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EFFECTIVENESS OF EDUCATIONAL INTERVENTIONS ON DISASTER PREPAREDNESS AND MANAGEMENT-:A STUDY AMONG THE FEMALE NURSES WORKING IN HEALTH FACILITY IN DISASTER PRONE AREAS OF KERALA

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ABSTRACT

The number and severity of disaster crises have been increasing in the world; in the past 30 years, the number of natural and technological disasters has increased dramatically which commonly leads to immense damage and devastation. Nurses are important members of the crisis team. 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 effect of educational intervention on nurse's role of disaster preparedness and management among the female nurses in selected disaster prone 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. And 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 educational booklet were distributed to the participants and to the Institution. 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 highest percentage of the female nurse's pre-test mean score, SD was below average regarding the various aspects of disaster, role of nurses on disaster preparedness and management before the educational interventional but in the follow-up phases the post-test mean score, SD was found highly significant the increase in the knowledge level indicates the effectiveness of Interventional programme with significant p value level (0.001Therefore, it is concluded that educational interventional programme has created greater awareness among nurse on disaster preparedness and management. The intent of this study was to help nurses to be prepared with adequate knowledge so they could be equipped with competenciesin order to respond to a disaster event effectively.

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INTRODUCTION

A disaster is a catastrophic incident that commonly leads to immense damage and devastation. Whether the cause of the event is natural or man-made, the outcomes can be shockings.[1]

According to WHO, a disaster is defined as "a situation which implies unforeseen and serious immediate threat to public health".[2]Disasters of different types such as earthquakes, cyclones, floods, tidal waves, landslides, volcanic eruptions, tornadoes, fires, hurricanes, snow storms, severe air pollution, heat waves, famines, toxicological accidents, nuclear accidents and warfare etc.[3]An average of one disaster per week occurs somewhere in the world that requires International assistance. Asia tops the list of casualties due to disasters.[4]A critical responsibility of a nurse is to manage in times of crisis and disaster. While natural disasters cannot be prevented, important steps can be taken before a disaster strikes to minimize the extent of damage. Disaster preparedness is every one's responsibility. It is equally important to be prepared when a disaster strikes and to know where to turn for help and the steps to be taken to begin the recovery following a disaster.[5]

The great challenges nurses face in responding to natural, manmade and technological disasters is due to the little time spent in teaching or learning this content during the basic nursing education programme. The main goal of nursing in crisis is to achieve the best possible level of health for the individuals and communities affected by the crisis**.**[6] Nurses comprises of highest percentage of health and medical workforce and it is important for them to understand the national disaster management cycle. Without nursing integration at every phase, communities and clients lose a critical part of the prevention network, and the multidisciplinary response team loses a first-rate partner. Eleven million nurses worldwide form the backbone of the health care system and are the frontline health care workers who are in direct contact with the public contributes to the health of the individuals, families, communities, and **at the** global level.[7]

BACKGROUND

The rapidly changing world faces natural and man-made disasters as well as threats of terrorism and pandemics. Since nurses make up the largest portion of the health care workforce in the country, it is critical that nurses in all specialty areas are to be trained in disaster nursing.

According to UNICEF and disaster Risk reduction (DRR) estimates that number of people affected globally by disaster has been increased by an estimate of 50,000 to 60,000 per decade [4].In 2015, 376 natural triggered disasters were registered. Asia accounted in 2015 for 62.7% of worldwide reported disaster victims (against 80.6% for the 2005-2014 decade's average), while Africa accounted for 28.0% (against 13.1% on average for the 2005-2014 period) and the Americas for 7.0% (against 5.8% on average for 2005-2014). Over the last decade, China, the United States, India, the Philippines and Indonesia constitute together the top 5 countries that are most frequently hit by natural disasters. In 2015, 36 natural disasters has been reported.[8]

India accounts for its climatic and geographical setting – made out of 29 states and 7 union territories- has 22 states which are disaster prone. 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. Over 1300 lives are lost due to floods every year. Asia has accounted for 83 percent of population affected by disaster globally the number of the people affected in the rest of the world was 1, 11,159 were in Asia it was 5,54,459. Within Asia, 24 % of deaths due to disasters have occurred in India. Floods and high winds accounts for 60% of all disaster in India[8].

A study undertaken by nurses in Hong Kong concluded 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.[7]Another 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.[9]A survey was conducted to evaluate mental health and psychological change after earthquake as part community health assessment in Mc Leod Hall, Charlottesville. A questioner was used to investigate each house hold for relationship between physical health access to health care, housing, food and water, and occurrence of negative mental health markers. The findings indicated that majority (67%) of the respondents experienced six or more mental health complaints continuously for two or more weeks after the earthquake[9]. An assessment study was conducted on human loss and injuries, environmental sanitations and relief activities after the earthquake in Bhuj. The survey was done in 144 villages; there were 541 deaths with a rate of 3.18 per 1000 population. Among the victims, majority were children (45.4%) and women (28.4%). The study revealed that 38.9% villagers were entirely depending on water tankers for water supply and in 42.4 5% villagers drinking water without chlorination. In 98.6% villages open field defecations was practiced.

