Post-2004 Tsunami: Preparedness of Malaysian coastal communities

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Abstract

The Indian Ocean tsunami of 26th December 2004 unleashed catastrophe in many nations including coastal communities located along the west-coast of Malaysian Peninsular. The goal of this study is to explore the impact of the tsunami to the preparedness of the affected coastal communities. Data was collected through questionnaire, interviews, documents analysis and field observations. It was found that the 2004 tsunami disaster has left a significant mark on Malaysia's and the world's disaster management landscape but the tragedy has also heightened disaster awareness and steps must be taken to ensure vulnerable communities are well-equipped to face any eventualities.

Keywords: Tsunami; sustainable coastal communities; disaster management; vulnerability

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1.0 Introduction

The Indian Ocean tsunami disaster of 26th December 2004 unleashed catastrophe in many nations including Malaysia in the east and as far west to countries on the African continent. This phenomenon was triggered by a massive earthquake with the recorded magnitude of 9.0 on the Richter scale, with the epicenter just off the west coast of North Sumatera, Indonesia. Approximately 224,685 deaths were reported with 174,729 confirmed dead and 49,956 considered missing (IFRC, 2013). The communities affected by the tsunami disaster in Malaysia were located along the west coast of the Malaysian Peninsular resulting in 68 fatalities and damaged properties. The objective of this study is to gauge the level of awareness of the affected communities in preparing themselves for future calamities after the tsunami disaster of 2004.

2.0 Literature Review

The study has been carried out qualitatively using the phenomenological approach to exploring and achieved a deeper understanding of a personal and subjective live experience of obese adolescents on body image (Denzin& Lincoln, 1994). A purposive sampling design was used to recruit the participants of the study. Consent form and information sheet was given to all participants to be signed by their parent/guardian. Once consented, the researcher arranged for an interview date, time and place with each participant according to his/her preferences with consideration of the comfort and safety of the participants and researcher. The inclusive criteria for this study were obese (BMI-for-age above 95th percentile, WHO (1995)) adolescents aged 13-17 years old found in institutions such as secondary schools and associations in the rural area of Selangor. Semi-structured interview guides were used and the interviews were audio-taped. The interviewed was lasted between 30 – 45 minutes and audio-taped. The tape had been listened immediately after the interview to make sense of the data and verifying the need for further interview, if needed. Audio-taped data then transcribed into verbatim by the researcher. The recorded interview was kept safely until the research completed and disposed of after the study is completed. A total of 14 adolescents were recruited for an in-depth interview.

The data had been analyzed based on thematic content analysis. NVivo10 (computer software) was used to facilitate the management of qualitative data. Data analysis had been done simultaneously with ongoing data collection. Began with listening to participants' verbal descriptions and then followed by reading and rereading the verbatim transcriptions or written responses, the researcher had identified and extract significant statement as they become immersed in the data. The translation of the data in English was done if the data is in Malay language. Then, the data were verified by the language expert.

Ethical approval had been obtained from the Research Ethical Committee, Universiti Teknologi MARA prior to data collection.

3.0 Methodology

The study area selected for this study is the Kota Kuala Muda coastal communities in the state of Kedah, Malaysia. Data was collected for this study through survey questionnaire, interviews, documents analysis and field observations. 211 respondents from eight villages (consisted of Kg. Kepala Jalan, Kg Masjid, Kg. Padang Salim, Kg. Paya, Kg. Sungai Meriam, Kg. Sungai Yu, Kg. Tepi Sungai, and Pulau Sayak) devastated by the 26th December 2004 tsunami took part in this study. The Likert scale measurement was used for statements within the questionnaire regarding the 2004 tsunami and its effect on the communities on a 5 point scale. Each alternative item is assigned from 1 (Strongly agree), 2 (Agree), 3 (Undecided), 4 (Disagree) and 5 (Strongly Disagree) for favourable items. This is to enable the respondents to rate each and every variables based on their opinions and perspectives.

Similarly, rating score was used to identify the variables with higher and lower weighted score, and is arranged accordingly to priority. This was done by allocating numeric value to the options; for example if the respondents chose the option as the first choice they will be scored 4, followed by second choice as 3, third choice as 2, the fourth choice as 1 and finally the last choice as 0 mark. These marks vary according to the number of variables the question has. Variables with the highest weight are considered as the most significant, while the ones with lower score signified the ones that are less significant.

Data was also gathered through documents analysis to enable the investigators to trace both factual and interpretive information about the implementation processes. For instance, subsequent to the tsunami disaster, relevant agencies in Malaysia have taken various measures and strategies to overcome or minimize the vulnerabilities of these communities. This include advanced warning systems, survival and rescue training modules, dissemination of vital information as well as major undertakings such as coastal defence initiatives. Furthermore, the researchers also paid close attention to the still-visible physical damages caused by the tsunami and any post-2004 tsunami mitigation development as part of field observation. Taking stock of these visible damages and mitigation measures are vital as these elements may contribute in the awareness level of the community members about their past difficulties and as a reminder in preparing themselves for any potential catastrophes. All of the gathered data were then triangulated to give credibility and internal validity to the research findings.

