

Are the youth prepared for earthquakes? Subjective knowledge, risk perception and mitigation behaviors among the youth in Metro Manila, Philippines

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Abstract

The present pandemic enables us to recheck the capacity of the youth to be prepared for various natural and man-made disasters. This study adds to the literature that assesses the current knowledge, perception and mitigation behaviors of the youth about earthquakes. A survey of 300 young individuals from one of the public universities in Manila, Philippines has revealed that young individuals still have high knowledge about earthquakes and the dangers because of earthquakes to themselves and their families. They also seek and share knowledge about the disaster because they perceive it to be a risky situation.

Earthquake mitigation behaviors are also part of their disaster preparedness practices. Relationships of these three variables were established. There is, however, a lack of actual dissemination of the earthquake-related knowledge and practices outside the social circles of the youth. It is, therefore, necessary to tap the capacity of the youth in information dissemination and mitigation at a community level.

Keywords: Youth, earthquake, subjective knowledge, risk perception, mitigation behaviors, Philippines

Introduction

The need to prepare for natural and man-made risks and disasters cannot be more emphasized because of the ongoing COVID-19 pandemic. On one hand, the World Health Organization⁶³ has continually emphasized that countries must have increased contextual levels of COVID-19 awareness, preparedness, management and care for their people. On the other hand, Governments must maneuver their populations and communities away from the deadly effects of natural calamities. The management of disasters during the pandemic, therefore, must be joint effort between the Government and its people^{19,26} and that the need to strengthen disaster risk reduction and recovery must be sustained efforts by various communities and people⁵⁴.

The youth sector has been highly engaged in climate and disaster advocacy⁵⁶. There has been a constant prodding that the youth are key to reducing the effects of disasters. The International Federation of Red Cross and Red Crescent Societies (IFRC) stated that youth's capacity to teach their communities the means of reducing risks and impacts of

disaster should be harnessed²⁸. The youth themselves recognize their capabilities by involving in disaster preparedness and recovery efforts⁶⁷.

The Southeast Asia Climate Outlook Survey⁵⁶ has recorded that the youths in the region have shown both interest and action for climate movement and mobilization. Philippine data that was included in the said survey would show that the respondents realize that the Government must equally prioritize the responses to COVID-19 and climate change. Youths in the Philippines have shown this consistent interest to discuss the important role of their sector in reducing disaster effects and advocating resilience⁶². Participative approaches have been put in place for the Filipino youths to be constantly empowered in advocating for climate change issues in their communities^{24,34}.

Despite the hopeful streak in the involvement of the youth in advocating for disaster risk reduction efforts in the Philippines, there is a dearth of literature on the documented knowledge, attitude and practices of the Filipino youth on one of the lingering natural disaster issues in the country. Seemingly, levels of earthquake knowledge, attitude and preparedness in the country have not been thoroughly investigated²⁵. The need to strengthen the scientific baseline data on earthquake preparedness is necessary.

There is an urgency to assess the readiness to mitigate the effects of earthquakes among the youth. In the wake of strings of devastating disasters that are experienced by the country, questions of readiness for such a catastrophe have sparked discussions and led to various endeavors. For one, geophysical disasters are a major concern and there are efforts to mitigate its effects. The country, being part of the Pacific Ring of Fire, puts Filipinos at risk especially those living in the fault line¹. In the capital Manila, the West Valley Fault is said to be at the "ripe of movement"³⁰. Furthermore, a Japan International Cooperation Agency³⁵ study predicts that a 7.2 magnitude earthquake on the West Valley Fault can kill more than 30,000 people and injure at least 100,000 Filipinos. The damages to residential buildings is also projected to be heavy.

This research asks: What are the levels and relationships of earthquake knowledge, risk perception and communication mitigation behaviors among young Filipinos? Determining the levels of knowledge, perception and practices leads to an assessment of the impact of decisions and actions related to disaster preparedness and response. Research on disaster risk

communication could also assist local and national government units in crafting disaster response plans and proposing campaigns that would raise calamity awareness.

Review of Literature

Factors that enable mitigation behaviors include subjective knowledge and risk perception. Knowledge is seen as an important consideration as it enables one to make critical decisions about a particular event or situation. The literature would differentiate knowledge as factual, actual or real knowledge^{32,44,45} on the one hand and subjective knowledge or knowledge confidence^{32,49} on the other hand.

Research on subjective knowledge generally shows that it is influential in determining risk-mitigating behavior while results have been mixed for factual, actual or real knowledge^{46,49}. Subjective knowledge is the belief that something is known by individuals about the risk⁴⁵. In the context of natural hazards, this is the human perception of the severity of their defenselessness when they, their properties and their communities are put at risk⁹. Further, subjective knowledge, as compared to factual knowledge, seemingly appears more relevant in the decision of individuals to take preventive measures⁴⁴.