Diseases such as URTI, diarrheal diseases, fever and conjunctivitis were commonly observed in the field area.[10]

A pilot study was conducted to assess the effectiveness of disaster conferences among 200 health care providers. The result has shown that among the 200 respondents, registered nurses (37%) and physicians (24%) were the largest categories of providers. Basic clinical care (39%) and triage (26%) were the most frequent response skills reported; the areas wherein respondents felt least prepared were disaster- specific response skills (22%) and systems issues (34%). Only 22% respondents reported that they did not know a specific skill**.**[11] A study was conducted to evaluate the effectiveness of planned teaching programmed on knowledge of disaster management among 50 N.C.C. students of selected schools of Belgaum city by using purposive sampling technique. The results reveal**ed** 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%. The difference between pre-test and post-test knowledge score was significant ($t=19.9$ $p<0.05$). Therefore, study is concluded that the planned teaching programme was effective in improving the knowledge of NCC students regarding disaster management. [12]

Government of India, ministry of home affairs and United Nations development programme has signed an agreement on august 2002 for implementation of "disaster risk management" programme to reduce the vulnerability of the communities to natural disasters, in identified multi hazard disaster prone areas. The programme has been divided in to two phases over a period of six years. Phase-1 would provide support to carry out the activities in 28 selected districts in the states of Bihar, Gujarat and Orissa. In Phase-2 the programme would cover 141 districts such as Assam, Meghalaya, Sikkim, West Bengal, Uttaranchal, U.P, Delhi, Maharashtra, Tamilnadu, Manipur, Mizoram, Tripura, Arunachal Pradesh and Nagaland[13.]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. Meanwhile, emergency preparedness refers to the preparedness pyramid which identifies planning, infrastructure, knowledge and capabilities, and training as the major components of maintaining a high level of preparedness.[14]

According Jakeway, LaRosa, Cary, and Schoenfisch (2008), preventing, preparing for, responding to and recovering from disasters and emergencies **have** become a priority for everyone. Since the time of 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. [15] With disasters occurring more frequently threatening people around the world, the need to prepare nurses for disaster has never been greater. Nurses should be equipped with the necessary knowledge and abilities to work in a disaster and to meet the needs of the respective serving community. However, more than 80% of nurses who volunteered to serve for a disaster event had no previous experience in disaster response. It was recommended by the World Health Organization (WHO) that all nations, no matter how frequent (or infrequent) the happenings, should prepare healthcare workers for a disaster. Nevertheless, most nurses were inadequately prepared for disaster. It is only through education and training can nurses can be equipped with the competencies required during disasters.[16]Most nurses receive little information regarding disaster preparedness education in nursing school. A survey **was done in** 2013in the schools of nursing among 348 respondents and the findings revealed that only 53% offered content in disaster preparedness, and a mean of 4 hours was devoted to this content. In general, nursing school faculty were inadequately prepared to teach disaster preparedness content .[17]

A study was conducted to assess knowledge and awareness concerning chemical and biological terrorism among the Nurses, physicians, nursing and medical students. The knowledge scores of the respondents were low. Less than 23% of the respondents reported confidence to provide healthcare during terrorism situation. They concluded that a need for nurses in continuing education and staff development programs to develop, implement and evaluate terrorism preparedness programs[18.]An exploratory study was conducted to assess knowledge and self-expressed practices regarding disaster management among secondary school teachers at selected schools of Pune city. A non-experimental research design was used. Five hundred and forty secondary school teachers were selected by purposive sampling technique. Survey was conducted using a structured interview questionnaire. Findings revealed that mean knowledge score was 15.9 (53%) and mean practice score was 7.05 (47%). There was moderate positive correlation between knowledge score and practice score ($r = 0.54$). Study concluded that that teacher's knowledge and self-expressed practices were not at satisfactory level. Capability building among teachers is utmost necessary [19]
Kerala is prone to several natural hazards, the most common of them being landslides, flooding, lightning, drought, coastal erosion, earthquakes, Tsunami, wind fall

and epidemics. Studies conducted in the state indicates that prolonged and intense rainfall or more particularly a combination of the two and the resultant persistence and variations of pore pressure are the most important trigger of landslides. All except 1 of the 14 districts in the state are prone to landslides. Wayanad and Kozhikode districts are prone to deep seated landslides while Idukki and Kottayam are prone to shallow landslides. A very recent study indicates that the additional cohesion provided by vegetation roots in soil is an important contributor to slope stability in the scarp faces of the Western Ghats of Kerala.It is important for nurses working in Kerala to have adequate knowledge which will increase their competent level of performance demonstrating the effective application of knowledge, skill and judgment" during the time of disaster [20,20a].

The researcher was prompted to conduct a study among nurses regarding the 'Educational intervention programme of Disaster Preparedness and Management" competencies as applied in disaster situations. This study also focuses on awareness regarding various types of disaster and the role of nurses during different phases of disaster because the health impacts will be more severe when nurses are not able to deal with these impacts. In addition, it will indicate the implications for the education and actual training needs of disasters. Nurses will be a major component of the frontline response to any disaster preparedness planning and can reap benefits during the actual crisis. Crisis skills must be developed to ensure that when nation has the crisis we need to respond to the inevitable natural disasters and the increased risk of terrorism. In investigator view this study will enhance the knowledge of nurse regarding disaster **Preparedness and** management so they can render the emergency nursing services to the victim whenever disaster strike in any particular area the particular area of the country and can save human lives as many as possible.