4.0 Results and Discussion

The sampling technique selected for the study is simple random sampling with both of the genders has equal opportunity to be chosen as the sample. Of 211 respondents participated in the survey, 129 (61%) were male respondents and 82 (39%) female respondents.

Table 1 shows the number of respondents based on their age group. It can be observed that the biggest age cohort is respondents aged from 31 to 35 with nearly 34% of the total and followed by the age group of 20-25 with about 22%. These two groups were in their 20s and teenagers respectively when the tsunami hit them in 2004 and generally should not have any difficulties in recalling the event and its aftermaths. Next are respondents between the age of 26-30 with almost 19%, respondents within the ages between 36-40 with about 16%,

those aged 46 and above with 9%, and the very least is from the age of 41-45 with only 0.5% consisting of only a single respondent.

The respondents were also asked regarding their length of stay at these communities and the two biggest groups are those who have been residing there ranging from six to ten years and between 16 and 20 years (about 40% for each group). Meanwhile, nearly 20% of the respondents indicated that they have stayed there for more than 21 years.

From Table 2, it can be concluded that nearly half of the respondents obtained their highest education at the secondary school level while 37% of them are with tertiary education level. The remainder of the respondents stated that their highest level of education were at primary school level.

The other information gathered from the survey was the level of monthly income of the respondents and it was found that about 71% of them earned less than RM500.00 a month while the remainder drawn a monthly income of between RM1000.00 to RM2,000.00. Looking at these figures, it can be surmised that most of the respondents came from low-income families. It should also be noted that about half of the respondents are fishermen or have someone in their families who are earning their income as fishermen.

4.1 Awareness of disaster management practices

Subsequent to the tsunami disaster of December 2004, the responsible agencies of the Malaysian government took many initiatives to equip the country and its people with better methods of advanced warning, coastal defence and creating awareness among the members of the public. One of the responses is the establishment of the Malaysian National Tsunami Early Warning System (MNTEWS) comprises of three major components; Monitoring and Detection, Data Processing and Data Dissemination (Malaysian Meteorological Department, 2013). The Monitoring and Detection involves the use of Seismic Network, Deep Ocean Buoy Network, Tide Gauge Network and Coastal Camera Network while the dissemination of warning can be made electronically and also through announcements relayed by relevant agencies at the local level. In ensuring that this system can meet its objectives, the authorities carried out various awareness campaigns and simulation exercises with communities exposed to this threat.

4.2 Awareness about MNTEWS and effective means of communicating information on disaster

To study the level of awareness about MNTEWS, the survey questionnaire includes a question on the early warning system and all 211 respondents answered that they are knowledgeable about such system. The respondents were also asked about their perception on the most effective means of communicating the information to members of the public and the result is shown in Table 3.

Table 3 shows that the internet has been selected as the electronic media most suitable for disaster information dissemination to the public with the weighted score of 844; whereby 100% of the respondents had chosen it as strongly agree. This can be easily understood as the penetration of internet services nowadays are not limited to the urban areas only but have also spread widely into the rural areas and relatively accessible without much difficulty with

the advancement of smartphones, tablets and other peripherals. In addition to the official information made available in real time by the relevant local agencies, members of the public can also access a large pool of information provided online from any parts of the world that may be applicable for implementation at the local level.

Radio and television were jointly-identified as the second most effective means of communication to members of the public for disaster awareness with the weighted score of 677 and 676 respectively. This probably is because almost all families at the very least own a radio and/or a television set and therefore are one of the most reliable medium of communication to the masses. The final option for the electronic media is mobile telecommunication with the score of 569. Based on this survey, it can be concluded that the respondents are of the opinion that the best means of communicating information regarding disaster awareness and information through electronic media is by the internet.

As for the printed media, newspaper was preferred as the most suitable means to communicate with the weighted score of 803 with 80% responded strongly agree. This possibly is because most newspapers are published daily and the news contained in the newspaper is quite up to date. In addition, the newspapers can be considered as the most affordable form of reading material which can be afforded by almost anyone and widely circulated. The next preferred printed media is articles with weighted score of 756 and this is followed by other printed media such as brochures, flyers and others which were given a weighted score of 739. The fourth option is books with the weighted score of 717 while magazines have been chosen as the least suitable means to communicate to the public with a score of 238. Based on these outcomes, it can be stated that for the printed media, the respondents opined that the newspaper is the best means of communicating to the public. However, looking at the differences in the score garnered by the internet and the newspapers in this survey, the former has to be considered as the best medium of disseminating this vital information as it can be distributed in real time and reaching a wider audience provided that the necessary tools are already in place for this endeavour.

4.3 Level of preparedness

Another element of disaster management covered in the survey was to investigate the opinions of the respondents with regards to the level of preparedness of both the national government and the local community in dealing with future disasters.

