UNDERSTANDING THE 'SPECIAL NEEDS' GROUPS FOR SHELTER AND EMERGENCY EVACUATION DURING FLOOD DISASTER

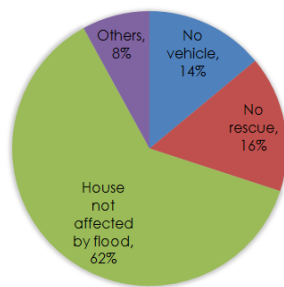Nur Sabahiah Abdul Sukor*, Mohd Ashraf Mohamad Ismail

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Graphical abstract

Abstract

This paper emphasizes the importance of understanding the diversify of inviduals with special needs for emergency response, relief and aids strategic plan for disaster event. The respondents for this study were the victims of East Coast flood disaster in 2014. The respondents with special needs were divided into two groups; the special needs groups and move to shelter (Group A, N= 340) and the special needs group and not move to shelter (Group B, N=411).The result shows that for Group A the elderly was the highest percentage of the special needs groups. Meanwhile, the insulin dependent diabetic patients dominated the percentages of special needs for Group B. This paper also suggests several methods to establish the data sharing platform between related agencies that focused on the special needs groups to enhance the evacuation plan and process during disaster.

Keywords: Special needs, elderly, diabetes patients, evacuation, shelter, flood victims

1.0 INTRODUCTION

Evacuating the special needs groups can be difficult as well as frustrating especially for emergency purposes because of the problem in identifying individuals with special needs and knowing their specific locations at the time of an emergency. The problem is worsened by the fact that many individuals with special needs are dispersed among the general population. Moreover, usually their needs were less recognized and planned not only for evacuation but also at the shelters. This condition also happened during the catastrophic flooding that hit East Coast Malaysia in December 2014 that caused the special needs groups to be suffered and stranded away from the flood reliefs and aids [1]. In order to find better ways to protect the special needs groups in disasters, it is needed to understand the complex structure of the nation's emergency management system. Usually, the emergency management will involves the federal agencies, state and local governments, tribal organizations, voluntary organizations, the private sector—including nursing homes and hospitals, and individuals and families.

For Malaysia case, The National Security Council (NSC) is the federal level agency that in charge the emergency management. The main task of NSC is to coordinate the disaster management process for every disaster events in Malaysia, including the flood disaster in Kelantan in the year 2014. When any disaster strikes the NSC usually will be alerted by police and fire and rescue department to take the necessary actions. It is assumed that the emergency response plans were including the consideration towards the victims that need special support. But in reality the agencies actually have the difficulties to identify the most vulnerable victims that needed to be mitigated first. Among the municipalities for which this research had been conducted, most of them had not prepared the list of people that requiring support in a time of disaster. This is because they believed that the neighborhood association leaders and local welfare commissioners understand who needs support in their

regions. However, in reality there was no effective evacuation plan for the special needs victims.

Therefore, this paper tries to understand the special needs groups based on the populations that involved in the flood disaster in Kelantan. The findings from this paper is expected to give an insight to the state, local and federal agencies to be well-equipped with the requirements of special needs populations in the emergency situation. It is believed that with a coordinated planning between the related agencies and health-care facilities, social services agencies, non-governmental and advocacy groups, the welfare of the special needs in the emergency situation will be more efficiently uphold.

2.0 LITERATURE REVIEW

The groups who need special attention either in terms of their health conditions or social care are often recognized as "at-risk individuals," "vulnerable populations," or "special-needs populations" [2]. These groups often include people who are elderly or young or have limited health condition or disabled or those who are geographical isolated. The populations with "special needs" are also defined in a variety of ways based on their characteristics such as cognitive, medical, physical, culture or a combination of the attributes that sets them apart from other individuals in terms of needs [3]. Meanwhile, within the emergency management and response fields, the confusion has led to some special needs populations being overlooked because of their invisibility. For example, people with cognitive or intellectual disabilities, or being unintentionally ignored (such as the hearing impaired) may not be able to hear announcements provided by public address systems or television stations. Thus, they may need scrolled messaging to assist them [4].