MATERIALS AND METHODS

AIM

The purpose of the study is to increase the knowledge on disaster preparedness and management among nurses in disaster prone area of Kerala

STATEMENT OF THE PROBLEM

A study to assess the educational intervention on disaster preparedness and management among the female nurses in disaster prone area of Kerala

HYPOTHESIS

H1: 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

MATERIALS AND METHODOLOGY

Research approach

This study was conducted in 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

Variables under the study are:

Independent variable: Planned educational Interventional programme=

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

SETTING OF THE STUDY

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.

SAMPLELING TECHNIQUE:

A total of 400 respondents were for the study based on subjects who fulfilled the inclusion and exclusion criteria that they must have been in the service in any area of specialization of nursing such as hospital or clinic nursing colleges and schools, Purposive non Random sampling was utilized in order to get the sample respondents in the said different areas of specialization.

DATA GATHERING INSTRUMENTS

Section 1: A Socio demographic data sheet

Demographic data sheet consists of variables such as age, education, occupation, socio economic status, marital status, years of experience and the category of the Institution they are employed

Section B: Details regarding the training programmes that the nursing personnel have attended at the National, State and at District level

Section C: Structured Questionnaire regarding th knowledge of different types of disaster and also about its management and prevention

DATA GATHERING PROCEDURE.

Medical Directors of selected hospitals and clinics were met. After receiving their approval of the

request, the investigator personally disseminated the questionnaire to the respondents and assured them their anonymity. Nursing personnel such as G.N.M/ BSc /Msc Nurses working in selected college, school, and hospitals were chosen by using lottery method. The follow up among the study samples was done, after 15 days via contacting through Emails, personnel contact, and also through telephonic contact. Based on their convenient of the Nurses duty of the Institutions convenient the Educational Intervention programme was planned. The intervention programme was conducted by Lecture, discussion methods using various Audio-visual aids like by means of power point, videos.Post test was conducted among the samples, after 15 days of educational intervention to assess their knowledge of disaster preparedness and management, after the retrieval of the filled up questionnaire the data were be tailed, tabulated and interpreted using statistical measures.

Data analysis: Demography data and the details regarding the training programmes that the nursing personnel have attended was analyzed by using Frequency and percentage distributions were used for representation of variables and presented in the form of tables and graphs

Inferential statistics helps in drawing inferences from the data like, finding the differences, relationship and association between two or more variables. The most commonly used inferential statistical tests are Z- test, t-test, ANOVA, chi- square tests et**c.** The test of significance paired' test was used to find out the effectiveness of structured teaching programme.

