



Original Article

Awareness on earthquake preparedness: A key to safe life

Abstract:

Introduction: Earthquake is one of the most dangerous natural disasters which lead to loss of life and property. As Nepal lies in the earthquake belt, it is essential to know how to save the lives and properties during earthquake. So providing awareness on earthquake and preparedness before, during and after earthquake is one of most important strategies to improve the quality of life in Nepal.

Objectives: To assess the knowledge and practice of adults regarding earthquake and its preparedness, to find the association between the knowledge score and the selected variables, to find the relationship between the knowledge and practice on earthquake preparedness.

Methods and Materials: A cross sectional descriptive study conducted among 300 adults of Sulk-Gandaki municipality, ward no-2, Dulegauda-Tanahun District, Nepal. Non-probability purposive sampling technique was used to collect the data. The data was collected by using a semi-structured questionnaire with interview technique from house to house.

Results: Regarding knowledge maximum 58% of the respondents had adequate knowledge and 42% had inadequate knowledge on earthquake preparedness. Regarding practice maximum 55% of the respondents had inadequate and 45% had adequate practice on earthquake preparedness. There was no significant association between the knowledge score and selected variables like age, sex, marital status and education. There was significant relationship between the knowledge score and practice score ($p = 0.01$)

Conclusion: The study was conducted to find out the knowledge level of adults about earthquake, and practice about earthquake preparedness. The study findings revealed that only more than half of the adults had adequate knowledge on earthquake & less than half had adequate practice on earthquake preparedness which shows that there is general lack of information about earthquake and its preparedness. As a part of the study a leaflet was distributed among the adults as an awareness regarding safety measures during earthquake that will increase their knowledge and can protect themselves from the hazards and can save their lives during earthquake.

Key Words: Awareness, earthquake, preparedness, Cross sectional study, Nepal,

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Introduction

Nepal is a small and land locked country in South Asia. It is situated between the two large and densely populated countries of Asia - China in the North and India in the South, East and West with an area of 147, 181 sq. kms. The Himalayas is one of the youngest and active mountain ranges in the world. It ranges from Afghanistan in the west to Myanmar in the east. The constant pushing of Indian plate towards the Eurasian plate has made the region seismically active. Mt. Everest the highest peak in the world with an altitude of 8,848 meters lies in Nepal. Nepal is a hotspot for geophysical and climatic hazards. The country is relatively ranked very high in terms of vulnerability to natural calamities. Preparedness plays a very significant role in creating

the seismic safety and thereby contributes to move forward to the path of peace, progress and prosperity. The 7.8 magnitude earthquake that struck Nepal on 25th April 2015 killed about 9,000 people, and left many thousands more injured and homeless. It occurred in a geological collision zone, where the Indian tectonic plate pushes north into the Eurasian plate, moving the ground an average of 2cm a year. Over decades, stress built up along a stretch of the fault line, which is called the Main Himalayan Thrust fault, close to Nepal's capital Kathmandu. The boundary between the two plates in this area had become locked - stuck together by friction and so immobile - building up energy that only a major earthquake could release. However, the quake on 25 April only released part of this

pent-up pressure. New data has revealed that the devastating quake that hit Nepal in April did not release all of the stress that had built up underground, and has pushed some of it westwards, (Published in Journals Nature Geoscience and Science). There is an increased risk of a future major earthquake in an area that straddles the west of Nepal and India, scientists warn. A major earthquake there is already long overdue: the last happened in 1505 and is estimated to have exceeded M8.5.¹

The main problem with Nepal is imparting knowledge to the common people. "Scientists must assess and effectively communicate their knowledge about earthquakes. Public officials must admit their mistakes and learn from them," said an expert. The public are generally poor judges of their own safety. They think they are safe until a disaster occurs. More public awareness of the need to prepare for disasters is needed. There is the need to make annual earthquake drills to sensitize the people. Following the earthquake of 1988, seismology related technology has improved in Nepal and certain precautionary methods have also been taken. The government has disaster contingency plans and programs. Based on the seismic records of the number of earthquakes that occurred since 1255, earthquakes of magnitude greater than 8 occurred on average once every 80 years. The last great earthquake of magnitude 8.3 occurred in 1934. With support from development partners, Nepal has already formulated a number of programs. But problems may remain over the quality of data and research. "We need to improve the research and quality of data to prepare for Disaster Risk Reduction."²

A study conducted to determine the state of awareness and level of preparedness in the communities located in the Kathmandu valley as well as finding out ways for awareness-raising on the seismic safety. The study was conducted between September 2007 and April 2008. The data was collected using the household survey from 430 respondents. A questionnaire was used to conduct face-to-face interviews. The result shows that the variables such as experience of an earthquake and concern for the future damage significantly influenced the preparedness among the respondents in the study area.³