List of examples for poor decision making during disaster evacuation is shown in Table 1. One example of poor decision making is '*failure to prioritize evacuation that the most vulnerable (residents of theriskiest areas and people with special needs) leave first*' [5]. It shows that it is important for the evacuation plan to be able to accommodate the needs of the most vulnerable victims under the extreme conditions. The most vulnerable victims are also including those who need special attention including the poor, disabled or ill.

In 2005, the catastrophic flooding in the New Orleans area revealed that it is important to well - equip to respond the peoples with mobility restrictions including the elderly and disabled people. An estimated 1,800 persons died in Hurricane Katrina and its aftermath. The fatalities were disproportionately elderly, with 71 percent of the victims older than 60, and 47 percent over the age of 75. Of the elderly affected by Katrina, most lived independently, and many were disabled and mobility-restricted [6]. In addition, on 11 March 2011, a magnitude 9.0 earthquake caused a huge tsunami that resulted in

catastrophic damage to Northeast Japan and nearly 20 000 deaths.56.1 percent of the victims were aged 65 or over, and the majorities were women [7].Meanwhile, it was also took 13,007 lives in Iwate, Miyagi, Fukushima where 54 percent of those fatalities were women and girls. Children younger than 15 years and adults 65 years or older accounted for 4.3% and 56.7%, respectively, of the total deaths [8].

Table 1 Examples of poor decision making [5]

General	Transportation
1) Failure to define who is in charge, conflicts over authority, and inadequate communication among top-level decision-makers.	1) Failure to have an effective evacuation plan for non-drivers.
2) Failure to distribute food and water immediately after the hurricane.	2) *Failure to prioritize evacuation to insure that the most vulnerable (residents of the riskiest areas and people with special needs) leave first.*
3) Waiting until the fourth day to deploy the National Guard and supply ships waiting nearby.	3) Failure to understand and address the reasons that discourage people from evacuating.
4) Failure to provide security to rescue teams.	4) Failure to offer free or subsidized evacuation transport to people who need it.
5) Failure to help evacuate families of essential staff (police, fire, transit, healthcare, utility, etc) so they could concentrate on emergency response.	5) Failure to prioritize evacuation traffic to favor buses, HOVs and service vehicles.
6) Failure of communications systems (telephone service stopped) and backup generators at critical facilities.	6) Failure to implement a transit and school bus "evacuation action plan".
7) Official overreaction to reports of violence, and so failing to provide help or allow evacuation of some people, particularly African-Americans.	7) Failure to use counter flow lanes and road shoulders for evacuation traffic, in some cases where it was possible.
8) Failure to show respect and compassion to disadvantaged people.	8) Failure to coordinate vehicle rentals, fuel distribution and services along evacuation route.
9) Failure to show respect and compassion to disadvantaged people.	9) Failure to use public transit, school buses, charter buses and trains for evacuation.
	10) Failure to accommodate pets

For the case of Kelantan's flood, which was also considered to be a "tsunami-like disaster" 202,000 victims were displaced [9]. However it is believed that still many villagers were stranded at their own house and struggled to get food, medicine and clean water. Even though only 10 fatalities were recorded during

the disaster, but the actual numbers of special needs populations that suffered were hardly identified.

Three examples above show that during the disaster events, elderly and other vulnerable populations are actually needs more attention. They actually faced a number of challenges in evacuations because of their physical, health or psychological conditions. For example, elderly are among the most vulnerable in the general population to the direct impact of natural disasters. Elderly who are as vulnerable as person with disabilities tend to face different risks in disasters from those faced by persons in the general adult population [10].

Other than elderly, people with special needs that require medical care also important. Federal Highway Association reported that examples of individuals with medical conditions who may need assistance during an evacuation may include some who have: a stable medical or psychiatric condition, but will need access to medications; oxygen or other specific medical needs; weight beyond the safety restrictions of general issue cots or requiring lifting equipment; difficulty in eating, dressing, bathing, and/or using the toilet; ambulatory challenges, requiring assistance with ambulation, mobility, position change, and transfer; periodic observation needs (e.g., glucose, vital signs,

urinary, catheter care); periodic wound care assistance and/or full-time medical or pharmaceutical needs outside of hospitalization [11]. Therefore, it is needed for the shelters for victims to provide the necessary equipment depending on the threat and the level of care that demanded [12].

