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PREVALENCE AND FACTORS ASSOCIATED WITH MILD COGNITIVE IMPAIRMENT AMONG OLDER MALAYSIANS

KHAIRIAH KAMAROLZAMAN

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By

KHAIRIAH BT KAMAROLZAMAN

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KHAIRIAH BINTI KAMAROLZAMAN

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Chairman: Prof. Tengku Aizan Tengku Abdul Hamid, PhD

Faculty: Institute of Gerontology

Despite mortality due to communicable diseases, dementia incidence is destined to increase in the developing world in tandem with the ageing population. In Malaysia, one of the significant health problems among elderly is Dementia. Studies show that mild cognitive impairment elderly tend to have lower compliance to medication and they are at higher risk of developing dementia later on. However, a little study was done in this field in Malaysia. Recognizing the importance of finding the factors associated with the occurrences of the early stage of dementia, this study focussed on describing nationwide study of mild cognitive impairment prevalence and its socio-demographic risk factors and health correlates among older Malaysians. This is community centred cross-sectional study conducted among elderly aged 60 and above in four states of Malaysia - Perak, Kelantan, Selangor and Johor. A Multi-stage stratified random sampling method was used for the data collection. The study was conducted from May 2012 to April 2014. A structured questionnaire was used to conduct the study through a face to face interview to obtained socio-demographic data. Mini Mental State Examination ≤22 was used to diagnosed mild cognitive impairment. A multivariate logistic regression was used to do the analysis. Ethics approval was obtained from National Medical Research Register prior to the study.

A total of 2112 older patients were entered into the analysis. The mean age of the patients was 69.2 years and 51.4% were female. The ethnics distribution was 63.4% Malay, 31.4% Chinese, 5% Indians and 0.2% other ethnic. The overall prevalence of mild cognitive impairment was 68% (N=1436/2112). In multivariate logistic regression analysis, respondents with older age (odds ratio OR 1.02, 95% confidence interval [CI] 1.00-1.04) were more likely to have mild cognitive impairment compared to that younger age. Similarly, those with no formal education (OR 6.85, 95% CI 4.58-10.25), primary education (OR 2.35 95% CI 1.84-3.00), loneliness (OR 1.18 95% CI 1.05-1.32) and low level of life satisfaction (OR 1.68 95% CI 1.02-2.67) were more likely to be associated with mild cognitive impairment in this population. Mild cognitive impairment is present in one in two elderly Malaysian. Aging population, presence of low education level, loneliness and dissatisfaction towards life were more likely to develop mild cognitive impairment.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia
Sebagai memenuhi keperluan untuk ijazah sarjana Sains

KELAZIMAN DAN FAKTOR BERKAIT DENGAN KEMEROSOTAN KOGNITIF RINGAN DALAM KALANGAN WARGA TUA

oleh

KHAIRIAH BINTI KAMAROLZAMAN

November 2015

Pengerusi: **Prof. Tengku Aizan Tengku Abdul Hamid, PhD**

Fakulti: Institut Gerontologi

Di sebalik kematian yang disebabkan oleh penyakit berjangkit, penyakit demensia telah menunjukkan peningkatan dalam negara-negara membangun seiring dengan penuaan populasi. Salah satu masalah kesihatan yang ketara di Malaysia dalam kalangan warga tua adalah Demensia. Kajian menunjukkan bahawa warga tua yang menghidap kemerosotan kognitif ringan (MCI) cenderung untuk kurang patuh kepada ubat-ubatan mereka dan mempunyai risiko yang lebih tinggi untuk menghidap penyakit demensia. Walau bagaimanapun, hanya sedikit sahaja kajian yang telah dilakukan dalam bidang ini di Malaysia. Menyedari betapa pentingnya mencari faktor-faktor yang berkaitan dengan kejadian peringkat awal demensia, kajian ini bertujuan untuk menerangkan kelaziman dan faktor-faktor risiko sosio-demografi serta kesihatan yang berhubung kait dengan warga tua secara menyeluruh di Malaysia. Ini adalah kajian berasaskan keratan rentas dalam kalangan warga tua yang berumur 60 tahun di empat negeri di Malaysia - Perak, Kelantan, Selangor dan Johor. Kaedah persampelan rawak pelbagai peringkat secara strata telah digunakan untuk melakukan pengumpulan data. Kajian ini telah dijalankan bermula pada Mei 2012 sehingga April 2014. Soal selidik berstruktur secara wawancara bersemuka telah digunakan untuk memperolehi data sosio demografi. Pemeriksaan *Mini Mental State* ≤22 digunakan untuk

