

Effectiveness of Disaster Risk Management Training on Knowledge, Willingness and Perceived Competencies among Nursing Students in Kathmandu, Nepal

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ABSTRACT

Introduction: Disaster Risk Reduction training have beneficial effect on preparing nursing students to respond to public health emergencies like disasters. Thus, this study evaluated the effectiveness of disaster risk management training on knowledge, willingness, and competencies among nursing students.

Methods: A single group pre-test and post-test design was adopted among 70 nursing students selected through complete enumeration technique from a nursing college. Ethical approval was obtained from Institutional Review Committee (IRC) of Institute of Medicine (IOM). Data was collected by using validated tool (Disaster Preparedness Evaluation Tool (DPET) in English version. Prior to training, pre-test was done. Participants received a total of 18 hours of disaster risk management training over three days. After 8 weeks of training, post-test was conducted. Data were entered into SPSS-20 version and analyzed using descriptive statistics and inferential statistics (independent-test) to assess the differences in mean score for knowledge, willingness and perceived competencies before and after the training.

Results: The overall mean score for disaster risk management increased from 3.86 ± 0.65 in pre-test to 4.87 ± 0.56 in post-test, with statistical significant difference ($p < 0.001$). After intervention statistically significant difference was found in all domains of DPET-K scale which includes Pre-disaster stage (Disaster knowledge and information), Bio-terrorism & Emergency response, Mitigation, Disaster stage and Disaster response, Recovery Post-disaster stage and Family preparedness.

Conclusion: Disaster Risk Reduction training have increased score on all five domain of DPET-K scale among nursing students which emphasize the need for periodical short term training on disaster management.

Keywords: Disaster risk management, knowledge, willingness, perceived competencies, nursing students

INTRODUCTION

Disaster is a major global public health concern causing the long term disintegration for human life and environment health.¹ Global warming has increased the risk of disaster occurrences.^{2,3} Asian countries are the highly disaster prone region accounting for 40% of all disaster and 49% of total mortality with 66% of the affected.⁴ Nepal is highly prone to multiple hazards like earthquakes, floods, landslides, droughts, heat and cold waves.⁵ In reducing disaster related risk and in case of its occurrence for timely interventions Nepal government had identified

different policies and implemented multiple strategies.⁶⁻⁷ Trainings among health professionals and nurses are one of the important and effective interventions. As a future healthcare professional, nursing students need to have periodical updated knowledge, hands on skills, and positive attitude to respond future disaster occurrence⁸⁻⁹ which will influence in developing their competencies for managing disaster situations.¹⁰⁻¹¹ Beside this disaster risk reduction strategy focuses engagement and partnership of citizens specifically among the youth group.¹² A multi-setting study in developed country found the low willingness among the health workers resulting threat to

response.¹³ Although policies are available, we could not found Disaster Risk Management (DRM) course on the nursing curriculum till date and it became the prime area for near future to concern. Hence, short course training based on scientific theoretical framework is essential.

HYPOTHESIS:

H1: After structured training, nursing students’ knowledge, willingness and perceived competencies in disaster risk management will be increased.

METHODS

The study had adopted a single group pre-test and post-test design. Data was collected at Maharajgunj Nursing Campus under Tribhuvan University, Institute of Medicine, Kathmandu, Nepal. The duration of the study was September to December 2023. Before data collection ethical approval was obtained from Institutional Review Committee (IRC, Institute of Medicine (Ref-48/081/82)). A total 70 nursing students studying at post graduate level were included by using complete enumeration technique. The sample size was 73 estimated by using power analysis where G* power 3.10 with power =0.8, $\alpha=0.05$ and effect size Cohen’s $d=0.67$.¹¹

Data was collected by using self-administered questionnaire through validated English version tool of Disaster Preparedness Evaluation Tool (DPET-K) for nurses developed by Han and Chun consisting of these 5 subscales i. Pre disaster stage Knowledge & Information: 11 items. ii. Bio-terrorism and Emergency: 4 items. iii. Mitigation (disaster stage): 5 items. iv. Recovery (post disaster stage): 8 items and v. Family Preparedness: 2 items total 30 item questions having cronbach alpha

value ranging from 0.766-0.953.²¹ Written informed consent was obtained from each of the participant. Anonymity was ensured by using code number instead of the name of the participant. The obtained information was kept confidentially at password protected laptop of the principal investigator. The information provided was used for the research purpose only.

