

THE ASSOCIATION BETWEEN SOCIODEMOGRAPHIC  
FACTORS AND DEPRESSION WITH QUALITY OF LIFE  
AMONG THE ELDERLY SURVIVORS OF THE 2014  
FLOOD IN KUALA KRAI, KELANTAN

DR. NURUL NADIA BINTI ISMAIL

DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE  
REQUIREMENTS FOR THE DEGREE OF MASTERS OF MEDICINE  
(PSYCHIATRY)



UNIVERSITI SAINS MALAYSIA

2017

## **DECLARATION**

I hereby declare that the work in this thesis is my own except for quotations and summaries which have been duly acknowledged.

**Dr Nurul Nadia binti Ismail**  
PUM 0073/13  
31<sup>st</sup> May 2017

## **CERTIFICATION**

I hereby certify that, to the best of my knowledge, this research project is an original work of the candidate, Dr Nurul Nadia binti Ismail.

**Supervisor,**

**Associate Professor Dr Asrenee Ab Razak**

MD, MMED (Psy), PhD (Psy Medicine)

Head, Department of Psychiatry

School of Medical Sciences

Health Campus Universiti Sains Malaysia

## ACKNOWLEDGEMENT

Alhamdulillah, all praise be to Him. This dissertation becomes a reality with kind support and help from many distinguish individuals. I would like to extend my greatest appreciation to all of them.

Foremost, I want to express my sincere gratitude to my supervisor Associate Professor Dr Asrenee Ab Razak for her endless support not only during the production of this dissertation, but throughout the master journey. Thank you for believing in me and help me to shine for a better person and a good psychiatrist.

I am also highly indebted to the rest of my research team Associate Professor Juwita, Associate Professor Azidah and Dr Sharifah Zubaidiah for their dedication and guidance.

I would like to thank the Fundamental Research Grant Scheme on Flood for the opportunity to conduct this research as well as to the committees and members of *Program Sentuhan Qalbu*, Hospital Universiti Sains Malaysia (HUSM) who had support my team during the research.

My special gratitude for both of my parents who has always be my greatest supporters, my beloved husband Dr Shamsul Anuar bin Asmee and my beautiful children Ayra Safiyyah and Arif Irsyad for holding my hands through thick and thin.

## PREFACE

This study is part of a bigger research head by my supervisor Associate Professor Asrenee Ab Razak under the Fundamental Research Grant Scheme (FRGS 203.PPSP.61761185) for flood Ministry of Higher Education Malaysia and Universiti Sains Malaysia. The original study proposal consisted of two parts; the qualitative part which fully conducted by Associate Professor Asrenee Ab Razak and the quantitative part. The quantitative data obtained from this research were analyzed for the purpose of producing this manuscript.

Part of the quantitative data and findings were already presented in:

1. The 2nd International Social Work Conference 2015: “Traumatic Stress as Predictors for Quality of Life among Elderly Post Flood Disaster in Kuala Krai, Kelantan”.
2. The Technology & Application for Disaster Management International Conference 2015: “Depression and Quality of Life among Elderly Post Flood Disaster in Kuala Krai, Kelantan”. The extended abstract was published in the Conference Proceeding Book (ISBN 978- 983- 41773- 5- 5).
3. The 21<sup>st</sup> National Conference on Health and Medical Science (NCHMS 2015): “The Prevalence of Depression and Traumatic Stress among Elderly Post Flood Disaster in Kuala Krai, Kelantan”

TITLE		i
ACKNOWLEDGMENT		ii
PREFACE		iii
TABLE OF CONTENTS		iv
ABSTRAK (BAHASA MALAYSIA)		vi
ABSTRACT (ENGLISH)		viii
CHAPTER 1: INTRODUCTION		1
CHAPTER 2: LITERATURE REVIEW		5
CHAPTER 3: OBJECTIVES OF THE STUDY		
3.1	General Objectives	18
3.2	Specific Objectives	18
CHAPTER 4: MANUSCRIPT		
4.1	Title Page	19
	Abstract	20
	Introduction	22
	Methodology	25
	Results	27
	Discussion	30
	References	37
	Tables	43
4.2	Guidelines/ Instructions to Authors of selected journal	50

## CHAPTER 5: STUDY PROTOCOL

5.1	Study Protocol and consent form submitted for ethical approval	61
5.2	Patient information and consent form	78
5.3	Ethical Approval Letter	99

## CHAPTER 6: APPENDICES

6.1	Elaboration of the methodology	101
6.2	Additional tables/ graphs	108
6.3	Abstract Presented in Conferences	124
6.4	Raw data on SPSS softcopy	133

## **ABSTRAK (BAHASA MALAYSIA)**

### **KAJIAN HUBUNGAN FAKTOR SOSIODEMOGRAFI DAN KEMURUNGAN DENGAN KE ATAS KUALITI KEHIDUPAN DI KALANGAN WARGA EMAS YANG MENJADI MANGSA BANJIR BESAR 2014 DI KUALA KRAI, KELANTAN.**

**Latar belakang:** Bencana alam seperti banjir memberikan impak negatif kepada kesihatan fizikal dan psikologi terutamanya di kalangan warga emas. Banjir seringkali berlaku di Malaysia. Walaubagaimanapun kajian setempat mengenai kualiti kehidupan selepas banjir di kalangan golongan warga emas adalah sangat terhad. Kajian ini bertujuan menentukan kadar kemurungan mangsa banjir di kalangan warga emas dan faktor- faktor sosiodemografi yang mempengaruhi kualiti kehidupan.

**Metodologi:** Kajian ini merupakan kajian keratan rentas enam bulan selepas bencana banjir. Seramai 156 warga emas telah dipilih daripada tiga buah kampung yang paling teruk dilanda banjir di Kuala Krai telah dipilih secara persampelan rawak mudah berstrata. Soal selidik dijalankan menggunakan Skala Kemurungan Geriatri (M-GDS15) manakala kualiti kehidupan menggunakan kaji selidik ringkas Organisasi Kesihatan Sedunia penilaian kualiti kehidupan. Kedua- dua kaji selidik ini telah diterjemah dan disahkan ke dalam Bahasa Melayu.

**Keputusan:** Kajian mendapati warga emas yang mengalami kemurungan klinikal yang ketara ialah 41.3% (M-GDS15). Daripada jumlah ini 23.2% mengalami kecelaruan kemurungan utama. Kemurungan mempunyai hubungan linear ketara negatif dengan kualiti kehidupan kesihatan fizikal, kesejahteraan psikologi dan kualiti persekitaran. Hanya jangkamasa banjir mempunyai hubungan linear ketara negatif dengan kesemua domain kualiti kehidupan. Selain itu mempunyai pekerjaan, mempunyai pengalaman banjir dan



berkahwin mempunyai hubungan linear ketara positif dengan kualiti kehidupan dan semakin berusia seseorang warga emas, mempunyai sejarah keluarga penyakit psikiatri dan menyaksikan sekurang- kurangnya satu situasi yang trauma mempunyai hubungan linear ketara negatif dengan kualiti kehidupan selepas bencana banjir.