A community based survey study conducted to assess the levels of awareness on Disaster Preparedness and promote community disaster reduction education among the residents of the Rajiv Gandhi community at Itanagar, India. The study was conducted from September 2010 to May 2011 and the data was collected through a common questionnaire (structured) from

the various community of the university campus, and then develop suggestion and measures for addressing those problems through in-depth discussions. The result of the study showed that disaster awareness among the community varies with the educational background, origin and age and the level can be strengthened through a combination of appropriate community based disaster preparedness, information technology and collaborative relationships between government, Non Government Organizations and community-based organizations.⁴

With the above background, this study was conducted to assess the knowledge practice regarding earthquake among adults; to find the association between the knowledge score and the selected variables and to find the correlation between the knowledge score and practice score on earthquake preparedness.

Conceptual framework

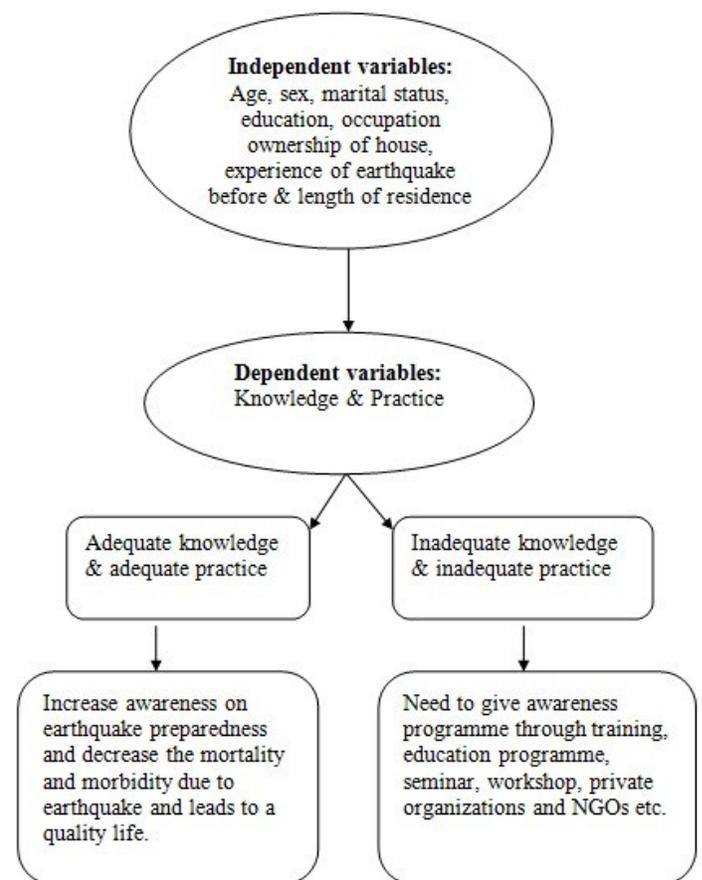


Fig. 1: Conceptual framework on earthquake preparedness
(based on other study findings)

Material and Methods

A cross-sectional descriptive study conducted among 300 adults above 20 years of age in Sulka-Gandaki Municipality, Ward no-2, Dulegauda-Tanahu District, Nepal in the month of May 2015. The tools used in the study were demographic Proforma, Knowledge questionnaire on earthquake, and Practice questionnaire on earthquake preparedness. The data was collected by using a semi-structured questionnaire with interview technique from house to house. The data obtained was analyzed using SPSS-Package (version 16.0).

Result

Out of 300 adults, majority 202(67.3%) were between the age of 20-40 years, 170 (56.7%) were female. Majority 256 (85.3%) were married, 106(35.3 %) were under high school level, 111 (37%) were housewife. Majority 245 (81.7%) of the adults were home ownership, majority 294 (98%) had experience earthquake before and 120 (40%) of the adults had their length of residence for 3-10 yrs.

Table 1: Range, Minimum, Maximum, Mean, Mean %, Median and Standard Deviation of knowledge scores. N=300

	Range	Min. Score	Max. Score	Mean	Mean %	Median	SD
Knowledge	9	4	12	8.84	73.66	9	±1.65

The data in table 2 shows that mean knowledge score was 8.84 (± 1.65).