membuat diagnosis kecelaan kognitif ringan. Multivariat regresi logistik telah digunakan untuk menganalisa data. Kelulusan etika telah diperolehi daripada *National Medical Research Register* sebelum kajian dijalankan.

Seramai 2112 pesakit warga tua telah dimasukkan ke dalam analisis. Minimum umur pesakit adalah 69.2 tahun dan 51.4% adalah perempuan. Taburan etnik adalah 63.4% Melayu, 31.4% Cina, 5% India dan 0.2% adalah etnik lain-lain. Prevalen keseluruhan kecelaan kognitif ringan adalah 68.3% (N = 1436/2112). Dalam analisis regresi logistik multivariat, warga tua yang lebih berumur, adalah lebih cenderung mendapat kecelaan kognitif ringan (OR 1.02, 95% CI 1.00-1.04). Begitu juga dengan golongan yang berhuruf buta atau tidak mendapat pendidikan formal (OR 6.85, 95% CI 4.58-10.25), golongan yang berpendidikan rendah (OR 2.35 95% CI 1.84-3.00), golongan yang menderita daripada kesunyian (OR 1.18 95% CI 1.05-1.32) dan golongan yang kurang berpuas hati tertahap kehidupan (OR 1.68 95% CI 1.02-2.67) adalah lebih cenderung untuk menghidapi kecelaan kognitif ringan. Satu daripada dua orang warga tua Malaysia menghidapi masalah kecelaan kognitif ringan. Umur yang semakin meningkat, tahap berpendidikan rendah, penderitaan dari kesunyian dan rasa tidak puas hati terhadap kehidupan adalah lebih cenderung menghidapi kecelaan kognitif ringan.

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Without the contribution of all those mentioned above, this work not had been possible. I hope this research could contribute to research development especially in the implementation of health aging policy in this country.

I certify that a Thesis Examination Committee has met on (date of viva voce) to conduct the final examination of (Khairiah binti Kamarolzaman) on her thesis entitled ("Prevalence and factors associated with mild cognitive impairment in older Malaysians") in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U. (A) 106] 15 March 1998. The Committee recommends that the student be awarded the Master of Science.

Members of the Thesis Examination Committee were as follows:

Rahimah binti Ibrahim, PhD
Senior Lecturer
Institute of Gerontology,
Universiti Putra Malaysia
(Chairman)

Hanina Halimatusaadiah binti Hamsan, PhD
Senior Lecturer
Faculty of Human Ecology
Universiti Putra Malaysia
(Internal Examiner)

Low Wah Yun, PhD
Professor
University of Malaya
Malaysia
(External Examiner)

ZULKARNAIN ZAINAL, PhD
Professor and Deputy Dean
School of Graduate Studies
Universiti Putra Malaysia

Date: 24 March 2016

This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Master of Science. The members of the Supervisory Committee were as follows:

Tengku Aizan Tengku Abdul Hamid, PhD
Profesor
Institute of Gerontology
Universiti Putra Malaysia
(Chairman)

Ching Siew Mooi,
Senior Lecturer
Faculty of Medicine and Health Sciences
Universiti Putra Malaysia
(Member)

_____

ZULKARNAIN ZAINAL, PhD
Professor and Deputy Dean
School of Graduate Studies
Universiti Putra Malaysia

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I hereby confirm that:

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This is to confirm that:

- the research conducted and the writing of this thesis was under our supervision;
- supervision responsibilities as stated in the Universiti Putra Malaysia (Graduate Studies) Rules 2003 (Revision 2012-2013) are adhered to.