RESULTS

Distribution of Demographic Variables

Figure 1: Educational wise Frequency distribution of nursing personnel

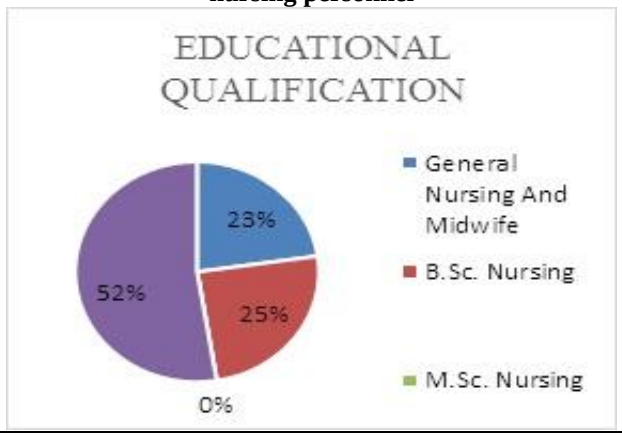

Figure 2: Age wise percentage distribution of nursing personnel

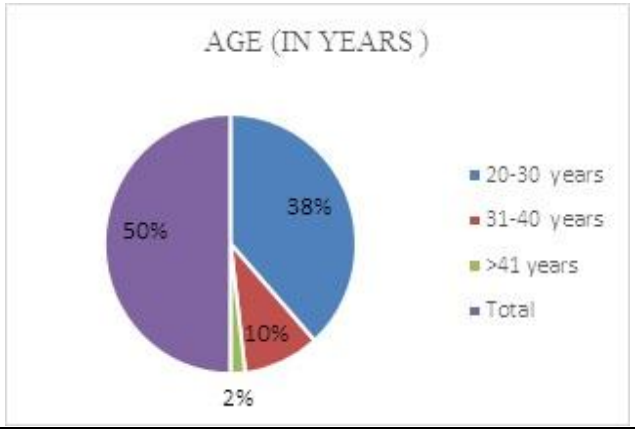

Figure 3: Religion wise percentage distribution of nursing personnel

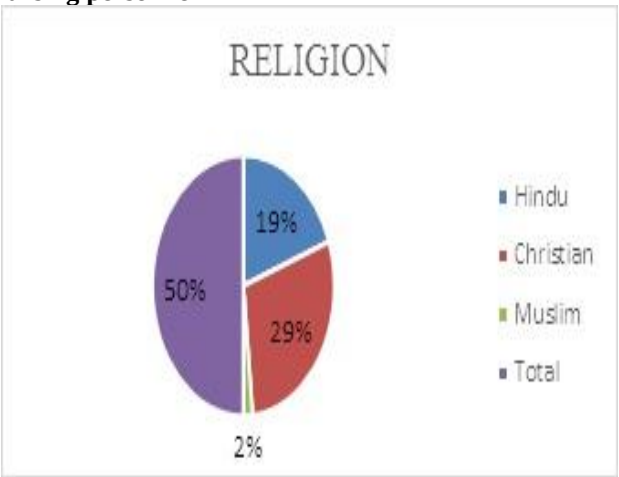

Figure 4: Working experience percentage distribution of nursing personnel

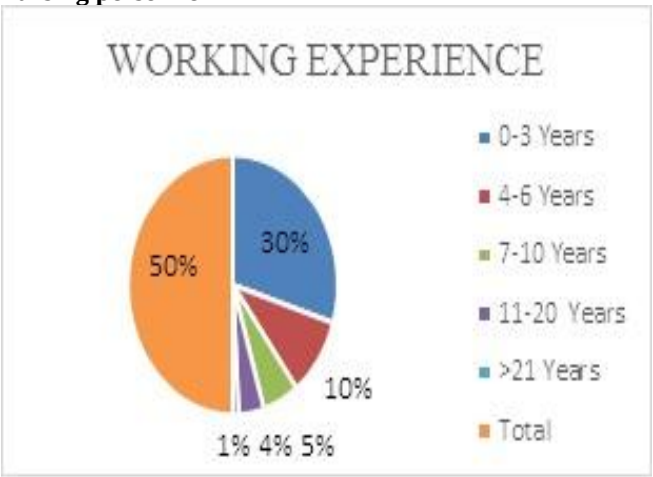

Figure 5: Awareness level of various category of Cyclone among the study respondents before and after the Educational interventions. (N:400)

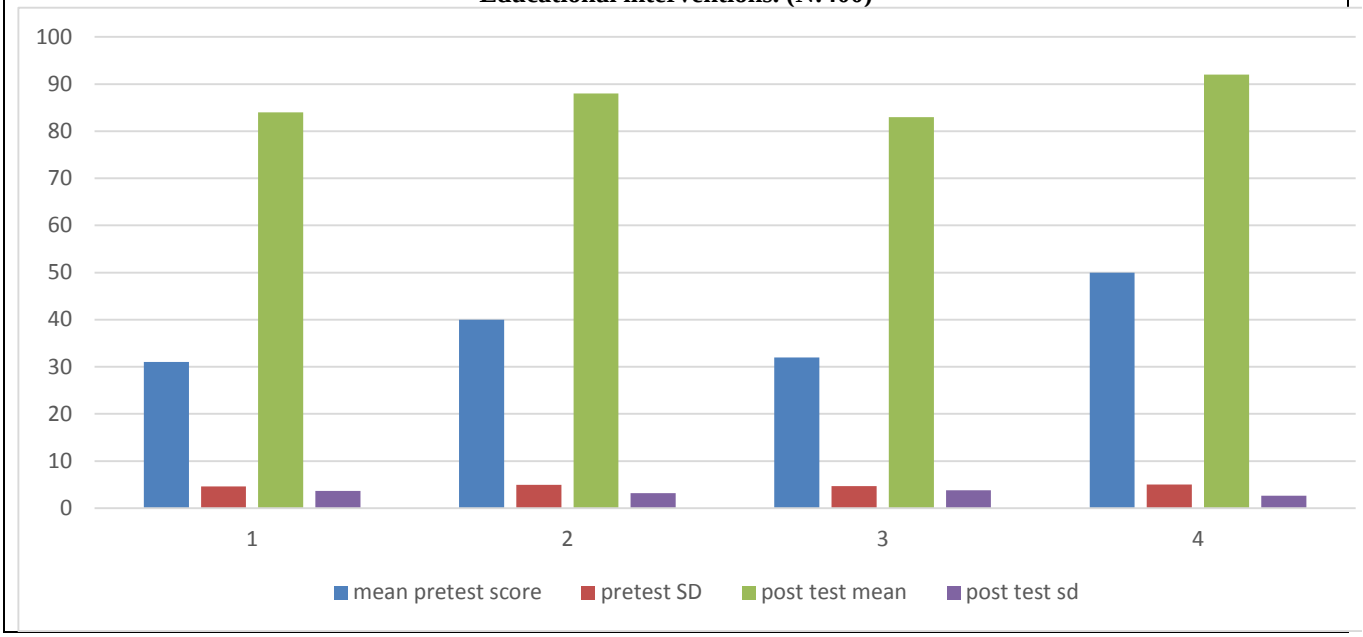

Table 1: Frequency and Percentage Distribution of Respondent regarding the Disaster Training programme Attended (N:400)