**Kesimpulan:** Kajian ini menunjukkan bahawa kelaziman kemurungan di kalangan warga emas adalah dua kali ganda berbanding kajian- kajian sebelum ini. Kajian ini membuktikan bahawa kemurungan di kalangan warga emas selepas kejadian banjir memberikan impak yang negatif kepada kualiti kehidupan selepas bencana banjir. Ini menunjukkan kepentingan penyaringan di kalangan warga emas selepas bencana. Faktor kepada penurunan kualiti kehidupan ialah pertambahan umur di kalangan warga emas, mempunyai sejarah keluarga menghidap penyakit mental dan menyaksikan pengalaman ngeri semasa bencana. Dapatan kajian ini akan menambahbaik pengurusan dan polisi terkini semasa banjir.

## **ABSTRACT**

### **THE ASSOCIATION BETWEEN SOCIODEMOGRAPHIC FACTORS AND DEPRESSION WITH QUALITY OF LIFE AMONG THE ELDERLY SURVIVORS OF THE 2014 FLOOD IN KUALA KRAI, KELANTAN.**

**Backgrounds:** Flood results in massive community destruction hence, reduced the physical and psychological status especially among the elderly. However, study on quality of life (QoL) after a disaster among the local elderly population is still lacking. The aim of this study is to determine the association between sociodemographic factors and depression with QOL among these elderly.

**Methods:** This is a cross sectional study conducted six months following flood in 2014. Based on the information District Office (DO) of Kuala Krai, the areas were stratified into six highly populated areas. Three of these areas would give adequate subjects to meet the sample size. The three areas were randomly selected by picking three out of six named areas in an individually enclosed envelopes. A total of 156 elderly were selected in this study. Depression was measured using the Malay validated Geriatric Depression Scale (M-GDS15) while QoL was assessed using the WHO Quality of Life questionnaire (WHOQOL- BREF).

**Results:** Proportion of clinically significant depression was 41.29%. Depression showed significant linear negative relationship with physical (-1.83, 95% CI: -2.51, -1.15,  $p < 0.001$ ), psychological (-1.74, 95% CI: -2.36, -1.12,  $p < 0.001$ ) and environment domains of QoL (-0.85, 95% CI: -1.53, -0.16,  $p = 0.016$ ). Only duration of involvement with flood showed a significant linear negative relationship with all domains. Employment status, previous experience with flood and being married showed significant linear positive relationship.

Older old, family history with psychiatry illness and witnessed traumatic event showed significant linear negative relationship with QoL.

**Conclusion:** Proportion for depression in this study was higher in comparison to previous study. Our study confirmed duration of flood and depression have inversed relationship with QoL. This indicated an urgent need for screening program among the elderly for depressive symptoms in the aftermath of disaster. Being older old, having positive family history with psychiatric illness and witnessed traumatic event during the disaster were the risk factors for poorer QoL. This study would improve the management and current policy during disaster.

**Keywords:** Quality of life, disaster, elderly, depression

## 1. INTRODUCTION

Disaster is defined as a “sudden, calamitous event that seriously disrupts the functioning of a community or society and causes human, material, and economic or environmental losses that exceed the community’s or society’s ability to cope using its own resources”. This definition is applicable for both natural and manmade disaster (UNISDR, 2009). The Earth Institute at Columbia University has documented the three most common natural disasters in Malaysia between 1965 to 2004 were flood, cyclone and drought. There were 24 floods recorded within this period. Of these three disasters, the number of victims affected by floods was the highest with the total of 899 620 and 243 deaths were documented. Therefore, floods were recognized as the primary hazard affecting Malaysia (1). Floods occur as the consequence to the change of wind from the northeast monsoon between the month of November to March (2). The states mostly affected by this monsoon are Kelantan, Terengganu, Pahang, and some parts of Sarawak and Sabah (2). During these rainy seasons these states are expected to receive the maximum amount of rain particularly between the period of November and January. However, according to the Malaysian Meteorological Department, the total rainfall in Kelantan and other states recorded in December 2014 was 60% more than the expected average value recorded during the previous years (3). This resulted in the worst flood scenario in the history of the country in decades with more than 150 000 victims affected (4). In Kelantan alone more than RM900 million (5) was spent to assist the flood victims, repairing and rebuilding the infrastructures damaged due to the flood. The National Security Council declared that this was the worst flood that struck Kelantan since 1967. The most pronounced impact of this flood or known as ‘bah kuning’ by the local people portrayed the massive physical destructions.

Natural disasters may result in massive community loss and reduction of the environmental resources including social connectedness, hence, reducing the physical and psychological status especially among vulnerable e.g. the elderly (6- 8). In the Asian tsunami in 2004, part of the northwestern coastal of peninsular Malaysia was severely affected. A study conducted has found persistent psychological issues at 6 weeks in about 1% of this tsunami victims, which warrant further treatment and management (9). However, further studies are needed to determine if similar prevalence will be found among the victims post flood including the elderly population. Constant deforestation and urbanization would inevitably lead to some imbalance in the ecosystem of the world. Thus the risk for disaster - either manmade or natural is inevitable and is expected to become more frequent.

World Health Organization (WHO) and The United Nations Population Fund (UNFPA) projected for changes in the structure of the world's general population. The life span of those aged 60 years and above are expected to increase by at least 20 years. Similar pattern is observed for Malaysian population. The 2014 report from the Malaysia Statistics Department projected the elderly population to be at 11.4% (4.4 million) by 2040 in comparison to 8.7% (2.8 million) in 2016. This could result in high utilization of health care system due to the high prevalence of physical illness (10) and neuropsychiatric conditions such as depression especially following a disaster. Furthermore, the increase in number of elderly population has predicted for more survival issues including maintaining an acceptable quality of life (QoL) among this vulnerable population. Physical illness, neuropsychiatric illness, independence, financial security, mobility and welfare support are among other factors associated with older population that determine the outcome of good quality of life (11,12).

The vulnerable elderly is inevitably exposed to the negative impact of disaster due to their physical limitations, multiple medical and psychological comorbidities especially during and in the aftermath of disaster. Despite this knowledge the study of quality of life among elderly post disaster in Malaysia is scarce. In fact, only few recent publications focused on the quality of life of the Malaysian's elderly population. Thus it limits the disaster preparedness that can specifically accommodate the need of this vulnerable group.