Signature: _____

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LIST OF ABBREVIATION

CI	Confidence interval
LSNS-6	Lubben Social Network Scale-6
MCI	Mild cognitive impairment
MMSE	Mini Mental State Examination
MOS-SSS	Medical Outcome Study Social Support Survey

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

In Malaysia, as in most countries, the proportion of older persons is increasing rapidly. The proportion of those aged 60 years and above in Malaysia had risen from 6.2% in 1998 to 8.4% in 2010, the number has contributed to the increase of 2.2 million of older Malaysian population (Statistics, 2014). Demographic projection placed Malaysia as the fourth fastest ageing country in the world with 2.7 times increase in the elderly between 2008 and 2040 and Malaysia is expected to be an aged nation in 2030 when 15% of the total population will be older persons (WHO, 2011).

Along with global aging, age-related diseases such as cognitive impairment and dementia will increase dramatically in the coming years and the Malaysia's situation goes as same (Akter et al., 2012). According to Krishnaswamy (1997), the prevalence of dementia was 6%, however, the prevalence rate had been estimated to increase from 11% to 14.3%(Hamid, Krishnaswamy, Abdullah, & Momtaz, 2010; Rashid, Azizah, & Rohana, 2012).

Cognitive impairment is defined as a decline in function in either one or multiple domains of cognitive function (Lezak, Howieson, Loring, Hannay, & Fischer, 2004). Dementia is one of the most common causes of cognitive impairment among elderly people (Forbes et al., 2015). It is a leading cause of disability, institutionalization, and mortality (Keene, Hope, Fairburn, & Jacoby, 2001). Therefore, it has a tremendous impact on both the individual and society.

The term of mild cognitive impairment (MCI) is proposed originally by Petersen et al. (1999) to describe a select group of individuals from the Mayo Older Normative Studies who demonstrated cognitive decline but did not meet diagnostic criteria for dementia. Those individuals have the criterion of memory complaint, preferably corroborated by an informant, memory impairment documented according to an appropriate reference value, essentially normal performance in non-memory cognitive domains, generally preserved activities of daily living and not demented (Petersen et al., 1999). The three subtypes of MCI are Amnestic-MCI, Non-amnestic MCI, and Multi-domain MCI (Schoenberg & Duff, 2011). It is the intermediate stage between the cognitive changes of normal aging and those of dementia (Petersen et al., 1999). The most widely used term is MCI. Dementia –particularly the type of

Alzheimer is normally preceded by a period of MCI. Several studies have shown that individual with MCI poses a higher risk to develop dementia compared to the normal individual (Amieva et al., 2004; Busse, Hensel, Guhne, Angermeyer, & Riedel-Heller, 2006; Yaffe, Petersen, Lindquist, Kramer, & Miller, 2006).

Epidemiological studies of risk factors have been seen as useful by adding to knowledge about what is 'normal' and 'pathological' ageing, and about the nature of dementia. Some factors may increase the risk of dementia and cognitive impairment, others may be protective. As a result of tremendous research that has been done, numerous factors have been proposed to contribute to the condition where it is multi-factorial and are caused by an interaction of genetic and environmental factors acting during the whole life of the individuals.

The exact cause of MCI is unknown but it is believed to be a heterogeneous condition of numerous causes (Razali, Baharudin, Jaafar, Sidi, & Rosli, 2012). Despite the important to know what is the factor related to biological aspect, this study will be conducted to investigate any relationship between psychosocial factors and to mild cognitive impairment among elderly in Malaysia.

1.2 Problem Statement

With a growing aging population and increasing expectation of good life, improving the quality of life and preserving mental health status has become a rising concern of the nation and it is important to recognize mild cognitive impairment. A number of studies found a significant impact of mild cognitive impairment in older people. The individuals with MCI may experience distress from the relatively minor impairments and the prospect of these symptoms converting to dementia. Besides that, low levels of adherence to prescribed medications have been documented in older adults with memory problems that do not preclude self-care, such as mild cognitive impairment (MCI) or early Alzheimer's disease (AD) (Ownby, Hertzog, Crocco, & Duara, 2006). Mild cognitive impairment may have public health significance not only as a risk factor for dementia but likewise as a condition correlated with psychological distress and decreased the quality of life.