Category of Training	Responses	No.of Respondents	Percentage (%)
State	Yes	69	17.2
	No	331	82.8
District	Yes	81	20.2
	No	319	79.8
College	Yes	182	45.5
	No	218	54.5
School	Yes	155	38.8
	No	245	61.2

Table 2: Awareness level of study respondents regarding the various aspects of disaster before and after the Educational interventions. (N:400)

Disaster related characters	Pre test	Standard deviation	Post test	Standard deviation	t Value	P value
Most vulnerable continent	**56**	**4.97**	**95**	**2.18**	**14.83**	**0.001****
Percentage of H2O surface	**38**	**4.87**	**84**	**3.62**	**17.73**	**0.001****
Meaning of disaster	**53**	**5**	**93**	**2.6**	**14.67**	**0.001****
Awareness of disaster	**16**	**3.67**	**81**	**3.93**	**24.21**	**0.001****
Hazards Awareness	**23**	**4.23**	**63**	**4.84**	**12.41**	**0.001****
Common disaster in India	**54**	**4.99**	**92**	**2.75**	**14.4**	**0.001****
Disaster prone district in Kerala	**53**	**5**	**88**	**3.25**	**11.87**	**0.001****
Common disaster in Kerala	**65**	**4.77**	**50**	**5.01**	**4.79**	**0.001****
Types of natural disaster	**48**	**5**	**90**	**3.07**	**14.28**	**0.001****
Types of manmade disaster	**56**	**4.98**	**94**	**2.42**	**14.7**	**0.001****

P Value <0.001 *significant at5%**significant at 1% level

Table 3: Awareness level of study respondents regarding the flood Management before and after the educational interventions. (N:400)

Disaster related characters	Pre-test score		Post-test score		T value	P value
	Mean	Standard deviation	Mean	Standard deviation		
Types of flood	60	4.90	92	2.75	11.77	0.001**
Flash flood	48	5.00	90	3.07	14.78	0.001**
Coastal flood	46	4.99	93	2.60	16.57	0.001**
flood management	27	4.43	81	3.93	17.85	0.001**
Risk mapping	40	4.89	86	3.50	15.64	0.001**
flood proofing	25	4.35	69	4.64	14.99	0.001**
Warning system	19	3.95	69	4.64	17.34	0.001**
Flood control measures	32	4.67	92	2.79	21.31	0.001**
Adverse effects of flood	60	4.91	92	2.79	10.85	0.001**

P Value <0.001 **significant at 1% level

Table 4: Awareness level of study respondents regarding various roles of nurses during different phases of Disaster before and after the educational interventions (N: 400)

Disaster related characters	Pre test score		Post test score		t value	P value
	Mean	Standard deviation	Mean	Standard deviation		
Principals of disaster management	44	4.96	92	2.79	17.373	0.001**
Stages of disaster management	58	4.95	92	2.79	12.517	0.001**
Contributing factors of disaster management	44	4.96	90	3.04	16.49	0.001**
Response phase	36	4.8	91	2.9	20.48	0.001**
Role of the nurse in the field care	36	4.8	90	3.07	-18.87	0.001**
Components of humanitarian supplies	50	5.01	86	3.42	12.122	0.001**
Strategy to reduce disaster	54	4.99	90	3	13.01	0.001**
Medical preparedness	46	4.99	92	2.79	16.28	0.001**
Components of response phase	52	5	90	3	13.22	0.001**
Stages of recovery phase	46	4.99	87	3.37	13.85	0.001**

P Value <0.001 **significant at 1% level

Table 5: Awareness level of study respondents regarding disaster related disease before and after the Educational interventions

Characters	No.of Subjects	Pre –Test Score		Post- Test Score		T value	P Value
		Mean	Standard Deviation	Mean	Standard Deviation		
Water borne diseases	400	16.4	4.80	10.8	2.68	21.68	0.001
Crowding associated diseases	400	14.6	4.99	10.4	2.08	15.53	0.001
Vector borne diseases	400	15.0	5.01	10.4	2.08	16.99	0.001
Other associated diseases	400	16.2	4.87	10.6	2.42	20.59	0.001

P Value <0.001 ** significant at 1% level

Table 6: Association of the respondent's knowledge regarding various disaster character with the Age (N:400)

Respondents level of knowledge regarding on disaster aspects	Level of Age with respondents	No	Mean	Std.deviation	Level of significance
Aspects of disaster terms, definition types etc.	20-30 years	306	37.64	2.548	0.056^{NS}
	31-40 years	78	35.64	2.556	
	>41 years	15	43.33	3.754	
Types of flood management & control measures	20-30 years	306	39.5	2.253	0.025^{S}
	31-40 years	78	32.17	2.388	
	>41 years	15	44	2.501	
Awareness of cyclone character	20-30 years	306	19.31	1.385	0.771^{NS}
	31-40 years	78	19.48	1.404	
	>41 years	15	22	1.897	
Knowledge of nurses role during different stages of disaster	20-30	306	34.83	2.541	0.501^{NS}
	31-40 years	78	37.56	2.4	
	>41 years	16	40.66	2.016	

