regarding disaster preparedness. Overall, very little focus has been given on the research and development on this topic.

Still, more scarce is the administrative operational research studies on this subject. To our knowledge, paramedic students have been the focus of research in this area in public health mainly for observational studies. Although paramedic students can play a vital role during the disaster the period of strike, to our knowledge, very few interventional studies have been conducted with paramedic students on this issue, globally.

With this background, we intended to do this operational research for overall improvement in emergency

preparedness among paramedic students working in a tertiary care hospital. This study was quite topical since every year disaster strikes us regularly in different parts of India, and paramedic students can play a vital role in disaster management as they are technically sound than common people. If we train them properly, many lives can be saved which will have a great impact on our society, in the long run.

This study aimed to test the efficacy of educational intervention packages to improve the emergency preparedness among paramedic students in a tertiary care hospital. Our objective was to ascertain the impact of a video-based educational intervention program (audiovisual lectures, simple lectures, and use of social media (WhatsApp and Facebook) on improvement in knowledge and attitude of paramedical students in a hospital.

Materials and Methods

We conducted a pre–post interventional study. The study period was 6 months from January 2019 to June 2019, which period was divided into Phases I, II, and III. For administrative purpose, we kept the sample size of 119. (All the paramedic students who were studying in a tertiary care hospital were included for this educational training program).

The baseline assessment of knowledge and attitude about emergency preparedness of paramedic students was done by a pretested questionnaire (e.g., what is the literal meaning (*Italian*) of “disaster”? and in hospitals who should take training regarding disaster management?) (Observation 1). Baseline scoring was given to paramedic students. After that, intervention Phase 1 was implemented. Intervention packages based on the topics such as disaster preparedness for landslides, floods, and earthquakes were delivered to them for 3 months on a weekly basis. This package included:

- i. Video-based interactive training on landslides, floods, and earthquakes was given to paramedic students in separate batches
- ii. WhatsApp group and Facebook group were created for sending educational materials on disaster preparedness (landslides, floods, and earthquakes) and short videos of disaster management (landslides, floods, and earthquakes); the groups were also used as a common platform for discussion regarding various aspects of emergency preparedness (landslides, floods, and earthquakes)
- iii. Lectures regarding disaster preparedness (landslides, floods, and earthquakes) were delivered to them in separate batches, and their doubts regarding emergency preparedness were cleared.

Training

The above-mentioned strategies were implemented for 3 months; after that period, Observation 2 was made. Changes in knowledge and attitude were observed by the score difference (Observation 2–Observation 1).

Our questionnaire had three components: in first component, general information, such as age, sex, and courses, was included. In the second part, knowledge component and, in the last part, attitude component were included.

For each right answer, five marks were awarded, and for each wrong answer, zero marks were awarded.

Our cumulative emergency preparedness score was 75, and we considered <25 scores as poor, 25–50 as average, and >50 as good. Impact of the intervention was assessed by looking in the score differences after documentation of end line score.

Answers for few questions were ranked in ordinal scale, such as agree, disagree, and don't know. Descriptive statistics (mean and standard deviation) were calculated, and the mean of cumulative score was compared using the Wilcoxon signed-rank test. We also compared the dependent variables (knowledge and attitude) with independent variables (gender, courses, residence, and age) using Mann–Whitney U-test. We analyzed our data using SPSS-version 22 (IBM, Chicago, USA) software. Ethical clearance was taken from the institute ethical committee, and informed written consent was taken from each participant for this study.

Results

Our response rate was 100% in both phases. Our results showed that 52 (43.7%) of the participants were male, with a mean age of 19.77 ± 1.8 years. Majority (65.5%) of them were from rural background. Majority of the paramedic students were pursuing BSc OT (65%), followed by Bachelor of Physiotherapy (21%), B. Optometry (15.1%), Bachelor of Radiotherapy (7.6%), Bachelor of Medical and Laboratory Technology (5%), and Bachelor of Audiology and Speech Language Pathology [BASLP] (5%), i.e., all our participants were pursuing their graduation course.

In our present study, it was observed that BASLP students got the highest score (60.1%) and the lowest score (20.5%) was obtained by Bachelor of Medical Laboratory Technology [BMLT]. BMLT students, and the difference came statistically significant ($P < 0.05$).

