CONSEQUENCES OF ELDER ABUSE AND NEGLECT AMONG OLDER ADULTS IN RURAL MALAYSIA

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CONSEQUENCES OF ELDER ABUSE AND NEGLECT AMONG OLDER ADULTS IN RURAL MALAYSIA

ABSTRACT

Elder Abuse and Neglect (EAN) is a growing public health concern. With the rapid increase of older population worldwide and especially in developing countries, EAN is likely to escalate. Abuse in late life has been shown to cause various adverse health impacts. However, compared to the other two domains of family violence – child abuse and intimate partner violence (IPV) – research findings pertaining to EAN health consequences are relatively scarce. This study is divided into two phases. Phase I is a systematic review that seeks to gather and critically appraise all the existing evidence on the health consequences of EAN. Phase II is a two-year prospective cohort study that aims at investigating the longitudinal relationships between EAN and three outcomes: mortality, sleep quality and chronic pain. A total of 1927 older adults in Kuala Pilah, Negeri Sembilan were recruited through a multi-stage cluster sampling strategy and interviewed face-to-face at baseline. One thousand one hundred and eighty nine (1189) were followed-up two years later through phone calls. Mortality was tracked using data from the National Registration Department. Sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI) and chronic pain was ascertained by self-reports consisting of two validated questions. Findings from Phase I ranked premature mortality, depression and anxiety as the most credible health outcomes of EAN. In Phase II, survival analysis and Cox regression showed no statistically significant difference of mortality risks between EAN victims and those not abused (β: 0.26, p=0.25), but patterns of hazard and survival plots suggested greater hazard and lower survival for EAN victims. A short follow-up period was a possible reason for statistical non-significance. With regards to sleep quality, abuse victims had significant worsening

of sleep over the period of two years compared to their non-abused counterparts (β: 0.49, *p*=<0.01). Among the EAN subtypes, neglect and psychological abuse were identified as stronger contributors to poor sleep: neglect (β: 1.13, *p*=0.03), psychological abuse (β: 0.64, *p*=<0.01). On the other hand, EAN did not contribute to higher risks of developing chronic pain (β: 1.14, *p*=0.45). In conclusion, abuse in late life adversely affects health. Preventive and intervention measures to address this problem need to be carried out at multiple levels: individual, community, healthcare, larger environment and system. Scientific evidence related to other health impacts of EAN is still scarce, thus highlighting the need for more research.

Keywords: *Elder abuse and neglect; elder mistreatment; elderly abuse; health outcomes; longitudinal study*

KESAN PENGANIAYAAN DAN PENGABAIAN DI KALANGAN WARGA EMAS DI KAWASAN LUAR BANDAR MALAYSIA

ABSTRAK

Penganiayaan warga emas merupakan satu isu kesihatan awam yang semakin meruncing. Transisi demografi yang berlaku di peringkat global, terutama di negara-negara membangun, memberi petanda bahawa fenomena ini akan semakin berleluasa. Penganiayaan warga emas memberikan pelbagai impak negatif terhadap kesihatan individu. Apabila dibandingkan dengan dua jenis keganasan keluarga yang lain seperti penderaan kanak-kanak dan keganasan rumahtangga, kajian yang dilakukan dalam bidang penganiayaan warga emas masih kurang. Tesis ini terbahagi kepada dua fasa. Fasa pertama adalah sebuah penilaian sistematik yang bertujuan mengumpulkan dan menganalisa semua hasil kajian saintifik mengenai kesan penganiayaan ke atas kesihatan warga emas. Fasa kedua merupakan kajian kohort prospektif yang bertujuan mengukur impak penganiayaan ke atas tiga perkara; kadar kematian, kualiti tidur dan kesakitan kronik. Sejumlah 1927 warga emas di Kuala Pilah, Negeri Sembilan telah dipilih secara pensampelan kluster berperingkat dan ditemubual. Penilaian susulan dilakukan selepas dua tahun ke atas seribu seratus lapan puluh Sembilan responden melalui panggilan telefon. Status kematian dikesan menggunakan data daripada Pejabat Pendaftaran Negara, manakala kualiti tidur dinilai menggunakan Indeks Kualiti Tidur Pittsburgh (PSQI). Kesakitan kronik dikenalpasti berdasarkan jawapan responden terhadap dua soalan yang telah divalidasi. Dapatan fasa pertama menunjukkan bahawa kesan penganiayaan yang disokong bukti saintifik terkukuh adalah kematian pra-matang, kemurungan dan kebimbangan. Dalam fasa kedua, analisis survival and regresi Cox tidak mendapati sebarang perbezaan yang signifikan antara mangsa penganiayaan dan responden yang tidak pernah didera (β: 0.26, p=0.25). Namun begitu, tren di dalam

plot survival dan risiko kematian (hazard) memberi petanda bahawa jangka hayat mangsa penderaan lebih pendek. Jarak masa susulan yang singkat – dua tahun – berkemungkinan merupakan salah satu sebab mengapa keputusan yang signifikan secara statistik tidak diperolehi. Kualiti tidur mangsa penganiayaan didapati lebih teruk berbanding mereka yang tidak dianiaya, selepas dua tahun (β: 0.49, p=<0.01), dengan penderaan emosi (β: 0.64, p=<0.01) dan pengabaian (β: 1.13, p=0.03) sebagai dua jenis penyebab utama. Bagi kesakitan kronik, ia didapati bukan kesan daripada penganiayaan ke atas warga tua (β: 1.14, p=0.45). Sebagai kesimpulan, penganiayaan warga emas memberikan pelbagai impak yang negatif ke atas kesihatan. Usaha-usaha bagi mencegah dan menangani permasalahan ini di pelbagai peringkat seperti di kalangan masyarakat awam, pengamal kesihatan, perkerja kebajikan dan pihak atasan (perangka polisi) harus dipertingkatkan. Kajian saintifik terhadap kesan-kesan penganiayaan yang lain ke atas kesihatan juga masih kurang, dan perlu dilipatganda.

Kata kunci: *penderaan warga emas; penganiayaan warga emas; eksploitasi warga emas; keganasan keluarga; impak kesihatan; kajian kohort prospektif*

ACKNOWLEDGMENTS

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LIST OF ABBREVIATIONS

CTS : Conflict Tactics Scale

EAN : Elder abuse and neglect

ESS : Epworth Sleepiness Scale

FOSQ : Functional Outcomes of Sleep Questionnaire

GEE : Generalized estimating equations

GLiM : Generalized linear model

HCU : Healthcare utilization

IPV : Intimate Partner Violence

ISI : Insomnia Severity Index

KT : Knowledge translation

MAR : Missing at random

MCAR : Missing completely at random

MCMC : Markov Chain Monte Carlo

MI : Multiple imputation

MNAR : Missing not at random

NI : Non-ignorable

NOS : Newcastle-Ottawa Scale

PSQI : Pittsburgh Sleep Quality Index

WHO : World Health Organization

LIST OF APPENDICES

CHAPTER 1: INTRODUCTION

This chapter gives a general introduction to a number of subjects related to the thesis. Population ageing at the global scale and the rapid demographic transition in Malaysia are first discussed. The historical background, definition, prevalence, risk factors and impacts of abuse in late life, or elder abuse, are presented, along with a conceptual framework. The last part consists of problem statement, study objectives and significance. There are two sets of literature review, one in this chapter and another in Chapter 2.

1.1   Global Ageing Phenomenon

The greying phenomenon worldwide is reflected by the rapid increase in the total and relative numbers of older adults across the globe. Increased life expectancy and decreasing fertility rates – two big achievements of public health interventions – have largely contributed to this. Estimated at 605 million in 2000, the older population is projected to reach 1.2 billion by 2025 (Kalache & Keller, 2000). While high-income regions such as North America and Europe were said to have the highest share of older adults, the fastest growth of older populations are actually taking place in less developed countries (Zimmer, 2016). The United States Census Bureau reported that from the year 2015 to 2050, older Europeans and North Americans are projected to increase by 10.4% and 6.3% respectively. In contrast, the percentage of older populations in Asian, Latin American and the Caribbean regions will more than double within a similar period of time (He, Goodkind, & Kowal, 2016). By 2050, eight in ten older adults are said to be residing in less developed countries (Hamid & Aizan, 2015). Despite the variations in trends and speed of ageing between countries, an inevitable outcome is the global explosion of those aged 60 and over in relation to other age groups. This demographic transition, set to pose new challenges to social services,

healthcare, financial, legal and political systems, has become one of the biggest concerns of the twenty-first century.

1.2   Demographic Transition in Malaysia

Like other developing countries, the older population in Malaysia is rapidly growing in comparison to the younger age groups. In 1991, it was estimated that there were 1 million older adults, representing 5.8% of total population. Within two decades, this figure more than doubled; 2.2 million older adults comprising 7.7% of total population. By 2040, it is predicted that 17.6% – or seven million – Malaysians will be those aged 60 and over (Elsawahli, Ahmad, & Ali, 2016; Tey et al., 2016). In addition, the oldest-old group (80 and over) is projected to quadruple between 2010 to 2050 (He et al., 2016).

Figure 1.1 (see page 3) illustrates the changes in population age structure that have been taking place since 1950. The younger age group (aged 0 to 14) began to decrease sharply from the year 1965, implying the beginning of decrease in fertility rates, and continues to fall thereafter. The older population on the other hand rose steadily from 2005 onwards, and is predicted to further increase in the future. The median age – an indicator of population ageing – showed an on-going upward trend starting from 1965, and will surpass 30 (the commonly used cut-off to imply that society is old) by 2020 (Hamid & Samah, 2006).
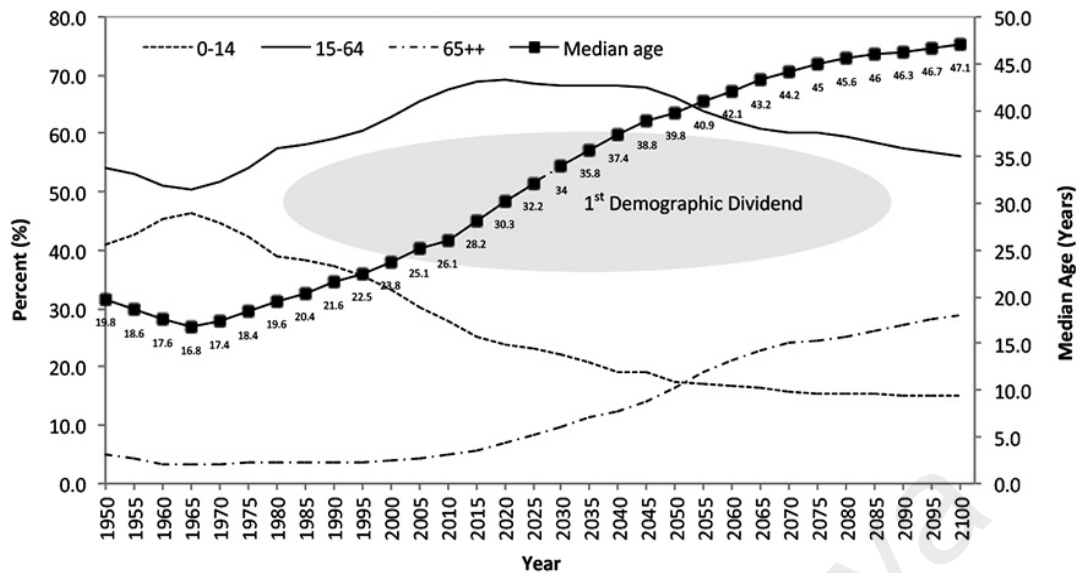
Figure 1.1: Population age structure and median age in Malaysia from 1950 to 2100
Source: World Population Prospects: The 2012 Revision (DESA, 2013).