As a disaster prone country, Japan has established a nursing care level determination system as shown in Table 2. This standard was being used to promote the in-home nursing care services and the data of populations that need the support are recorded. In addition, Japan's government also advised the local authorities to prepare a list in advance of people who need support during disasters, as well as who will support them [13].

Meanwhile World Health Organization summarized that minimizing the disaster vulnerability of the special needs group requires a solid understanding of the specific needs and traits of this vulnerable population, and identification of the risk factors that lead to their vulnerability [14]. In addition, it is also claimed that any effective disaster policies and programs that specifically target the special needs population should establish strong connections between them and available resources, and also evaluate the efforts to ensure that vulnerabilities are being well- handled [15].

Table 2 Nursing care level determination system in Japan [1]

Segment	Rough standard of condition
Support Required: Level 1	The person can conduct basic activities of daily living almost independently. To support the activities of daily living and inhibit deterioration of the current condition, and for prevention of a long-term care required condition, a certain level of support for instrumental activities of daily living shall be provided. (He/she can operate basic activities of daily living almost independently. A low level of support to prevent a long-term care required condition in the future is necessary.)
Support Required: Level 2	The person in Support Required: Level 1 loses the capacity for instrumental activities of daily living slightly, and needs a certain level of support. (Although he/she needs a low level of support for daily living, he/she will be able to maintain or improve bodily functions by using the nursing-care services.)
Long-Term Care Required: Level 1	The person in Support Required: Level 2 loses the capacity for instrumental activities of daily living partially, and needs support for some parts of daily living. (He/she cannot stand up or walk firmly. He/she can go about his/her daily living almost independently, but needs partial support for toilet activities and bathing.)
Long-Term Care Required: Level 2	In addition to the condition of Long-Term Care Required: Level 1, the person also needs partial support for activities of daily living. (He/she cannot stand up or walk without help, and needs partial or full support for toilet activities and bathing.)
Long-Term Care Required: Level 3	Compared to the condition of Long-Term Care Required: Level 2, the person significantly loses both the capacity for activities of daily living and instrumental activities of daily living, and needs almost full nursing care. (He/she cannot stand up or walk without help, and needs full support for toilet activities, bathing, and changing clothes.)
Long-Term Care Required: Level 4	In addition to the condition of Long-Term Care Required: Level 3, the person seriously loses the capacity to move and finds it difficult to perform activities of daily living without nursing care. (His/her capacity for activities of daily living is totally deteriorated, and he/she needs full support for toilet activities, bathing, and changing clothes s well as partial support at mealtimes. He/she finds difficulty in performing activities of daily living without nursing care.)

3.0 METHODOLOGY

The purpose of this paper is understand the human diversify that needs special attention in evacuating and sheltering process.

A questionnaire survey that focused on the flood victims in 2014 were held based on the shelters' database from National Security Council (NSC).Therefore, 14 schools that used as shelters were selected to be the spot of questionnaire distribution. The schools that had been selected were SK Sri Rantau Panjang 1, SK Rantau Panjang, SK Kedai Tanjung, SK Gual Tinggi, SK Sri Rantau Panjang 2, SMK Rantau Panjang, SK Lati, SMKA Lati, SK Meranti, SK Gelang Mas, SK Kok Pauh, SK Bakong, SK Gual To'Deh and Sk Rahmat.

From 7000 forms distributed, 4447 were returned which give 63% of the response rate. However only 751 respondents were identified to have the special needs people in their household. For analysis purpose, the data of respondents with special needs in their household were divided into two groups which are i. the special needs groups & move to shelter (Group A, N= 340) and ii. the special needs group & not move to shelter (Group B, N=411). To bear in mind that the respondents who answered the questionnaire survey maybe not the person who has special need but they may have the vulnerable individu in their household. Table 3 shows the questions and answer scales that used in the questionnaire survey.