In addition, by identifying the common significant risks for development of depression among the elderly specifically after a disaster, it will help to improve screening and enable early detection for depression. There is a high prevalence of depression among the elderly population in various setting including in the aftermath of disaster but these are still under detected. Depression has an inverse relationship with quality of life and prognosis of chronic illnesses such as acute coronary syndrome and diabetes mellitus. Thus effective prevention programs such as psychoeducation must be established and activated during and post disaster.

Studies in this population would help both government and non-government sector in developing policies in multiple areas including health care system, financial, insurance and retirement scheme, placement or replacement mechanisms and facilities for leisure activities to ensure this elderly population continues to enjoy a good quality of life. Thus, they would be able to contribute for the growth and development of each country. It would benefit the younger generation by learning from the current experiences.

It is therefore of utmost importance to study the elderly population as reference to ensure a good government policy such as the health and public services and the living condition that are able to accommodate the demand from this population to ensure a meaningful later life (13).

The quantitative part which was reported specifically for this manuscript has utilized Geriatric Depression Scale (M-GDS15) and WHO quality of life brief questionnaires (WHOQOL-BREF) to screen for the presence of depressive symptoms and level of QoL among the elderly population sampled for this study. Both questionnaires have been validated in Malay language and these questionnaires have been used widely among the Malaysian population. In addition, specific questionnaires were also developed to determine the sociodemographic factors and the aspects of flood which might have influenced the presence of depression and QoL among the elderly. This study hypothesized that there is an association between factors such as age, marital status, total monthly income, level of education, previous experience with flood, the presence of past psychiatric history, duration of involvement with flood and perceived level of difficulties due to flood with development of depressive symptoms and the level of quality of life.

## **2. LITERATURE REVIEW**

### **2.1 Psychological Wellbeing Post Flood Disaster**

The most common reported psychological sequelae in the aftermath of disasters are post-traumatic stress disorder or symptomatology, depression, adjustment and anxiety disorder. There were mixed findings on the association between natural disaster and psychological morbidities among the vulnerable elderly population. For example, study in Israel and Iran found that elderly people especially those with good physical health, had lower prevalence of psychological distress and more resilience in the aftermath of disaster (11, 12). This could be explained by repeated exposure to traumatic events including disaster which helped the elderly to become more resilient (14). However, study among the tsunami victims supported the vulnerability theory where being old was found to be significantly associated with higher prevalence for development of psychological distress in comparison to younger adults (15). Similarly, study among the elderly population in Japan namely the Great East Japan Earthquake and tsunami, found higher psychological distress especially among the older population (16,17). Studies on floods also found that ageing is one of the predictors for the development of psychological sequelae (18). Another study which was conducted about 6 months following the 2011 flood in Thailand found significant associations between disruption of essential services and chronic illness with possible serious mental illness (19). This finding was further supported by an earlier study which was conducted in England to study on the psychological impact of the summer 2007 floods. Disruption to essential services increased adverse psychological outcomes by two- to three-fold (20). However, none of these studies were specifically conducted among the elderly population. A similar study focusing on the elderly population is needed to compare if similar factors were also found to be associated with psychological wellbeing in local context.



## **2.2 Depression Among Elderly Post Flood Disaster**

Depression among the elderly population is common but is still under diagnosed. The reasons for the under diagnosis of depression in elderly population were due to the common belief that depression is part of the normal ageing, somatic symptoms as part of physical illness and it would resolve by time (21). Undiagnosed depression in elderly will inevitably lead to worsening in function which may in turn cause loss of independence. Early recognition of depression in these high risk elderly population may improve the prognosis of the physical illness and lead to improvement in overall functioning and quality of life.

The prevalence of depression among the community dwelling elderly in western countries were found to be lower at the rate of 1% - 4% (22, 23) in comparison to the three Asian countries - Indonesia (33.8%), Vietnam (17.2%) and Japan (30.3%) (24). The rate is higher in primary care across the world due to strong association with chronic illness and multiple medical comorbidities (25- 27). Sudden loss of properties to flood including damaged house and community destructions are significant life events that precipitated bereavement, thus predisposing them to depression (28).

A meta-analysis of qualitative studies identified six risk factors for the development of depression among elderly population. The factors were disability, having had new medical illness, poor health status, history of depression in the past, poor self-perceived health and bereavement. Similar risk factors were also identified from the quantitative meta-analysis which include bereavement, disability and past history of depression. Another two factors that were recognized were sleep disturbance and being female (28). Having physical illness and bereavement did not only precipitate the development of depression but were also associated with poor prognosis (29).

A systematic review and meta-analysis to determine the prognosis of depression in elderly community and primary care populations found four factors that were associated with poor prognosis which consist of physical illness, disability, cognitive impairment and depression of severe type (30). The psychosocial model hypothesized that loss of self-esteem, loss of meaningful roles, loss of significant others and diminished social contacts to have significant causal relationship with depression especially among the elderly who live in community (31).

A local study has been conducted to determine the prevalence of major depression among the elderly who were hospitalized for physical illness in Hospital Universiti Sains Malaysia (HUSM). More than one third from a total of 271 elderly inpatients were found to have major depression (37.3%) with higher prevalence in female (45.8%) than male (25.9%) (32). Lower prevalence of depression was found in a community study among the elderly in rural Federal Land Development Authority (FELDA) with mild depression of 23.5%, and 2.5% had severe depression (33). This study also described having good physical functioning to be inversely correlated with depression.

The psychological wellbeing may have direct relationship with depression thus similar sociodemographic factors may also predict the prevalence of depression in this elderly population (26). Another study found a significant relationship between chronic morbidity and psychological well-being among the elderly in Northern Peninsular Malaysia (34). Those who have multiple chronic illnesses were predicted to have lower levels of psychological well-being. The same study also found that factors such as being elderly women, not married and unemployed are significant factors associated with low levels of

psychological well-being. Unemployment also found to be significantly associated with depression in elderly in other local community study (35). Elderly female, not married and low total family income which correlated with employment status were also found to be significant factors for depression among elderly receiving treatment in primary health care clinic (36).

In a systematic review, the prevalence of depressive symptomatology or depression was found to be increased in the aftermath of flood (37). However, the prevalence of depression recorded has huge discrepancy from 7.7% to 53.5% (38). The discrepancy in the prevalence could probably be explained by the differences in the timing of the study conducted (e.g. 3-6 months in comparison to 18 months following disaster), type of questionnaires used and the type of area affected by floods (eg urban vs rural area). Similar findings were also found in study focusing on the elderly population. The elderly was consistently found to have higher level of depressive symptoms which developed as early as two months after a disaster (17). The prevalence of depression remained to be high among the vulnerable elderly up to one year after the natural disaster (39).