Studies have suggested that some of the sociodemographic variables which had impacts in predicting mild cognitive impairment are age (Nie et al., 2011), marital status, income, ethnicity and religion employment (Rashid et al., 2012).

In addition, sociodemographic characteristic, clinical risk factors such as family history, smoking status (Lai Kuan Lee, Shahar, & Rajab, 2009), diabetes mellitus, hypertension, dyslipidaemia, stroke, cardiovascular disease and chronic kidney disease are also predictors of mild cognitive impairment.

Besides that, psychosocial factor like social network (Henry et al., 2012) and social support (Gwyther, 1997), life satisfaction (Kahana, Galper, Zilber, & Korczyn, 2003), personality (Donati et al., 2013) and loneliness (Wilson et al., 2015) are also playing important role in predicting MCI. Furthermore, elderly are the group of people which tend to be more lonely than younger age group (Jylha, 2004). So it is important to study the loneliness among elderly and know the impact on MCI.

Despite there is previous study have been done on the topic of dementia in Malaysia, there is still a gap in the knowledge of mild cognitive impairment in this country. Practically, there is still no nationwide study have been done on MCI in Malaysia. Furthermore, from the literature review, previous studies were conducted either in the rural or urban area in which the result not generalizable.

1.3 Justification of Study

It is crucial that this study will recognize key elements that lead to mild cognitive impairment and increase the understanding of the connection between sociodemographic characteristic, clinical and psychosocial factor and mild cognitive impairment in Malaysia. To our best knowledge, this is the first study in our country to look at sociodemographic characteristics, clinical risk factor and psychosocial factor simultaneously. The present study is exclusive in Malaysia, in that no well-known research has examined these areas simultaneously.

The fast growth of the older population in Malaysia needs consideration to the factors that lead to mild cognitive impairment. It is serious for practitioners and policymakers to develop a strategy for intensify new programs and services to care for this group and made aware of factors that will bear upon the lives of aging peoples.

The outcome of this study will be beneficial to specialists both services providers and the academic community, from a diversity of fields. Older adult themselves, friends, and family will benefit from the study. In addition, gerontologist, social workers, psychologist as well as mental health counsellors will be benefited from this study.

1.4 Research Question

Given the general paucity of knowledge on identified factors for MCI in this country, the research questions are formulated as follow:

1. What is the prevalence of mild cognitive impairment among the elderly subjects in Malaysia?

2. Is there any association between socio-demographic characteristic, clinical risk factors, psychosocial factors and mild cognitive impairment?
3. What are the predictors of mild cognitive impairment?

1.5 Study Objectives

1.5.1 General objective:

The general objective of this study was to determine the prevalence and factors associated with mild cognitive impairment among elderly in Malaysia.

1.5.2 Specific objectives:

1. To describe the distribution of older respondents by sociodemographic characteristic (age, gender, ethnicity, religion, marital status, level of education, employment, income, and living arrangement)

2. To describe the distribution of older respondents by clinical risk factors (smoking status, chronic diseases, family history of dementia)

3. To describe the distribution of older respondents by psychosocial factors (social support, social network, satisfaction with life, personality and loneliness)

4. To determine the prevalence of mild cognitive impairment among older respondents.

5. To determine the association between sociodemographic characteristic, clinical risk factors, psychosocial factors and mild cognitive impairment.

6. To determine the predictors of mild cognitive impairment.

1.6 Hypothesis

Alternative hypothesis for this study are:

H_1: There is a significant association between mild cognitive impairment and socio-demographic characteristics.

H_2: There is significant association between mild cognitive impairment and clinical risk factors.

H_3: There is significant association between mild cognitive impairment and psychosocial factors.

1.7 Theoretical background and Conceptual Framework

1.7.1 Theoretical background

To an explanation of psychosocial of the older adult, numerous theoretical frameworks have been recognized, containing the socio-emotional selective theory, the convoy model, activity theory, disengagement theory, the functional-specificity model and task-specific model (Gurung, Taylor, & Seeman, 2003). In this section, literature is discussed in relation to the main effect model and convoy model as micro and macro element for describing this study. These theories were chosen as the basis for this study to understand the association of sociodemographic characteristic, psychosocial network and mild cognitive impairment in Malaysia.