Table 3 Questions related with special needs in the questionnaire

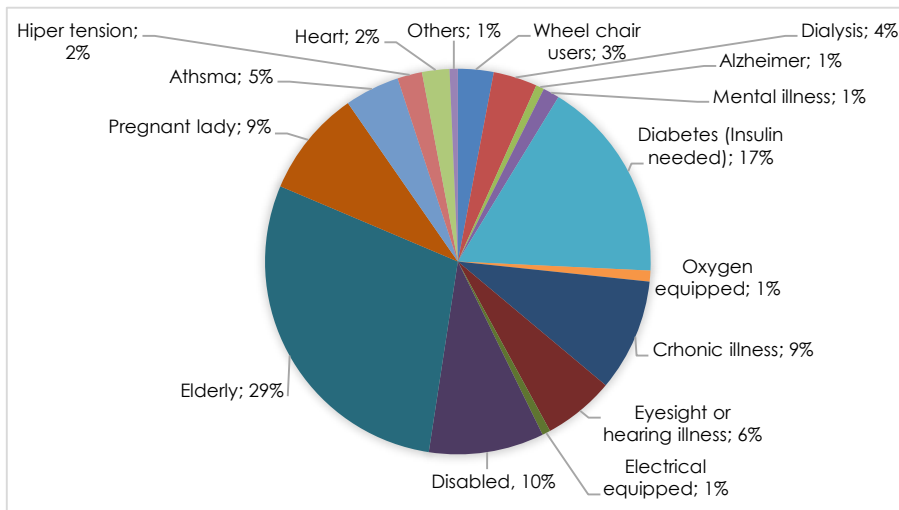| Question	Answer scale	Mean/SD
Age (please state your age)	-	37.09/14.38
Please choose your gender	☐ Male ☐ Female	1.47/ 0.499
Does your family member that needs special care or special support move to the provided evacuation shelters?	☐ Yes ☐ No	1.19/0.389
IF YES **Please choose the type of health problem or special needs**	☐ Using a wheelchair to get around ☐ Have Dialysis ☐ Have Alzheimer ☐ Have a Mental Illness ☐ Have Diabetes (Insulin dependent) ☐ Requires oxygen ☐ Chronic health conditions ☐ Have vision or hearing impaired ☐ Requires a medical device that uses electricity ☐ Persons with disabilities ☐ Group of elderly ☐ Pregnant women ☐ Have asthma ☐ Have high blood pressure ☐ Have heart disease ☐ Others	8.59/3.56
How does your family member that needs special care or special support move to the provided evacuation shelters?	☐ Own vehicle ☐ Neighbour or friend's help ☐ Public transport (taxi or rental car ☐ Fire and rescue department ☐ Non-govermental organization ☐ Others (please state) _____	2.48/1.622
IF NOT **Why your family member that needs special care or special support not moving to the provided evacuation shelters?**	☐ Do not own any vehicle ☐ Rescue team not arrived ☐ No need to move (house not fully affected) ☐ Shelter not convinient ☐ Need medication ☐ Others (please state) ☐ _____	2.5 8/0. 840

Figure 1 Category of vulnerabilities for the special needs people and moved to the evacuation shelters
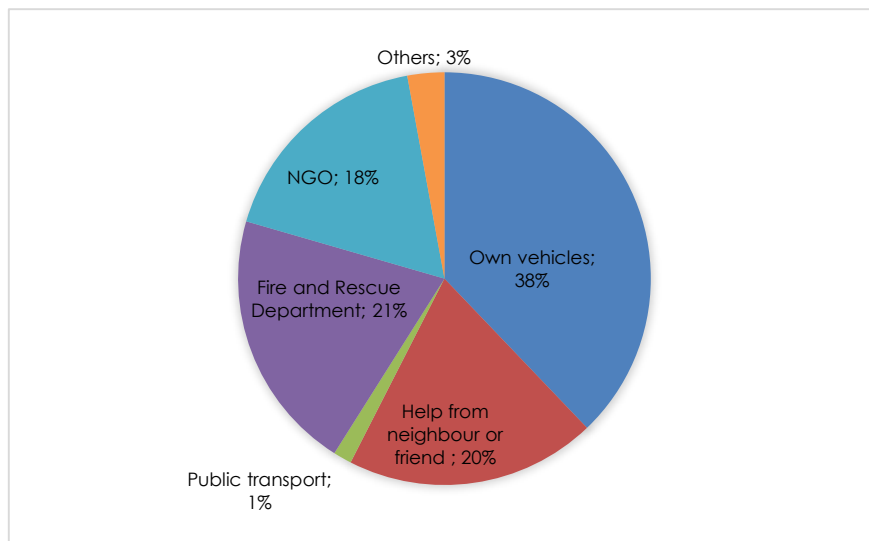