This booming of older adult population has begun to draw attention of policy-makers, healthcare providers, public health personnel, researchers, politicians and other stakeholders. Among the biggest concerns were those pertaining to: a) healthcare; the rise of non-communicable diseases and medical expenses, and the need for healthcare providers and facilities to adapt to the increase of older patients; b) social security; the need to reform the current inadequate pension system and provision of benefits for retirees; c) social services; existing services are very limited and are not in line with the rapid demographic transition and changes in social structure; d) legislations; more specific acts are needed in order to give older adults greater protection against abuse and exploitation, and; e) resources; the huge financial cost implicated with this phenomenon (Bongaarts, 2004; Carone et al., 2005; Wiener & Tilly, 2002).

1.3 Elder Abuse and Neglect (EAN)

1.3.1 Historical background

The publication of 'Granny Battering' in 1975 in the UK has been generally regarded as the 'trigger' behind the advent of systematic and concerted effort to study EAN (Baker, 1975) Subsequently, EAN began to draw attention and spark interest among researchers. Most of the work on EAN however, was initially carried out in North America mainly as a result of mandatory reporting of suspected cases which facilitated identification for research purposes (Giurani & Hasan, 2000). This was followed by a rapid surge of exploration and investigation into EAN among high-income, western older populations. Research in middle and low-income countries commenced much later, and to this day older adults from less developed regions are still understudied and inadequately represented (Yunus, Hairi, & Choo, 2017).

In Malaysia, the National Policy for the Elderly was introduced for the first time in 1995 as a response to the demographic transition that witnessed a rapid growth of older population (Rani, 2007). However, it was not until late 1990's and throughout 'the noughties' (a decade that began from January 1, 2000) that the subject of abuse in later life gained national spotlight. A number of newspaper headlines reporting abuse and neglect of senior citizens by family members triggered public outcries, and prompted widespread debates. As a result, the plight of senior citizens was taken more seriously, as reflected by the introduction of the National Policy for Older Persons (2011) which formulated a more comprehensive strategy for elder empowerment and protection – including the pledge to support research activities.

Scientific explorations and systematic studies of EAN in Malaysia began roughly a decade ago, though the rapid surge of relevant publications could be seen only few years back. Since then, findings on EAN have increased both in magnitude and

visibility in the scientific literature. A search using Google Scholar and PubMed databases employing *"elder abuse in Malaysia"* as the key phrase gave no result from 1990 to 2000, two results from 2001 to 2010 and ten results from 2011 to 2017.

1.3.2 Definition and typology

There has been no consensus on a single, standard definition of EAN (Yunus, Hairi, & Choo, 2017). From the beginning of EAN conceptualization, various attempts have been made to define it and they have been subjected to changes and modifications with time. EAN definition thus has undergone a long chronological development. For instance, O'Malley et al (1979) defined elder abuse as "the wilful infliction of physical pain, injury or debilitating mental anguish, unreasonable confinement or deprivation by a caretaker of services which are necessary to the maintenance of mental and physical health" (O'Malley et al., 1979). In 1984, Eastman described abuse in old age as "the systematic maltreatment, physical, emotional or financial, of an elderly person by a care-giving relative" (Eastman, 1989). Comijs (1998) suggested an alternative definition; "all acts or the refraining from acts towards persons over 65 years of age, by those who have a personal or professional relationship with the older person, leading to (repeated) physical, psychological, and/or material damage" (Comijs et al., 1998).

Many other proposed definitions are not mentioned here, as the discourse of EAN definition is beyond the scope of this thesis. However, among the most widely used and accepted definition of EAN – which is used in this study – is provided by WHO: "a single or repeated act, or lack of appropriate action, occurring within any relationship where there is an expectation of trust which causes harm or distress to an older person" (WHO, 2002). On a separate note, it is perhaps interesting to also highlight that some researchers have raised the question of whether a common definition is necessary, as

definitions can differ according to contexts and settings given the complex and multi-dimensional nature of EAN (Mysyuk, Westendorp, & Lindenberg, 2013).

Earlier publications seemed to have confined EAN to physical violence, whereas later developments included other components such as emotional, sexual, financial and neglect. Like EAN definition, classification of abuse too underwent changes over time. Currently the most common practice is to categorize EAN into five subtypes, that is – physical, emotional, financial, sexual and neglect (Laumann, Leitsch, & Waite, 2008; WHO, 2002). Recent attempts to expand the classification of EAN by including 'social abuse' (Yi, Honda, & Hohashi, 2015), defined as cutting off an older person's social contact, or restricting his activities to socially isolate him, may lead to a new understanding of EAN in the future. Similarly, there was a call to recognize 'system abuse', a concept mainly related to how health services have not been sensitively designed to cater for the needs of older adults (Mysyuk et al., 2015). Nevertheless, for this study the more common five sub-types of EAN as mentioned above, are employed. They are defined as follows (Dixon et al., 2010):

1. Physical abuse: the infliction of pain or injury, physical coercion, or physical or drug-induced restraint.

2. Psychological abuse: the infliction of mental anguish.

3. Financial or material abuse: the illegal or improper exploitation or use of funds or resources of the older person.

4. Sexual abuse: non-consensual sexual contact of any kind with the older person.

5. Neglect: the refusal or failure to fulfil a caregiving obligation. This may or may not involve a conscious and intentional attempt to inflict physical or emotional distress on the older person.

1.3.3 Aetiology

Against the backdrop of rapid demographic transition, widespread urbanization and westernization in developing countries have brought about inevitable changes to social structures, societal norms and traditional values. As more females participate in the labour market and relinquish their traditional roles as caregivers at home, the conventional practice of caring for, and supporting old parents has been slowly eroded and re-defined (Ho et al., 2009). The shift from joint family households to nuclear ones – another consequence of economic expansion and industrialization – has contributed to the weakening of ties and social interaction with the older generation (Goode, 1963). In addition, the rural-urban migration trend among youths in search of better education and job opportunities often lead to older adults feeling left out and losing instrumental support (Nations, 2002). Even though the culture of filial piety still holds strong in most Asian countries, many traditional norms and values – including those pertaining to family relationships – have been compromised, as they trail along the path of modern development.

These phenomena however, are not able to fully explain the occurrences of abuse and neglect in late life. Being a complex and multi-dimensional subject, the aetiology of EAN is best described through a combination of factors at different levels. Since EAN came to public attention, various attempts have been made to explain its causes. Among the earliest theories proposed was the Caregiver Stress Theory (Wolf, 2000), which described EAN as result of burnout or exhaustion experienced by an overburdened caregiver (relative) who has to provide continuous care for the dependent, impaired victim. Another Theory - the Social Learning Theory or Cycle of Violence Theory – was derived from child maltreatment literature (Bandura, 1978). This theory posits that violence is a learned behaviour, and it is passed from one generation to the next; a

person who experienced abuse during childhood or witnessed violence in his family is more likely to become abusive later towards his family members, including old parents. The Social Exchange Theory on the other hand, focussed on the imbalance of power and contribution in the relationship dynamics between the victim and perpetrator (Homans, 1958).

Riggs and O'Leary introduced the Dyadic Discord Theory, derived from intimate partner violence (IPV) literature, as one possible explanation for EAN. According to this theory, violence that happens in a family is usually a product of relationship discord and behaviors (Riggs & O'Leary, 1996). Another theory based on the IPV literature was the Power and Control Theory. Here the abuser's coercive tactics to gain and maintain power and control in the relationship is highlighted (Walker, 1990). Conversely, the Ecological Theory combined a number of potential causes of EAN and categorized them into four systems: macro, exo, micro and ontogenetic. Variables in the macrosystem are age, gender inequality and societal aggression norms, whereas those in the exosystem are economy and integration into the community. Microsystem variables include individual and family characteristics while the ontogenetic system entails physiology, affect and behaviour (Urie, 1979). This theory posits that "individuals are embedded in a series of environmental system that interact with one another and with the individual to influence personal development and life experiences" (Roberto & Teaster, 2017).

A newer theory is the Contextual Theory of Elder Abuse proposed by Roberto and Teaster which is built upon two models: Bronfenbrenner's Ecological Model and Social-Ecological Model by the Centers for Disease Control (Roberto & Teaster, 2017). Four contexts constitute this theory: individual, relational, community and societal. Elder abuse is positioned "within a larger set of actors and behaviours found within

relationships, communities, and societies". This theory "recognizes the intersectionalities of individual identities as well as the dynamic relationships of older individuals and establishes a foundation for exploration and examination of the breadth and depth of individual characteristics on the occurrence of elder abuse, how those occurrences are linked to the lives of others, the response of the communities in which older adults live, and the power and influence of societal norms and values for propagating or stopping elder abuse" (Roberto & Teaster, 2017).

1.3.4 Prevalence and risk factors

A systematic review by Cooper et al in 2008 found that the EAN prevalence worldwide ranged from 3.2% to 27.5% (Cooper, Selwood, & Livingston, 2008). Another review conducted five years later reported that the prevalence of EAN in developing countries ranged from 13.5% to 28.8% (Sooryanarayana, Choo, & Hairi, 2013). A newer systematic review and meta-analysis in 2017 conducted across 28 countries came up with a pooled prevalence rate of 15.7%; 11.6% for psychological abuse, 6.8% for financial abuse, 4.2% for neglect, 2.6% for physical abuse and 0.9% for sexual abuse (Yon et al., 2017). In Malaysia, it was reported that 9.6% low-income urban elders reported having experienced abuse in the past 12-months (Sooryanarayana et al., 2015), whereas among rural elders, the prevalence stood at 4.5% (Rajini, 2016).

Findings of prevalence studies on EAN have to be interpreted in the light of common limitations that researchers face, such as heterogeneity in definition and methods (tools) of assessment. In addition, the actual magnitude of EAN has always been said to be higher than the official, published figures due to under-reporting. One study stated that for every EAN case reported, five were not informed to authorities (Dolan, 1998).

Individual risk factors for EAN include cognitive impairment, behavioural problems, psychological problems, functional dependency, poor physical health, low income, trauma or past abuse and ethnicity. Those related to perpetrator were caregiver stress and psychiatric illness or psychological problems. Other risk factors comprised family disharmony, conflictual relationships, poor social support and living arrangements (Johannesen & LoGiudice, 2013b). Dependency on elders (victim) and substance abuse among perpetrators have also been reported as risk factors for EAN (Dolan, 1998; Hwalek et al., 1996), and older females are found to be more vulnerable (Biggs et al., 2009). A study conducted in rural Malaysia revealed associations between abuse and low-income, poor social support and depression (Yunus et al., 2017).

1.3.5 Current Scenario in Malaysia

EAN in the Malaysian context has not been adequately understood and systematic research in this field is still rudimentary. The culture of filial piety, defined as 'the notion of respect and care for elderly family members and of family reciprocity' (Chappell & Kusch, 2007) is strongly ingrained within Malaysian society especially among the three main ethnic groups – Malay, Chinese and Indian. Old parents are traditionally taken care of by their adult children as a sign of respect and a way of returning their favour, while sending elders to the nursing homes can be still considered an alien culture which is highly frowned upon. The notion of older adults being abused by family members thus has been generally considered taboo. Accordingly, there is a tendency among family members and even victims to hide their abuse experiences for fear of the stigma attached to it. Community members on the other hand avoid intervening in what is regarded as a 'private matter'.

However, trends are slowly changing. With the recent increase in publicity given to EAN by mainstream media, there is growing awareness and acceptance among the

Malaysian public with regards to the importance of openly discussing the issue and addressing it. Various stakeholders including policy-makers, healthcare providers, researchers, social workers, public health personnel and politicians have also begun to take interest in EAN not only due to the 'pressure' elicited by media reports which are often followed by public outcries, but also due to the realization of the rapid growth of older population – a condition that is likely to aggravate EAN.

From the legal perspective, there are a number of acts which cover older adults. These include acts within the civil law (the Domestic Violence Act 1994, the Penal Code, Care Centre Act 1993, Employment Act 1955, Pensions Act 1980 and Employees Provident Fund Act 1991) and Shariah legal system (Islamic Family Law Act 1984). However, all these acts have been regarded as either irrelevant or not specific enough to EAN circumstances (Jamaludin, 2017). Except for the DVA, Penal Code and Islamic Family Law Act 1984, other acts mentioned are not directly related to EAN, nor do they play any role in protecting elders against abuse and exploitation. For instance, Employment Act 1955 makes no mention about prohibition of discrimination against older adults in employment, while Pensions Act does not address the issue of financial exploitation (manipulation of pension scheme) of retirees by trusted family members of strangers (Jamaludin, 2017).