Most (95%) of our students responded that they were taught about disaster management in their schools

through lecture. During the baseline survey, we found that 76.5% of students knew the literal meaning of disaster; the percentage was increased (99%) after the intervention. During the baseline survey, only 47.9% of students knew the most common form of disaster as per the world disaster report 2016. Out of all students, 62% of them knew the disaster cycle correctly which was increased to 87.6% after their training program. Less than half (48.7%) of students were aware about the full form of GPS during the initial survey; the percentage improved (78%) after the training. Less than half (46.2%) of the students knew that earthquake is the most common form of disaster in which maximum deaths occur. Among all students, only 35.3% knew correctly that till 2016, 16 major disasters were reported in our country; the percentage improved to 88.7% after the training. Majority (76.55) of them knew that posttraumatic stress disorder is common after any disaster. Majority (68.9%) of them knew the name of the head of the National Disaster Management Authority in India. About 63.3% of the students knew the meaning of color coding for triage, and 54.65% knew the meaning of CODE ORANGE correctly. More than half (52.1%) of the students were aware about the sponge effect occurring in the hills/vegetations, and all of them were in favor of reforestation [Table 1].

All students perceived that training for disaster preparedness is necessary for all health-care facilities. They agreed that it is important to have an emergency plan and disaster management committee in their institute. Out of total students, 89.9% agreed that it is important to know about their role and duty during disaster response in their facility; after intervention, the agreement was 100%.

As per our present training program, most (68.5%) of the students liked the audiovisual training method, followed by social media (20%), and 11.5% preferred simple lectures. In addition, 40% of the students responded that they would like to get trained by that mock drill, and 26.1% were interested in disaster preparedness workshops as future learning methods.

According to the students, not only paramedic students but also all health workers (doctors and nurses) should receive proper training regarding disaster management, as they can save lives more efficiently. During the baseline survey, 47.05% of students knew correctly that what to do, if a warning signal of disaster comes to them. After intervention, the knowledge was increased to 99.4%.

The cumulative score of pretest and posttest was analyzed using the Wilcoxon signed-rank test (as our data were not normal, so we have used nonparametric test). The

Table 1: Impact of intervention on knowledge (pre-post)

Questions	Correct answer	
	Pretest n (%)	Posttest n (%)
Knowledge		
Literal meaning (<i>Italian</i>) of “Disaster” is bad star/luck	91 (76.5)	117 (99)
As per world disaster report 2016 flood is the most common form of disaster?	57 (47.9)	100 (84.03)
Able to write the stages of disaster cycle	74 (62.2)	103 (87.6)
Global positioning system	58 (48.7)	93 (78.1)
All government departments can help us to minimize loss in disaster, except-private insurance companies	33 (27.7)	100 (84.03)
Most common public health consequence of a disaster	61 (51.3)	117 (99)
Arranged the following disaster cycle in a logical sequence	78 (65.5)	93 (78.1)
Natural disaster causing maximum deaths in earthquake	55 (46.2)	118 (99.2)
In India, 2016, 16 major disasters were reported	42 (35.3)	106 (88.7)
PTSD is the most common mental health problem occurs after any disaster	91 (76.5)	119 (100)
Prime Minister is the Head of the National Disaster Management Authority in India	82 (68.9)	118 (99.2)
Blue color is not used in triage	76 (63.9)	106 (88.7)
CODE ORANGE used in hospitals for external disaster	65 (54.6)	93 (78.1)
Attitude		
Training in disaster planning is necessary for each hospital	119 (100)	119 (100)
It is necessary to have an emergency plan in your facility, city, or country for any anticipated hazards	119 (100)	119 (100)
It is necessary to have a disaster management committee in your facilities	113 (95)	113 (95)
It is necessary to know your duty and role during disaster response in your facility	107 (89.9)	119 (100)
In hospitals who should take training regarding disaster management?	Pre	Post
All	110 (92.4)	119 (100)
Doctors	3 (2.5)	0
Nurses	6 (5)	0
If warning signal of cyclone is given to you which one you will not do - wait and watch	56 (47.05)	119 (100)
Sponge effect is seen in Green hills	62 (52.1)	119 (100)

PTSD=Post Traumatic Stress Disorder

mean score of the pretest was 41.51 ± 13.55 and posttest was 45.21 ± 10.093 , and a significant improvement was observed in cumulative score ($P < 0.005$) [Table 2].

