Knowledge of Disaster Preparedness and Management among Nurses in the Disaster Prone Areas of Kerala

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Abstract: *Disasters have been integral parts of the human experience since the beginning of time, causing premature death, impaired quality of life, and altered health status. The main goal of nursing in crisis is to achieve best possible level of health for the individuals and communities affected by crisis. This study was aimed to evaluate the knowledge of nurses before and after the Educational Intervention programme regarding the disaster preparedness and management in selected DisasterProne district of Kerala.Research approach adopted for this study was Quantitative study approach. The research design adopted for present study was quasi experimental (one group pre-test post-test design) and the samples were selected by the using purposive sampling technique. 400 samples were selected from Healthcare Facility of hospitals, nursing colleges and schools. The researcher prepared a structured Educational interventional programme, used variety of teaching methods like Lecture, Discussion, Videos, power point presentation and information Booklet were distributed to the participants and to the Institution. **Result**: The overall knowledge of nursing personnel regarding various types of disaster, preparedness and management, pre - test Mean score was 95.72, SD (8.80) whereas post-test Mean score was 72.24 SD(6.78) and percentage mean effectiveness 23.48%, 't'test value was 43.7.From the present study findings it was evident that the knowledge of nurses on disaster preparedness and management was found highly significant the increase in the knowledge level indicates the effectiveness of Interventional programme with significant p value level (0.001). There is a significant association of nurse's knowledge regarding various aspects of disaster with educational status at 0.007; cyclone 0.032, with at p< 0.5. There is no significant association of knowledge of nurses regarding disaster character, Flood and prevention strategy, Cyclone, Earthquake, Drought, landslide and mitigation measures, Role of nurse's regard to various components of disaster prevention and management, response in different stages with education,Occupation,Religion .Therefore, it is concluded that Educational Interventional programme has created greater awareness among nurse on Disaster preparedness and management.*

Keywords: *Disaster Preparedness, Disaster Management, Intervention Programmes, Health care facilities, Disaster types.*

1. BACKGROUND

Disasters have been integral parts of the human experience since the beginning of time, causing premature death, impaired quality of life, and altered health status. Global warming, shifts in climates, sea-level rise, and societal factors may coalesce to create future calamities. Generally, disasters are of two types-Natural and Man-made. Natural disasters are flood, cyclone, drought, earth quake, cold wave, thunderstorms, heat waves, mud slides, volcanoes, Tsunamis and storm. Man-made disaster includes epidemic, deforestation, pollution due to prawn cultivation, chemical pollution, wars, road /train accidents, riots, food poisoning, industrial disaster/ crisis and environmental pollution.[1]Disasters are no longer limited to natural catastrophes. Man-made emergencies also cause disasters in terms of fatalities and economic losses. [2]Asia accounted in 2015 for 62.7% of worldwide reported disaster victims (against 80.6% for the 2005-2014 decade's average), India has a highly diversified range of natural features. Its unique geo-climatic conditions make the country among the most vulnerable to natural disasters in the world. 28 percent of the country's total cultivable area is drought prone. 60 percent land mass is earthquake prone and 76 lakh hectares of land is flooded every year.World Health Organization WHO, (2009) expert consultation reported that preparedness including improving community and individual reaction and response which lead to minimize and reduce disaster and injuries and also includes plans which related to communication, victim, evacuation which means (Triage) "to sort" it refers to the process of sorting patient based on severity of illness or

injury. The author added in the area of response phase that it is the product of preparedness, and as a complete and coordinate community response requires integration of disaster plan.[3]

Disaster nursing can be defined as "the adaptation of professional nursing knowledge, skills and attitude in recognizing and meeting the nursing, health and emotional needs of disaster victims." Zhang (2008) states that from the health effects of global warming to the implications differences on disease, Injuries are among the leading causes of death and burden of diseases all over the world. Everyday almost 16,000 individuals die from injuries with the growing threat of a naturally occurring or man-made global pandemic; many public, private, federal, state and local institutions have developed preparedness and response plans.[4]