The limitations of the DVA 1994 and Penal Code on the other hand lie in their lack of specificity to circumstances related to EAN. For example, the DVA 1994 (Amendment 2012) was originally enacted to deal with cases of spousal abuse, despite its capacity to cover all persons in a household. Even though this act can be used for EAN cases, it does not take neglect into account, a common phenomenon in which adult children abandon their parents or do not provide them with the basic needs such as food, shelter and clothes. Accordingly, local experts have argued that it is inadequate for the

protection of senior citizens and that a separate act is needed (Jamaluddin, 2015). On the contrary, the Islamic Family Law Act 1984 provides that "the court may order any person liable thereto according to Hukum Syarak, to pay maintenance to another person where he is incapacitated, wholly or partially, from earning a livelihood by reason of mental or physical injury or ill-health and the court is satisfied that having regard to the means of the first-mentioned person it is reasonable so to order" (Arshad, 2014). While this may be used to address the issue of elder neglect, the drawbacks – as argued by experts – are the lack of clear mention of elderly parents as the persons entitled to maintenance and the conditions laid to qualify for such maintenance. These loopholes can create a lot of complications and make the processes of claiming of rights unnecessarily difficult for older adults (Abdurrahim, Saidin, & Hamid, 2015; Arshad, 2014).

1.4 Impacts of abuse in late life

A number of studies have documented the wide range of adverse effects of EAN on the health and well-being of victims. The two other forms of family violence, mainly – intimate partner violence (IPV) and child abuse – have been shown to cause various physical, psychological, behavioural and social impacts both in the short and long run. Among the long-term health consequences of child maltreatment for instance, include different types of mental disorders, drug use, suicide attempts, risky sexual behaviour, sexually transmitted diseases (Norman et al., 2012) and premature mortality (Chen et al., 2016). On the other hand, IPV has been associated with major depressive disorder (Beydoun et al., 2012), injury, chronic pain, gastrointestinal symptoms, post-traumatic stress disorder (PTSD) and gynaecological problems (Campbell, 2002), as well as adverse birth outcomes such as low birth weight and pre-term births (Hill et al., 2016).

Research into the health consequences of EAN is relatively scarce. A systematic review on EAN health outcomes reported premature mortality, depression and anxiety as the most scientifically credible, while other consequences such as higher hospitalization rates, digestive symptoms and suicidal thoughts needed stronger evidence (Yunus, Hairi, & Choo, 2017). Given that EAN belongs to the domain of family violence, a plausible assumption could be that its effects, or at least the nature or pattern of its effects, should resemble those of child abuse and IPV. However, differences may exist for a number of reasons: 1) unlike victims of child abuse, EAN victims are at a different (later) phase of life, where they usually have established identities and roles; 2) older adults have different physical and psychological characteristics compared to children and younger adults; 3) older adults may have different values, worldviews and coping style, which influence their choice of response and help-seeking behaviour; 4) abuse episodes experienced by EAN victims may have started at a later stage in life, or much earlier (a continuation of violence episodes from childhood or adulthood); 5) some unique characteristics of EAN, such the nature of relationship between the victim and perpetrator, are different from child abuse and IPV.

Taking these points into consideration, more research is needed to understand how abuse in late life affects victims' health. Even though initial understanding of EAN was derived from the literature of child abuse and IPV, there are clear distinctions between the two and the former, which suggest that EAN may have unique health outcomes, or a different mechanism in affecting health. It is equally important to note that effects of EAN are not always necessarily negative. Victims of EAN and family violence have reported positive experiences such as learning better coping methods, obtaining greater resilience and feeling more prepared and confident in facing other life challenges (Kahana, Harel, & Kahana, 1988; Kobasa, Maddi, & Kahn, 1982). However, the

positive outcomes of EAN are beyond the scope of this thesis. More details on the (health) consequences of EAN will be provided in Chapter 2.

1.5   Conceptual framework

Anetzberger (1997) proposed a conceptual framework delineating the consequences of elder abuse (Anetzberger, 1997), by showing how various factors interact to influence abuse outcomes. The theory posits that effects of abuse on older adults depend on meaning, that is, how abuse or violence episode is perceived by the victim. Meaning in turn depends on cultural background, cohort (group) experience and individual experience. Three elements known as modifying factors which include nature of abuse, relationship with perpetrator and personal circumstances, influence how 'meaning' is formed. Examples of nature of abuse are type, duration and severity whereas examples of personal circumstances are disability status and social support.

Meaning – that is how victims view and define their traumatic experiences – will not only determine abuse outcomes, but also affect victims' choice of response and help-seeking behaviour. Consequences can either be physical (e.g., mortality, injury, headache, digestive symptoms, chronic pain, etc), psychological (e.g., depression and anxiety), behavioural (e.g., anger and helplessness) and social (e.g., dependence and isolation). The four dimensions – contributing factors, modifying factors, meaning of violence and effects on victims – constitute the framework. The figure below gives a clearer illustration of the model:

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┌─────────────────────────────┐
│ CONTRIBUTING FACTORS        │
│ 1. Cultural background      │
│ 2. Individual influences    │
│ 3. Cohort influences        │
└─────────────────────────────┘
                                    ┌─────────────────────────────┐
                                    │ MODIFYING FACTORS           │
                                    │ 1. Nature of abuse          │
                                    │ 2. Relationship with abuser │
                                    │ 3. Personal circumstances   │
                                    └─────────────────────────────┘
        ┌─────────────────┐
        │ Meaning of      │
        │ violence/ abuse │
        └─────────────────┘

┌─────────────────────────────┐
│ EFFECTS/ CONSEQUENCES:      │
│ 1. Physical                 │
│ 2. Psychological/ emotional │
│ 3. Behavioural              │
│ 4. Social                   │
└─────────────────────────────┘
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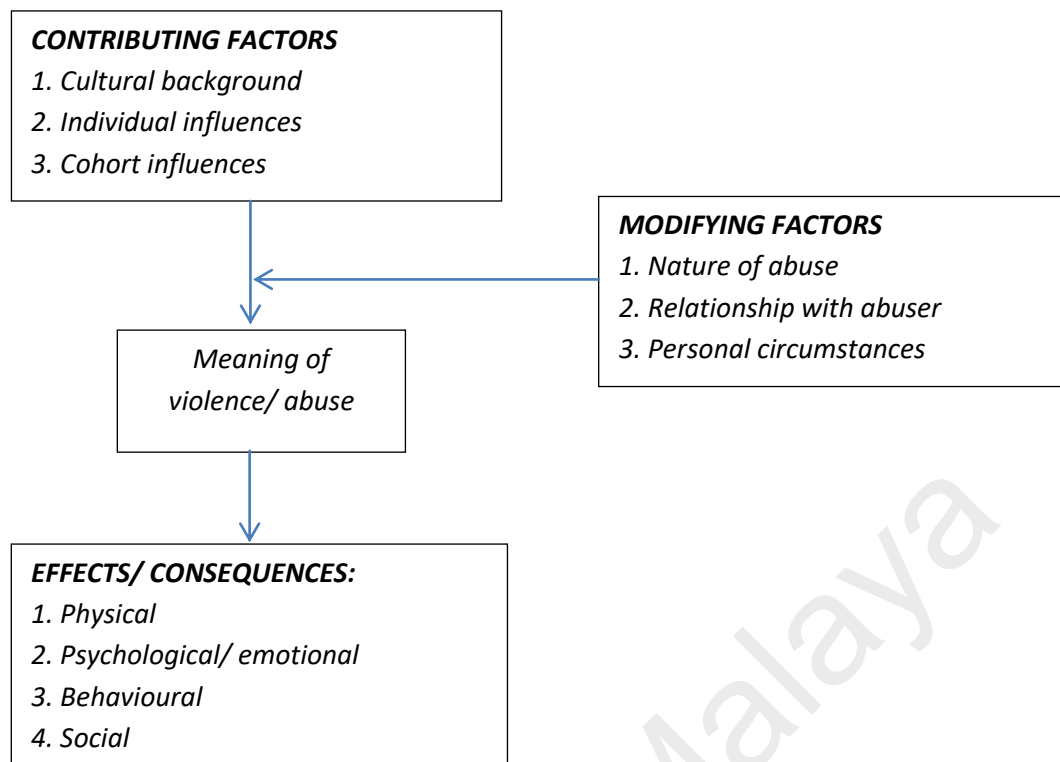
Figure 1.2: Proposed conceptual framework for understanding effects of family violence on older adult survivors

Source: Elderly Adult Survivors of Family Violence: Implications for clinical practice (Anetzberger, 1997)

Given that the meaning attached to violence or abuse is the main determinant of outcomes, and that this perception is influenced by culture, group and individual experiences, it can be reasonably argued that consequences of EAN or their manifestations may differ across regions and ethnic groups, or change with time.

1.6   Problem Statement, Study Objectives and Significance

1.6.1   Problem Statement

EAN is a universal phenomenon, yet its occurrence in the Malaysian context is poorly studied and understood. More specifically, there is little evidence related to the impacts of EAN on health. In existing literature, there is preponderance towards older populations in western or high-income nations, whereas those from low and middle-income regions have been large under-represented. In addition, the causal relationships between a wide range of health conditions and EAN are not adequately investigated.

1.6.2 Study Objectives

The general objective of this study is to determine the health consequences of EAN – first among older populations across the globe, second among a more specific group, community-dwelling rural older Malaysians. The first step was to gather existing evidence on EAN outcomes from current scientific literature and assess their strength of evidence. Findings obtained are then used to guide the more specific objectives with regards to the older Malaysian cohort. These specific objectives include studying the relationships between EAN and three health-related outcomes: mortality, sleep quality and chronic pain. The objectives are listed as follows:

1. To determine the consequences of EAN from the existing literature and assess their strength of evidence.

2. To study the impacts of EAN on mortality among rural, community-dwelling older Malaysians.

3. To study the relationship between EAN and sleep quality among rural, community-dwelling older Malaysians.

4. To study the relationship between EAN and incidence of chronic pain among rural, community dwelling older Malaysians.

More details on how these outcomes were selected and the rationale behind it are presented in Chapter 2 (Literature Review). Secondary objectives include obtaining the prevalence of lifetime abuse, chronic pain and poor sleep among rural community-dwelling Malaysian elders.

Research questions are constructed as follows:

1. What are the health consequences of EAN?

2. What is the prevalence of lifetime EAN in rural Malaysia?

3. Does EAN increase the risk of mortality among older rural Malaysians?

4. Does EAN affect sleep quality among rural older Malaysians?

5. Does EAN lead to higher risks of developing chronic pain among rural older Malaysians?

1.6.3 Significance of this study

Many health-related impacts of EAN can be subtle and gradual. A certain period of time is usually needed before acute health symptoms emerge. Due to these reasons, policy-makers do not always address EAN in an urgent and holistic manner. What can persuade them to invest more in EAN prevention, early detection and intervention is scientific evidence of the severity of impact of this social malaise. Objective and measurable outcomes of EAN are important not only to justify the need for intervention, but they can be translated into a more accurate estimation of economic and health burden associated with EAN.

Under-reporting of EAN is partly a result of the failure of medical practitioners to detect and diagnose abuse. This limitation has been attributed to inadequate training and exposure to the subject of EAN in the medical curriculum, and the lack of clear guidelines on how to manage abuse victims (Kennedy, 2005). Understanding the sequel of EAN thus will assist clinicians in identifying victims who are otherwise unable, or reluctant to report. Evidence-based management guidelines and treatment modalities aiming specifically at EAN victims can be designed or upgraded if scientific findings related to EAN health outcomes are established.

In addition to preventive measures and early detection, rehabilitation of abuse victims is of paramount importance. With the rapidly growing older adult population,

the number of those experiencing maltreatment or abuse is expected to increase. Health and social support services therefore are required to respond to victims' needs. These services however, cannot be sensitively designed and specifically tailored to the needs of EAN survivors without research-backed evidence on the health outcomes of EAN. Other than that, findings of this study will add to the existing scholarly literature of EAN and this is elaborated in greater details in Chapter 2 (2.7 Study Gap and Rationale).