Participants were given to fill up the questionnaire before training. Disaster management training course of 18 hours with theoretical and practical inputs were provided by the four experts from Disaster Preparedness Network Nepal (DPNET). After 8 weeks participants were given the same questionnaires to fill up. Then all data were entered in Microsoft excel 2007 and then analyzed by statistical package for social science (SPSS) version 20. Both descriptive percentage, mean and SD were measured initially and followed by inferential statistics independent t test to observe the differences in outcome variables before and after the intervention considering statistically significant at $p < 0.005$.

Description of Training

The training was conducted by the trained resource person from Disaster Preparedness Network Nepal (DPNET) on 18 hours in 3 days having these components: Part 1: Understanding disaster risk related concept and management cycle, Part 2: Strengthening disaster risk governance to manage disaster risk, Part 3: Investing in disaster risk reduction for resilience. Part 4: Enhancing disaster preparedness for effective response.^{1,3,4}

RESULT:

All the female students studying at Master Level (Socio-demographic Information not included)

Table 1: Mean differences on knowledge on pre disaster stage: Disaster knowledge & information before and after intervention

Variables (11 items, 1-11)	Pre-Test		Post-Test		Mean Difference	t -score	p-value	S E
	Mean	SD	Mean	SD				
I am familiar with the local emergency response system for disasters.	3.86	1.40	4.97	1.121	1.111	0.032	0.974	0.236
I know the limits of my knowledge, skills, and authority as future nurse to act in disaster situations	4.40	1.28	5.25	0.803	0.857	5.286	<0.001	0.206
I consider myself prepared for the management of disasters.	4.03	1.18	5.08	0.809	1.048	7.006	<0.001	0.192

Variables (11 items, 1-11)	Pre-Test		Post-Test		Mean Difference	t -score	p-value	S E
	Mean	SD	Mean	SD				
I know where to find relevant research or information related to disaster preparedness and management to fill in gaps in my knowledge	4.21	1.09	5.32	0.839	1.111	7.987	< 0.001	0.182
I find that the research literature on disaster preparedness and management is easily accessible.	4.24	1.19	5.02	0.871	0.778	5.136	< 0.001	0.196
I find that the research literature on disaster preparedness is understandable	4.37	1.04	5.16	0.807	0.794	6.029	< 0.001	0.174
I have a list of contacts in the medical or health community in which I practice.	2.89	1.40	4.08	1.248	1.190	0.001	< 0.999	0.245
I know referral contacts in case of a disaster situation (health department, e.g.,).	3.46	1.46	4.67	1.150	1.206	0.016	< 0.987	0.245
Finding relevant information about disaster preparedness related to my community needs is an obstacle to my level of preparedness	3.17	1.51	3.98	1.577	0.714	0.000	< 0.999	0.284
I know whom to contact in case of disaster situation in my community	3.70	1.49	4.75	1.150	1.048	0.014	0.989	0.249
I have participated on disaster drill or advocacy in my community	2.37	1.79	3.16	1.638	0.794	0.000	0.999	0.318

Table 1 showed the increased post-intervention mean score with statistically significant differences in five of the following items "I know the limits of my knowledge, skills, and authority as a future nurse to act in disaster situations", "I consider myself prepared for the management of disasters" ("I know where to find relevant

research or information related to disaster preparedness and management to fill in gaps in my knowledge" "I find that the research literature on disaster preparedness and management is easily accessible" "I find that the research literature on disaster preparedness is understandable with (p < 0.001).

Table 2: Mean differences on knowledge on bio-terrorism, emergency response before and after intervention

Variables (4 items, 12-15)	Pre-test		Post-test		Mean difference	t score	p-value	SE
	Mean	SD	Mean	SD				
I am familiar with the local emergency response system for disaster	2.97	1.43	4.46	1.318	1.492	0.000	0.999	0.254
I know how to use personal protective equipment	5.13	0.96	5.70	0.586	0.571	4.693	< 0.001	0.155
I know how to perform isolation procedures so that I minimize the risks of community exposure	4.78	1.07	5.40	0.757	0.625	4.606	< 0.001	0.175
I know how to execute decontamination procedures.	4.76	1.10	5.44	0.778	0.683	4.872	< 0.001	0.18

Table 2 demonstrated increased mean score with statistically significant differences in the following items: "I know how to use personal protective equipment" "I know how to perform isolation procedures to minimize the risks of community exposure" "I know how to execute decontamination procedures" with (p < 0.001).