Another important psychological sequelae in the aftermath of disaster that was frequently reported is post-traumatic stress. In a systematic review between the period of 1980 till February 2007 conducted by Nirea and colleague (40) on post-traumatic stress disorder (PTSD) in the aftermath of natural disaster, they found that a huge range of prevalence was recorded which ranges between 3.7% and 60%. Following an earthquake in 2008 in Sichuan Province in China, it was found that the point prevalence for post-traumatic stress symptoms was almost three times higher in the elderly population than the general adult (22.5% vs 8.0%) (41). However, the prevalence of post-traumatic stress at one year

after disaster was found to be reduced in comparison to depression (39) suggesting that the development of post-traumatic stress is more pronounced during the acute state. Among the identifiable factors associated with development of post-traumatic stress in the aftermath of disaster include being female, widowed, lower level of education, low monthly income, sustained physical injury and low social support (42).

In a review to identify the social vulnerability factors for development of Social Vulnerability Index for United States, few important factors were highlighted to be associated with an increase in the social vulnerability (43). These factors include being at the extremes of age which includes elderly and children, low income, female, low level of education and high dependency on social services. However, this review did not find any difference for social vulnerability between those who lives in rural and urban area. However, in the more recent systematic review on flooding and mental health, being female and elderly were not found to be consistently associated with increased in the development of mental health problems. But, this systematic review also found having low socioeconomic status increased the risk for development of mental health problems due to flood (37).

### **2.3 Quality of Life (QoL) Post Flood Disaster**

World Health Organization (WHO) defines QoL as individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. QoL is viewed as a complex interaction between physical health, psychological state, level of independence, social relationships, personal beliefs and their relationship to salient features of their environment (44). Centers for Disease Control and Prevention (CDC) has defined HRQOL as "an individual's or group's perceived physical and mental health over time."

Disasters affect the whole aspect of living predominantly physical, psychological, environmental status, social support (6- 8) and substantially affect the overall quality of life (QOL). Elderly people would have to confront the issues of survival and at the same time needed to be able to maintain moderate to good quality of life. There were many issues among older population with regards to determining good quality of life. Factors such as physical illness, neuropsychiatric illness, independency, financial security, mobility and welfare support are among the factors that determine the outcome of quality of life (45, 46).

A study conducted among 1168 community-dwelling elderly population in China, found that the presence of depression is associated with reduced quality of physical health, environmental status and psychological wellbeing (47). In 2011, Thailand experienced its worst flood, ranking the natural disaster as the world's fourth costliest disaster. In a study following this disaster, it was found that there was no difference between the quality of life among the elderly and the younger adult (48). In addition, there were no difference between gender with quality of life. Furthermore, in this study with total sample of 200 respondents, the majority rated their level of quality of life using the WHO quality of life-brief Thai

questionnaire (WHOQOL-BREF-THAI), as moderate or high despite having to be evacuated to the relief center. This study also found that despite the severe flood affecting the sample population, the quality of life was relatively preserved due to the shelter management which fulfilled their fundamental requirements, as well as the periodical visits by celebrities who gave encouragement to the flood survivors and close care from the university administration where the evacuees were relocated to. This study highlighted the importance of a good disaster management in order to maintain acceptable or good quality of life.

The growth of the elderly population also predicted for an increase in the incidence of psychiatric illness mainly depression which imposed great constraint to maintain good quality of life (49). Therefore, the presence of depression in the aftermath of disaster further predicted a lower level of quality of life.

In Malaysian context, local studies found that self-rated health, gender, employment status, and level of education influenced the perceived level of quality of life among 229 community dwelling elderly (50). Other study among the community dwelling elderly also found other factors such as age, sex, race, marital status, living with spouse and family members and being socially active were significantly associated with better quality of life, while being dependent and have poor to moderate social support associated with lower quality of life (51). The importance of social support in maintaining good physical and mental health of quality of life were further supported in studies among the elderly attending out-patient clinic as well as living in elderly homes (52, 53).

Even though studies of quality of life among the elderly population in various context had been done in the past, the availability of literatures published on the impact of disaster on

the vulnerable elderly among the Malaysian population is still relatively rare. This issue had in fact been addressed by the government to be further investigated and to create better plans for disaster management in order to mitigate the impact of disaster on the Malaysian population (10). Hence, there is a need to explore the factors that significantly predicted the level of quality of life among this local elderly population. In addition, the psychological sequelae in the aftermath of disaster such as depression and post-traumatic stress need to be explored as depression is known to significantly influence the quality of life among the vulnerable elderly.

In this thesis, the manuscript focuses on the prevalence of elderly depression and the association between sociodemographic factors and depression as predictors for quality of life (QoL) among the elderly in the aftermath of 2014 flood in Kuala Krai, Kelantan.

## 2.4 References:

1. Malaysia Natural Disaster Profile. The Earth Institute at Columbia University. [Date of publication unknown]. Available from: [https://www.ldeo.columbia.edu/chrr/research/profiles/pdfs/malaysia\\_profile1.pdf](https://www.ldeo.columbia.edu/chrr/research/profiles/pdfs/malaysia_profile1.pdf)
2. Monsun. [Internet]. Laman Web Rasmi, Jabatan Metereologi Malaysia, Kementerian Sains, Teknologi dan Inovasi (MOSTI); 2017. Available from: <http://www.met.gov.my/web/metmalaysia/education/weather/weatherphenomena/monsoon>.
3. BBC News Malaysia flooding: PM Najib Razak to tour inundated areas. Retrieved from <http://www.bbc.com/news/world-asia-30609549>, December 27, 2014
4. Bernama, Flood situation in Kelantan worsens, more victims evacuated, December 29, 2014 12:15 MYT. Retrieved from: <http://english.astroawani.com/flood-news/flood-situation-kelantan-worsens-more-victims-evacuated-51139>
5. Bernama, Over RM900mil needed to assist flood victims in Kelantan – Mustapa, January 09, 2015 09:15 MYT. Retrieved from: <http://english.astroawani.com/flood-news/over-rm900mil-needed-assist-flood-victims-kelantan-mustapa-51699>
6. Ngo EB. When disasters and age collide: Reviewing vulnerability of the elderly. *Natural Hazards Review*. 2001;2(2):80-9. Available from: [http://ascelibrary.org/doi/pdf/10.1061/\(ASCE\)1527-6988\(2001\)2:2\(80\)](http://ascelibrary.org/doi/pdf/10.1061/(ASCE)1527-6988(2001)2:2(80))
7. Krause N, Shaw BA, Cairney J. A descriptive epidemiology of lifetime trauma and the physical health status of older adults. *Psychology And Aging*. 2004;19(4):637. Available from: <http://psycnet.apa.org/journals/pag/19/4/637/>
8. Glaesmer H, Brähler E, Gündel H, Riedel-Heller SG. The association of traumatic experiences and posttraumatic stress disorder with physical morbidity in old age: a German population-based study. *Psychosomatic Medicine*. 2011;73(5):401-6. Available from: <http://www.sciencedirect.com/science/article/pii/S0163834310002598>
9. Krishnaswamy S, Subramaniam K, Indran T, Low W-Y. The 2004 Tsunami in Penang, Malaysia: Elderly Mental Health Intervention. *Asia- Pacific Journal of Public Health*. 2012;24(4):710-8. Available from: <http://journals.sagepub.com/doi/full/10.1177/1010539512453261>
10. Rahman BA. Issues of disaster management preparedness: A case study of directive 20 of National Security Council Malaysia. *International Journal of Business and Social Science*. 2012;3(5). Available from: [https://www.researchgate.net/profile/Badrudin\\_Rahman/publication/267841454\\_Issues\\_of\\_Disaster\\_Management\\_Preparedness\\_A\\_Case\\_Study\\_of\\_Directive\\_20\\_of\\_National\\_Security\\_Council\\_Malaysia/links/551bbd940cf251c35b50a50c.pdf](https://www.researchgate.net/profile/Badrudin_Rahman/publication/267841454_Issues_of_Disaster_Management_Preparedness_A_Case_Study_of_Directive_20_of_National_Security_Council_Malaysia/links/551bbd940cf251c35b50a50c.pdf)
11. Cohen O, Geva D, Lahad M, Bolotin A, Leykin D, Goldberg A, et al. Community Resilience throughout the Lifespan--The Potential Contribution of Healthy Elders. *Plos One*. 2016;11(2):e0148125-e. Available from: <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0148125>
12. Forouzan AS, Baradarn Eftekhari M, Falahat K, Dejman M, Heidari N, Habibi E. Psychosocial needs assessment among Earthquake survivors in Lorestan province with an emphasis on the vulnerable groups. *Global Journal Of Health Science*. 2013;5(4):79-84. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4776830/>
13. Chen P. Psychosocial factors and the health of the elderly Malaysian. *Annals Of The Academy Of Medicine, Singapore*. 1987;16(1):110-4. Available from: <http://europepmc.org/abstract/med/3592576>