Boone and Moore (2011) states that nurses play several roles during a disaster. This may include: preserving open lines of communications, ensuring quality patient care, providing current education, influencing policy and financial decisions and providing security for staff, patients and families.[5]

2. OVERVIEW OF LITERATURE

According Jake way, LaRosa, Cary, and Schoenfisch (2008), preventing, preparing for, responding to and recovering from disasters and emergencies have become a priority for everyone. Since Florence Nightingale demonstrated to the world the important role that nurses play on the front lines of responding to disasters, the field of public health and disaster nursing has continued to expand its scope and define its significance. Public health nurses bring critical expertise to each phase of a disaster: mitigation, preparedness, response, and recovery.[6]Disaster nursing is provided in numerous environments and settings, each with unique conditions with which disaster nurses must be familiar. Essential nursing abilities needed for the appropriate management of disaster victims include critical thinking, adaptability, teamwork and leadership. Proper patient care and management in disaster settings mandates understanding of both individual care and mass patient care. [7]According to Stanhope and Lancaster (2008) the role of a nurse during disaster depends a great deal on the nurse's experience, professional role in a community disaster plan, specialty training, and special interest. [8]According to Powers and Daily (2010) the ability of hospitals to improve their preparedness capability and to protect the lives of patients and healthcare workers often is linked to national and international planning initiates and guidelines.[9]The medical aspects of a disaster account for less than 10% of resources and personnel expenditure. Hospitals and health care provider teams respond to unexpected occurrences such as explosions, earthquakes, floods, fires, war or the outbreak of an infectious epidemic.[10]Disaster management is the key programme of any nation to prepare and face any emergency situation of natural or manmade events. Thus disaster management includes disaster preparedness, planning, preventing or mitigating or responding to a disaster. Health professionals take more proactive approach; their responsibility is not only post disaster response, but also starts from planning for an improved response and for prevention or mitigation of the disaster impact to allow for a healthier and happier life for all.[11].

Disaster preparedness, including risk assessment and multidisciplinary management strategies at all system levels, is critical to the delivery of effective responses to the short, medium, and long-term health needs of a disaster-stricken population. Preparedness includes planning, infrastructure, knowledge and capabilities, and training regarding level of preparedness.[12]Study undertaken by nurses in Hong Kong, the conclusion was that nurses are not adequately prepared for disasters, but are aware of the need for such preparation. Also, that disaster management training should be included in the basic education of nurses.[13]

At the health care facility level, nurse executives provide leadership to assure that the needs are met for both existing patients and those who require care because of the consequences of a disaster.Attending disaster-related education/training is seen to be a predictor to adequate knowledge among community health nurse. It is therefore paramount for health administrators to conduct disaster-related education/training nurses to improve their knowledge and practice towards disaster management.[14]

Nurses have been a part of disaster preparedness and response as long as nurses have existed. Nurses have special role in advocating systematic profit-driven health care services during disaster. Nurses are needed for prevention, surveillance, and response of every type. Nurses are routinely assigned to assist in triage and screening for health problems, administration of first aid and psychological support, implementation of infection control procedures, and monitoring so that the congregate living situation does not lead to an outbreak of disease. They have always been key players during epidemic situations by performing contact tracing and conducting case investigations,