Table 7: Association of the respondent's knowledge regarding various disaster character with the Educational Status (N:400)

Aspects of disaster	Level of education	No	Mean	Std.Deviation	Level of significance
Aspects of disaster terms ,definition types etc	GNM	173	38.61	2.82	0.51 ^{NS}
	BSC	187	37.27	2.45	
	MSC	40	33.33	2.21	
Types of flood management & control measures	GNM	173	37.28	2.44	0.279 ^{NS}
	BSC	187	40	2.25	
	MSC	40	34.35	1.8	
Awareness of cyclone character	GNM	173	21.44	1.37	0.032*
	BSC	187	18.28	1.39	
	MSC	40	16.15	1.51	
	BSC	187	26.23	1.58	
	MSC	40	25.64	1.77	
Knowledge of nurses role during different stages of disaster	GNM	173	39.19	2.48	0.007**
	BSC	187	34.22	2.48	
	MSC	40	26.15	2.37	

P Value<0.05 *significant at5 % level. P Value<0.01 **significant at 1 % level

Table 8: Association of the respondents knowledge regarding various disaster character with the Religion

Respondents level of knowledge regarding on disaster aspects	Character	No	Mean	Std.deviation	Level of significance
Aspects of disaster terms, definition types etc.	Hindu	155	38	2.43	0.663 ^{NS}
	Christian	231	36.79	2.68	
	Muslim	14	43.07	3.01	
Types of flood management & control measures	Hindu	155	37.61	2.28	0.137 ^{NS}
	Christian	231	38.05	2.29	
	Muslim	14	50.76	2.56	
Awareness of cyclone character	Hindu	155	19.87	1.38	0.321 ^{NS}
	Christian	231	18.87	1.41	
	Muslim	14	24.61	1.56	
	Christian	231	51.55	3.34	

	Muslim	14	73.07	2.49	
Knowledge of nurses role during different stages of disaster	Hindu	155	36.71	2.21	0.582 NS
	Christian	231	34.58	2.67	
	Muslim	14	40	2.44	

P Value<0.05 *significant at5 % level. P Value<0.01 **significant at 1 % level

Table 9: Association of the respondent's knowledge regarding various disaster character with the years of experience

Respondents level of knowledge regarding on disaster aspects	Years of experience of respondents	No	Mean	Std. Deviation	Level of significance
Aspects of disaster terms ,definition types etc.	0-3	238	36.3	2.46	0.444 NS
	4-6	79	42.15	2.68	
	7-10	44	36.34	2.57	
	11-20	31	34.83	2.93	
	>21	8	42.85	4.46	
Types of flood management & control measures	0-3	238	38.99	2.29	0.259 NS
	4-6	79	41.26	2.04	
	7-10	44	34.09	2	
	11-20	41	32.58	2.78	
	>21	8	32.85	4.34	
Awareness of cyclone character	0-3	238	18.69	1.39	0.539 NS
	4-6	79	21.51	1.41	
	7-10	44	18.4	1.41	
	11-20	31	20.96	1.39	
	>21	8	21.42	1.86	
Knowledge of nurses role during different stages of disaster	0-3	238	34.28	2.38	0.123 NS
	4-6	79	39.62	2.7	
	7-10	44	30.45	2.786	
	11-20	31	4.29	2.224	
	>21	8	3.4286	2.636	

P Value<0.05 *significant at5 % level. P Value<0.01 **significant at 1 % level

DISCUSSION

This study investigated the effectiveness of Educational Intervention on Nurse's role of disaster preparedness and management among the female nurses in selected Disaster Prone district of Kerala. 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, and it is evident Educational Intervention was effective with significant p value< 0.00

This study is supported by a study conducted by Sonia. teal. to assess the Effectiveness of Structured Education and Awareness Program on Disaster Preparedness among Inhabitants of a Selected Community of New Delhi andfinding revealed statistical significant difference between mean pre-test and post-test scores. The mean post-test knowledge scores (29.87) of community inhabitants regarding disaster preparedness was higher than their mean pre-test knowledge scores (20.85) with a mean difference of 9.02 and computed 'z'-value (7.973). The education and awareness program on Disaster Preparedness developed by the researcher was found to be effective in enhancing the knowledge.[21]

Another study was done to determine KAP of emergency nurse and community health nurse towards disaster management, 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.[8]

General characteristics of the study subjects

Figure 1-4 shows the important demography variable profile of respondents, out of 400 subjects regarding the educational qualification of respondent's

majority of them were 188(47.0%) were BSc Nurses, 173(43.2%) have done General Nursing and midwifery and 39(9.8%) were MSc nurses. Jamison et al states that**.** educated individuals might have more awareness of risks because they are likely to have greater access to information sources and be better able to evaluate the risk information [22]

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. This is similar to study done by Chan (2005) showed that nurses who were young (26-30 years) had lower levels of knowledge than older adults (31-40 years) in clinical management systems. [23] This finding could be linked with the higher skills through years of experience among older nurses**.**

In respect to religion aspect of the present study majority were Christian 231(57.8%), because in India the Christian Missionaries started Nursing and as service to the humanity so the Christian young girls were enrolled to do nursing, whereas Hindus considered as a menial Job. Nearly 156(39%) were Hindus and very few were 13(3.2%) Muslims. Most of the respondents have 238(59.5%) experience between 0-3 years, 79(19.8%) have 4-6 years' experience, 45(11.2%) had 7-10 years' experience, 31(7.8%) had 11-20 years of experience and very few had work experience 7(1.8%) greater than 21 years. This study is supported by Lindell etal. States that there exist a relationship between duration of work experience and level of performance in nursing clinical practice).An individual's previous experience with a hazardous event can heighten perception of risk and promote preparedness [24].