We also compared the dependent variables (knowledge and attitude) with independent variables (gender, courses, residence, and age) using Mann–Whitney U-test (nonparametric).

A significant difference of knowledge and attitude was observed with respect to age and courses ($P < 0.05$). However, our baseline results showed that most of our participants had average knowledge (54.6%), followed by poor knowledge (24.4%). Approximately one-fifth (21.0%) of the participants had good knowledge regarding disaster preparedness.

Discussion

Our study results indicate that the overall knowledge level of the students was average, and there is a scope for improvement. Similar study results were reported in some studies conducted globally, for the same purpose.^[8-10] As an example, studies conducted in Lagos, Nigeria, and Nairobi, Kenya.^[8,10] Results showed that in the hospitals, the overall level of knowledge among the among health-care and nonhealth-care staff

was average in Lagos and Nairobi, respectively.^[8,10] A study in Shanghai was conducted among medical professionals and community residents. It was observed that community residents demonstrated very poor knowledge. However, a significant improvement in knowledge and attitude was observed after conducting an educational program among them.^[11] In our present study, similar findings were observed, i.e., a significant improvement in knowledge and attitude was observed.

In contrast to the present results, international studies showed that staff had good enough knowledge regarding disaster management.^[12]

All of our students perceived that training for disaster preparedness is necessary for all health facilities. In addition, all of them were agreed that it is important to have an emergency plan and disaster management committee in their facility, city, or country for any anticipated hazards. This may be due to nowadays our students are well informed regarding disaster, as it is a common phenomenon in the northern part of India, especially in the sub-Himalayan region. It also reflects their positive attitude about disaster preparedness. We observed that our participants were much younger than the Iranian participants.^[13]

Table 2: Mean (pre- and postintervention test) score among the students

	Mean score	P
Pretest	41.51±13.55	0.002
Posttest	45.21±10.09	

Training to the young students is advantageous; this is because our knowledge, beliefs/attitudes, and social and cultural norms about various aspects of our life (including health) are formed and concretized in childhood. Hence, medical schools can also play a prominent role in developing knowledge and attitudes about disaster preparedness through formal education. Cultivation of a social milieu that supports health-promoting behavior at an early age, not just book learning, is an ever more significant aspect of education in medical schools (i.e., informal education). Hence, "CATCH THEM YOUNG" concept is aptly applicable in this case (regarding disaster preparedness training) also.^[14-17]

Regarding training methods, most of our students liked our interactive audiovisual method. However, their preferred methods were mock drill, followed by workshops. It can be arranged in the future. The least preferred training method was lecture. Most of the students opined that all health workers (doctors, nurses, and Group D) should receive proper training regarding disaster management. This attitude reflects their maturity in such a young age, which is good for the whole society. It was observed that after educational intervention programs, their knowledge was significantly increased.

A significant difference of knowledge and attitude was present with respect to courses and age. In our present study, it was observed that BASLP students were obtained the highest score than other students. Regarding age, a significant difference was observed. A similar finding was observed in the study conducted in Iran.^[13]

Several limitations were met in the current study. First, we conducted our study with a small sample size (119). We cannot generalize our findings, to do this, we have to conduct this study with a larger sample size in the future.

Due to resource constraints, our training methods did not include mock drill (which was the most preferred method of students), so our results might be better, if we included mock drill within our training packages.

Conclusion

A considerable number of students had "average knowledge," with limited opportunities for training despite their beliefs toward disaster management.

There were formal teaching programs (by lectures) in schools, but it is not uniform. Their knowledge and attitude can be improved by introducing regular and interactive training programs such as mock drills, WhatsApp groups, audiovisual methods, and workshops.

Practical suggestions

Therefore, setting-based approach for disaster training programs is urgently needed for all, with specific emphasis on key personnel such as health-care workers, administrators, facility managers, medical teachers, first responders, and public health providers. Simultaneously, training methods such as mock drills and workshops are essential now a day, and it should be conducted at all levels and reconciling with existing government disaster training programs (National Disaster Management Authority).

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Conflicts of interest

There are no conflicts of interest.

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