1.7   Background of the PEACE Initiative

This doctoral work is part of the Prevent Elder Abuse and Neglect Initiative (PEACE) which commenced early 2014 in response to the growing dilemma of EAN in Malaysia and the vision of the National Health Policy for Older Persons (2008) and National Policy for Older Persons (2011). The overarching aims of these two policies were: 1) formulation of strategies which safeguard older adults' rights and welfare; 2) promotion and advocacy of issues relevant to older adults; 3) encouragement of lifelong learning, active participation in community activities and intergenerational solidarity, and; 4) promotion of strong governance and shared responsibility among stakeholders. PEACE is a five-package program which aims at advancing EAN research and services through a coordinated, multi-step approach involving stakeholders across sectors.

Specific objectives of the PEACE initiative include:

1.   To examine the magnitude, risk factors and consequences of EAN among community dwellers and institutionalised older adults

2.   To investigate the role of caregiver strain in preventing EAN

3.   To provide education and training to healthcare providers

4.   To provide education and training to formal and informal caregivers

5. To identify existing laws on EAN, understand the gaps and refine them via a more comprehensive approach

A multi-sectoral partnership was formed in order to implement PEACE. This involved: 1) academics and clinicians from different disciplines including public health, family medicine, geriatrics and law; 2) officials from the State Health Department; 3) Department of Social Welfare; 4) various community-based organizations, and; 5) media outlets. Negeri Sembilan, one of the fourteen states in Malaysia was chosen for the pilot phase, and programs are being gradually expanded to other states. The author has been deeply involved in PEACE activities which include conducting research, disseminating scientific findings via multiple channels such as publications, conferences and other meetings, organizing awareness-raising campaigns and promoting elder rights through advocacy work.

CHAPTER 2: LITERATURE REVIEW

The first part of Chapter 2 presents the details of literature review with regards to the overall health-related impacts of Elder Abuse and Neglect (EAN). These include the methods of search in online databases and grey literature, critical appraisal of relevant studies and summarization of findings. The second part discusses existing study gaps and the rationale of this study, while the third part elaborates on outcome variables.

2.1   Consequences of Abuse in Late Life on Health

Similar to child abuse and IPV, EAN is another domain of family violence that has been shown in numerous empirical studies to adversely affect health (Dong, 2015;Yunus, Hairi, & Choo, 2017). The impact of maltreatment in late life on well-being is not confined to mortality and physical complaints, but also extends to psychological, social and behavioural health, besides changes in healthcare utilization patterns (Yunus, Hairi, & Choo, 2017). For instance, older adults who experienced abuse were reported to have risks of mortality two to three times higher than those not abused (Dong et al., 2009; Lachs et al., 1998). Similarly, EAN victims were found to be at greater risks of disability and decline in physical function and overall health (Schofield & Mishra, 2004; Schofield, Powers, & Loxton, 2013). In the mental health sphere, effects of EAN include depression (Mouton et al., 2010;Fisher & Regan, 2006; Yan & Tang, 2001), anxiety (Olofsson, Lindqvist, & Danielsson, 2012; Wong & Waite, 2017; Yan & Tang, 2001), psychological distress (Comijs et al., 1999; Stöckl & Penhale, 2015; Yan & Tang, 2001) and suicidal ideation (Olofsson et al., 2012; Wu et al., 2013). Fewer evidence suggests sleeping disturbances (Olofsson et al., 2012) and loneliness (Wong & Waite, 2017) as other possible effects. EAN has also been

associated with social dysfunction (Schofield & Mishra, 2004; Yan & Tang, 2001), progressive dependency (Dong, 2005) and worsening of quality of life (Chokkanathan & Natarajan, 2017; Gupta, 2016). As regard to healthcare utilization, EAN leads to higher frequencies of hospitalization (Dong & Simon, 2013), outpatient visits (Dong & Simon, 2013; Olofsson et al., 2012) and admission to nursing homes (Dong & Simon, 2013).

The mechanism of how abuse influences health can be explained in various ways. Besides physical abuse which can cause direct injury or death, or sexual abuse which can result in sexually transmitted diseases, other subtypes – psychological, financial and neglect – are more subtle. At the biological level, they act as a form of chronic stressor, gradually altering physiological processes in the body and eventually manifesting in the forms of signs and symptoms. Prolonged stress or psychological distress triggers the cortisol response which then alters the patterning of brain activity and function (Lovallo, 2015; Lupien at al., 2009), affects the immune system which in turn results in higher vulnerability to infectious and inflammatory diseases (Dhabhar, 2014), and leads to significant behavioural changes when combined with genetic susceptibility (Lovallo, 2015). In fact, physical and sexual abuse additionally exert psychological trauma on victims, and thus may share similar pathways in affecting health.

Other than its emotional repercussions, financial exploitation can cause decline in health through loss of resources or income on which victims rely for daily basic needs and healthcare consumption. Adequate financial resources have been demonstrated to influence health through "a direct effect on the material conditions necessary for biological survival, and through an effect on social participation and opportunity to control life circumstances" (Marmot, 2002). Similarly, neglect and its consequences are multi-dimensional; they can range from complete abandonment of elders in unfit living

conditions to more delicate forms such as lack of provision of access to healthcare and medications, or lack of assistance for performing basic activities of daily living. Often, financial and psychological components are embedded within neglect and thus augmenting its negative impacts on health.

Even though scientific literature on the health outcomes of EAN is currently on the rise, research in this area can still be considered rudimentary or relatively young, in comparison with child abuse and IPV. As much as some overlap is expected to exist between child abuse, IPV and EAN with regard to health effects, variations are bound to exist due to reasons elaborated in the previous chapter. There is a need therefore, to gather existing evidence of EAN health consequences in order to provide a deeper and more holistic understanding of the issue, enable a critical analysis of findings, and identify study gaps useful for future research. A systematic literature search was thus performed and described below.

2.2   Research question and review criteria

In order to ensure a comprehensive literature review, a thorough search strategy was formulated. Searching for relevant information was done in a systematic manner, in accordance with the guidelines offered by the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) (Moher et al., 2009).

The aim was to gather, critically appraise, and summarize the best available evidence on the consequences of EAN in order to answer the following formulated questions:

1. What are the health consequences of EAN?

2. What is the strength of evidence of the outcomes?

While formulating the research questions, the following criteria were adhered to:

1. Study population was community-dwelling and institutionalized older adults defined as those aged 60 and older in general. For older individuals in African countries, a cut-off value of 50 years was used instead (WHO, 2013).

2. Exposure of interest was abuse or mistreatment in all forms: physical, psychological/ verbal, financial, sexual and neglect. Self-neglect was excluded.

3. Comparison group was older individuals within the same community setting who were not abused.

4. Outcomes were categorized into mortality, morbidity (physical, mental, social, and behavioral), and health-care utilization (hospitalization, outpatient visit, emergency department visit, etc).

5. All observational studies – cross-sectional, case-control, and cohort – were included in this review.

Inclusion criteria were: a) studies with primary data collection; b) written in English; c) outcomes quantitatively described and measured, with effect size(s), and; d) abuse occurs in late adulthood (60 years and onward). Exclusion criteria were: a) studies without comparator groups; b) narrative reviews, case reports or case series; c) publications without primary data; d) duplicate studies; e) qualitative studies, and; f) studies whose exposure was lifetime abuse or abuse in adulthood without any age specification. Only health-related outcomes were considered. Impacts of EAN on other spheres such as the social support services, legal field, or financial cost were out of scope. The categorization of countries into high, middle (upper and lower), and low-income groups was based on the World Bank's classification.

2.3   Search strategy

Search strategy included electronic database searches and snowball searches of citation lists in relevant articles and reviews. Eight electronic databases were searched from their start date to 20 May 2017: Embase, Scopus, PubMed, Cochrane Library, EBSCOhost (psychology and behavioral sciences collection), CINAHL, ScienceDirect, and Campbell Collaboration. Gray literature search was conducted in Gray Literature Report (The New York Academy of Medicine), OpenGrey, and Google Scholar. Search terms were explored in title/abstracts/key words and they included: "elder abuse and neglect" or "elder abuse" or "elder mistreatment" or "elderly abuse" and "outcomes" or "consequences" or "impacts" or "effects". The search was not restricted to any particular health outcome given the broader terms used. While searching in OpenGrey and Gray Literature Report, key words such as "elder abuse" or "elderly abuse" or "elder mistreatment" or "elder abuse and neglect" were employed without any addition. This was deliberately done to avoid missing out any potential papers at the initial stage.

2.4   Study selection

Study selection occurred in few phases. First, titles were screened to identify relevant papers. Attention was given to a set of key words (same as those used in electronic database searching, in addition to "mortality," "death," "hospitalization," and "health utilization") while screening the titles. Whenever there was doubt concerning the relevance of a title, it would be included. The abstracts of selected papers were then screened. In any case of doubt, the article would be included and its full-text retrieved in the next stage. The full texts of all selected abstracts were assessed and appraised. Inability to retrieve the full text of a study was addressed by contacting the original author(s). After a maximum period of eight weeks, the study was excluded if there was no response.

2.5   Data extraction and quality appraisal

A specially designed form was used for data extraction to gauge the following information from each study: author, year of publication, study design, sample/study subjects, setting, sample size, exposure (with operational definition), outcome(s), tool(s) of measurement, confounding factors, and effect sizes. The complete data extraction form is available as Appendix A. Quality assessment was performed using the Newcastle–Ottawa Scale (NOS) (Wells, Shea, & O'connell, 2014). For cross-sectional studies, an adapted version of NOS was used, with slight modifications (Appendix B). Studies were ranked as high-, medium-, and low-quality groups according to the number of stars awarded. The categorization of the scoring system was as follows: 8–9 (high), 6–7 (medium), and less than 6 (low) for cohort studies; 8–10 (high), 6–7 (medium), and less than 6 (low) for cross-sectional studies; and 8–9 (high), 6–7 (medium), and less than 6 (low) for case-control studies. The original NOS is available as Appendix F.

2.6   Results

The initial search resulted in a total of 1127 papers. A number of 186 duplicates were detected and removed. Screening of titles excluded 869 studies as they were found irrelevant to the review scope, questions, and objectives. The remaining 72 abstracts were then screened, from which 38 were ruled out. Those excluded were (1) eight studies measuring only self-neglect as exposure, (2) eight studies having elder abuse/mistreatment as the outcome, instead of exposure, (3) one case series, (4) five studies whose objectives did not fit with the review questions, (5) one qualitative study, (6) one study whose exposure was lifetime abuse (abuse starting from childhood years), (7) one study in which the age of study subjects contradicts the definition of older adults

(60 not used as cut-off), (8) seven studies which existed only as abstracts, and (9) six papers which were not primary studies.

The full texts of the remaining 33 studies were retrieved for final assessment and appraisal. One full text could not be obtained, and contacting the original author yielded no response for more than eight weeks. The following studies (n=9) were further excluded: (1) one study which was part of another study (both treated as one), (2) one study whose exposure was family violence in adult life without age specification, (3) one study which merely described the outcomes without quantitative measurements, (4) two studies whose exposure was lifetime abuse, (5) two studies without comparator groups, (6) one study whose outcome was out of the review scope, and (7) one study in which EAN was treated as an outcome. Twenty-four studies met all the inclusion criteria and thus were taken to the next stage.