engaging insurveillance and reporting, collecting specimens, administering immunizations, andeducating the community. Hence, nurses are a key staff member behind the rapid establishment of refugee camps for those who need shelter.[15]A study was done to determine KAP of emergency nurse and community health nurse towards disaster management. Researchers found that adequacy of knowledge and practice, and portraying positive attitude was driven by being involved in disaster response and attending disaster-related education. They recommended paramount for health administrators to conduct disaster-related education/ training for front-liners such as emergency and community health nurses to improve their knowledge and practice towards disaster management.[16]A study was conducted to test the hypothesis of an audio visual presentation of hospital disaster plan followed by simulated disaster exercise and debriefing improved staff knowledge, hospital preparedness regarding disaster in Victoria, Australia. Randomly selected 50 members (medical, nursing and administrative staffs) were survived. Pre interventions pass rate was 18% and post intervention pass rate was50%. The disaster exercise and education process has the greatest benefit for the individuals and departments involved directly.[17]A study was conducted to evaluate the effectiveness of planned teaching programmed on knowledge of disaster management among 50 N.C.C. students Belgaum city by using purposive sampling technique. The results show that the mean percentage of knowledge in the pre-test was 21.31% with mean and SD of 3.18%, and mean percentage in the post-test was 36.41% with mean and SD of 2.27% and post-test knowledge score was significant ($t=19.9$ $p<0.05$). Therefore, study is concluded that the planned teaching programmed was effective in improving the knowledge regarding disaster management.[18]

With These Backgrounds an attempt has been made in this study to assess the knowledge of Disaster Preparedness and Management among nurses in the disaster prone areas of Kerala with the following prime objectives.

3. OBJECTIVES OF THE STUDY

❖ To assess the demographic characteristics of nursing personnel

❖ To assess the frequency and Percentage Distribution regarding various Disaster Training programme of nursing personnel

❖ To determine the effectiveness of the Educational interventional program for the nurses regarding different types of disaster , and the preparedness, management by comparing the pre-test and post test score

❖ To find out the association between the knowledge of the nursing personnel regarding different types of disaster, and the various role of the nurses on disaster preparedness, management   with selected baseline variable.

4. HYPOTHESIS

❖ H_1: There will be a significant difference in pre-test and post test Knowledge score of the nursing personal regarding different types of disaster, and the preparedness, management following the educational Interventional programme

❖ H2: There will be a significant association between the pre-test score of the nursing personnel regarding the types of disaster and the various roles of the nurses on preparedness, and management with the selected demographic variables

5. MATERIALS AND METHODOLOGY

This study was conducted in selected district of Kerala in the health care setting of hospitals, nursing colleges and schools, at the high risk disaster zones in the year 2016-2017. The research approach adopted for this study was quantitative approach. The research design adopted for the present study was pre experimental research with one group pre-test post-test method. Planned educational interventional programme

Independent variable: Planned educational Interventional programme to the nurses working in health facilities in the disaster prone areas of Kerala has been taken as the Independent variable in this study.

Dependent Variable: Knowledge, and awareness of nursing personnel regarding disaster preparedness and management.

Sampling Technique and Data Collection Tools

A total of 400 respondents were chosen for the study based on subjects who fulfilled the inclusion and exclusion criteria Purposive non Random sampling was utilized in order to get the sample respondents in the said different areas of specialization.A self-made questionnaire was used as the major tool in gathering the data needed in the study. It was divided into four parts, the first of which was on the respondents' demographic profile in terms of age, gender, religion, year of service and area of specialization. Consecutively, the other parts focused on the nurse's knowledge regarding different types of disaster like, Flood, Cyclone, Landslide, Avalanches, and Drought etc. and also about its management and prevention before and after Educational Interventional programme. Each correct answer was given 1 mark; wrong or unanswered questions were given no score. Each correct answer is given 1 mark; wrong or unanswered questions were given no score. A pilot study was conducted on 10% of study sample to evaluate the developed tools for clarity and applicability then necessary modification was made. The ethical clearance was obtained and the permission was taken from the higher authorities like Government of Kerala (Health &Family Welfare Department), concern authority of the hospitals, nursing colleges and schools for conducting the study. The follow up among the study samples was done, after 15 days via contacting through Emails, personnel contact, and through telephonic contact. Based on the convenient of the Nurses duty of the Institutions The researcher implemented structured Educational interventional programme, by using variety of teaching methods like Lecture, Discussion, Videos, power point presentation and Educational Booklet were distributed to the participants and to the Institution. After the retrieval of the filled up questionnaire the data will be tailed, tabulated and interpreted using statistical measures by the statistician was analysed by using Frequency and percentage distributions were used for representation of variables and presented in the form of tables and graphs. The most commonly used inferential statistical tests are Z- test, t- test, ANOVA, chi- square tests et**c.**

