

# Public Awareness on Earthquake: A study on a Residential Area under Sylhet City of Bangladesh

Mufti Nadimul Quamar Ahmed

**Abstract** — Major purpose of this study was to investigate how much local people of a residential area under Sylhet City Corporation (SCC) are aware about earthquake. This research also tried to know earthquake knowledge of the respondents and their perceptions about the role of GOVT, SCC, and NGO's regarding building awareness among them. Sample size in this research was 89 among them 66.3% were male and 33.7% were female. This research was descriptive in nature and a self administered questionnaire survey was the method of collecting data. 5 point likert scale ranging from strongly agree to strongly disagree was used to know the perception of the respondents. It is found in this research that, majority of the respondents (57.52%) had medium awareness compared to high awareness (23.81%) and low awareness (18.67%). Most proportion of the respondents had medium knowledge about earthquake (65.17%). 22.47% respondents had high knowledge and 12.36% respondents had low knowledge. Large proportion of the respondents replied that, they did not noticed any types of awareness building activities from Sylhet City Corporation (SCC), Sylhet district administration, Fire service authority even from any NGO's at their area. Though Sylhet is the most risky region for earthquake in Bangladesh therefore, this study recommends that our government should have to take some steps such as, arranging different training programme on how to save from the affects of an earthquake, maintaining strictly the building code, providing poster, leaflet to the mass people to create public awareness for minimizing the damages of an earthquake etc.

**Keywords** — Earthquake, Awareness, Perception, Residential area, SCC, NGO

## 1 INTRODUCTION

**B**ANGLADESH has an area of about 1,47,570 square kilometers (56,977 square miles) and it is the 8<sup>th</sup> most populous country in this world. Geographically, the country is situated at the periphery of the Indian and European plaits. Over the last thirty years, Bangladesh has experienced nearly 200 climate-related disasters accounted for around \$16 billion economic losses including complete damage of asset, property, livelihoods and over thousands of death toll [1]. There are different reasons like; geographical location, land characteristics, multiplicity of rivers etc. that makes Bangladesh one of the most vulnerable country to natural disasters. Every year Bangladesh has to face many natural disasters like floods, cyclones, storm surges, droughts, tornados, riverbank erosions, earthquakes etc. When natural events adversely affects the livelihood, shelter of human beings as well as affects on the whole environment then these natural events will call disasters. On average Bangladesh is affected by the cyclones 16

times in a decade which are originated from the Bay of Bengal [2].

According to Bangladesh National Building Code (BNBC, 1993) [3], the country is divided into three seismic zones and the most severe zone including north and northeastern area of Bangladesh. Sylhet is in danger zone according to BNBC [3].

Earthquake is one of the most catastrophic natural phenomenon since the beginning of this world. Human being is almost helpless facing this hazard because, no one predicts when it does happens. In any country both the rural as well as urban area can be affected by a medium or large earthquake. A strong earthquake not only destroy lives of millions people, it also might change the geography of a region. On September 7, 2017 an earthquake strikes at southern Mexico had a preliminary magnitude of 8.1 and depth of 69.7 kilometers (43 miles). It has killed at least 61 people in Mexico, all of them in the southern part of the country that was closer to the quake's epicenter off the Pacific Coast.

Bangladesh, a south Asian country, covers one of the largest deltas. It had experienced several major earthquakes during the last 100 years and has been affected by small and medium earthquakes occasionally. The major part of Bangladesh is occupied by one of the largest delta of the world formed by the

• Author name is **Mufti Nadimul Quamar Ahmed**. He is currently pursuing masters degree program (Research) in Department of Sociology in Shahjalal University of science and technology (SUST), Sylhet, Bangladesh. E-mail: [muftinadim.sust@gmail.com](mailto:muftinadim.sust@gmail.com)

Ganges-Brahmaputra-Meghna river system [4].

Choudhury, J.R. (1993), in his study showed the major earthquakes that affected in Bangladesh. He also presented different natural disasters that occurred in Bangladesh in different times. Moreover, he showed different maps which indicate seismic zone, seism tectonic, isoseismics etc [5].

A.Hossain (1998) mentioned in his study that north-eastern cities of Bangladesh are more vulnerable to earthquake hazards compared to the central, eastern, southern and western cities. *Mymensingh, Kishorgonj and Sylhet* are the most vulnerable cities in the northeast [6].