The steps of study identification and selection are shown in a diagram below:
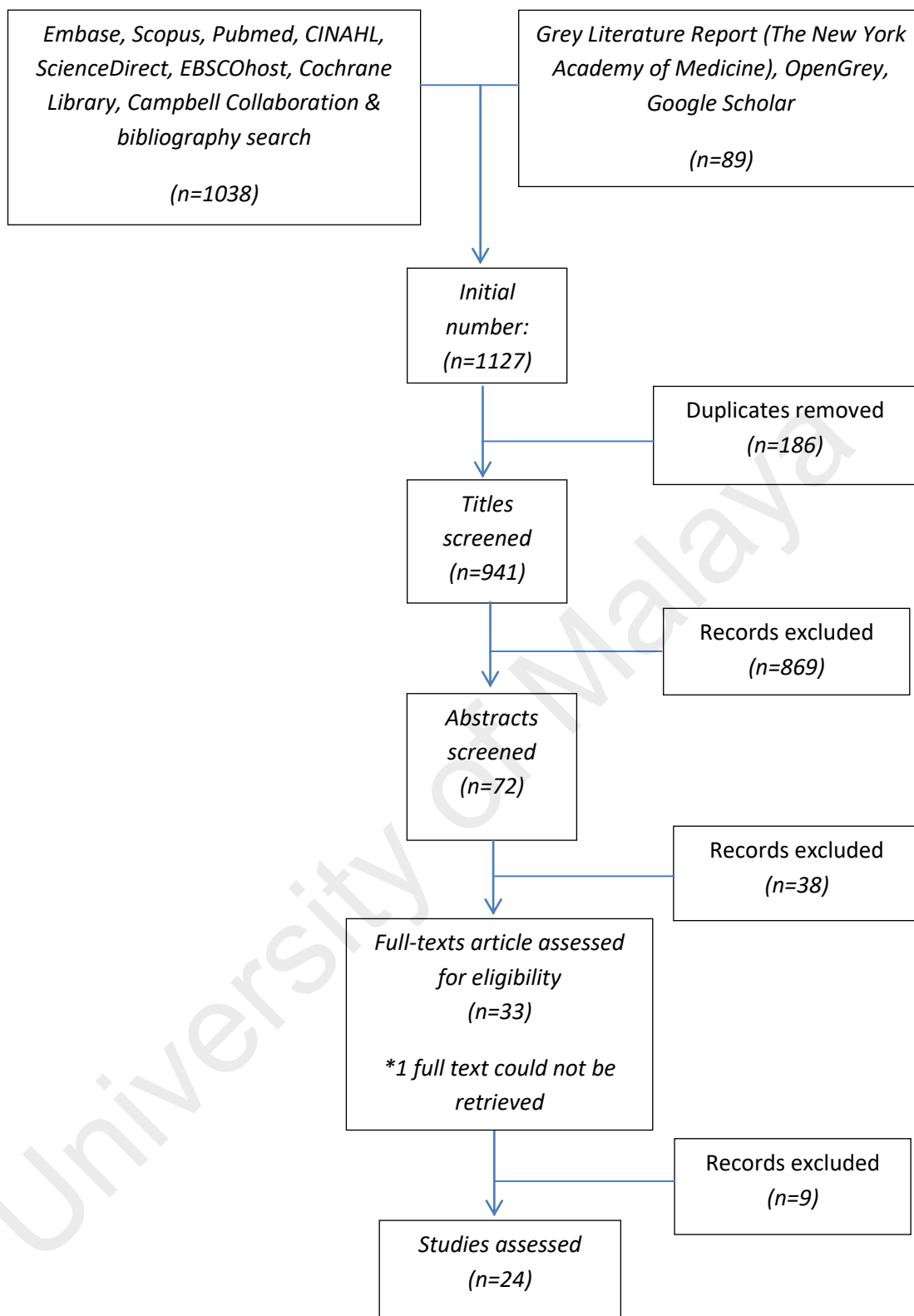
Figure 2.1: Flowchart of study selection

Extracted data (results) from the selected twenty-four studies are summarized and presented in the table of evidence below (Table 2.1). Outcomes were then analysed and ranked based on the number of studies supporting them, quality achieved (using the NOS) and study design. Table 2.2 illustrates EAN consequences according to the strength of evidence.

Table 2.1: Summary of health consequences of EAN

Outcome Category	Specific Outcome	Effect Size(s)/ Finding(s)	Quality	Author, Publication Year
Mortality	All-cause mortality	HR:2.06, 95%CI:1.48-2.88	High	Dong et al, 2009
	All-cause mortality	Coercion factor- HR:1.21, 95%CI:1.06-1.40 Dejection factor- HR: 1.12, 95%CI: 1.03-1.23	High	Schofield et al, 2013
	All-cause mortality	OR: 3.1, 95%CI: 1.4-6.7	High	Lachs et al, 1998
	All-cause mortality Specific-cause mortality	Physical abuse- HR:1.54, 95%CI: 1.09-2.18 Verbal abuse- HR: 1.16, 95%CI: 1.09-1.25 Physical abuse- HR: 2.12, 95%CI: 1.17-3.84	High	Baker et al, 2009

Outcome Category	Specific Outcome	Effect Size(s)/ Finding(s)	Quality	Author, Publication Year
Morbidity Physical health	Decline in physical function	β:-2.81, SE: 0.81	High	Schofield & Mishra, 2004
		No significant decline compared to non-abused counterparts	Medium	Cannell et al, 2015
		β:0.71, p<0.05	Medium	Wong & Waite, 2017
	Bodily pain/ Musculoskeletal pain	β:-1.99, SE: 0.97	High	Schofield & Mishra, 2004
		Psychological abuse Men- OR:2.1, 95%CI: 1.5-2.9 Women- OR:2.2, 95%CI: 1.7-2.9 Physical abuse Men-OR:2.6, 95%CI:1.7-4.2	Medium	Olofsson et al, 2012
	Head pressure	Psychological abuse β:0.15, 95%CI:0.14,0.54 Physical abuse β:0.04, 95%CI:0.03,0.38 Financial abuse β:0.05, 95%CI:0.04,0.40	High	Sten et al, 2014
	Heaviness in the legs	Psychological abuse β:0.08, 95%CI:-0.001,0.54	High	Sten et al, 2014

Outcome Category	Specific Outcome	Effect Size(s)/ Finding(s)	Quality	Author, Publication Year
	General health	β:-1.61, SE: 0.70	High	Schofield & Mishra, 2004
		Psychological abuse Men- OR:2.2, 95%CI: 1.4-3.4 Women- OR:3.8, 95%CI: 2.7-5.3 Physical abuse Men-OR:2.2, 95%CI:1.2-4.1	Medium	Olofsson et al, 2012
	Physical component summary scores (PCS)	β:-0.75, SE: 0.36	High	Schofield & Mishra, 2004
	Metabolic syndrome	WHO criteria OR:3.95, 95%CI: 2.86-5.47 AHA criteria OR: 2.03, 95%CI:1.56-2.64 IDF criteria OR:2.55, 95%CI:1.97-3.29	Medium	Dong & Simon, 2014
	Diabetes	Physical abuse Men-OR:1.7, 95%CI: 1.1-2.7	Medium	Olofsson et al, 2012

Outcome Category	Specific Outcome	Effect Size(s)/ Finding(s)	Quality	Author, Publication Year
	Co-morbidity index	Verbal abuse β:0.11, P<0.05	Medium	Wong & Waite, 2017
	Digestive problems/ Gastro-intestinal syndromes	OR:1.60, 95%CI:1.22-2.09	Medium	Fisher & Regan, 2006
		OR:2.87, 95%CI:1.65-4.99	Medium	Stockl & Penhale, 2014
		Psychological abuse Men-OR:1.3, 95%CI:1.0-1.9 Women-OR:2.0, 95%CI:1.6-2.6	Medium	Olofsson et al, 2012
	Chronic pain	OR:1.65, 95%CI:1.28-2.15	Medium	Fisher & Regan, 2006
	Weight problems	OR:1.88, 95%CI:1.1-3.2	Medium	Stockl & Penhale, 2014
		Psychological abuse Men-OR:1.4, 95%CI:1.0-1.9 Women-1.4, 95%CI:1.0-1.8 Physical abuse Men-OR:1.7, 95%CI:1.1-2.7	Medium	Olofsson et al, 2012

Outcome Category	Specific Outcome	Effect Size(s)/ Finding(s)	Quality	Author, Publication Year
	Headache	Psychological abuse Men-OR: 2.1, 95%CI: 1.4-3.0 Women- OR: 1.5, 95%CI: 1.1-2.0 Physical abuse Men-OR:1.8, 95%CI: 1.1-3.2	Medium	Olofsson et al, 2012
		Physical abuse β:0.04, 95%CI:0.01,0.49	High	Sten et al, 2014
	Incontinence	Psychological abuse Men-OR:1.7, 95%CI:1.2-2.4 Women-OR:1.6, 95%CI:1.2-2.1 Physical abuse Men-OR:2.3, 95%CI:1.4-3.7 Women-OR:1.8, 95%CI:1.2-2.9	Medium	Olofsson et al, 2012
	Allergy	Psychological abuse Men-OR:2.2, 95%CI:1.5-3.3 Women-1.8, 95%CI:1.4-2.5	Medium	Olofsson et al, 2012

Outcome Category	Specific Outcome	Effect Size(s)/ Finding(s)	Quality	Author, Publication Year
	Somatic complaints	Physical abuse β: 0.16, p=0.006 Verbal abuse β: 0.35, p<0.001	Low	Yan & Tang, 2001
	Disability	Vulnerability factor HR:1.19, 95%CI:1.00-1.41 Dejection factor HR:1.40, 95%CI:1.24-1.58	High	Schofield et al, 2013
Psychological/ mental health	Poor mental health	β:-4.63, SE: 0.60	High	Schofield & Mishra, 2004
	Role-emotional	β:-7.88, SE: 1.60	High	Schofield & Mishra, 2004
	Mental health component summary scores (MCS)	β:-3.15, SE: 0.42	High	Schofield & Mishra, 2004
		Physical abuse PE:-1.12, 95%CI: -2.45 to 0.21 Verbal abuse PE:-0.55, 95%CI: -0.75 to -0.34	Medium	Mouton et al, 2010

Outcome Category	Specific Outcome	Effect Size(s)/ Finding(s)	Quality	Author, Publication Year
	Depressive symptoms/ Depression	Physical abuse PE:0.20, 95%CI: -0.21 to 0.60 Verbal abuse PE:0.18, 95%CI: 0.11 to 0.24	Medium	Mouton et al, 2010
		OR:2.24, 95%CI: 1.70-2.96	Medium	Fisher & Regan, 2006
		Physical abuse β:0.4, p<0.001 Verbal abuse β:0.27, p<0.001	Low	Yan & Tang, 2001
	Negative emotional symptoms	OR: 2.13, 95%CI: 1.04-4.36	Medium	Begle et al, 2011
	Psychological distress/ psychological problems	Emotional abuse OR: 2.53, 95%CI: 1.47-4.37 Financial abuse OR: 2.53, 95%CI: 1.45-4.41	Medium	Stockl & Penhale, 2014
		Physical abuse β:0.24, p<0.001 Verbal abuse β:0.50, p<0.001	Low	Yan & Tang, 2001
		β:-0.32, p<0.01	Low	Comijs et al, 1999

Outcome Category	Specific Outcome	Effect Size(s)/ Finding(s)	Quality	Author, Publication Year
	Anxiety	Psychological abuse Men-OR:10.0, 95%CI:5.3-19.0 Women-OR:6.3, 95%CI:3.7-11.0 Physical abuse Men-OR:7.1, 95%CI:3.0-16.0 Women-OR:7.4, 95%CI:3.6-15.0	Medium	Olofsson et al, 2012
		Physical abuse β: 0.16, p=0.005 Verbal abuse β: 0.39, p<0.001	Low	Yan & Tang, 2001
		Verbal abuse β:0.11, p<0.05	Medium	Wong & Waite, 2017
	Loneliness	Verbal abuse β:0.18, p<0.01	Medium	Wong & Waite, 2017
	Stress	Psychological abuse Men-OR:5.7, 95%CI:3.5-9.5 Women-OR:6.3, 95%CI:4.2-9.3 Physical abuse Men-OR:5.9, 95%CI:3.1-11.0 Women-OR:3.8, 95%CI:1.9-7.6	Medium	Olofsson et al, 2012