Demographic Profile of the Respondents

The study of De la Cruz (2009) noted a significant relationship between the nurses' demographic profile variables and their performance of nursing functions. More specifically, she identified a close level of performance among nurses grouped by age, educational attainment, civil status and length of experience in the nursing profession. Further, a research by Wendt and Alexander (2007) found that client care provided by nurses was largely the same across the spectrum of specialties, years of experience, geographic region, and facility.[19]Among 400 respondents with the respect to educational qualification: Majority of respondents 188(47.0%) were BSc Nurses, 173(43.2%) did General Nurse and midwifery and 39(9.8%) were MSc nurses. Majority of respondents were between 307(76.8%)20-30 years of age, followed by 78(19.5%) between 31-40 years of age and 15(3.8%) were more than 41 years of age. Regarding the Marital status of the respondent's majority of the subject 284(71%) were married and living together and 116(29%) were single, even the Divorce respondent have mentioned as single. The majority of the respondents were working as staff nurses or as clinical in structure 319(79.8%), 42(42%) were ward in charges and only 39 (9.8%) were post graduate faculty working as teachers. The majority of the sample 360(90%) were residing in the urban area and very few are 40 (10%) living in rural areas.

Table No: 1. *Percentage Distribution of Respondent regarding the Disaster*

Training programme

Category of Training	Responses	No.of respondents	Percentage
State	Yes	69	17.2
	No	331	82.8
	Total	**400**	**100.0**
District	Yes	81	20.2
	No	319	79.8
	Total	**400**	**100.0**
College	Yes	182	45.5
	No	218	54.5
	Total	**400**	**100.0**
School	Yes	155	38.8
	No	245	61.2
	Total	**400**	**100.0**

The above table reveals the respondent's participation regarding the disaster training at various levels. This indicates that the Institution are not organising regular Training programme for the staff and not equipping them with adequate knowledge, necessary skills regarding Disaster Mitigation, preparedness to save lives at the time of disaster in preserving the livelihood.

Knowledge level of various aspects of Disaster among Nurses

The following table shows the pre-test and post-test scoresof the respondents pertaining to various disaster related components such as various aspects of the disaster terms, definition, types like Flood, cyclone Drought, Landslide, Earthquake, Management Control measures, Adverse effect and the role of the nurses to reduce disaster, immediate responsibility of nurses before and after the Educational Interventions

Table No 2: *Awareness level of various category of disaster among the study respondent before and after the Educational interventions*

S.No	Disaster related characters	No .of subjects	Pre-test	Standard deviation	Post-test	Standard deviation	P value
1	Most vulnerable continent	400	56	4.97	95	2.18	0.001
2	Percentage of H2O surface	400	38	4.87	84	3.62	0.001
3	Meaning of disaster	400	53	5.00	93	2.60	0.001
4	Awareness of disaster	400	16	3.67	81	3.93	0.001
5	Hazards Awareness	400	23	4.23	63	4.84	0.001
6	Common disaster in India	400	54	4.99	92	2.75	0.001
7	Disaster prone district in Kerala	400	53	5.00	88	3.25	0.001
8	Common disaster in Kerala	400	65	4.77	50	5.01	0.001
9	Types of natural disaster	400	48	5.00	90	3.07	0.001
10	Types of manmade disaster	400	56	4.98	94	2.42	0.001