Risk perception is also a necessary variable to interrogate in the context of disaster preparedness. Yang and colleagues⁶⁴ stated that this is a person's individual assessment of a danger where an assessment is found on one's actual and communicated experiences about a risk. This means that the way people perceive risk could be different from one another. Earlier research on the concept authored by Delia et al²³ has revealed that such a perception allows a person to fathom his or her world "through systems of personal constructs – the central processing function of the mind." Judgment of risks is based on how risk is perceived as socially amplified and one's judgment of such an amplification of the risk³⁷. Such processing enables an individual to have peculiar responses to risk and such a peculiarity is driven by emotions but could be decoded as the reaction to a risk is a patterned behavior⁵¹. Ropeik and Gray⁵¹ added that people's notion of a risky situation is based on available information, their intake on the information and their psychological filters.

The end goal for subjective knowledge and risk perception is for individuals to have an increased sense and set of mitigating behavior during disasters. Mitigating behaviors may be information seeking and sharing^{16 60}. Information seeking is said to be a behavioral element that is present when individuals are faced with uncertainty before and after a disaster event¹⁶. It is an action that allows a person to look and ask for information⁴¹, attend disaster-relevant activities³⁶ and search for expert knowledge on a defined natural crisis⁶⁰. This practice seems to stem from the inadequacy of information that arises from the uncertainty brought about by the conditions of an operational environment¹⁸. Moreover, information-sharing behavior is

one's access to available information on the intensity, location and related disaster damage²².

Data or information sharing is generally assumed to be part of disaster mitigation in a community²⁹, local and national government⁶⁶ and media⁴³. Shankar⁵⁷ claimed that for information sharing to be facilitated, there must be an efficient relation between the victims and the officials who are supposed to be part of the recovery effort and management. Information-sharing here is seen in acts like discussing earthquake preparedness to family, sharing information to friends via social media and to the members of the community¹⁵ that are seen as cooperative responses by a given community²⁰ in traditionally hierarchical situations⁵⁵.

Other forms of mitigating behaviors are risk analysis⁶, risk perception¹³, collective action^{8,18,65} and disaster preparedness³⁶. There are mixed notions on the factors that affect mitigating behaviors. On one hand, some argue that mitigating behaviors are sex-specific^{39,41,50} and age-dependent^{14,42,53,59}. On the other hand, some studies have found that sex and age have no impact on mitigation behavior^{38,52}. Mitigation behaviors also include preparedness steps that are undertaken by individuals to combat the perceived effects of the seismic risk.

In order to ground the study's notion of risk knowledge and perception, this research utilized Kasperson et al's Social Amplification of Risk³⁷. The framework argues that an individual will look for sources of information through various channels and social stations that would help him or her process, evaluate and interpret the situation. Communicating and acting on risks have valuable meaning because these enable an individual to process the social world. Subsequently, this notion assumes notable amplification steps such as processing of information, preparing, wanting to act about the risks and taking actions against a risk³⁷.

The relationship of subjective knowledge, risk perception and mitigating behaviors is argued in the Theory of Reasoned Action. The theory argues that despite the seemingly linear flow from knowledge and perception to behavior, the intents and actual practices are voluntary³¹. People's actions are based on their own perceptions and that of society. While the theory predicts intentions and behavior, it also guides where and how to target behavioral change attempts⁵⁸. Using the theory for disaster preparedness implies that people's behaviors are results of how they estimate the risky situation and how the situations pose harm to them⁴⁷.

Material and Methods

This research is a one-shot quantitative research study. Using a survey, the study determined the level of earthquake subjective knowledge, earthquake risk perception and earthquake communication mitigating behaviors of youths

in the capital Manila in the Philippines. The youths were represented by undergraduate university students. Furthermore, the data were collected through self-administered surveys.

The researchers applied non-probability sampling in selecting the respondents for this study. The non-probability sample is acceptable if the quantitative research is a pilot study of a larger research on the subject matter²⁷. The survey questionnaire obtained information about the socio-demographic characteristics of the sample such as gender, age and civil status. It also asked the respondents' knowledge of earthquake risk through a Likert scaling of subjective knowledge. To assess risk perception, items were developed by the researchers based on the description of two risk perception indicators: consequence estimates and subjective probability³⁷. Risk perception was also measured using a seven-point Likert scale.

To measure the level of the participant's communication mitigation behavior, they were asked about mitigation practices. Cronbach's alpha test was utilized to compute the reliability score (.839) of the created instrument. The survey was conducted by the researchers from January to December 2020. The researchers were able to administer the survey to 300 students.