Poortaheri et al. (2011) in their study used both qualitative and quantitative methods to evaluate the most important factors of earthquake risk management, such as education, awareness, knowledge, skill, institutional capability and resilience, in Qazvin Township. Results of their study show that, all of the key factors of risk management are poor [7].

Strand and Borchgrevink (2006) found in their research that, as a result of the massive earthquake that struck northern parts of Pakistan and India on 8 October 2005, more than 75 000 lives were lost, and approximately 100,000 people were severely injured and 2.8 million were left without shelter [8].

Shanshan Ye et al. (2011) mentioned in their study that, the Wenchuan earthquake that occurred on May 12, 2008 was the biggest after the 1976 Tangshan earthquake in China. The result of that earthquake affects the whole nation as well as it affects on the world. The researchers discussed impacts of the earthquake and disaster damage characteristics of earthquake-stricken area based on their field survey and from mass media analysis. This article estimates the direct and indirect economic loss due to the Wenchuan earthquake based on some model [9].

Khan et al. (2001) also showed severe earthquake and increased probability of earthquakes the risk of loss of life and damages to property in Bangladesh would be quite high. [10].

## 2 METHODOLOGY

Descriptive research design was followed in this study. Based on the research objectives, quantitative method has been followed to conduct this study. As of BBS (2011) Sylhet City Corporation occupies a total area of 26.5 sq km. It has 27 wards and together with 207 Areas known as Mahallahs [11]. Ward No.7 of Sylhet City Corporation is divided by 7 areas. These are; i) *Bon Kolapara*, ii) *Fazil Chist*, iii) *Jalalabad*, iv) *Kolapara*, v) *Pir Mahallah*, vi) *Saif Ali Khan Road* and vii) *Subid Bazar*. This research was conducted in *Jalalabad* residential area under 7 No. Ward of Sylhet City Corporation. According to Bangladesh Bureau of Statistics (BBS, 2011) and local councilor office, total number of household in my study area is 1136 [11]. All the households in *Jalalabad* residential area were considered as

the population of this study. Therefore, total population of this study was 1136. Household head from each sample households were the respondent in this study. By using sampling size formula of Nurul Islam (2011) [12], 89 households were selected as the samples of this study. Survey was the method that has been followed to collect quantitative data throughout the research. In case of survey method, standard questionnaire was provided to the respondents where maximum questions were close ended in form. Questions were formed in easy & understandable way so that, the respondents can easily provide their answer. If any respondent feel problems or confusions to understand any question, the researcher repeated that question & make it clear to them. 5 point Likert scales ranging from strongly disagree to strongly agree were used to assess the perceptions of the respondents regarding the role of GOVT, SCC and NGO's to make people aware against earthquake hazard. Respondents were requested to indicate their level of agreement or disagreement to that particular statement. A value was assigned for every reaction for example 5 for strongly agree, 4 for agree, 3 for neutral, 2 for disagree and 1 for strongly disagree. Quantitative techniques like percentage, frequency etc. presented by graphs and tables were used to discuss the major findings.

## 3 RESULTS

### 3.1 Socio-Demographic Backgrounds of the Respondents

Table1: Socio-demographic characteristics of the respondents

Characteristics	%
<b>Gender</b>	
Male	66.3
Female	33.7
<b>Age Group</b>	
Young Age (18-36)	64.0
Middle Age (37-55)	18.0
Elderly (56+)	18.0
<b>Education</b>	
No Years of Schooling	2.24
1-5 Years	12.36
6-10 Years	34.83
11-12 Years	23.60
13-16 Years	26.97
<b>Family Size</b>	
2-4	19.1
5-6	58.4
More than 6	22.5

Source: Field Survey (2016)

Source

The above table 1 shows that 66.3% of the respondents were male and 33.7% of the respondents were female. Most proportion of the respondent belonged to young age group (64%). Middle aged and old age group consist of 18% respondents respectively. Actual year of schooling was taken as education score of a respondent. A respondent who could not read and write was given a score zero. A score of 1 was given for each year of formal schooling he/she completed in any formal educational institution. The education scores of the respondents ranged from 0 to 16. It is found that, the average year of schooling was 10.67 with the standard deviation of 3.87. According to the above table 1, majority of the respondents (34.83%) had 6-10 years of schooling, 2.24% of the respondents had no formal education. Moreover, 12.36% had 1-5 years of schooling, 23.6% had 11-12 years of schooling, and 26.97% of the respondents had highest years of schooling which is 13-16 years. Table 1 also depicts that, 58.4% respondents have 5-6 members in their family, 22.5% have more than 6 members and 19.1% have 2-4 members in their family.