The table-2 illustrates the familiarity of the Respondents regarding various aspects of the disaster terms, definition, types, and about the disaster prone district in Kerala. It shows the low awareness about all the items in the pre-test score but the analysis of the post-test reveals higher score in the Mean, Standard deviation value in all the category of the disaster related item after the educational intervention with the highly significant p value.(p< 0.001)
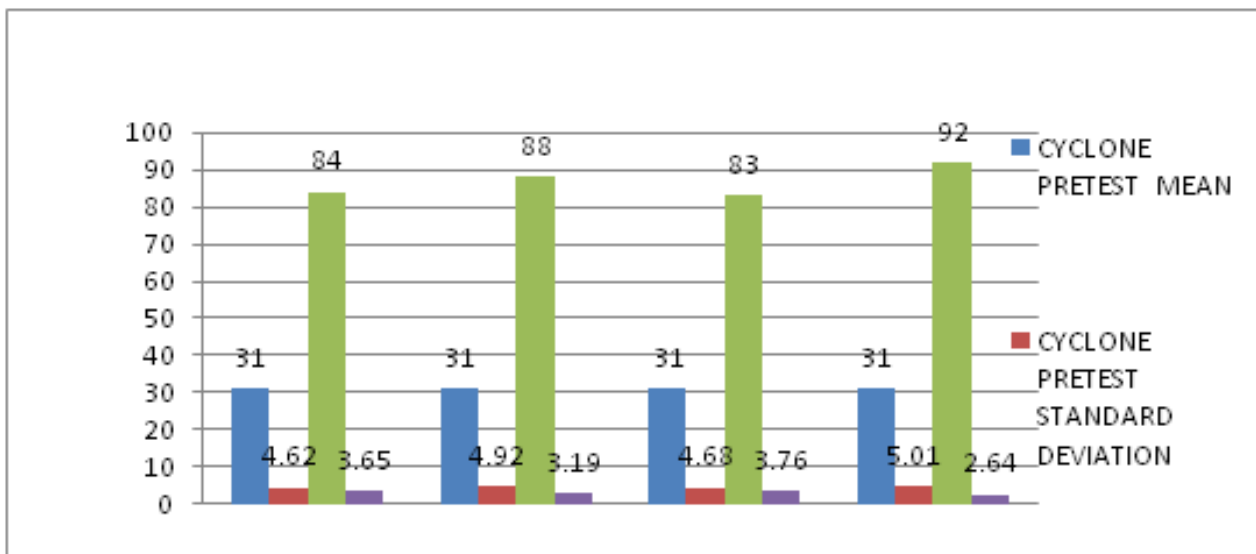

Figure-1: *Awareness level regarding cyclone before and after intervention*

It was evident from the above graph that there was significantly better knowledge mean score, with the standard deviation awareness of Cyclone during the post test after the Educational interventions programme It is evident that there was significantly better knowledge score in the post test with p value level (0.001).
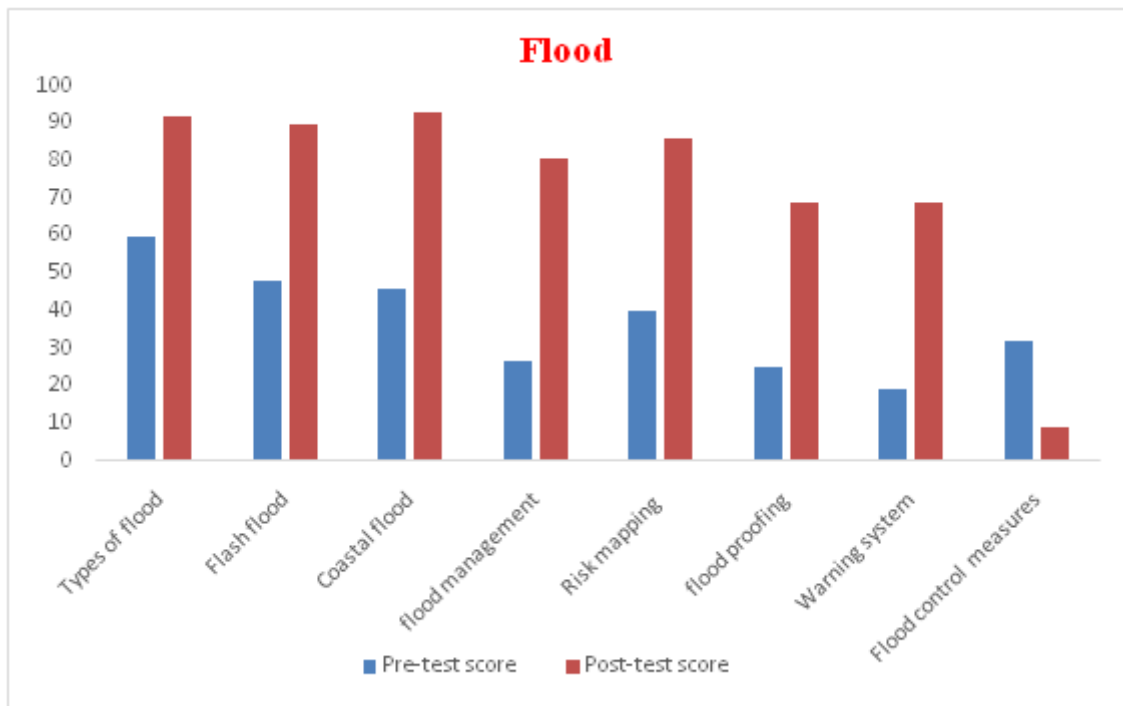
Figure-2: *Awareness level regarding flood before and after intervention*