Table 3: Mean differences on knowledge on mitigation, disaster stage: Disaster response before and after intervention

Variables (5 items, 16-20)	Pre-test		Post-test		Mean difference	t score	p-value	SE
	Mean	SD	Mean	SD				
I feel reasonably confident can treat patients independently without supervision of a physician in a disaster situation.	3.41	1.20	4.40	1.100	0.984	0.051	0.96	0.181
I would feel reasonably confident in my abilities to be a member of a decontamination team.	4.13	1.18	4.97	1.015	0.841	0.520	0.604	0.155
I would feel confident working as a triage nurse practitioner, and setting up temporary clinics in disaster situations.	4.21	1.08	5.13	0.889	0.921	6.595	<0.001	0.142
I would feel confident in my abilities as a direct care provider and first responder in disaster situations.	4.25	1.22	5.13	0.813	0.873	5.645	<0.001	0.156
I would feel confident as a manager or coordinator of a shelter.	3.70	1.28	4.81	1.014	1.111	0.724	0.47	0.181

Table 3 found statistical mean difference on "I would feel confident working as a triage nurse practitioner and setting up temporary clinics in a disaster situation" (p < 0.001). "I would feel confident in my abilities as a direct care provider and first responder in disaster situations" (p < 0.001).

Table 4: Mean differences on knowledge on recovery post disaster stage before and after intervention

Variables (8 items , 21-28)	Pre-Test		Post-Test		Mean difference	t score	p-value	S E
	Mean	SD	Mean	SD				
I am familiar with psychological interventions, behavioral therapy, cognitive strategies, support groups and incident debriefing for patients who experience emotional or physical trauma.	3.76	1.43	4.95	0.923	1.190	5.933	<0.001	0.202
I am familiar with what the scope of my role as a nurse practitioner in a post-disaster situation would be.	4.13	1.10	5.29	0.831	1.159	8.294	<0.001	0.14
I would feel confident providing patient education on stress and abnormal functioning related to trauma.	4.37	1.14	5.14	0.877	0.778	5.333	<0.001	0.146
I participate in peer evaluation of skills on disaster preparedness and response.	3.17	1.40	4.78	1.142	1.603	0.026	0.979	0.295
I would feel confident providing education on coping skills and training for patients who experience traumatic situations so they are able to manage themselves.	4.08	1.25	5.08	0.921	1.000	5.656	<0.001	0.177
I am able to discern the signs and symptoms of acute stress disorder and post-traumatic stress syndrome (PTSD).	4.13	1.16	4.95	1.156	0.825	0.009	0.993	0.149

Variables (8 items , 21-28)	Pre-Test		Post-Test		Mean difference	t score	p-value	S E
	Mean	SD	Mean	SD				
I feel confident managing (treating, evaluating) emotional outcomes for acute stress disorder following disaster in a multi-disciplinary way	3.83	1.20	4.92	0.903	1.095	6.925	<0.001	0.158
I know what to perform focused health assessment for PTSD	3.51	1.28	4.68	1.202	1.175	0.004	0.997	0.216

Table 4 showed increased post-intervention mean score on following five items with statistically significant differences on as follows: "I am familiar with psychological interventions, behavioral therapy, cognitive strategies, support groups, and incident management" , "I am familiar with what the scope of my role as a nurse practitioner in a post-disaster situation would be", "I

would feel confident providing patient education on stress and abnormal functioning related to trauma", "I would feel confident providing education on coping skills and training for patients who experience traumatic situations, enabling them to manage themselves", "I feel confident managing (treating, evaluating) emotional outcomes for acute stress disorder following a disaster in a multidisciplinary way".

Table 5: Mean differences on family preparedness before and after intervention

Variables	Pre-Test		Post-Test		Mean difference	t score	p-value	Std. Error
	Mean	SD	Mean	SD				
I have personal/ family emergencies plans in place for disaster situation.	3.37	1.42	4.75	1.177	1.381	0.009	0.993	0.254
I have agreement with family members on how to execute my personal/ family emergency plans.	3.51	1.46	4.89	1.152	1.381	0.019	0.986	0.254

Table 5 found that the post-test results demonstrated an increase in the mean values for two items: "I have personal/family emergency plans in place for disaster situations" from 3.37 ± 1.42 to 4.75 ± 1.177 , "I have an

agreement with family members on how to execute my personal/family emergency plans from 3.51 ± 1.46 to 4.89 ± 1.152 . However, despite these improvements, the changes were not statistically significant.