14. Cherniack EP. The impact of natural disasters on the elderly. *American Journal Of Disaster Medicine*. 2008;3(3):133-9. Available from: <http://europepmc.org/abstract/med/18666509>
15. Satapathy S, Kasi S. Psychological functioning of tsunami affected people with disabilities: impact of age. *Journal of Emergency Management*. 2012;10(3):171-83. Available from: <https://www.cambridge.org/core/journals/prehospital-and-disaster-medicine/article/div-classtitlea196-psychological-distress-quality-of-life-and-post-traumatic-stress-among-tsunami-affected-people-with-disabilitiesdiv/06DCFAC07711A2249ECF3D6A71466EFB>
16. Inoue M, Yamaoka K. Social Factors Associated With Psychological Distress and Health Problems Among Elderly Members of a Disaster-Affected Population: Subgroup Analysis of a 1-Year Post-disaster Survey in Ishinomaki Area, Japan. *Disaster Medicine And Public Health Preparedness*. 2016:1-8. Available from: <https://www.cambridge.org/core/journals/disaster-medicine-and-public-health-preparedness/article/social-factors-associated-with-psychological-distress-and-health-problems-among-elderly-members-of-a-disaster-affected-population-subgroup-analysis-of-a-1-year-postdisaster-survey-in-ishinomaki-area-japan/46D8BEABD1FB1E2037CD17C982B0EFA0>
17. Matsubara C, Murakami H, Imai K, Mizoue T, Akashi H, Miyoshi C, et al. Prevalence and risk factors for depressive reaction among resident survivors after the tsunami following the Great East Japan Earthquake, March 11, 2011. *Plos One*. 2014;9(10):e109240-e. Available from: <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0109240>
18. Lowe D, Ebi KL, Forsberg B. Factors increasing vulnerability to health effects before, during and after floods. *International Journal Of Environmental Research And Public Health*. 2013;10(12):7015-67. Available from: <http://www.mdpi.com/1660-4601/10/12/7015/htm>
19. Yoda T, Yokoyama K, Suzuki H, Hirao T. Relationship Between Long-term Flooding and Serious Mental Illness After the 2011 Flood in Thailand. *Disaster Medicine And Public Health Preparedness*. 2016:1-5. Available from: <https://www.cambridge.org/core/journals/disaster-medicine-and-public-health-preparedness/article/div-classtitlerelationship-between-long-term-flooding-and-serious-mental-illness-after-the-2011-flood-in-thailanddiv/2FA137BC1120B704261407D9B0D8CDC9>
20. Paranjothy S, Gallacher J, Amlôt R, Rubin GJ, Page L, Baxter T, et al. Psychosocial impact of the summer 2007 floods in England. *BMC Public Health*. 2011;11(1):145. Available from: <https://bmcpublichealth.biomedcentral.com/articles/10.1186/1471-2458-11-145>
21. Conner KO, Copeland VC, Grote NK, Koeske G, Rosen D, Reynolds III CF, et al. Mental health treatment seeking among older adults with depression: the impact of stigma and race. *The American Journal Of Geriatric Psychiatry*. 2010;18(6):531-43. Available from: <http://www.sciencedirect.com/science/article/pii/S1064748112600633>
22. Beekman A, Copeland J, Prince MJ. Review of community prevalence of depression in later life. *The British Journal Of Psychiatry*. 1999;174(4):307-11. Available from: <http://bjp.rcpsych.org/content/174/4/307>
23. Alexopoulos GS. Depression in the elderly. *The Lancet*. 2005;365(9475):1961-70. Available from: <http://www.sciencedirect.com/science/article/pii/S0140673605666652>
24. Wada T, Ishine M, Sakagami T, Kita T, Okumiya K, Mizuno K, et al. Depression, activities of daily living, and quality of life of community-dwelling elderly in three Asian countries: Indonesia, Vietnam, and Japan. *Archives Of Gerontology And Geriatrics*. 2005;41(3):271-80. Available from: <http://www.sciencedirect.com/science/article/pii/S016749430500052X>