The respondent awareness of pre-test mean score with standard deviation regarding the types of flood, flash flood, coastal flood, 60%(4.90),48%(5.00),46% (4.99)whereas the post-test values were 92%(2.75), 90(3.07), 93% (2.16), respectively at level of significant with p value(0.001).Regarding flood management the pre-test mean score was only 27% with the Standard deviation(4.43) comparing to the post test mean score of 81%, standard deviation(2.60), it's clearly evidenced that the significant increased level of knowledge following the educational programme
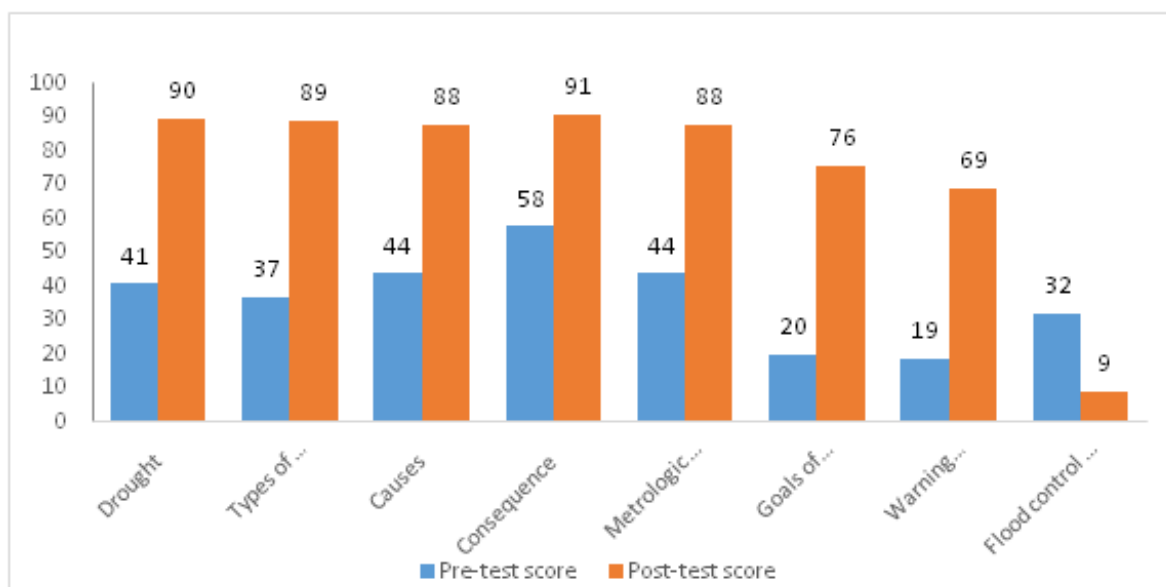