To analyze the data, mean score and frequency counts were computed to describe the levels of subjective knowledge, risk perception and mitigating behaviors. Moreover, Pearson Correlation was used to determine the relationship of the variables.

Results

A total of 300 young individuals from Metro Manila, Philippines participated in this research. Majority of the respondents were female (50.3%) while 38.03% of them were males. The rest were part of the LGBTQIA+ 11.67%. Most of the respondents belonged to the 18-20 years old age bracket (61.96%). This is to be followed by the respondents who were part of the 21-24 years old age group (36.80%). Further, the least number of respondents belonged to the 25-28 years old age bracket (1.22%). Lastly, all of the respondents were undergraduate students from various colleges and academic units in one of the biggest universities in the Philippines.

In terms of subjective knowledge, table 1 shows that the Filipino youths who were part of this study mentioned that they know much about the possible damages of earthquakes ($M= 5.73$, $Sd=1.023$) but also agreed that they do not feel comfortable discussing their knowledge about these damage/s to their friends and family members ($M=5.36$, $Sd=1.356$). Interestingly, the respondents are undecided if they consider themselves as more knowledgeable about earthquakes than their friends ($M=3.58$, $Sd= 1.535$). Moreover, the respondents only slightly agreed that they know less about the possible damage/s of earthquakes compared to most people they know ($M=5.00$, $Sd=1.273$). Lastly, they also slightly agreed that they do not know a lot about earthquakes ($M=5.06$, $Sd=1.526$). Overall, results of the study show a high level of earthquake subjective knowledge among the youth ($M=4.94$, $Sd=1.030$).

Table 1
Earthquake Knowledge of Young Filipinos

Earthquake Knowledge Questions	Mean Score
I know much about the possible damage/s of earthquakes.	5.73
I do not feel comfortable talking about my knowledge about the possible damage/s of earthquakes to my friends and family members.	5.36
Among my circle of friends, I'm one of the more knowledgeable on earthquakes.	3.58
Compared to most people, I know less about the possible damage/s of earthquakes.	5.00
When it comes to earthquakes, I really don't know a lot.	5.06

Table 2
Earthquake Risk Perception Indices

Earthquake Risk Perception Questions	Mean Score
I think that my family and I are safe from an earthquake disaster.	3.79
I am aware of the earthquake disasters that are happening in my country.	6.03
There is a high chance that an earthquake will occur in my locality.	5.57
Earthquakes are a big problem in my locality.	4.50
I am aware that I live in an earthquake prone area.	5.12
Earthquakes are extremely damaging to my locality.	4.93

Table 2 shows the youth's earthquake risk perception. Results of the study show that these young individuals are undecided about their own and their families' safety from an earthquake disaster ($M=3.79$, $Sd=1.478$). This is the case even if they agree that they are aware of the earthquake disasters in the Philippines ($M=6.03$, $Sd=.888$) and despite the notion that a high chance of an earthquake will occur in their locality ($M=5.57$, $Sd=1.328$). Furthermore, they also slightly agreed that an earthquake is a big problem in their locality ($M=4.50$, $Sd=1.630$) since they know that they live in an earthquake prone area ($M=5.12$, $Sd=1.669$) and that earthquake is extremely damaging to their locality ($M=4.93$, $Sd=1.599$). Overall, the study shows that a high level of risk perception is evident among these respondents ($M=4.99$, $Sd=.890$).

Table 3 shows the youth's disaster mitigating behaviors. Results of the study revealed that they slightly agree that they research earthquake related information on their own ($M=4.59$, $Sd=1.472$) and slightly disagree that they ask experts regarding earthquake preparedness measures ($M=3.46$, $Sd=1.704$). They also mentioned that they still attend earthquake preparedness seminars ($M=3.36$, $Sd=1.763$). The respondents slightly agreed that they share earthquake related information to their families and friends via social media ($M=4.77$, $Sd=1.696$). They slightly agreed that they discuss earthquake related information within their household ($M=4.96$, $Sd=1.604$) and participate in the University's earthquake drill ($M=5.44$, $Sd=1.519$). The student respondents, however, slightly disagreed that they

help their locality in disseminating earthquake related information ($M=3.39$, $Sd=1.645$). The results of the survey showed that the respondent's communication mitigating behaviors is also high ($M=4.90$, $Sd=1.105$).

To identify the relationship among variables, Pearson product-moment correlation coefficient was used. Table 4 shows that a moderate, positive and significant relationship exists between earthquake knowledge and earthquake risk perception ($r = 0.347$, $n = 163$, $p = .000$). Similarly, the students' earthquake knowledge and communication behaviors were moderately, significantly and positively correlated too ($r=.450$, $n=163$, $p=.000$). Moreover, earthquake risk perception and communication behavior also had a moderate, positive and significant relationship ($r=.314$, $n=163$, $p=.000$).