25. Craven MA, Bland R. Depression in primary care: current and future challenges. *The Canadian Journal Of Psychiatry*. 2013;58(8):442-8. Available from: <http://journals.sagepub.com/doi/abs/10.1177/070674371305800802>
26. Momtaz YA, Ibrahim R, Hamid TA, Yahaya N. Sociodemographic predictors of elderly's psychological well-being in Malaysia. *Aging & Mental Health*. 2011;15(4):437-45. Available from: <http://www.tandfonline.com/doi/abs/10.1080/13607863.2010.536141>
27. Teh EE, Hasanah CI. Validation Of Malay Version Of Geriatric Depression Scale Among Elderly Inpatients. 2004. Available from: [http://eprints.usm.my/10198/1/Validation\\_of\\_Malay\\_Version\\_of\\_Geriatric\\_Depression\\_Scale\\_Among\\_Elderly\\_Inpatients\\_\(PPSPerubatan\).pdf](http://eprints.usm.my/10198/1/Validation_of_Malay_Version_of_Geriatric_Depression_Scale_Among_Elderly_Inpatients_(PPSPerubatan).pdf)
28. Cole MG, Dendukuri N. Risk factors for depression among elderly community subjects: a systematic review and meta-analysis. *American Journal Of Psychiatry*. 2003;160(6):1147-56. Available from: <http://ajp.psychiatryonline.org/doi/full/10.1176/appi.ajp.160.6.1147>
29. Denihan A, Kirby M, BRUCE I, CUNNINGHAM C, COAKLEY D, LAWLOR BA. Three-year prognosis of depression in the community-dwelling elderly. *The British Journal Of Psychiatry*. 2000;176(5):453-7. Available from: <http://bjp.rcpsych.org/content/bjprpsych/176/5/453.full.pdf>
30. Cole MG. Prognosis of depression in elderly community and primary care populations: a systematic review and meta-analysis. *American Journal Of Psychiatry*. 1999;156(8):1182-9. Available from: <http://ajp.psychiatryonline.org/doi/full/10.1176/ajp.156.8.1182>
31. Reker GT. Personal meaning, optimism, and choice: Existential predictors of depression in community and institutional elderly. *The Gerontologist*. 1997;37(6):709-16. Available from: [https://oup.silverchair-cdn.com/oup/backfile/Content\\_public/Journal/gerontologist/37/6/10.1093/geront/37.6.709/2/37-6-709.pdf?Expires=1489372077&Signature=B2QKVYMFfRkiPgOlZMQ~LSpucWM7Hp26hX5MAQ4GcfGHOfW4jTgqxFA4tMqi9p7T0vqzqp7XwJZavFX40y1xT5IJaexsJJ0weEboWVEI9QfKs2Bzmjts0Ofw5WKzducPJNvSN36piADmlwcbQnkQrFdNMRZ0H3KJRODVnDhcwD0GP8p2MD0wqrIFzNnOjIW603nh6tbUNgEvxRoL31h5mcnDnG2zmo-XraVedQ9QSGHGnWBNepgUYQ7ACQWWCUjpLsWkHIqVcda1-v9npY9JMOe3Re8ZvEnMzCOodB2uEwpne43QVwhXMdCbGX7SDsgSnL4XxCB3Nz4rwZgXTAodg\\_\\_&Key-Pair-Id=APKAIUCZBIA4LVPAVW3Q](https://oup.silverchair-cdn.com/oup/backfile/Content_public/Journal/gerontologist/37/6/10.1093/geront/37.6.709/2/37-6-709.pdf?Expires=1489372077&Signature=B2QKVYMFfRkiPgOlZMQ~LSpucWM7Hp26hX5MAQ4GcfGHOfW4jTgqxFA4tMqi9p7T0vqzqp7XwJZavFX40y1xT5IJaexsJJ0weEboWVEI9QfKs2Bzmjts0Ofw5WKzducPJNvSN36piADmlwcbQnkQrFdNMRZ0H3KJRODVnDhcwD0GP8p2MD0wqrIFzNnOjIW603nh6tbUNgEvxRoL31h5mcnDnG2zmo-XraVedQ9QSGHGnWBNepgUYQ7ACQWWCUjpLsWkHIqVcda1-v9npY9JMOe3Re8ZvEnMzCOodB2uEwpne43QVwhXMdCbGX7SDsgSnL4XxCB3Nz4rwZgXTAodg__&Key-Pair-Id=APKAIUCZBIA4LVPAVW3Q)
32. Teh EE, Hasanah CI. Prevalence Of Major Depression Among Elderly Patients Hospitalized For Physical Illness At Husm And The Associated Psychosocial Factors. 2004. Available from: [http://eprints.usm.my/6795/1/Prevalence\\_of\\_Major\\_Depression\\_Among\\_Elderly\\_Patients\\_Hospitalized\\_for\\_Physical\\_Illness\\_at\\_HUSm\\_and\\_the\\_Associated\\_\(PPSPerubatan\).pdf](http://eprints.usm.my/6795/1/Prevalence_of_Major_Depression_Among_Elderly_Patients_Hospitalized_for_Physical_Illness_at_HUSm_and_the_Associated_(PPSPerubatan).pdf)
33. Ibrahim N, Din NC, Ahmad M, Ghazali SE, Said Z, Shahar S, et al. Relationships between social support and depression, and quality of life of the elderly in a rural community in Malaysia. *Asia-Pacific Psychiatry*. 2013;5(S1):59-66. Available from: <http://onlinelibrary.wiley.com/doi/10.1111/appy.12068/full>
34. Momtaz YA, Hamid TA, Yahaya N, Ibrahim R. Effects of chronic comorbidity on psychological well-being among older persons in Northern Peninsular Malaysia. *Applied Research In Quality of Life*. 2010;5(2):133-46. Available from: <http://link.springer.com/article/10.1007/s11482-010-9098-2>
35. Sidik SM, Rampal L, Afifi M. Physical and mental health problems of the elderly in a rural community of Sepang, Selangor. *The Malaysian Journal Of Medical Sciences: MJMS*.