### 3.2 Earthquake Knowledge of the respondents

Table 2: Knowledge about Earthquake of the respondents

Statements	Yes (%)	No (%)
Know that Sylhet is the most risky region for earthquake	95.5	4.50
Experience of facing earthquake	95.5	4.50
Notice any type of awareness programme regarding earthquake telecast in TV	74.2	25.8
Notice any awareness programme regarding earthquake in newspaper	61.8	38.2
Try to know what to do before, during and after an earthquake	79.8	20.2
Know that earthquake can be measured	80.9	19.1
Notice any earthquake awareness activities from sylhet city corporation	36.0	64.0
Receive any leaflets or posters from the Sylhet district administration office which highlights the direction about what to do during and after an earthquake	39.3	60.7
Watch any activities regarding what to do during and after earthquake from the fire service authority	31.5	68.5
Notice any awareness programme's initiated by any NGO's on earthquake at your area	21.3	78.7

Source: Field Survey (2016)

Table 2 shows that, 95.5% respondents said they know Sylhet is the most risky region for earthquake in Bangladesh and

similar percentage have experience of facing earthquake. While, only 4.5% respondents have no prior knowledge regarding this issue and the proportion is similar to those who have no experience of facing earthquake. 74.2% and 61.8% respondents have noticed any type of awareness programme regarding earthquake telecast on TV and newspaper respectively. Most proportion of the respondents (79.8%) said that they Try to know what to do before, during and after an earthquake. 80.9% know that earthquake can be measured while, it is unknown to 19.1% respondents. Table 2 also depicts that, most proportion of the respondents (64%) said they did not notice any types of earthquake awareness activities from sylhet city corporation. 60.7% respondents did not receive any leaflets or posters from the Sylhet district administration office which highlights the direction about what to do during and after an earthquake. Moreover, 68.5% respondents did not watch any activities regarding what to do during and after earthquake from the fire service authority and 78.7% respondents did not notice any type of awareness programme's initiated by any NGO on earthquake at their area of residence. In order to measure earthquake knowledge of the respondents, for every affirmative response the respondent got score of 1 and for every negative response he/she got 0. Earthquake Knowledge scores of the respondents found between 3-10 against the possible range of 0-10. Based on the observed earthquake knowledge score, the respondents were categorized into the following three categories, "Low knowledge", "Medium Knowledge" and "High knowledge". Data presented on figure 1 revealed that, most proportion of the respondents (65.17%) had medium knowledge about earthquake, compared to Low knowledge (12.36%) and high knowledge (22.47%).

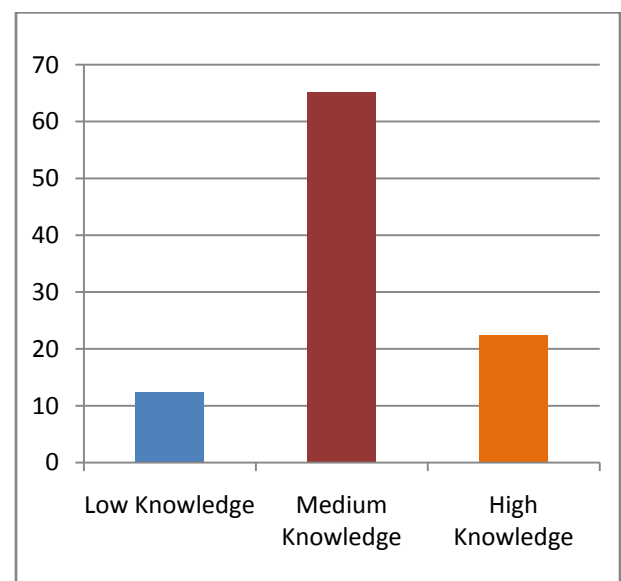


Fig 1: Level of earthquake knowledge

### 3.3 Perceptions about the Role of GOVT, SCC and NGO's against Earthquake

To understand perceptions of the respondents about the Role of GOVT, SCC and NGO's against Earthquake, this study used total 7 statements and the respondents were asked to indicate their nature of agreement or disagreement on these statements. Their responses were coded according to the level of agreement on each statement such as strongly agree, agree, neutral, disagree and strongly disagree. A value was assigned for every reaction for example 5 for strongly agree, 4 for agree, 3 for neutral, 2 for disagree and 1 for strongly disagree.