The first model was, main effect model existed in 1985 (Cohen & Wills, 1985). This model indicates that support enhances health and wellbeing. Such a direct benefit could come as a consequence of the perceptual experience that others will provide assistance in the result of stressful occurrences or simply as an outcome of integrated membership in a social network. The sensing of the older people that others are willing to help could result in increased overall positive effect and in elevated senses of self-esteem, stability, and control over the surroundings. These psychological states may, in turn, influence susceptibility of the elderly to physical illness through their effects on neuroendocrine or immune system functioning (Jemmott & Locke, 1984) or through changes in health-promoting behaviors (eg, decreased cigarette smoking, decreased alcohol use, and improved diet or exercise patterns). So it can slow down or prevent the development of mild cognitive impairment. It is important as to determine the association of support with mild cognitive impairment.

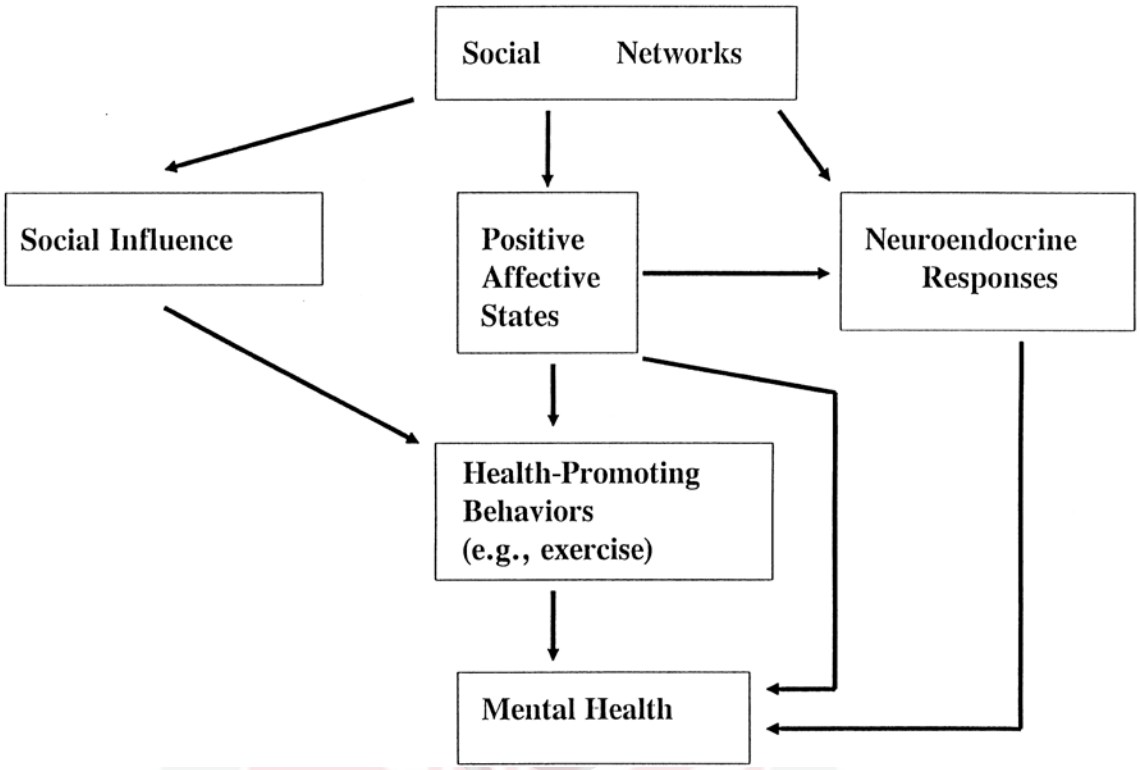

Figure 1 Main effect model of social ties and mental health (Stansfeld, 2002).

This theory is one of the relevant theories for this study because it determines the association between social support and mild cognitive impairment based on the research question, objectives and theoretical model. One component of this study is related to measuring social support which measures the functional component of network, which will be measured by Lubben Social Network Scale. So, the main item in the main effect model (network) of the older adult in the relation to mild cognitive impairment in this study will be measured.