Discussion

The study shows that the Filipino youths are aware of the possibility of a strong earthquake since they know much about the possible damages of earthquakes. Such a finding runs parallel with Bentson's¹² argument that the presence of hazards enables individuals to seek information about its effects on them. In a highly earthquake susceptible country like the Philippines, actual knowledge of the youth is important since it tells the policy makers of the needed earthquake-related program that they must offer to the people.

Table 3
Earthquake-related communication Mitigating Behaviors

Communication Mitigating Behaviors Question	Mean Score
I research for information related to earthquakes.	4.59
I ask experts regarding earthquake preparedness measures.	3.46
I attend earthquake preparedness seminars.	3.36
I share earthquake related information to my family & friends via social media.	4.77
I help my locality in disseminating information related to earthquakes.	3.39
I discuss earthquake related information within our household.	4.96
I participate in the university's earthquake drills.	5.44

Table 4
Correlation between Earthquake Subjective Knowledge, Earthquake Risk Perception and Earthquake Communication Behavior

Variables	Pearson r	P-value	N
Knowledge and Risk Perception	0.347**	.000	300
Knowledge and Communication Behavior	.450**	.000	300
Risk Perception and Communication Behavior	.314**	.000	300

Level of significance $p < 0.01$

In this study, young individuals who believed that they knew more about the risk posed by natural disasters were also more likely to believe that they were in control of things and thus, were more likely to engage in finding out about the natural disaster and how they could mitigate its effects^{3,33,67}.

What is perhaps alarming is that even if the risks are high, there is little room for the youth to discuss its adverse effects on their social circles. The potent role of the students in engaging the community must be emphasized². Targeting educated youth just like the ones who were involved in this study, is an ideal move as they could provide social interactions about the matter¹⁰. Youth-led initiatives are important in forming resilient communities^{4,5}.

The results indicate that the respondents have not experienced any strong earthquake in their lifetime; they do not know if they are currently safe from the disaster once an earthquake strikes¹¹. These young individuals, however, feel that if indeed an earthquake will occur, then it will be a big problem for them, their families and their communities²¹.

Such an awareness of the potential damage of an earthquake enables individuals to research and prepare about the disaster⁷ and make them conscious of their roles as protectors of their families and properties⁴⁵.

Young people's earthquake mitigation behaviors show that they research about the nature of earthquakes and their effects since the young individuals do not consider themselves as experts on the matter¹⁷. These students take advantage of online and face-to-face seminars so that they can be prepared when the disaster strikes. Since it is easier to share information about the disaster through online means, earthquake-related information is quickly sent to their loved ones. The communication about disasters does not stop with the sharing of information as the youth facilitate and participate in discussions about the matter. If they have the opportunity to do so, they also participate in earthquake drills.

Similar to previous findings, there is, however, a lack of conscious effort to disseminate information outside the confines of the family³. Efforts must be made to enable the youth to consistently discuss the effects of earthquakes outside of their tight circles⁴⁰. The positive relationships among subjective knowledge, risk perception and earthquake preparedness among the youth support the already existing literature⁶¹ and provide hope to the advocates of disaster and risk reduction efforts in the Philippines.

Conclusion

The study shows that young Filipinos have existing knowledge and positive perception about their capacity to prepare for earthquakes. The youth's knowledge and attitude are also related to their existing preparedness behaviors on earthquakes. There is, however, a constant need to enrich

such knowledge and attitude and provide continuous disaster-related programs so the youth could help themselves, their social circles and their communities become better prepared when disaster strikes. Schools should come up with disaster risk communication programs and plans that would appeal to the students' level of knowledge. The information dissemination should be done across fronts, from social media to traditional means of accessing and disseminating information.

Local government units could tap youth organizations in universities to enhance the students participation in earthquake mitigation programs too. Policy-makers should constantly monitor and evaluate their disaster preparedness playbooks to gauge if such reflect the current knowledge, attitude, behaviors and capacities of the youth.

Despite the COVID-19 pandemic, there is a need to assess the readiness of the youth in other forms of disasters as natural calamities such as earthquakes may strike along with our other health and disaster concerns. While this study's results remain optimistic, there are still a lot of efforts that must be made to activate the youth during disasters. Nurturing the factual and actual knowledge about earthquakes, its risks and the many mitigation measures is a must while the loose ends such as the lack of information dissemination outside the family and within their communities must be dealt with. The youth's voice could be tapped to help disseminate and do actual work during pandemics and disasters.

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