Frequency and Percentage Distribution of Disaster Training

Table 1 describes **regarding the Disaster Training programme attended** by study the subject's at the various level, at the district level majority of the subjects 319(79.8%) didn't attend the training whereas only 81(20.2%) had participated, at the college level 218(54.5%) had not participated and nearly 182(45.5%)have attended the training session. In school level, majority of the respondents 245(61.2%) have not participated but only155 (38.8%) had participated in the disaster training programme. This indicates that Institution are not organizing regular Training programme for the staff and not equipping them with adequate knowledge, necessary skills regarding Disaster Mitigation, preparedness to save lives and also to serve as ready Manpower at the time of disaster in preserving the livelihood. There is also evidence that education increases the acquisition of general knowledge that could influence values, priorities, capacity to plan for the future, and ability to appropriately allocate available resources [25]

Awareness level of various category of disaster among the study respondent before and after the Educational interventions

The table2 illustrates regarding the familiarity of the Respondents regarding various aspects of the disaster terms, definition, types, and about the disaster prone district in Kerala. It shows generally low awareness regarding 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.($p<0.001$).Even though being the Nursing personnel majority of them were not aware of the definition of disaster .comparing with the post-test mean score there was increase in the knowledge level of 81%, standard deviation 3.93 there was a high variation in the score after the Interventional programme with the significant p value of <0.001.The present study findings have revealed statistical significant improvement in posttest phases after the educational interventional programmes using different method of teaching and the application of the guidance booklet. This study is supported by Faupel, C.E., and S.P. Styles those disaster education interventions can be influential in raising awareness and knowledge of disasters, which in turn can enhance disaster preparedness actions [26].

Awareness of respondent about flood and cyclone before and after the Educational interventions

The table 3 and Figure5 reveals respondent awareness of pre-test mean score with standard deviation regarding the types of flood, flash flood, coastalflood,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, Risk mapping, flood proofing method, flood control measures the pre-test mean score with the Standard deviation was only 27% (4.43), 40%(4.89), 25%(4.39), 32%(4.67)comparing to the post-test mean score, standard deviation was 81%, (2.60),86% (3.5), 69% (3.5),60% (4.92). It is evident that there was significantly higher knowledge score in the post test with p value level (0.001).Figure5 reveals that there was significantly high mean score with the standard deviation regarding awareness of Cyclone during the post-test after the Educational interventions programme This is similar to a study conducted to evaluate the effectiveness of a structured teaching on disaster management among 40 rural school teachers. Majority (72.5%) had inadequate 27.5%, had moderate knowledge on disaster management teaching increased to moderate knowledge (60%) and

adequate knowledge (35%) with regard to knowledge on disaster management in the post test. The structured teaching programme regarding disaster management was founded very effective [27]

Roles of the nursing personnel related to Disaster Preparedness and Management before and after the Educational interventions

Out of 400 respondents the pre - test mean score, SD, regarding the principles, various stages of disaster and contributing factors of disaster management were 44(4.96), 58[4.95], 44[4.96], While in the post-test it was remarkably high 92[2.79], 92[2.79], 90[3.04]. The pre-test mean score, SD about the nurse's role in response phase, role in field care, and awareness of the humanitarian supplies were 36[4.80], 36[4.80],50[5.01] respectively which was relatively high and significant with p value 0.001 in the post test scores of91[2.90], 90[3.07], 86[3.42]. The pre - test mean score, SD, of medical preparedness, components of response phase, stages of recovery phase of disaster were 54[4.99], 46[4.99],52[5], 46[4.99] whereas the post test scores were90[3], 90[2.79],90[3], 87[3.37] and the increased knowledge level score indicates the effectiveness of Educational Interventional programme with significant p value level (0.001). Numerous studies have mentioned the need for education and training regarding the nurse's own field to care for patients during disaster events that are rarely encountered in the usual practice and countries that have experienced disasters such as the United States and India recognized the severity of the problem and organized discussions and workshops regarding nurse education [28]

This study finding are also in agreement with an 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.

Awareness regarding common disease during disaster before and after the Educational Interventions

This table reveals that the educational Interventional strategy on Disaster related disease among the Nursing personnel was effective indicating that the difference from pre-test to post-test mean score, standard deviation regarding theWater borne diseases,Crowding associated diseases, Vector borne diseases, Other associated diseases ,and Disease associated with dead bodiesfollowing disaster, reveals that the pre – test level of values were 16.4(4.80) 14.6 (4.99) 15.0 (5.01) 16.2 (4.87) 15.5 (4.98) low comparing to posttest knowledge scores of 10.8 (2.68) 10.4 (2.08) 10.4 (2.08) 10.6 (2.42) 10.5 (2.23)respectively, shows a significant p value 0.001.