- 2004;11(1):52. Available from: <https://tspace.library.utoronto.ca/bitstream/1807/7529/1/mj04006.pdf>
36. Mohd Sidik S, Zulkefli M, Afiah N, Mustaqim A. Prevalence of depression with chronic illness among the elderly in a rural community in Malaysia. *Asia Pacific Family Medicine*. 2003;2(4):196-9. Available from: <http://eds.b.ebscohost.com/eds/pdfviewer/pdfviewer?sid=3d70f739-4b04-4643b186e2629ed3fd10%40sessionmgr104&vid=0&hid=121>
37. Fernandez A, Black J, Jones M, Wilson L, Salvador-Carulla L, Astell-Burt T, et al. Flooding and mental health: a systematic mapping review. *PloS One*. 2015;10(4):e0119929. Available from: <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0119929>
38. Alderman K, Turner LR, Tong S. Floods and human health: a systematic review. *Environment International*. 2012;47:37-47. Available from: <http://www.sciencedirect.com/science/article/pii/S0160412012001237>
39. Chen Y-L, Hsu W-Y, Lai C-S, Tang T-C, Wang P-W, Yeh Y-C, et al. One-year follow up of PTSD and depression in elderly aboriginal people in Taiwan after Typhoon Morakot. *Psychiatry And Clinical Neurosciences*. 2015;69(1):12-21. Available from: <http://onlinelibrary.wiley.com/doi/10.1111/pcn.12227/full>
40. Y. Neria, A. Nandi and S. Galea (2008). Post-traumatic stress disorder following disasters: a systematic review. *Psychological Medicine*, 38, pp 467-480. doi:10.1017/S0033291707001353. Available from: <https://www.cambridge.org/core/journals/psychological-medicine/article/div-classtitlepost-traumatic-stress-disorder-following-disasters-a-systematic-reviewdiv/4D7C81052A8CCF01FD3DA2BA30A587A2>
41. Jia Z, Tian W, Liu W, Cao Y, Yan J, Shun Z. Are the elderly more vulnerable to psychological impact of natural disaster? A population-based survey of adult survivors of the 2008 Sichuan earthquake. *BMC Public Health*. 2010;10:172-. Available from: <https://bmcpublichealth.biomedcentral.com/articles/10.1186/1471-2458-10-172>
42. Chen G, Shen H. A cross-sectional study on posttraumatic stress disorder among elderly qiang citizens 3 years after the wenchuan earthquake in china. *Canadian Journal Of Psychiatry*. 2012;57(9):547-53. Available from: <http://journals.sagepub.com/doi/pdf/10.1177/070674371205700905>
43. Cutter SL, Boruff BJ, Shirley WL. Social vulnerability to environmental hazards. *Social Science Quarterly*. 2003;84(2):242-61. Available from: <http://onlinelibrary.wiley.com/doi/10.1111/1540-6237.8402002/full>
44. WHO. The World Health Organization quality of life assessment (WHOQOL): position paper from the World Health Organization. *Social Science & Medicine*. 1995;41(10):1403-9. Available from: <http://www.sciencedirect.com/science/article/pii/027795369500112K>
45. Foster JR. Successful coping, adaptation and resilience in the elderly: An interpretation of epidemiologic data. *Psychiatric Quarterly*. 1997;68(3):189-219. Available from: <http://link.springer.com/article/10.1023/A:1025432106406>
46. García-Peña C, Wagner FA, Sánchez-García S, Espinel-Bermúdez C, Juárez-Cedillo T, Pérez-Zepeda M, et al. Late-life depressive symptoms: Prediction models of change. *Journal Of Affective Disorders*. 2013;150(3):886-94. Available from: <http://www.sciencedirect.com/science/article/pii/S0165032713003650>
47. Cao W, Guo C, Ping W, Tan Z, Guo Y, Zheng J. A community-based study of quality of life and depression among older adults. *International Journal Of Environmental Research And Public Health*. 2016;13(7):693. Available from: [https://scholar.google.com/scholar?q=A+community-based+study+of+quality+of+life+and+depression+among+older+adults.&btnG=&hl=en&as\\_sdt=0%2C5](https://scholar.google.com/scholar?q=A+community-based+study+of+quality+of+life+and+depression+among+older+adults.&btnG=&hl=en&as_sdt=0%2C5)

48. Waelveerakup W. The quality of life of flood survivors in Thailand, Nakhon Pathom Rajabhat University. *Australasian Emergency Nursing Journal*. 2014;17(1):19-22. Available from: <http://www.sciencedirect.com/science/article/pii/S1574626713001080>
49. Parkar SR. Elderly mental health: needs. *Mens Sana Monographs*. 2015;13(1):91. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4381326/>
50. Yahaya N, Abdullah SS, Momtaz YA, Hamid TA. Quality of life of older Malaysians living alone. *Educational Gerontology*. 2010;36(10-11):893-906. Available from: <http://www.tandfonline.com/doi/abs/10.1080/03601271003609009>
51. Khan AR, Tahir I. Influence of Social Factors to the Quality of Life of the Elderly in Malaysia. *Open Medicine Journal*. 2014;1(1). Available from: <https://benthamopen.com/FULLTEXT/MEDJ-1-29>
52. Sazlina S, Zaiton A, Afiah MN, Hayati K. Predictors of health related quality of life in older people with non-communicable diseases attending three primary care clinics in Malaysia. *The Journal Of Nutrition, Health & Aging*. 2012;16(5):498-502. Available from: [http://download.springer.com/static/pdf/250/art%253A10.1007%252Fs12603-012-0038-8.pdf?originUrl=http%3A%2F%2Flink.springer.com%2Farticle%2F10.1007%2Fs12603-012-0038-8&token2=exp=1489029030~acl=%2Fstatic%2Fpdf%2F250%2Fart%25253A10.1007%252Fs12603-012-00388.pdf%3ForiginUrl%3Dhttp%253A%252F%252Flink.springer.com%252Farticle%252F10.1007%252Fs12603-012-0038-8\\*~hmac=877d7e1747900538b0a58010621b945ae3ae4980576a03449ebe44d772407cab](http://download.springer.com/static/pdf/250/art%253A10.1007%252Fs12603-012-0038-8.pdf?originUrl=http%3A%2F%2Flink.springer.com%2Farticle%2F10.1007%2Fs12603-012-0038-8&token2=exp=1489029030~acl=%2Fstatic%2Fpdf%2F250%2Fart%25253A10.1007%252Fs12603-012-00388.pdf%3ForiginUrl%3Dhttp%253A%252F%252Flink.springer.com%252Farticle%252F10.1007%252Fs12603-012-0038-8*~hmac=877d7e1747900538b0a58010621b945ae3ae4980576a03449ebe44d772407cab)
53. Onunkwor OF, Al-Dubai SAR, George PP, Arokiasamy J, Yadav H, Barua A, et al. A cross-sectional study on quality of life among the elderly in non-governmental organizations' elderly homes in Kuala Lumpur. *Health And Quality Of Life Outcomes*. 2016;14(1):1. Available from: <https://hqlo.biomedcentral.com/articles/10.1186/s12955-016-0408-8>

### **3. OBJECTIVES**

#### **3.1: General Objective**

The aim of the study is to determine the prevalence of psychological morbidities (depression and posttraumatic stress) and association with quality of life (QoL) among the elderly affected by flood in Kuala Krai, Kelantan.

#### **3.2: Specific Objectives**

3.2.1: To determine the prevalence of depression among the elderly in the aftermath of 2014 flood disaster in Kuala Krai, Kelantan.

3.2.2: To determine the association between sociodemographic factors and depression with quality of life among the elderly in the aftermath of 2014 flood disaster in Kuala Krai, Kelantan.

**4.1 TITLE: THE ASSOCIATION BETWEEN SOCIODEMOGRAPHIC FACTORS AND DEPRESSION WITH QUALITY OF LIFE AMONG THE ELDERLY SURVIVORS OF THE 2014 FLOOD IN KUALA KRAI, KELANTAN**

**Authors:** Nurul Nadia ISMAIL<sup>1</sup>, Asrenee AB RAZAK<sup>1</sup>, Azidah ABDUL KADIR<sup>2</sup>, Juwita SHAABAN<sup>2</sup>, Sharifah Zubaidiah SYED JAAPAR<sup>1</sup>

<sup>1</sup>Department of Psychiatry,  
School of Medical Sciences, Universiti Sains Malaysia,  
16150 Kota Bharu, Kelantan.