Figure 2 Method used by the special needs people to evacuate to the shelters.

4.0 RESULT

Figure 1 shows the relevant data for the special needs group (Group A) with the catagories of their vulnerability. It shows that elderly was the highest percentage of the special needs, followed by the diabetes peoples, disabled peoples, pregnant ladies, chronic illness, eyesight or hearing illness and other categories. However, one vulnerable individu maybe listed in more than one categories. For example one elderly might be categorized as elderly, but also may has heart disease or athsma. Therefore this data is showing the percentages of illness categories, not representing the percentage of the individuals.

For special needs in Group A, 435 illness or special needs categories were identified. Figure 2 shows how the respondents with the special needs family member evacuated to the shelters. The result shows that most

of them had evacuated by using their own vehicles including boats. It is followed by help from fire and rescue department, their neighbours and friends, NGOs, public transport such as taxis or rental vehicles and others.

Meanwhile, Group B in the result representing the special needs groups that not move to the shelters during the emergency event either they were refused to move or they were stranded away from the evacuation process. Figure 3 shows that as of 411 individuals that were not going to the shelters, 579 disabilities were identified. Similar with Group A, most of the special needs in Group B were categorized as the elderly. It is followed by the diabetes patients, disabled, asthma, chronic illness, oxygen equipped, wheel chair users and other categories.

In order to identify the reasons for not moving, Figure 4 reveals the data. The findings show that most

of the respondents with the special need members in their household were refused to move. One of the reasons for victims' willingness to stay at home during the flood disaster were they claimed that they still can handle the situation and only some parts of their house were affected by the flood. Another reason is the condition of the shelters that were too crowded and not convenient for those who have illness. The findings also show that the respondents claimed that they not moved to shelters because no rescue team arrived, no vehicles to evacuate and others.
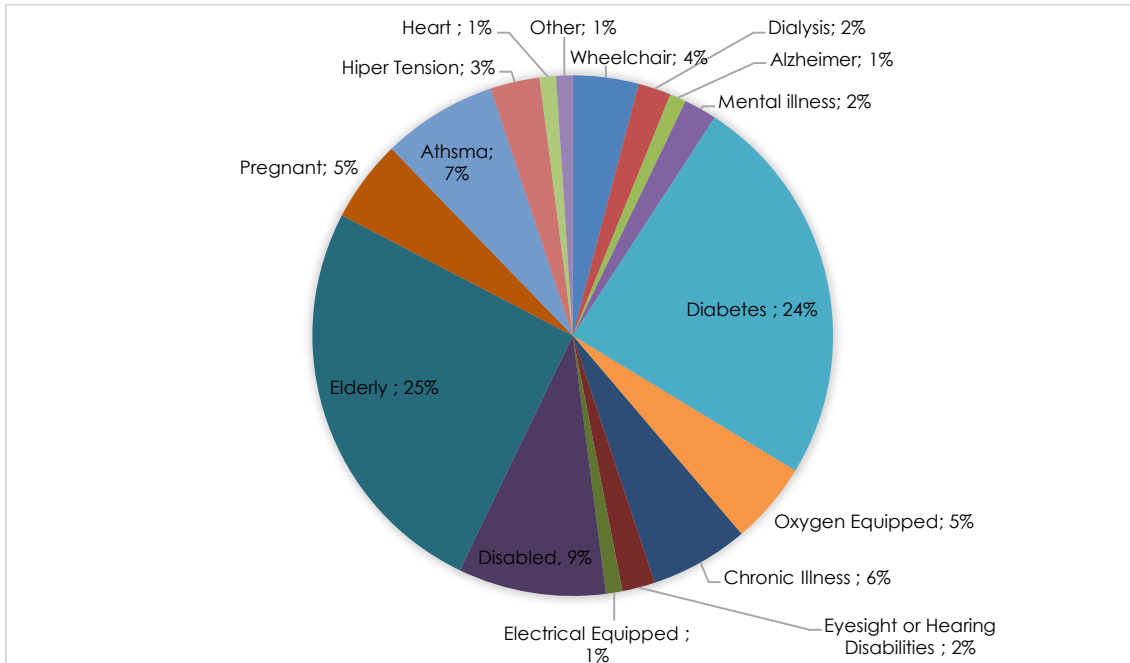