Outcome Category	Specific Outcome	Effect Size(s)/ Finding(s)	Quality	Author, Publication Year
	Suicidal ideation	Psychological abuse Men-OR:5.4, 95%CI:2.6-11.2 Women-OR:2.6, 95%CI:1.5-4.4 Financial abuse Men-OR:4.2, 95%CI: 1.1-16.2 Physical abuse Women-OR:2.6, 95%CI: 1.5-4.4	High	Wu et al, 2012
		Psychological abuse Men-OR:7.3, 95%CI:4.6-11.0 Women-OR:3.5, 95%CI:2.3-5.2 Physical abuse Men-OR:4.7, 95%CI:2.4-9.0	Medium	Olofsson et al, 2012
	Attempted suicide	Psychological abuse Men-OR:5.3, 95%CI:2.3-12.0 Physical abuse Men-OR:5.4, 95%CI:1.8-16.0	Medium	Olofsson et al, 2012

Outcome Category	Specific Outcome	Effect Size(s)/ Finding(s)	Quality	Author, Publication Year
	Sleeping problem	Psychological abuse Men-OR:3.5, 95%CI:2.1-5.9 Women-3.0, 95%CI: 2.0-4.3 Physical abuse Men-OR:5.1, 95%CI:2.8-9.3 Women-OR:2.3, 95%CI:1.4-4.5	Medium	Olofsson et al, 2012
Others	Social dysfunction	β:-5.27, SE: 1.00	High	Schofield & Mishra, 2004
		Physical abuse β:0.12, p=0.032 Verbal abuse β:0.41, p<0.001	Low	Yan & Tang, 2001
	Self-rated health	No association after full adjustment	Medium	Cisler et al, 2010
	Decline in quality of life (QOL)	Clustering of abuse β:-0.15, p<0.05	High	Chokkanathan &Natarajan, 2017
		Overall abuse Lower QOL scores (t-test), p<0.001	Low	Gupta, 2016

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Outcome Category	Specific Outcome	Effect Size(s)/ Finding(s)	Quality	Author, Publication Year
Healthcare utilization	Hospitalization	RR:2.72, 95%CI: 1.84-4.03	High	Dong & Simon, 2013
	Visit to Emergency Department (ED)	Overall abuse RR:2.33, 95%CI: 1.60-3.38 Psychological abuse RR:1.98, 95%CI: 1.29-3.00 Financial abuse RR:1.59, 95%CI: 1.01-2.52 Neglect RR:2.04, 95%CI: 1.38-2.99	High	Dong & Simon, 2012
	Admission to nursing home	Overall abuse RR:4.60, 95%CI: 2.85,7.42	High	Dong & Simon, 2013
	Behavioural health services usage	RR:1.79, 95%CI: 1.67-1.92	Medium	Schonfeld et al, 2006
	Healthcare use index	Psychological abuse Women-OR:2.6, 95%CI:1.9-3.5 Physical abuse Women-OR:1.8, 95%CI:1.0-3.1	Medium	Olofsson et al, 2012

Table 2.2: Health consequences of EAN according to strength of evidence

Robust evidence	Inconsistent evidence	Limited evidence
Premature mortality Depression/ depressive symptomatology Anxiety	*Physical health* Decline in physical function Bodily pain/ musculoskeletal pain Poor general health Digestive problem/ gastrointestinal symptoms Headache *Mental/ psychological health* Poor mental health Psychological distress Suicidal thoughts *Healthcare utilization* Increased frequency of health visit/ healthcare consumption *Others* Decline in quality of life (QoL) Social dysfunction	*Physical health* Metabolic syndrome Diabetes Chronic pain Weight problem Incontinence Allergy Somatic complaints Disability *Mental/ psychological health* Loneliness Stress Suicidal attempt Sleeping problem Social dysfunction *Institutionalization* Admission to nursing home

From twenty-four studies, three (13%) were conducted in developing countries – China, India – whereas twenty one (87%) came from high-income nations: the United States, Hong Kong, Australia and Europe. This reflects an under-representation of non-western older populations from middle- and low-income regions. In terms of study

design, twelve (50%) studies employed prospective (longitudinal) designs, while the other twelve (50%) were cross-sectional, indicating a relative scarcity of credible evidence pertaining to causal relationships between abuse and its various health outcomes.

2.6.1 Mortality

Four studies – all prospective cohort – were conducted to ascertain the impact of EAN on mortality (Dong et al., 2009;M. W. Baker et al., 2009; Mark S Lachs et al., 1998; Schofield et al., 2013). Findings corroborated the relationship between EAN and greater risks of premature death. In fact, given the study design and high-quality status (determined using NOS) achieved by all the four studies, premature mortality can be considered the most reliable health-related consequence of EAN. Nevertheless, it is limited by the fact that all studies were derived from two countries – the United States and Australia. Whether a similar result is replicable in a different setting, especially low and middle-income, remains a question. In addition, the study on mortality in Australia was exclusive to females.

Another palpable deficiency was the scarcity of evidence on how mortality rates differ across EAN subtypes. The common approach was to treat EAN as a single entity as the predictor variable. One study – Baker et al – assessed the relations between three types of abuse and mortality, and found that physical abuse led to higher mortality rates than verbal abuse or combination of the two (Baker et al., 2009). Conversely, another study (not included in Table 1 because it did not have a comparator group and was therefore excluded) demonstrated that neglect had the biggest impact on mortality, followed by financial abuse, polyvictimization, psychological and physical (Burnett et al., 2016). The same study also revealed interactions between gender and mortality among EAN victims, thus proposing that gender be taken into account in future studies

(Burnett et al., 2016). In the four studies listed in Table 1, interaction between gender and mortality was not analysed or described.

2.6.2 Morbidity

A wide range of morbidity outcomes emerged from the systematic search. Overall, EAN was shown to cause decline in general health and physical function (Wong & Waite, 2017; Schofield & Mishra, 2004). Various clinical manifestations such as musculoskeletal pain (Olofsson et al., 2012; Schofield & Mishra, 2004), head pressure (Stén et al., 2014), leg heaviness (Stén et al., 2014), digestive complaints (Fisher & Regan, 2006; Olofsson et al., 2012; Stöckl & Penhale, 2015), headache (Olofsson et al., 2012; Stén et al., 2014), incontinence (Olofsson et al., 2012), allergic reactions (Olofsson et al., 2012), and chronic pain (Fisher & Regan, 2006) were shown to be associated with EAN. Likewise, abuse victims were more likely to have weight problems (Stöckl & Penhale, 2015), metabolic syndrome (Dong & Simon, 2015), diabetes (Olofsson et al., 2012) and higher co-morbidities (Wong & Waite, 2017) than those not abused. On the contrary, two studies reported no relationship between EAN and decline of physical function as well as self-rated health (SRH) (Cannell et al., 2015; Cisler et al., 2010). In the sphere of mental health, depression or depressive symptomatology (Fisher & Regan, 2006; Mouton et al., 2010; Yan & Tang, 2001) and anxiety (Olofsson et al., 2012; Wong & Waite, 2017; Yan & Tang, 2001) were among the most consistent outcomes, followed by psychological distress (Comijs et al., 1999; Stöckl & Penhale, 2015; Yan & Tang, 2001) and suicidal ideation (Olofsson et al., 2012; Wu et al., 2013). Limited evidence was demonstrated for stress (Olofsson et al., 2012), loneliness (Wong & Waite, 2017), suicidal attempt (Olofsson et al., 2012) and sleeping problems (Olofsson et al., 2012). EAN was also reported to negatively affect quality of life (Chokkanathan & Natarajan, 2017; Gupta, 2016) and result in social

dysfunction (Schofield & Mishra, 2004; Yan & Tang, 2001). Despite the differences in strength of evidence, our findings in general show that EAN has hazardous effects on physical, mental and social health.

An obvious limitation is the cross-sectional design employed by half of the studies (n=12). Outcomes such as loneliness, stress, suicidal ideation, suicidal attempt, digestive symptoms, weight problems, chronic pain, metabolic syndrome, diabetes, sleeping disturbances, and decline in QoL were all derived from cross-sectional investigations. This remains an impediment to causality, as the possibility of relationships in the opposite direction cannot be ruled out. It could simply be that study subjects who suffered from physical illnesses or mental health problems had higher chances of being abused given the higher dependency and greater demand for care. In fact, studies showed that physical dysfunction, dependency and mental health issues were among the risk factors for EAN (Johannesen & LoGiudice, 2013b).

One reasonable method to strengthen the evidence in cross-sectional studies is by demonstrating a dose-response curve between the exposure and outcome variables (Hill, 1965). If a study can display that as abuse gets more severe (in frequency or in the form of clustering), physical complaints or mental health symptoms become worse, it will be more plausible to accept the possibility of causal relationships between EAN and health decline, even though the credibility does not reach that of a longitudinal study. For instance, it is unlikely that worsening of QoL leads to higher frequency of mistreatment episodes. The opposite is more logical – increasing abuse severity or polyvictimization (clustering of abuse) causes deterioration of QoL. Nevertheless, demonstration of dose-response relationships was not a common practice. It was observed that very few studies (from the twenty-four analysed) employed this strategy to augment their findings and interpretation.

The majority of studies investigating morbidity outcomes were conducted in high-income nations. Again, this reflects an underrepresentation of older populations from middle- and low-income regions – Asia, Africa and the Middle East – whose sociocultural composition and contexts can be very different. The conceptual framework proposed by Anetzberger (1997) listed cultural background as one of the factors influencing EAN health consequences (Anetzberger, 1997). Similarly, culture is said to affect perception of abuse and the expression of bodily symptoms (Kirmayer & Sartorius, 2007). Korean women for instance, were found to be more tolerant to situations viewed as abusive by their Caucasian and African-American counterparts (Moon, 2000).

Another important question which has not received adequate attention was the impact of gender on health outcomes of EAN. Prior studies have highlighted gender distinctions with regard to coping style and physiological reactions to stress (Kirschbaum, Wüst, & Hellhammer, 1992; Kudielka & Kirschbaum, 2005; Matud, 2004). Among all the selected studies, only two performed separate analyses for males and females from their samples (Olofsson et al., 2012; Wu et al., 2013), demonstrating differences in outcomes such as diabetes, weight problems, headache, suicidal ideation and suicidal attempt (Olofsson et al., 2012; Wu et al., 2013).

An example of how culture and gender can influence the impact of abuse in late life on health is explained as follows: while physical abuse was associated with suicidal ideation among Swedish men and not women (Wong & Waite, 2017), a similar relationship was found among Chinese women and not men (Wu et al., 2013). This could be due to the dissimilar interpretations of, and attitude towards suicide and suicidal behaviour across cultures. In Caucasian society, suicide is more common among men than women as it is regarded a masculine behaviour. On the contrary,

suicide is reported to be more common among Chinese women than men because it is deemed an "act of the powerless", and men who killed themselves are viewed as weak (Canetto, 2008).

2.6.3   Healthcare utilization (HCU)

Abused and neglected older adults had higher rates of HCU across four studies (Dong & Simon, 2013a; Dong & Simon, 2013b; Olofsson et al., 2012; Schonfeld, Larsen, & Stiles, 2006). This included hospitalization, emergency department visit and behavioural health services utilization. In addition, EAN victims were more likely to be admitted to nursing homes compared to non-victims (Dong & Simon, 2013b). From these five studies, four were conducted among older Americans and one among older Swedish. No other region or country was represented, which brings in the question of whether a similar pattern of healthcare consumption among abused older adults would take place had the studies been replicated in lower resource settings.

Even though researchers may readily hypothesize that greater HCU among EAN victims is a universal phenomenon given that the relationship between abuse and poor health is well-established, patterns of healthcare consumption in middle- and low-income countries could widely differ. Utilization of healthcare is influenced by the organization of a healthcare system in a country which determines the availability of health facilities and ease of access to services. Countries with fewer resources may have less sophisticated health services, greater barriers to health access, and lack adequate social support services to detect abuse cases and facilitate victims' contact with healthcare providers. As suggested by Andersen (1995), consumption of formal healthcare services is determined by a complex interplay between three factors – predisposing, enabling and need (Andersen, 1995). Health problem thus, is not the only determinant of HCU. In addition, cultural interpretations of abuse may affect

individuals' choice of response and health-seeking behaviour. The relationship between culture or sociocultural contexts and health-seeking behaviour has been shown in a number of studies (Ensor & Cooper, 2004; Oberländer & Elverdan, 2000; Shaikh & Hatcher, 2005). Further discussions on HCU and EAN however, are beyond the scope of this thesis.