Fig.2 Bar diagram regarding knowledge score

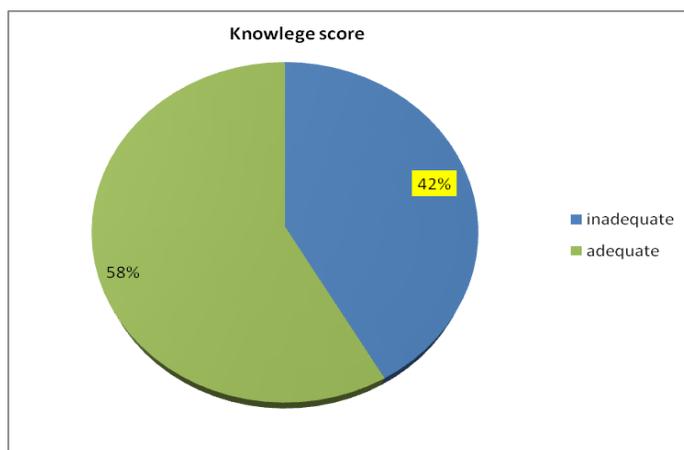


Fig.2 represents that maximum 58% of the adults had adequate knowledge and 42% had inadequate knowledge regarding earthquake.

Table 2: Frequency and percentage of practice on earthquake preparedness:

Table 2 (I) - Before earthquake:

N = 300

Characteristics of practice	Yes	%	No	%
1.Preparation of emergency supply kit	47	15.7	253	84.3
2. Storing of breakable items, harmful chemicals and flammable materials securely in the lowermost shelves.	164	54.7	136	45.3
3.Consulting engineers before constructing house	85	28.3	215	71.7
4.Geological study before building house	39	13	261	87
5.Discuss about natural disaster at home any time	203	67.7	97	32.3
6. Any information about earthquake from the Government	137	45.7	163	54.3
7. Having house earthquake insurance?	18	6	281	93.7

Data presented in Table 2 (I) shows that regarding practice on preparedness before earthquake, out of 300 participants majority (84.3%) had not prepared emergency supply kit, 54.7% stored breakable, harmful chemicals and flammable objects in the lowermost shelves. Approximately seventy seven percent did not concern engineers before constructing house/building, 87% had not done geological study prior to house construction, but 67.7% had discuss about natural disaster at home any time. Majority (54.3%) had no information about occurrence of earthquake from the Government and 93.7% did not have house earthquake insurance.

Table 2 (II) - During earthquake (if inside a building/house): N = 300

Characteristics of practice	Yes	%	No	%
8. Remain calm during earthquake	94	31.3	205	68.3
9. Go outside if there is earthquake immediately	255	85	45	15
10. Remain where they were	117	39	183	61
11. Open the door for exit	254	84.7	46	15.3
12. Take cover under heavy desk/table for safety	110	36.7	190	63.3
13. Stay away from glass and windows	259	86.3	41	13.7
14. Cover face and head	116	38.7	184	61.3
15. Alert and keep eyes open	279	93	21	7
16.Shut down electricity, gas and water at main fuse box/valve	157	52.3	143	47.7
17.Know what number to call in an emergency	13	4.3	287	95.7

The data presented in Table 2 (II) shows that regarding practice during earthquake while they were inside building or house. Majority (68.3%) of the participants were not calm during earthquake but 85% had gone outside immediately from the house. During earthquake 61% had not stayed where they were, 84.7% had opened the door for exit, 63.3% had not taken shelter under desk or table for safety, 86.3% had stayed away from glass and windows. 61.3% even had not covered face and head, 93% were alert and kept eyes open. 52.3% did not shut down electricity, gas and water at main fuse box/valve. Though earthquake is prevalent in Nepal still 95.7% did not know the number to call in emergency.

Table 2 (III)- During earthquake (if outside): N = 300

Characteristics of practice	Yes	%	No	%
18. Move to an open area.	275	91.7	25	8.3
19. Stay away from trees, power line posts and buildings	214	71.3	86	28.7
20. Stop and get out if they are in a moving vehicle	189	63	111	37
21. If driving, pull over the side of the road and stay in the vehicle until the shaking stops.	227	75.7	73	24.3

The data presented in Table 2 (III) shows that regarding practice during earthquake while they were outside, majority (91.7%) of the participants had moved to an open area, 71.3% had stayed away from trees, power line, posts and buildings. In case of driving during earthquake, 63% had stopped and got out if they were in a moving vehicle, 75.7% had pulled over the side of the road and stayed in the vehicle until the shaking stops while they were driving.

Table 2 (IV)- After earthquake: N = 300

Characteristics of practice	Yes	%	No	%
22. Help those around you if you expect after shocks	225	75	75	25
23. Check themselves and nearby people for injury and provide first aid	227	75.7	73	24.3
24. Report injuries or fires to the emergency services	106	35.3	194	64.7
25. Turn on radio and TV for emergency instructions and conveying important messages	292	97.3	8	2.7

The data presented in Table 2(IV) shows that regarding practice of the participants after earthquake, majority (75%) helped those around them if they expect aftershocks, 75.7% checked themselves and nearby people for injury and provided first aid. Among them 64.7% did not report injuries or fires to the emergency services, and majority (97.3%) did turn on radio and TV for emergency instructions and conveying important messages.