Table 6: Mean differences on overall knowledge on disaster risk management before and after intervention

Variables Domains	Pre-Test		Post-Test		Mean difference	t score	p-value	SE
	Mean	SD	Mean	SD				
Prevention; Pre-Disaster stage Disaster Knowledge & Information	3.70	0.97	4.67	0.56	0.97	15.19805	<0.001	0.064
Bioterrorism & Emergency Response	4.41	0.84	5.25	0.62	0.82	10.08450	<0.001	0.081
Mitigation, Disaster Stage: Disaster Response	3.94	0.94	4.89	0.77	0.95	10.12551	<0.001	0.094
Recovery post disaster stage	3.87	0.91	4.97	0.76	1.15	12.03888	<0.001	0.096
Family preparedness	3.44	1.38	4.82	1.38	1.38	9.51030	<0.001	0.145
Overall score	3.86	0.65	4.87	0.56	1.01	16.59473	<0.001	0.061

Table 6 presents the highest mean difference observed in the family preparedness domain, which increased from mean 3.44 ± 1.38 to 4.82 ± 1.38 with $p < 0.001$ followed by recovery (post-disaster stage) with mean 3.87 ± 0.91 to 4.97 ± 0.76 with mean difference 1.15. On Pre-disaster

stage (disaster knowledge and information): mean 3.70 ± 0.97 to 4.67 ± 0.56 with mean difference 0.97. On Mitigation, disaster stage, and disaster response mean 3.94 ± 0.94 to 4.89 ± 0.77 with mean difference 0.97. On Bio-terrorism and emergency response mean 4.41 ± 0.84

to 5.25 ± 0.62 with mean difference 0.85. The overall mean score for disaster risk management has increased from 3.86 ± 0.65 to 4.87 ± 0.56 , with statistical significant difference ($p < 0.00$), Statistical significance was found in all domains with $p < 0.001$.

DISCUSSION

Our study findings showed that there was a significant increased on mean score on all aspect of disaster preparedness scale after the training.

Similar to this findings a study conducted the University at Turkey during the year 2019 found that after completion of the training, the preparedness perceptions of students in the experimental group regarding the “pre disaster phase” was significant greater than for the students in the control group. This showed that the students in the experimental group were aware of importance of disaster preparedness and the training made students in the experimental group better prepared to respond to disasters and increased their willingness to prepare.⁹

A descriptive, analytical study conducted in western Iran in 2020 among 70 nursing students revealed that for competence was 125.58 ± 14.19 . There was a significant relationship between the mean score of nursing competence in response to disasters and student history of participating in an exercise and training course ($P < 0.001$).¹⁰

Likewise our study findings is consistent with the evaluative study conducted at Hongkok during the year 2020 among 307 nursing students’ using a single group pre-and post-intervention comparisons which found positive significant score in disaster knowledge ($p < 0.001$) and perceived ability ($p < 0.01$), but no substantial change in willingness to respond to disasters was observed.¹¹

Another cross-sectional survey conducted in Bangladesh during the year 2022 among 308 nursing students showed that student nurses’ perceived levels on disaster preparedness was (mean= 3.12 ; SD = 0.59), on disaster responsibility (mean = 3.65 ; SD = 0.60), and disaster recovery-ability (mean = 3.45 ; SD = 0.69) were moderate; however, their perceived readiness for disaster management was low. Furthermore, more than half of the respondents recommended more workshops and training on disaster management to increase their disaster management capacity. In addition, one-fourth of them suggested more drills and practical knowledge for enhancing their disaster management capacity.¹⁴

A pre–post interventional study conducted on Northern India among paramedic students found significant difference 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.¹⁸ A study conducted in the University of Indonesia during the year 2018 showed that the training had an effective capacity in the disaster prevention and mitigation compared to the educational video screening and control. Training is an effective method in the disaster prevention and mitigation skills of the students in disaster prone areas.²⁰

CONCLUSION

The study inference that among nursing students structured training on disaster have resulted increased score on all five domain of DPET-K scale which include Pre disaster stage Knowledge & Information, Bio-terrorism and Emergency, Mitigation (disaster stage), Recovery (post disaster stage) & Family Preparedness after intervention which inferences the need for periodical training for nursing students in their co-curricular course.

INTEREST OF CONFLICT: None

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