2.7   Study gap and rationale

From the vast and systematic literature review conducted, it can be concluded that there is a wide range of health impacts of EAN which vary in their strength of evidence. While premature mortality, depression and anxiety emerged as the most credible outcomes, little evidence is available with reference to non-western older adults and the effect of mistreatment on mortality across EAN subtypes and gender. Accordingly, this study attempts to address these gaps. Assessing risks of death among abused older Malaysians will provide an insight into the extent of health and economic burden that can be averted with more efficient EAN intervention programs. In addition, understanding how different EAN subtypes affect mortality and if one sex is more vulnerable to mortality than the other, will assist in the designation of more effective and specific measures.

Among the health consequences with the weakest evidence (Table 2.2) are chronic pain (from the physical health category) and sleeping problems (from the mental health category). Each of them is supported by a single study of cross-sectional design. These two health conditions are crucial to investigate because they are common in old age, and they contribute significantly to older adults' well-being and healthcare costs. Even though pain – described as either 'bodily pain' or 'musculoskeletal pain' – was explored in two other studies (Olofsson et al., 2012; Schofield & Mishra, 2004), there are differences between these two terms and chronic pain. Chronic pain is more specific in

the sense that it is continuous for a certain period of time, while bodily or musculoskeletal pain usually refers to any episodes of pain within a shorter span. For example, one of the studies that investigated pain as an outcome employed the SF-36 questionnaire which regarded 'bodily pain' as any pain experiences within the past four weeks that interferes with daily activities (Schofield & Mishra, 2004). The second study did not provide any operational definition of 'musculoskeletal pain', or any description of how pain was assessed (Olofsson et al., 2012). Similarly, in the only study which reported an association between EAN and chronic pain, no clear definition of chronic pain was given. Moreover, the study subjects were limited to females (Fisher & Regan, 2006).

This study attempts to address the existing limitations by examining the longitudinal relationship between EAN and chronic pain, taking into account older Malaysian men and women. Understanding the dynamics between abuse and prolonged episodes of pain is important because a health symptom that is continuous and which disrupts an individual's ability to perform daily tasks is more physically and mentally debilitating, and consequently, more costly.

The association between sleeping problems and elder abuse among Swedish older adults was demonstrated by Olofsson et al (Olofsson et al., 2012). Sleeping disturbances in the study was determined using the GHQ-12. The GHQ-12 is primarily designed to screen for common psychological and psychiatric disorders (Goldberg, 1972), and therefore not specific to sleep quality even though sleep disturbances is generally viewed as being part of mental or psychological health. Among its twelve items, only one addresses sleep (Goldberg, 1972). Our study conversely explores the longitudinal relationship between EAN and sleep quality within a span of two years, using the Pittsburgh Sleep Quality Index (PSQI), a validated scale comprising seven

components specifically designed for assessing sleep quality and has been validated among older adults from various countries (Cole et al., 2006; Goldberg, 1972; Spira et al., 2012).

The findings by Olofsson et al may not be generalizable to other communities due to the fact that non-western older adults who have different cultural backgrounds or live in lower-resource settings may exhibit different sleep habits or have different ways of subjectively measuring their sleep. As argued by Stranges et al, "Sleep habits are multifaceted and result from a complex interplay between genetics, environment, and social factors, as well as the presence of comorbidities. Factors contributing to sleep problems in older adults from low income countries may differ from those characteristics of Western societies" (Stranges et al., 2012).

Problems pertaining to sleep are common complaints in the clinical setting, but it is unclear whether poor sleep or decline in sleep quality without a clear underlying pathological cause would trigger suspicion of abuse among healthcare providers. Examining the impact of EAN on sleep quality will hopefully expand the clinical utility of sleep measurement, and incorporate – to a greater extent – the subject of elder abuse into clinical practice.

Based on the findings of the systematic review, the study gaps identified and the weight of outcomes, three variables were selected to be studied – mortality, sleep quality and chronic pain.

2.8   Definition and Measurement of Chronic Pain

The concept of chronic pain has undergone a long series of transitions from its days of inception. Since the 1970's when the journal *Pain* was first published, there had been multiple calls from researchers and experts to clarify the taxonomy of pain (Bonica,

1979; Loeser & Black, 1975). The International Association for the Study of Pain (IASP) in 1994 published a 'Classification of Chronic Pain' and acknowledged chronic pain as a distinct phenomenon from acute pain (IASP, 1994). Unlike the earlier bulk of scientific literature which supported the notion of chronic pain being mainly psychological in origin, newer findings have pointed to psychological symptoms as consequences of, instead of antecedent to chronic pain (Breen, 2002). The aetiology of chronic pain thus remains unclear at this point of time, despite a general belief that it is a complex interaction between the nervous, immune, and endocrine systems (Breen, 2002).

Chronic pain is a subjective and multidimensional syndrome (Breen, 2002) with its most common sites being head, lower back, knee, hip, shoulder, wrist (or hand), and other joints (Abdulla et al., 2013; Carnes et al., 2007). Given its complexity and the various dimensions by which chronic pain can be characterized, there is no single consensus on how to define this condition. Dimensions of chronic pain include symptoms, intensity, site, time frame, consequences, duration, frequency, source and severity (Croft, Blyth, & van der Windt, 2010). A variety of definitions therefore have been employed across studies, depending on which dimension is highlighted. For instance, the cut-off duration for defining chronic pain varies from three months to one year. Accordingly, three studies conducted in Malaysia, Japan and across multiple countries used three months, six months and twelve months as cut-offs, respectively (Nakamura et al., 2011; Tsang et al., 2008; Zaki & Hairi, 2014). Despite this heterogeneity, a systematic review of studies on chronic pain among Asian adults found that the majority of studies subscribed to the cut-off period of three months as proposed by the IASP (Zaki & Hairi, 2015). The IASP thus defines chronic pain as "pain that persists beyond normal tissue healing time, which is assumed to be 3 months" (IASP, 1994).

Question has been posed as to whether distinctions should be made between continuous and episodic pain, considering that pain which persists for a long time may not necessarily be experienced continuously. Nevertheless, some researchers regard 'chronic pain' as encompassing both recurrent and continuous pain (Croft et al., 2010). Other temporal terms used to describe chronic pain include 'persistent', 'intermittent' and 'recurring' (Breen, 2002). Intensity and consequence are two other dimensions by which chronic pain can be operationalized. For example, Lu and Javier took into account pain intensity in defining chronic pain (Lu & Javier, 2012) whereas Jackson et al included consequence (interference with daily activities) (Jackson et al., 2014). Other studies have either incorporated a different element or a combination of elements into their operational definition of chronic pain (Zaki & Hairi, 2015).

In most epidemiological studies, chronic pain is assessed using questionnaires which rely on self-report. This is mainly due to its subjective nature (Croft et al., 2010). Different instruments have been utilized in the measurement of chronic pain. One of them is the single-question tool, or a combination of two or more questions. For instance, Elliot et al identified chronic pain using two questions; the first assessed the presence of pain or discomfort, and the second determined the duration of pain (Elliot et al., 1999). Other instruments include validated scales such as the Numerical Rating Scale, Visual Analog Scale, Verbal Descriptor Scale and Chronic Pain Grade (CPG) (Elliott et al., 1999; Zaki & Hairi, 2015). Such heterogeneity in measurement tools poses a great challenge to the comparison of study findings.

2.9 Significance of Chronic Pain to Ageing and EAN

The prevalence of chronic pain is generally higher among older adults (Zaki & Hairi, 2015). Ageing thus, is associated with chronic pain (Wong & Fielding, 2011;Loeser & Melzack, 1999). From the individual perspective, chronic pain leads to "physical,

psychological, and social alterations of function to varying degrees" and is closely related to emotional suffering (Breen, 2002). Those with chronic pain were found to have poorer overall health and quality of life, greater interference with daily tasks, and lower chances of employment (Latham & Davis, 1994; Smith et al., 2001).

From the healthcare perspective, chronic pain consumes huge medical expenses (Loeser & Melzack, 1999). American adults who reported chronic back or neck pain (termed as spine problems), spent a total of USD 6096 on the average (per person) in 2005 alone – almost double the amount of health expenditure of those without spine problems (Martin et al., 2008). In 2010, the total costs of chronic pain were estimated at USD560–635 billion in America (Breivik, Eisenberg, & O'Brien, 2013). Similarly, Malaysian elders who had chronic pain were found to have higher rates of hospitalization than those without, even though its financial cost was not quantified (Zaki & Hairi, 2014). Community is affected by chronic pain through work absenteeism, loss of productivity, early retirement and disability (Breivik et al., 2013). All these mentioned consequences, albeit not being specific to older adults, are aggravated when implicated with ageing.

Whether abuse in late life contributes to the development of chronic pain is unclear. To date, there has been only one study of cross-sectional design which demonstrated a significant association between the two (Fisher & Regan, 2006). More credible evidence therefore is needed to ascertain this relationship. Given that earlier studies corroborated the idea of chronic pain being psychological in origin (Breen, 2002), this could be a plausible explanation to the link between EAN and chronic pain. Moreover, the relationship between chronic pain and trauma – whether physical or emotional – has been well-documented in various scientific writings (Breen, 2002). As EAN can be regarded as a source of stressor or trauma (both physical and psychological depending

on the subtype), it can be hypothesized that EAN may result in prolonged and recurrent episodes of pain.

On the contrary, there are studies which showed that psychological distress is an outcome of chronic pain, not precursor to it (Breen, 2002), and thus what precipitates chronic pain remains unknown. These conflicting evidences provide a 'window of opportunity' for future studies, and are especially relevant to the question of whether a causal relationship exists between EAN and chronic pain.

In this study, we have adopted the definition of chronic pain as endorsed by the IASP. An additional dimension, the consequence – degree of interference with daily activities – is also assessed, for we considered it to be most relevant to the well-being of older adults in the Malaysian context. More details on the operational definition and measurement are provided in Chapter 3.

2.10   Definition and measurement of sleep

Sleep is "a dynamic brain process that is the result of the interaction between two largely independent basic mechanisms: the circadian rhythm and the homeostatic drive to sleep". It is therefore, not a passive state of unconsciousness (Stanley, 2005). Although the exact role and function of sleep is still not fully understood, it is believed that sleep contributes to the "restoration of physical and mental functioning" (Stanley, 2005). The sleep cycle can be divided into Non-REM and REM (rapid eye movement). Non-REM comprises Stage 1 to Stage 4 of sleep, whereas REM comprises the last stage (Stage 5) (Carskadon & Dement, 2005).

Sleep can be measured either objectively or subjectively. Objective measurement of sleep often employs polysomnography (PSG) and the Multiple Sleep Latency Test (MSLT), but these methods are considered impractical for population-based research

(Buysse et al., 2008). The more common approach is the subjective measurement using questionnaires. Among the most widely used validated scales for the subjective assessment of sleep are the Pittsburgh Sleep Quality Index (PSQI), Epworth Sleepiness Scale (ESS), Functional Outcomes of Sleep Questionnaire (FOSQ) and Insomnia Severity Index (ISI) (Buysse et al., 2008; Omachi, 2011).

In this study, we have employed the PSQI for its compatibility with our study objectives, that is to measure the overall sleep quality among those abused and not abused, and discriminate between 'good' and 'poor' sleepers (Buysse et al., 1989). The ESS has been designed mainly for assessing daytime sleepiness whereas the FOSQ primarily measures the "impact of excessive sleepiness on functional outcomes" (Johns, 1991; Omachi, 2011; Weaver, 1997). On the other hand, the ISI is more specific to measuring insomnia symptoms and the degree of distress caused by them (Omachi, 2011).