Figure-3: *Awareness level of flood before and after intervention*

It was evident from the above diagram thatthe respondents mean pre-test score with the standard deviation regarding the drought consequences of, Metrologic drought and goals of drought were 58(4.45), 44(4.91), 20(4.01) and post test score was 91(2.87), 88(3.28), 76(4.29the increase in the knowledge level indicates the effectiveness of Interventional programme with significant p value level (0.001).

Table No 3: *Awareness level of various aspects of Landslide among the study respondent before and after the Educational interventions*

S.No.	Disaster related characters	No. of Respondents	Pre-test score		Post test score		P value
			Mean	Standard deviation	Mean	Standard deviation	
1	Land slide	400	62	4.86	88	3.19	0.001
2	Causes of land slide	400	49	5.01	87	3.34	0.001
3	Types of land slide	400	42	4.95	87	3.39	0.001
4	Effects	400	56	4.96	19	3.07	0.001
5	Mitigation measures	400	57	4.96	88	3.25	0.001

*P Value <0.001   ** significant at 1% level*

Regarding the Knowledge of the respondents about land slide, causes, types, effects and mitigation measures, the pre-test mean score, standard deviation was 62(4.86), 49(5.01), 42(4.95), 56(4.96), 57(4.96) whereas the post-test scores was 88(3.19), 87(3.34), 87(3.39), 90(3.07), 88(3.25) respectively with statistically significant p value(0.001).

Table No 4: *Awareness level of the respondent regarding the role of the nursing personnel in various stages of disaster management before and after the Educational interventions*

S.No.	Disaster related characters	No. of Respondents	Pre-test score		Post test score		P value
			Mean	Standard deviation	Mean	Standard deviation	
1	Measures to reduce the severity of disaster	400	50	5.01	89	3.10	0.001
2	Responsibility of the nurse in response phase	400	36	4.82	88	3.19	0.001
3	Goals of the mass causality	400	49	5.01	90	2.98	0.001
4	Triage of victims	400	44	4.98	88	3.28	0.001
5	Major causes of the injury	400	30	4.60	59	4.92	0.001
6	Rapid assessments of the victims	400	51	5.01	88	3.26	0.001
7	Aspects fails during disaster	400	52	5.00	90	2.97	0.001
8	Disaster Agents	400	54	4.99	88	3.19	0.001
9	Host factor affecting during disaster	400	47	5.00	88	3.22	0.001

*P Value <0.001   ** significant at 1% level*

Regarding the respondent's pre-test mean score, standard deviation was relatively low about measures to reduce disaster, immediate responsibility of nurses in response phase, goals of treating mass causality, and the importance of Triage victimwere50(5.01), 36(4.82), 49(5.01),44(4.98) whereas the post-test mean score, standard deviation was relatively high89(3.10), 88(3.19), 90 (2.98),88(3.28) due to the effectiveness of Educational Intervention. The Knowledge of the respondents mean score, standard deviation regarding the major cause of injury, rapid assessment of the victim, common aspects fails during disaster, disaster agent ,and factor affecting the host during disaster, reveals low value such as 30(4.60), 51(5.01) 52 (5.00),54 (4.99),47(5.00) whereas a significant difference was in the post test score as 59(4.92), 88(3.26), 90(2.97), 88(3.19),88(3.22) with the P value 0.001. There was high increase in the post-test knowledge score of the Nursing personnel regarding the various role of the nurses during disaster after the Educational intervention with significant difference p value <0.001

Table no: 5 *Nursing personnel overall knowledge regarding various types of disaster, before and after the Educational interventions*