Table 3: Respondents Perception

	Responses	(%)
The government has sufficient prior preparation for tackling the damage of an earthquake	Strongly Disagree	7.90
	Disagree	47.2
	Neutral	8.70
	Agree	23.1
	Strongly agree	13.1
The Sylhet City Corporation is active in raising awareness among the mass people of Sylhet city	Strongly Disagree	20.2
	Disagree	31.5
	Neutral	8.90
	Agree	18.5
	Strongly agree	20.9
The awareness programme from the fire service authority are taking place on the regular basis	Strongly Disagree	24.7
	Disagree	43.8
	Neutral	9.30
	Agree	16.2
	Strongly agree	6.0
Sylhet district administration is active in developing massive awareness among the mass people of Sylhet City.	Strongly Disagree	10.1
	Disagree	52.4
	Neutral	11.3
	Agree	10.8
	Strongly agree	15.4
Building Code' is maintained now a days	Strongly Disagree	9.0
	Disagree	62.4
	Neutral	8.90
	Agree	11.6
	Strongly agree	8.10
The government is strictly monitoring the maintenance of the Building code to reduce the loss of earthquake	Strongly Disagree	32.6
	Disagree	34.8
	Neutral	11.3
	Agree	6.30
	Strongly agree	15.0
The activities of Non-government organizations (NGO's) are conducted sufficiently in raising awareness among the mass people of Sylhet City	Strongly Disagree	31.5
	Disagree	33.7
	Neutral	10.2
	Agree	14.9
	Strongly agree	9.70

Source: Field Survey (2016)

Table 3 depicts responses from respondents regarding different statements. It is observed from the table 3 that, most of the respondents disagree on the statements related to positive role from GOVT, SCC, and Fire service authority even from Sylhet district administration (47.2%, 31.5%, 43.8%, and 52.4% respectively). Respondents think they do not perform their role accordingly to make people aware about earthquake. 62.4% respondents disagree that now a day's building code' is maintained properly. Very small proportion of the respondents strongly agrees on that (9%). 34.8% respondents did not think the government is strictly monitoring the maintenance of the building code to reduce the loss of earthquake. Moreover 33.7% respondents disagrees with the statement that the activities of Non-government organizations (NGO's) are conducted sufficiently in raising awareness among the mass people of Sylhet City. For testing internal reliability of the items, cronbach's alpha test was done. The result shows that the items are consistent and reliable as the conbach's alpha value is greater than the usual threshold value of .7 (Table 4).

Table 4: Reliability test results (Cronchach's Alpha test)

Items	Cronbach's Alpha	Cronbach's Alpha if Item Deleted
Item 1	.796	.786
Item 2		.757
Item 3		.776
Item 4		.785
Item 5		.739
Item 6		.796
Item 7		.747

### 3.4 Earthquake Awareness of the respondents

Table 5 shows that, 98.9% respondents said that they know soil test is required before constructing house. Only 1.1% respondents have no prior knowledge regarding this issue. 78.6% respondent thinks it is essential to consult with civil engineers to build a house. Majority of the respondents (49.4%) had medium extent knowledge about what to do during an earthquake 24.7% respondents know to some extent. 11.2% respondents have no knowledge about what they should do during an earthquake. On the other hand, 14.6% respondents know about this issue in high extent. 84.3% respondent thinks it is necessary to follow the building code. Highest percentage of the respondents (48.3%) seems it's important to seek advice from civil engineers during the construction of building to minimize loss in case of massive

earthquake. 77.5% and 85.4% respondents never participated in a campaign regarding earthquake initiated by the fair service authority and NGO's respectively. 23.5% respondents thinks collapsing of building is the only aftermath of an earthquake. while 76.5% did not think so (Table 5). In order to measure earthquake awareness of the respondent for every affirmative response the respondent got fixed score for that question according to their response. For every negative response he/she got 0. Earthquake awareness scores of the respondents ranged from 3-15 against the possible range of 0-15. Based on the observed earthquake awareness score, the respondents were categorized into the following three categories, "Low Awareness", "Medium Awareness" and "High Awareness".