Table 4 illustrates the opinion of respondents pertaining to the level of preparedness in dealing with tsunami and non-tsunami disasters for the national government and the local community. From these results, the national government was given by the respondents weighted scores of 297 and 337 for its preparedness in dealing with tsunami and other non-tsunami disasters respectively. This indicates that the respondents have lower expectations for the preparedness of the national government when tsunami and non-tsunami disasters are compared. On the other hand, the respondents had given a higher weighted score of 379 for the preparedness of the local community in dealing with another tsunami disaster but placed lower expectations for non-tsunami disasters with 253 only. Interestingly the respondents were of the opinion that they have higher confidence in the local community in dealing with tsunami when compared to the national government with the weighted score of

379 and 337 respectively. It is possible this is their view because the respondents have dealt directly with tsunami prior to this and they probably felt that the local communities now are better equipped if they need to face the same calamity. It should also be added that the higher confidence in the local community has been made possible because of the various approaches made by the government that include educating and creating awareness for the public and implementing the many measures intended to reduce the vulnerabilities of these communities.

Meanwhile, the physical remnants that can be observed in the study area probably act as a reminder for the members of the community about the tragedies that they have endured in the past and the need for them to be on their toes at all time. Quite a few tsunami-damaged houses can be found in these communities and they had been left as they were as a tribute or monument to the disaster (refer to Figure 1). Another monument established after the tsunami 2004 in the area is a collection of colourful damaged fishing boats stacked on top of each other signifying the strength of the natural disaster and simultaneously the loss of earning for the local communities as most of them are fishermen (refer to Figure 2). Both of these examples are located next to the main local traffic route and they served as a monument/reminder for both the locals and the outsiders of the devastating impact of the 2004 tsunami and might also contributed to their high level of preparedness.

Table 1: Age of respondents

Age (years)	Frequency	Percent
20-25	47	22.3
26-30	39	18.5
31-35	71	33.6
36-40	34	16.1
41-45	1	.5
46 and above	19	9.0
Total	211	100.0

(Source: Survey)

Table 2: Respondents' highest education levels

Highest education level	Frequency	Percent
Primary school	33	15.6
Secondary school	100	47.4
University level	78	37.0
Total	211	100.0

(Source: survey)

Table 3: Effective means of communication

Means	1-Strongly Agree (Score Of 4)		2-Agree (Score Of 3)		3-Undecided (Score Of 2)		4-Disagree (Score Of 1)		5-Strongly Disagree (Score Of 0)		Total	Av. Sum
	No	Score	No	Score	No	Score	No	Score	No	Score		
Electronic media												
a. Television	43	172	168	504	0	0	0	0	0	0	676	3.2
b. Radio	44	176	167	501	0	0	0	0	0	0	677	3.2
c. Mobile Telecommunication	47	188	127	381	37	74	0	0	0	0	569	2.7
d. Web (Internet)	211	844	0	0	0	0	0	0	0	0	844	4.0
Printed media												
a. Newspaper	169	676	42	126	0	0	0	0	0	0	802	3.8
b. Magazines	10	40	201	198	0	0	0	0	0	0	238	1.1
c. Books	84	336	127	381	0	0	0	0	0	0	717	3.4
d. Articles	123	492	88	264	0	0	0	0	0	0	756	3.6
e. Other printed media	106	424	105	315	0	0	0	0	0	0	739	3.5

(Source: Survey)

Table 4: Perception on level of preparedness

	1-Good (Score of 2)		2-Fair (Score of 1)		3-Poor (Score of 0)		Total	Av. Sum
	No	Score	No	Score	No	Score		
National Government								
a. Tsunami	84	170	127	127	0	0	297	1.41
b. All disasters (except for tsunami)	126	252	85	85	0	0	337	1.6
Local Community								
a. Tsunami	168	336	43	43	0	0	379	1.8
b. All disasters (except for tsunami)	42	84	169	169	0	0	253	1.2

(Source: Survey)

Figure 1: Remnants of tsunami-damaged houses in the study area
(Source: Field Observation)

Figure 2: A monument of wrecked fishing boats reminding on-lookers of the 2004 tsunami devastation
(Source: Field observation)

5.0 Conclusion

It can be concluded that the 26th December 2004 tsunami disaster has left a significant mark on Malaysia's and the world's disaster management landscape. Internationally for instance, the event has promoted a higher level of cooperation between countries in providing a network of warning and recovery systems. At the local level, this study finds that the poor are the majority that are exposed to tsunami disaster but the tragedy is also responsible in heightening disaster awareness and steps must be taken to ensure all vulnerable communities are well-equipped to face any eventualities. The steps taken by both the government agencies and the local communities in responding to the tsunami have been fruitful and the paper shows significant level of confidence demonstrated by all of the stakeholders in anticipating future disasters. It is interesting to note that the respondents

perceived the local communities were in a better position if compared to the national government in preparing for tsunami. This behaviour is a positive characteristic that should be emulated by any vulnerable communities as those who are well-prepared are more likely to be able to return to normalcy in a shorter period of time. It is crucial that this level of awareness can be continuously nurtured and further improved in guaranteeing the vulnerable communities are capable to handle the challenges in the future.

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