General aspects of disaster	No. of subjects	Mean	Standard deviation	P value
Pre-test	400	95. 7250	8.80501	.0001
Post-test	400	72.2400	6.78177	

*P Value <0.001   ** significant at 1% level*

The table-5 illustrates the overall knowledge of nursing personnel pre - test mean score, standard deviation regarding various types of disaster, was (95.7250), (8.80501) whereas the post test scores were (72.2400.), (6.78177). Because the researcher organized Educational Intervention was implemented by using various teaching methods   like lecture, discussion with PowerPoint presentation videos   regarding Natural, Manmade disaster and also study subjects were given a highly informative booklet which has helped them to gain better insight about the minor disaster. As it was defined by Veenema, a disaster is "any event where the demand exceeds the available resources. This means that nurses need to be prepared to deal with all hazards. whereas in the study of Gundran (2013) carried out in Philippine he identify that most of the participants(81.3%) disaster simulation should be performed for their training in hospitals.73.3% and Copnell (2015) concluded on the basis of their quantitative study that Nurses must have sufficient knowledge in all extents of disaster management especially in responding to disasters which is similar to our study findings that the pre-test mean scores of all the general aspects of disaster shows significance deficiency before the Educational Intervention.[20,21,22]

These findings are in agreement with Jiang et al. demonstrated that a significant positive relationship between nurses' knowledge and level of competence in nursing practice and indicates that strategies need to be developed for nurses to improve their knowledge, attitudes and practice. The present study findings revealed a highly significant difference for knowledge and attitude of the study subjects regarding disaster preparedness as well management $P \leq 0.00$ following the educational interventional programme.TheEducational interventional programme helped   to improve and enhance the knowledge of the nurse's role on disaster prevention and management.There was a significant difference in the post-test Knowledge score of the nursing personal comparing to the pre-test score regarding different types of disaster, and the preparedness, management following the educational Interventional programm. So hypothesis is accepted.

The association of knowledge of nursing personnel scores about types, roles of disaster management and prevention have been correlated with selected demography variable. There is a significant association of nurse's knowledge regarding various aspects of disaster with educational status at 0.007; cyclone 0.032, with at p< 0.5. There is no significant association of knowledge of nurses regarding disaster character, Flood and prevention strategy, Cyclone, Earthquake, Drought, landslide and mitigation measures, Role of nurse's regard to various components of disaster prevention and management, response in different stages with education,Occupation,Religion .

6.   CONCLUSION AND RECOMMENDATIONS

The study findings reveal that the educational interventional programmes was effective in terms of improving the knowledge of the nursing personnel regarding the role of nurses during disasters in terms of preparedness, mitigation, response and recovery phase. Comparing the pre test scores, the post-test mean score, and standard deviation was found highly significant, increase in the knowledge level indicates the effectiveness of Interventional programme with significant p value level (0.001)

❖ Therefore, Institution should develop policies for disaster management and pay more attention to the problem of disasters and preparedness for their management. Training programs are essential to increase their awareness about disaster management.

❖ Nurses regardless of variations in demographic profile, should always manifest a high sense of awareness to their roles during disaster, be prepared in critical situations and apply their management skills in facing different clients and situations.

❖ This study should be utilized to create awareness to all the nurses, nursing students and nursing educators by enhancing their profession's capability and competency through training and educational session.

Policy Suggestions

✦ Nurses should be part of disaster management Plan; they ought to   have ongoing training of drills to be done regularly. And the disaster plan should be regularly updated.

✦ Nursing Council ought to ensure that   all nursing training Institutions, hospitals emphasize disaster nursing preparedness and management in   their programs.

- Need for an enhanced curriculum for nurses in emergency planning and response.

- Development of continuing education programmes and in-service education is a necessity.

- Graduate programmes in nursing administration and education should include content on disaster preparedness, planning and response related to their role in disaster.

- Nursing research in disaster and disaster nursing is necessary in order to provide information to make evidenced-based decisions regarding practice and education.

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