Table 3: Range, Minimum, Maximum, Mean, Mean %, Median and Standard Deviation of practice scores on earthquake preparedness. N=300

	Range	Min. Score	Max. Score	Mean	Mean %	Median	SD
Practice	19	5	24	14.07	56.28	14	±3.13

The data in table 3 shows that mean practice score was 14.07 (±3.13).

Fig.2 Bar diagram regarding practice score on earthquake preparedness

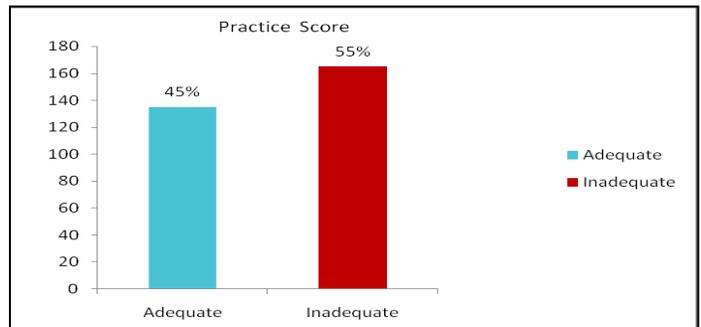


Fig.2 Represents that maximum 55% of the adults had inadequate practice and 45% had adequate practice regarding earthquake preparedness.

Table 4: Chi square values computed between the knowledge score and selected variables N=300

Selected variables	Inadequate knowledge (<8.4)	Adequate knowledge (≥8.4)	df	χ ²	Re-remarks
Age:					
20-40 yrs	78	124	1	2.36	NS
41 yrs & above	47	51			
Sex:					
Male	56	74	1	0.19	NS
Female	69	101			
Marital status:					
Married	109	147	1	2.67	NS
Unmarried	16	28			
Education:					
Illiterate	37	44	1	0.73	NS
Literate	88	131			

χ² (1) = 3.84, χ² (2) = 5.99, p= 0.05: NS = Not significant

The data presented in the table 4 shows that there is no significant association between the knowledge score and selected variables like age, sex, marital status and education.

Table 5: Correlation between knowledge score and practice score

Test of significance	r value	p value
Pearson Correlation	0.192	0.002**

P=0.01, **= significant

Data in Table 5 shows that there is significant relationship between the knowledge score and practice score.

Discussion

A cross-sectional study conducted in Tehran city among 1195 Tehran's residents in 2009 to assess the preparedness of people and find the related earthquake risk factors. The study showed that 1076 (90.0%), 1160 (97.1%), and 490 (41.0%) of the participants achieved half of the possible scores for the knowledge, attitude, and practice components, respectively which supports the present study findings of low scores of knowledge(58%) and practice(45% respectively. Furthermore, the study revealed that for low knowledge having a high-school (p=0.033) or lower education (p<0.001) lack of previous experience (p<0.001), being housewife (p=0.002) were identified as risk factors for taking precautionary measures against earthquake which contradicts the present finding as 106(35.3 %) were under high school level, majority 294 (98%) had experience earthquake before and 111 (37%) were housewife.^{5,6}

The present study finding shows that only 58% of the respondents had adequate knowledge about the earthquake preparedness which is supported by a study conducted in MP India to assess the current level of knowledge about disaster preparedness and mitigation among 375 undergraduate medical students. The study revealed that undergraduate medical students have little knowledge about disasters and disaster preparedness.

An exploratory study conducted to assess knowledge and self-expressed practices regarding disaster management among 540 secondary school teachers at selected schools of Pune city India. The study revealed that only 7.22% teachers had good score the mean knowledge score was 15.9 (53%) and mean practice score was 7.05 (47%) which shows there is gross deficiency in knowledge and practices of teachers regarding

disaster management. This study supported the present study findings as only 58% of the respondents had adequate knowledge, the mean score was 8.84(73.66%) and only 45% had adequate practice, the mean score was 14.07(56.28%) regarding earthquake preparedness. There was moderate positive correlation between knowledge score and practice score (r = 0.54) whereas there was significant correlation between the knowledge and practice score(r= 0.192) in the present study.⁷

Conclusions

The study concluded that the knowledge and practice of the adults regarding earthquake preparedness were low as there was no information and awareness programme from private organization and the Govt. agencies. So it is the time to give the effective awareness programmes about earthquake to the public and community of the nation so that the people can take precaution and prevent from the hazards due to earthquake which will safe their life and increase the quality of life.

Recommendation

1. A similar study can be conducted on a larger population so as to make the generalization of the findings a possibility.
2. Interventional studies can be conducted in different community setting to increase the awareness.
3. Similar studies can be organized in different districts of Nepal that are more vulnerable for earthquake.

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Ethical clearance

Prior permission was obtained from the chief officer of Sulka-Gandaki Municipality, Dulegauda, Tanahu and verbal inform consent from the participants was taken.

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