The second model is the Convoy Model. Kahn and Antonucci (1980) introduced the Convoy model of social support. The social support and social role theories are the origins of convoy model. To better inspect the varying effect of social support across the life span, Kahn and Antonucci join these two perspectives into the convoy of social support model. According to the convoy model, individuals are surrounded by supportive others who move with them throughout the life course. These relationships vary in their closeness, their quality (e.g., positive, negative), their function (e.g., aid, affect, affirmation exchanges), and their structure (e.g., size, composition, contact frequency, geographic proximity). The structure, function and quality of convoys are

influenced by personal (e.g., age, gender) and situational (e.g., role demands, norms, values) characteristics while having significant implications for health and well-being (Fiori, Antonucci, & Cortina, 2006). Furthermore, according to this model, personal factor like sex, age, race, religion, education and marital status shaped one convey, influence social relation which gives effect to support network and social network and, in turn, hypothesized to influence the health. In the context of this study, the health outcome was mild cognitive impairment.

True to the study of aging, which is a quintessentially interdisciplinary enterprise, the convoy model has been used by researchers in multiple disciplines including anthropology, epidemiology, human development, medicine, psychology, sociology, and social work. The model was chosen also because the utility of the convoy metaphor for understanding social relations from various disciplinary perspectives is apparent (Antonucci, Ajrouch, & Birditt, 2014). So, another purpose of the study is to measure the component of support in Medical Outcome Social Support Survey Scales (MOSSS). So, the main item in the main effect model (network) of the older adult in the relation to mild cognitive impairment in this study will be measured.

1.7.2 Conceptual Framework

Based on the models, this study aimed to investigate the role of sociodemographic characteristic, clinical risk factors and psychosocial factors of mild cognitive impairment. Figure 1 shows the conceptual framework of the study.