Figure 3 Category of vulnerabilities for the special needs people and not moved to the evacuation shelters
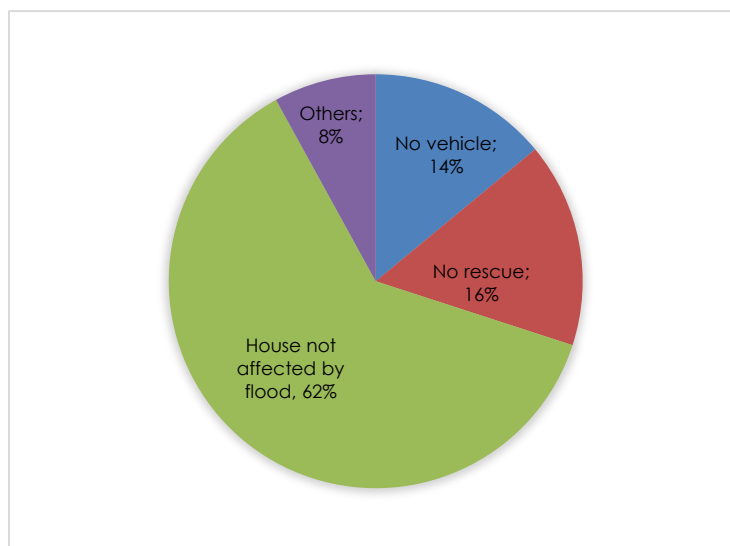

Figure 4 Reasons given by the special needs people Group B for not moved to the evacuation shelters

5.0 DISCUSSION

The 2014 flood was the most significant and largest recorded flood in the history of Kelantan. During the emergency response and shelter, the vulnerable groups' needs and requirements were usually overlooked. The findings for this paper were divided into two groups. Data analysis for Group A in this paper addressed the categories of special needs for the victims who moved to the shelters. Most of them were identified as elderly and moved to the shelters by using their family's vehicles. Meanwhile 21% of them were

rescued by the fire and rescue department. This finding is actually important for the rescue teams to prepare their assets and well-trained man powers to handle the elderly during the evacuation process.

Meanwhile for Group B, it is a shocking finding that reveals the insulin dependent diabetic patients were more likely to stay at home during the flood event. It can be related with the condition at the shelter or evacuation center that crammed with other flood victims and not comfortable for the person who needs special care. In reality the required diabetes medication was really hard to obtain at the relief shelters [16]. If the patient chose to evacuate they needed to brought along their insulin and supplies that had enough only for a few days. This maybe the main factor that caused most of the diabetes patients in this study preferred to stay at home.

Therefore, the findings from this study suggest that it is a crucial obligation for the responsible agencies to organize the evacuation plan that taking into account the condition of the special needs groups. For example, it is necessary to identify the older persons and persons with disabilities who will need emergency transportation and special medication treatment earlier. In order to establish the database for the special needs groups, it is firstly suggested to prepare the list of people that requiring support during the emergency condition through municipalities. Then, the information that collected should be sharing between related organizations during a normal time and discuss how to utilize the information. Several methods of collecting the special needs groups' information are suggested as listed in Table 4. In order to create effective database the combination of Method 1 and Method 3 is recommended.