Beyond damaging and destroying physical infrastructure, natural disasters can lead to outbreaks of infectious disease. Hydro-meteorological disasters, like floods, are the most common (40 percent) natural disasters worldwide and are widely documented. Flooding also is usually followed by the proliferation of mosquitoes, resulting in an insurgence of mosquito-borne diseases such as malaria. Geophysical disasters like earthquakes leads to outbreaks of infectious diseases reported due to displacement into unplanned and overcrowded shelters, with limited access to food and safe water**.** [29]An outbreak of diarrhoeal disease post flooding in Bangladesh in 2004 involved more than 17 000 cases, with the isolation of Vibrio cholera (O1 Ogawa and O1 Inaba) and enterotoxigenicEscherichiacoliA large (>16 000 cases) cholera epidemic (O1 Ogawa) in West Bengal in 1998 was attributed to preceding floods and floods in Mozambique in January–March 2000 led to an increase in the incidence of diarrhoea [30.]

Vector-borne diseases

The risk of vector-borne disease outbreaks can be influenced by other complicating factors, such as changes in human behaviour (increased exposure to mosquitoes while sleeping outside, movement from non-endemic to endemic areas, a pause in disease control activities, overcrowding), or changes in the habitat which promote mosquito breeding (landslide deforestation, river damming and re-routing). [31]

Nursing interventions and management of vector-borne illnesses are also important in the aftermath of disasters when waters become stagnant or gastrointestinal disease becomes prevalent due to unsanitary or over-crowded conditions that result from lack of electricity and/or plumbing[32]. Advanced planning and mitigation are crucial for all countries and at all levels of government. It is especially imperative for healthcare providers to have a thorough knowledge of what lies ahead to take decisive action for training and mock-drills [33]

Association of the demographic variable with the disaster aspects

Table No 6-9 describes about the association of the demographic variable of Age, Education Religion and Years of experience of the study at 0.05 and 0.01 level of significant

Table No 6 depicts there is a significant association of the knowledge regarding nurse's role during different stages of disaster 0.007 ($p<0.01$ level) and significant association of flood management and control measure with age 0.025at (p value<0.0 5).

Table No 7 revels there is a significant association of the knowledge regarding nurse's role during different stages of disaster with the education at

0.007 ($p<0.01$ level and also there is a significant association of flood management and control measure 0.025at p value<0.05with the Educational status Table No 8&9 shows there was no significant association of knowledge regarding various aspects of disaster include flood, cyclone, role of nurses in different phases of disaster management and prevention, and about the disaster related disease with the demographic variable of the religion, years of experience at $p<0.05$ level

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 **is** mandate for understanding both individual care and mass patient care [34].

IMPLICATIONS OF STUDY

The findings of the study have implications in various field of nursing Practice, nursing research, nursing education and nursing administration.

Nursing administration

- Nurse Administrator should motivate the in-service education and Continuing education in the School, College of nursing, hospital and community settings to promote and to equip the nursing personnel, with adequate knowledge, necessary skills regarding Disaster Mitigation, preparedness, management to save lives and also to serve as ready Manpower at the time of disaster in preserving the livelihood.
- No disaster plan was available in School, College of nursing and hospital.Therefore authorities should take initiative, to sensitize the Nursing personnel and students regarding disaster preparedness and management. It is therefore strongly recommended that each Institution to have their own disaster management plan (SDMP).

Nursing education

- Allotment of more theory and practice hours for the curriculum of Nurse will improve the competency of the nurses.
- The result of this study can be considered as a performance appraisal of the nursing personnel and according to that in - service education can be planned to all schools, college, specialty hospitals and in the community to improve the knowledge of health personnel and general public regarding disaster management

Area for further research

- In this study, it was found that there is low level of knowledge among nurses regarding various types of disaster, role of nurses in prevention, and management of disaster with regional disproportionality. Therefore, disaster education activities remain a phenomenon. More researches are needed in this area
- Similar study can be conducted among nursing students in the school and college and also among general public.
- Similar study can be undertaken as comparative study between the nurses working in Private and Government sector
- Similar study can be conducted by using advanced technology like simulation, online learning, virtual classrooms, etc.

CONCULSION

From the present study findings it was evident that the highest percentage of the Female Nurse's pre-test mean score, standard deviation had poor knowledge regarding the various aspects of disaster, role of nurses on disaster preparedness and managementbefore the educational interventional programmesand in the follow-up phases after implementation of the educational intervention using different method of teaching and application of the Disaster guidance booklet the post-test mean score, standard deviation was found highly significant the increase in the knowledge level indicates the effectiveness of Interventional programme with significant p value level (0.001).This study plays an important role of the nurse regarding prevention and management of various disasters. This study has not only improved the knowledge of the nurses it could be considered as a part of continuing professional development in all aspects.

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