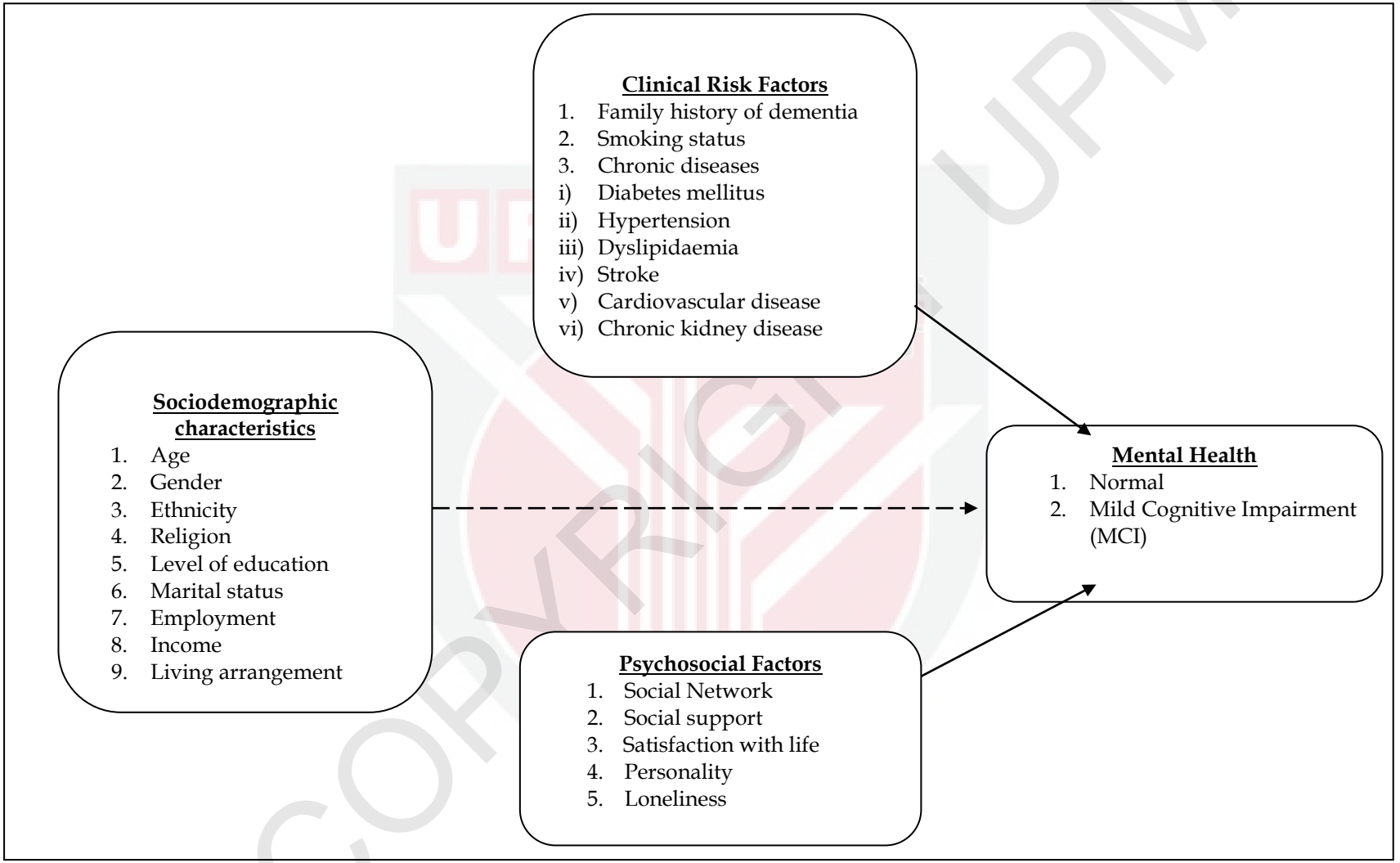

Figure 2: Conceptual framework of research

1.8 Conceptual and Operational Definition

1.8.1 Mild cognitive impairment

Conceptual definition

Mild cognitive impairment is a term to describe the transitional stage between healthy ageing and dementia, in which the cognitive decline is noted through memory complaints and some mental deficits that have seen but are not enough to be characterized as dementia (DeCarli, 2003).

Operational definition

The operational definition of mild cognitive impairment is based on validated Malay version of Mini Mental Health Examination (MMSE) (Razali et al., 2014). A score of 22 and more was defined as normal and a score of 21 and less was considered as mild cognitive impairment (Hamid et al., 2010; Rowe & Kahn, 1997).

1.8.2 Estimated monthly income

Conceptual definition

Estimated monthly income was defined by summation of all source of income from the household, either from main income or side income reported by the respondent.

Operational definition

The monthly income is measured in "ringgit Malaysia".

1.8.3 Education level

Conceptual definition

Education attainment was defined as highest educational system received as reported by the respondent.

Operational definition

It was classified into four classes which were no formal education, primary education, secondary education or tertiary education. Primary education was up to Standard 5 or Standard 6. Secondary education was up to "*Sijil Rendah*

Penilaian" (Form 3) or "*Penilaian Menengah Rendah*" (Form 3) or "*Sijil Pelajaran Malaysia*" (Form 5). Tertiary education includes "*Sijil Tinggi Pelajaran Malaysia"* (Form 6, A level), Diploma, Degree, Master, or Philosophy Doctor (Ph.D.).

1.8.4 Living arrangement

Conceptual definition

Living arrangements are a variable that collects the familial and non-familial relationship of a person to all the other people with whom they usually reside (New Zealand Statistic, 2015).

Operational definition

Living arrangement was classified into two categories which are living alone or living with someone else.

1.8.5 Chronic disease

Conceptual definition

Chronic disease was defined as five diseases which were hypertension, diabetes mellitus, stroke, dyslipidemia, cardiovascular disease and chronic kidney disease.

Operational definition

Chronic disease was defined based on self-report of the respondents. Respondent answer "yes" (1) as having the disease and "no" (0) as not having the disease. The respondent who answered yes was those under follow up with the clinician and also under medication.

1.8.6 Smoking history

Conceptual definition

Smoking is the inhalation of the smoke of burning tobacco that is used mostly in three forms which are cigarettes, pipes, and cigars (Gosselin, Kim, & Thom 2002).