Table 5: Respondents Awareness of earthquake

Statements	Responses	(%)
Know that it is required to test the soil before building construction	1. Yes	98.9
	2. No	1.10
It is essential to consult with civil engineers to build a house	1. Yes	78.6
	2. No	21.4
Know anything about what to do during an earthquake	1. No	11.2
	2. To some extent	24.7
	3. Medium extent	49.4
	4. High extent	14.6
It is necessary to follow Building Code	1. Yes	84.3
	2. No	15.7
Why it seems important to seek advice from civil engineers during the construction of building	1.To minimize the cost	2.20
	2.Structure becomes solid	25.8
	3.To escape the risk of damage of an earthquake	23.6
	4.To minimize los in case of massive earthquake	48.3
Ever participated in a campaign regarding earthquake initiated by the fair service authority	1. Yes	22.5
	2. No	77.5
Ever taken part in any earthquake campaign instructed by any NGO's	1. Yes	14.6
	2. No	85.4
Collapsing of building is the only aftermath of an earthquake	1. Yes	23.5
	2. No	76.5

Source: Field Survey (2016)

Data presented in figure 2 revealed that most proportion of the respondent (57.52%) had medium awareness about earth-

quake, compared to low awareness (18.67%) and high awareness (23.81%).

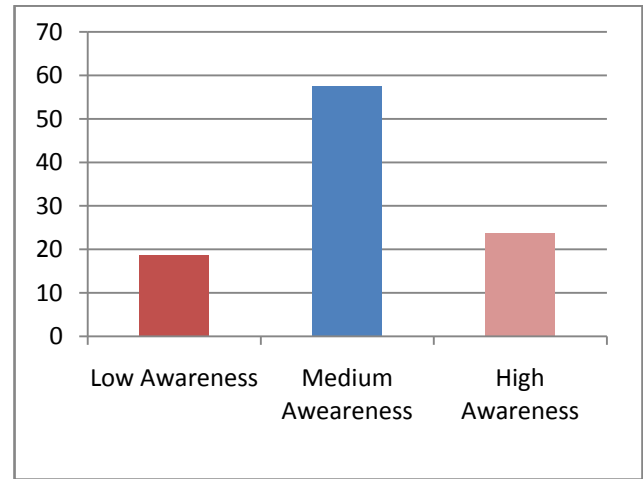


Fig2: Level of earthquake awareness

#### 4 CONCLUSIONS

This research was conducted to know about the awareness of local people of *Jalalabad* residential area under 7.No.ward of Sylhet City Corporation about earthquake hazard. Keeping the major objective in mind this research also tried to know earthquake knowledge of the respondents as well as perceptions of the local people of *Jalalabad* area about the role of GOVT, SCC, and different NGO's to make them aware about earthquake. It is found that most proportion of the respondents from the study area (57.52%), among them 36% were male and 21.52% respondents were female) had medium awareness about earthquake, compared to low awareness (18.67%) and high awareness (23.81%). Most of the respondents have said that, they never seen any earthquake awareness activities from Sylhet City Corporation (SCC) at their area and have not received any leaflets or posters from Sylhet district administration regarding what to do during and after an earthquake. Most of the respondents also replied they have not noticed any awareness building activities from any NGO's regarding earthquake at their area. As natural disaster is now becoming a part of our life in Bangladesh because of its geographical setting and other causes, therefore we could not avoid it. In reality, human beings never can make them free from natural disasters. What we can do is to try to minimize loss as much as we can. Since the most part of Bangladesh especially Sylhet is the most risky zone for earthquake therefore, it is recommended that our government should have to take some steps against earthquake management, such as; arranging different training programme, maintaining strictly the building code, providing poster, leaflet to the mass people to create public awareness in order to minimize the damages of an earthquake.

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