Table 4 Information collecting methods for the special needs group

Suggested Method	Details
Method 1 Sharing the information between the related organizations`	All disaster prevention and emergency response related departments, independent disaster-prevention organizations, and other related agencies including local welfare related departments should allow utilization of obtained private information without consent of the people in the list other than for intended purpose and provision of information to third parties.
Method 2 Collecting information that the concerned parties given by themselves	Notice regarding the establishment of the registration system for the special needs groups should be announced and distributed to the villagers followed by establishing a responsible department or association leaders to collect information and details of any vulnerable individual who want to register their names on the list of people requiring support in emergency time after announcing and distributing
Method 3 Collecting information with the approval of the concerned parties	All disaster prevention and emergency response related departments, welfare related departments, independent disaster-prevention organization and welfare related organizations directly contact the people requiring support and collect necessary information from them.

6.0 CONCLUSION

To prevent any fatality and tragedy during disaster, the related organizations and emergency response departments play an essential role in establishing effective emergency plan for disaster victims including the special needs groups. It is confident that lessons learned from East Coast flood disaster in 2014 will lead to implementation of guidelines, which will lead to better relief of individuals with special care who must contend with either small emergencies or large scale disasters. This paper also strongly recommended that by recognizing and addressing the essential supports that needed in rescue, evacuation and shelters plan, the quality, delivery, and effectiveness of the care provided to special needs can be improved. Therefore, more time and lives can be saved, reduce suffering, and provide substantial savings and benefits to the society.

Acknowledgement

References

[1] Bernama. 22 Dec 2014. Pain Filled Situation for Kelantan Flood Victims. *The Malay Mail Online* (cited 5 september 2015)http://www.themalaymailonline.com/malaysia/ article/pain-filled-situation-for-kelantan-flood-victims.

[2] Nick, G. A. 2009. Emergency Preparedness for Vulnerable Populations: People with Special Health-care Needs. *Public Health Report*. 124: 338-343.

[3] Sorensen, B. V. 2006. Populations with Special Needs. *ORNL/TM-2006/559. U.S. Department of Energy.*

[4] National Organization on Disability. 2005. *Report on Special Needs Assessment for Katrina Evacuees (SNAKE) Project.*

[5] Litman, T. 2006. *Lessons From Katrina and Rita: What Major Disasters Can Teach Transportation Planners. Journal of Transportation Engineering*. 132: 11A(11): 11-18.

[6] Cahalan, C. and Renne, J. 2007. *Emergency Evacuation Of The Elderly And Disabled*.

[7] Satomi, S. 2011. The Great East Japan Earthquake: Tohoku University Hospital's Efforts and Lessons Learned. *Surgery Today*.41:1171–1181.

[8] Nakahara, S. and Ichikawa, M. 2013. Mortality in the 2011 Tsunami in Japan. *Journal of Epidemiology*. 23: 70.

[9] Boo, S.L. 15 Jan 2015. Kelantan Floods Like Japan's 2011 Tsunami, Says NSC. *The Malay Mail Online*[Online] From:http://www.themalaymailonline.com/malaysia/article /kelantan-floods-like-japans-2011-tsunami-says-nsc (Accessed on 5 September 2015).

[10] Gibson, M. J. 2006. *Social Sciences in Health Care and Medicine. American Association of Retired Persons.* NOVA Publisher.

[11] Lindley, J.A. 2009. Evacuating Populations With Special Needs. Routes To Effective Evacuation Planning Primer Series. *Federal Highway Administration.*

[12] Taaffe, K. M., Kohl, R. and Kimbler, D. L. 2005. Hospital Evacuation: Issues And Complexities. *Proceedings of the 2005 Winter Simulation Conference.*

[13] Yurihama-cho website. *Indication of the Main Support And The Level Of Care Required (in Japanese*) [Online] From: http://www.yurihama.jp/page.cgi?p=3148 [Accessed on 5 September 2015].

[14] Hutton, D. 2008. *Older People In Emergencies: Considerations For Action And Policy Development.* World Health Organization.

[15] Ngo, E. B. 2001. *Natural Hazard Reviews*. Social Vulnerability to Disasters, Second Edition. 2: 80.

[16] American Diabetes Association. 2007. Economic Costs of Diabetes in the U.S. in 2007. *Diabetes Care.*