Operational definition

Smoking history was classified into three categories which were current smokers, former smokers, or Non-smokers. Current smokers refer to those who were reported to have smoked 100 cigarettes or more in their lifetime and smoke daily or some days in the past one-month preceding data collection. Former smoker was defined as respondents who reportedly smoked 100 cigarettes and more during their lifetime but did not smoke in the past one month preceding the data collection. Non-smokers refer to those without any history of smoking in their lifetime.

1.8.7 Social Network

Conceptual definition

Social network is defined as a group of people who maintain an important, often ongoing, relationship in their lives forms social network. These people could be family, relatives, friends, neighbours, or other individuals (Nutt, 2001).

Operational definition

In this study, social network had been operationalized by the amount of contact between friends and family members using Lubben Social Network Scale-6 LSNS-6 (Rubinstein, Lubben, & Mintzer, 1994). Respondent was asked about the number of people from friends and family members with whom they are in regular contact with.

1.8.8 Social Support

Conceptual definition

Social support is defined as "information leading the subject to believe that he is cared and loved for, esteemed and valued for and also a member of a network of communication and mutual obligation" (Cobb, 1976).

Operational definition

In this study, social support function is the dimension of emotional and informational support, tangible support, affectionate support. And positive social interaction support, which was operationalized by using Medical Outcomes Study Social Support Survey (MOS-SSS). The higher the score indicated the better function of social support (Sherbourne & Stewart, 1991).

1.8.9 Satisfaction with Life

Conceptual definition

Life satisfaction has been defined as an individual's evaluation of his or her life based on what he or she wants to accomplish versus actual accomplishments (Ghusn, Hyde, Stevens, Hyde, & Teasdale, 1996).

Operational definition

In this study, life satisfaction was measured using Satisfaction With Life Scale (SWLS) by (Diener, 2009). The SWLS is a short 5-items instrument designed to assess global cognitive judgments of satisfaction with one's spirit. A score of 20 represents the neutral point on the scale, the degree at which the respondent is about equally satisfied and dissatisfied. For example, scores between 21 and 25 represent slightly satisfied, and scores between 15 and 19 represent slightly dissatisfied with life. Scores between 26 and 30 represent satisfied, and scores from 5 to 9 are indicative of being extremely dissatisfied with life.

1.8.10 Personality

Conceptual definition

Personality is the set of psychological traits and mechanisms within the individual that are organized and relatively enduring and that influence his or her interactions with, and adaptations to, the intrapsychic, physical, and social environments (Larsen, 2005).

Operational definition

Personality was measured by using Short Scale Eysenck Revise Personality Questionnaire Neuroticism Factor. It was 12 item questions measuring the personality of the subject. High total scores indicate strong emotional liability and over activity.

Eysenck and Eysenck (1975) defined high neuroticism scores as being nervous, worrying, moody, and frequently depressed individuals who are likely to sleep badly and to suffer from various psychosomatic disorders. They are regarded as too emotional, reacting too strongly to all sorts of stimuli, and finding it hard to come back on an even keel after emotionally arousing experiences. Individuals with high scores tend to be emotionally over responsive, and encounter difficulties in calming down. Such persons complain of vague somatic upsets, and report many worries, anxieties, and irritating emotional feelings. They may develop neurotic disorders when under strain, which fall short of actual neurotic collapses. High scores do not prevent such persons functioning adequately in the kin and work positions.

1.8.11 Loneliness

Conceptual definition

Loneliness is defined as the "distress that results from discrepancies between ideal and perceived social relationships" (Cacioppo, Hughes, Waite, Hawkley, & Thisted, 2006). This so-called cognitive different perspective makes it clear that loneliness is not synonymous with being alone, nor guaranteeing with others protection from feelings of loneliness. Rather, loneliness is the worrying feeling that happens when one's social relationships are perceived as being less filling than what is wanted.

Operational definition

In this study, loneliness was operationalized by using 3-items loneliness scale (Hughes, Waite, Hawkley, & Cacioppo, 2004). It was three items questions with 3 answers Likert scale. The total score was calculated and persons with higher score tend to be lonelier. Highest score is nine and lowest score are zero.

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