<sup>2</sup>Department of Family Medicine,  
School of Medical Sciences, Universiti Sains Malaysia,  
16150 Kota Bharu, Kelantan.

**Correspondeng Author:**

Nurul Nadia Ismail;  
Psychiatry Department, School of Medical Sciences, Universiti Sains Malaysia  
Kota Bharu, 16150 Kota Bharu, Kelantan, MALAYSIA  
Email: [nur\\_aidan@yahoo.com](mailto:nur_aidan@yahoo.com); Tel: +609- 7676710; Fax: +609- 7659057

**Disclosure of funding:** This project was supported by Fundamental Research Grant Scheme (FRGS: 203.PPSP.61761185) Ministry of Higher Education Malaysia and Universiti Sains Malaysia) for flood

## **ABSTRACT**

**Backgrounds:** Flood results in massive community destruction hence, reduced the physical and psychological status especially among the elderly. However, study on quality of life (QoL) after a disaster among the local elderly population is still lacking. The aim of this study is to determine the association between sociodemographic factors and depression with QOL among these elderly.

**Methods:** This is a cross sectional study conducted six months following flood in 2014. Based on the information District Office (DO) of Kuala Krai, the areas were stratified into six highly populated areas. Three of these areas would give adequate subjects to meet the sample size. The three areas were randomly selected by picking three out of six named areas in an individually enclosed envelopes. A total of 156 elderly were selected in this study. Depression was measured using the Malay validated Geriatric Depression Scale (M-GDS15) while QoL was assessed using the WHO Quality of Life questionnaire (WHOQOL- BREF).

**Results:** Proportion of clinically significant depression was 41.29%. Depression showed significant linear negative relationship with physical (-1.83, 95% CI: -2.51, -1.15,  $p < 0.001$ ), psychological (-1.74, 95% CI: -2.36, -1.12,  $p < 0.001$ ) and environment domains of QoL (-0.85, 95% CI: -1.53, -0.16,  $p = 0.016$ ). Only duration of flood showed a significant linear negative relationship with all domains. Employment status, previous experience with flood and being married showed significant linear positive relationship. Older old, family history with psychiatry illness and witnessed traumatic event showed significant linear negative relationship with QoL.

**Conclusion:** Proportion for depression in this study was higher in comparison to previous study. This study confirmed duration of flood and depression have inversed relationship with QoL. This indicated a need for screening program among the elderly for depressive symptoms in the aftermath of disaster. Being older old, having positive family history with psychiatry illness and witnessed traumatic event during the disaster were the risk factors for poorer QoL. This finding would improve the management and current policy during disaster.

**Keywords:** Quality of life, disaster, elderly, depression



## INTRODUCTION

Over the past decade, The International Disaster Database has recorded the Asian continent as having the highest death tolls from flood disaster with total damage cost amounting to more than USD200 million. To date, the flood that hit Malaysia in December 2014 was the worst and had been known as ‘tsunami-like disaster’ (1). The state of Kelantan was the worst affected with more than two hundred thousand evacuees recorded.

Disaster may affect the whole aspect of living predominantly physical, psychological, environmental status, social support (2-4) and consequently the overall level quality of life (QoL). In the event of disaster, the elderly population is the worst to be affected due to the presence of vulnerability factors such as physical and mobility limitation, high prevalence of both medical and psychiatry morbidity and reduced cognitive capacity (5-8). Furthermore, the diverse needs of the vulnerable elderly results in more complex responses to disaster and they tend to suffer disproportionately due to biopsychosocial disadvantages (2, 6).

The most common psychiatric sequelae in the aftermath of disaster reported were post-traumatic stress, depression and anxiety (9). In non-disaster period, the prevalence of depression among community dwelling elderly in developed countries was found to be at 1%- 4% (10, 11). However, the prevalence of depression was higher among the community dwelling elderly in Indonesia (33.8%), Vietnam (17.2%) and Japan (30.3%) (12). The rate is higher in primary care and inpatients across the world due to strong association with chronic illness and multiple medical co-morbidities (13-15). Disaster such as massive flood which will inevitably lead to sudden loss of properties including destructions of houses and community are significant life events that may precipitate bereavement, thus predisposing the elderly to depression (16, 17). A systematic review found an association between the

development of depression symptomatology with living in the areas affected by flood (9). This review also indicated that the severity of depressive symptoms was higher among people who live in the flooded area than those who live in the non-flooded area. The prevalence of depression post flood varies between 7.7% and 53.5% (18). Thailand experienced its worst flood in 2011. A study conducted at six months post flood to determine the relationship between flood exposure and serious mental illness found that the risk of developing serious mental illness was 1.5 times higher compared to those who were not affected by flood (19). Further analysis in this study also found that having disruption to services and medical history of chronic illness such as hypertension and diabetes as predictors for the development of serious mental illness.

Depression was found to be negatively associated with the level of quality of life (QoL) after a natural disaster (20). QoL is a complex interaction between physical health, psychological state, level of independence, social relationships, personal beliefs and their relationship to salient features of their environment (21). The World Health Organization (WHO) defines QoL as the integration of individual's perception of their position in life in relation to their goals, expectations, standards and concerns with the cultural and social context. A study conducted among the elderly at twelve months post Chi-Chi earthquake reported a lower level of QoL in the physical, psychological and environmental domain (22). However, study conducted among the victims of 2011 flood in Thailand, did not find age as the predictive factor for lower level of QoL (19). A study post flood in Sichuan, China found the association between older age, singlehood, poor sleep patterns and chronic illness with lower level of quality of life in physical and mental health (23).

Although disaster is known to be one of the most important negative life events that has been associated with the development of psychological, physical and social distress, research on its impact on mental health is still lacking probably due to the stigma attached with it (24). Even though disaster is known to have negative impact among the elderly in comparison to the adult population (25), study that focuses on the factors that may influence the level of QoL in the aftermath of disaster is scarce (7). This is also true for the Malaysian elderly population. As the elderly population in Malaysia is projected to increase in the next few decades (Malaysia Statistics Department, 2014), more elderly may be at higher risk to be affected by disaster (26).

Therefore, this study aimed to determine the prevalence of depression and level of QoL among the elderly survivor in the aftermath of 2014 flood disaster in Kuala Krai, Kelantan. This study also aimed to determine the association between the sociodemographic factors and QoL. We hypothesized that demographic factors such as marital status, past occupation, duration of flood and depression to be associated with level of QoL.