2.11 Significance of poor sleep to ageing and EAN

Sleep disturbances are common in old age. One study reported that up to 50% older adults experience sleeping problems (Neikrug & Ancoli-Israel, 2010), while another study conducted across eight low-income countries found 16.6% of their elder respondents experiencing sleep disturbances (Stranges et al., 2012). Ageing per se as an antecedent to sleep disturbances has been refuted, even though there is wide recognition that changes in sleep architecture do occur with ageing (Neikrug & Ancoli-Israel, 2010).

Inability to get sufficient sleep is often cited as the one of the main causes of sleep disturbances among older individuals. This is elicited by a combination of factors, which include co-morbidities (medical illness), life changes, environmental changes and polypharmacy – all of which are common phenomena in old age (Neikrug & Ancoli-

Israel, 2010). Besides, one of the changes associated with ageing is disruption of the daily sleep-wake cycle (Stranges et al., 2012), which results from the weakening and desynchronization of the circadian rhythms. "It is hypothesized that the deterioration of the suprachiasmatic nucleus and its subsequent weakened functioning contribute to the disruption of circadian rhythms in older adults" (Neikrug & Ancoli-Israel, 2010). A large meta-analysis of 65 studies demonstrated that "with age, the percentage time of rapid eye movement (REM) sleep decreased while the percentages of light sleep (stage 1 and stage 2 sleep) increased" (Ohayon et al., 2004).

The relationship between abuse in late life and sleep disturbances is unclear, with very scarce evidence available to date. To the best of our knowledge, there is only one study of cross-sectional design which demonstrated an association between elder abuse and sleep disturbances (Olofsson et al., 2012). On the other hand, studies have documented adverse impacts of child abuse and IPV on sleep. Greenfield et al found that child abuse was a risk factor for long-term sleep disturbances, whereas Dillon et al showed that IPV victims suffered from sleeping problems (Dillon et al., 2013; Greenfield et al., 2011).

Given that ageing is often related to sleeping problems, understanding the impact of EAN on sleep quality is crucial for it has the potential to aggravate the existing health bur den. Similarly, its lack of identification as a possible cause of decline in sleep quality will limit the effectiveness of measures designed to improve sleep. Besides, sleep is an important clinical construct that predicts survival and mortality among older adults (Dew et al., 2003; Mallon, Broman, & Hetta, 2000). Poor sleep is associated with depression, anxiety and low quality of life (Neikrug & Ancoli-Israel, 2010). Older adults with sleep difficulties have been shown to have more cognitive decline, slower reaction times and greater memory impairment (Crenshaw & Edinger, 1999; Lim et al.,

2013). They also "have balance, ambulatory and vision difficulties, even after adjusting for medication use", which result in higher risks for falling (Brassington, King, & Bliwise, 2000). Investigation into all potential causes of sleeping disturbances is therefore crucial given the serious health implications associated with this condition.

CHAPTER 3: METHODS AND MATERIALS

Chapter 3 discusses all aspects related to the study methodology which include design, setting, sampling, variables, instruments (tools), and data collection and management. The final part discusses relevant ethical issues and analytical approaches adopted.

3.1 Study Design

The study consists of two phases: a systematic review followed by a population-based, prospective cohort study. Details of Phase I – systematic review – have been presented in Chapter 2. Phase II is a two-year longitudinal study which is part of *the Malaysian Elder Mistreatment Project (MAESTRO)* first initiated in April 2013 with the approval of the Medical Ethics Committee of University Malaya Medical Centre (MEC ref.no: 902.2).

3.2 Setting

The main study was conducted among older adults in Kuala Pilah, one of the seven districts of Negeri Sembilan, other districts being Jelebu, Jempol, Port Dickson, Seremban, Rembau and Tampin. Negeri Sembilan is one of the thirteen states in Malaysia located in the western coast of Peninsular Malaysia, with a population of roughly one million according to the 2010 population census (DoSM, 2010). Kuala Pilah has a size of 103,020 hectares (JPBDSM, 2013) with 63, 874 residents. Those aged 60 and over constitute 14.5% of Kuala Pilah population, higher than other districts (DoSM, 2010).

Kuala Pilah is generally considered rural and lies between Jempol and Seremban. Main economic sources include agriculture, plantations (rubber, palm, fruit orchards, livestock and vegetables) and manufacture industry which include electrical and electronics, textile, furniture, rubber products and others. Malays comprise 57.8% of Kuala Pilah inhabitants, Chinese 21.9%, Indian 14.3%, others (aborigines, etc) 0.4% and non-citizens 5.7% (DoSM, 2010). Kuala Pilah is approximately located 100 km from the capital city, Kuala Lumpur.

Figure 3.1: Map of Negeri Sembilan, Peninsular Malaysia
Source: Google Maps

Figure 3.2: Map of Kuala Pilah district in Negeri Sembilan
Source: Google Maps (www.panoramio.com)

3.3   Study Period

The MAESTRO project began in April 2013. Baseline assessment (face-to-face interview) was carried out in a span of eight months from November 2013 to July 2014. Follow-up telephone interviews were completed in four months, from December 2015 to March 2016.

3.4   Sampling Frame

The sampling frame was all community-dwelling older adults, defined as those aged 60 and over who have been residing in Kuala Pilah for the past 12 months (minimum period) or more. Exclusion criteria were:

1. Non-citizens

2. Those living in institutions (eg: nursing homes)

3. Those with severe hearing impairment or deafness

4. Those who are unable to communicate independently (eg: stroke patients having speech trouble)

5. Those with severe cognitive impairment (assessed using the Elderly Cognitive Assessment Questionnaire)

3.5   Sample Size Calculation

Sample size calculation was done using the Open Epi online sample size calculator for cohort study (Sullivan, 2013) . Information needed was:

1. Two-sided significance level: set at 95%

2. Power (1-beta, chance of detecting): set at 80%

3. Ratio of unexposed to exposed

The term 'exposed' here refers to those with abuse or neglect experience. For the sample size calculation in this study, 9.6% was used based on a study conducted among urban Malaysian elders (Sooryanarayana et al., 2015). A systematic review and meta-analysis by Yon and colleagues reported a worldwide pooled prevalence rate for overall abuse of 15.7% (Yon et al., 2017). Both values – 9.6% and 15.7% were put into the calculator and whichever yielded a larger result (sample size) was taken.

The ratio of unexposed/exposed if 9.6% was used: (100-9.6)/9.6 = 9.42

4. Percentage of unexposed with outcome

Outcome chosen and specified was mortality, given that premature mortality has been recognized as the most reliable and scientifically credible consequence of EAN (Yunus, Hairi, & Choo, 2017). A study by Dong and colleagues on the effect of EAN

on mortality documented 5.91 deaths per 100 person-years for those not abused (Dong et al., 2009).

5. Percentage of those exposed with outcome

The value of 13.49 (deaths per 100 person-years) was used based on the same study by Dong et al. This was the mortality rate of those abused (Dong et al., 2009).

Result: Sample size needed was 1336, according to the formula by Fleiss (Fleiss, Statistical Methods for Rates and Proportions, formulas 3.18 &3.19). Inflation of 1336 by 20% to account for possible non-response gave a final number of 1604.

When 15.7% was used as the prevalence of 'exposure', the sample size calculated (according to Fleiss formula) was 898. Inflation with 20% yielded a sample size of 1078. The bigger sample size – 1604 – was therefore chosen.

3.6   Sampling strategy

A multi-stage cluster sampling strategy was employed to select study subjects. In the first stage, Kuala Pilah was chosen from the seven districts of Negeri Sembilan. Kuala Pilah has the highest proportion of older adults in comparison to other districts. In the second stage, with the help of the Malaysian Department of Statistics (DoS), the district was divided into 254 artificially created Enumeration Blocks (EBs). Each EB contained 80 to 120 Living Quarters (LQs). A number of 156 EBs were then randomly selected. This was followed by another random selection of 16 to 20 households from every EB based on a computer-generated list. Selection of 156 EBs and 16-20 households per EB was done to achieve the required sample size, initially yielding 2496 older persons. Each household was represented by one older adult. These individuals were then identified in a house-to-house visit conducted using local terrain maps provided by the

DoS. Those who agreed to participate and fulfilled the inclusion criteria were assessed. If the older person refused or was unable to participate for any reason, the household next-door (on the right) or nearest to it was included.

The complex sampling design aimed at ensuring adequate coverage and obtaining a heterogeneous and representative sample from the target population. The flow chart below illustrates how sampling was done.

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┌────────────────────────────────────────────────┐
│  Kuala Pilah divided into 254 Enumeration Blocks (EB)  │
└────────────────────────────────────────────────┘
                      │
                      ▼
        ┌──────────────────────────────┐
        │   156 EBs randomly selected   │
        └──────────────────────────────┘
                      │
                      ▼
        ┌──────────────────────────────┐
        │ 16 – 20 households randomly selected │
        │        from every EB          │
        └──────────────────────────────┘
                      │
                      ▼
        ┌──────────────────────────────┐
        │  House-to-house visit to identify │
        │ selected individuals and obtain consent │
        └──────────────────────────────┘
```
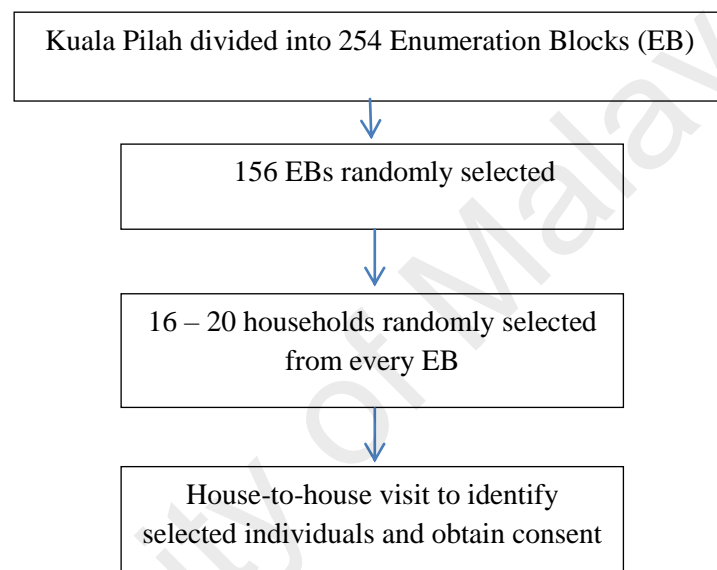
Figure 3.3: Flow of sampling procedure

3.7 Variables and Instruments

Home-based, face-to-face interviews were conducted by trained personnel using a structured questionnaire. The independent variable was elder abuse and neglect (EAN) and the dependent variables were mortality, sleep quality and chronic pain.

3.7.1 Elder Abuse and Neglect (EAN)

The exposure variable in this study was abuse and neglect. The operational definition of EAN was based on the National Study of Elder Abuse and Neglect in Ireland (Naughton et al., 2011), with slight modifications. While the National Study of Elder

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Abuse and Neglect in Ireland defines abuse by restricting the occurrences within the last 12 months, this study took into account all experiences of abuse and neglect in late life – from the age of 60 and onwards. In other words, any abuse and neglect experienced by a respondent prior to the last 12 months (or not) is considered EAN, as long as the episode(s) takes place when the victim has reached the age of 60. This approach of estimating prevalence of abuse has been used before in child abuse and IPV literature (Filkenhor et al., 2014; Stöckl et al., 2014).

Physical, sexual and financial abuse was operationally defined as any one occurrence since the age of 60, as reported by the elder respondent, if this was perpetrated by someone in a position of trust such as family members, friends or neighbours. Psychological abuse and neglect were defined as ten or more occurrences within a year since the age of 60, as reported by the elder respondent, if this was perpetrated by someone in a position of trust. When there were less than ten such occurrences within a year, psychological abuse and neglect was still established if the episode(s) was perceived by the older adult as having a serious impact.

Permission to use the questionnaire was obtained from the researchers involved in the National Study of Elder Abuse and Neglect in Ireland. The questionnaire was derived from the modified Conflict Tactic Scales (CTS) and revised by Naughton and colleagues (Choo et al., 2016; Naughton et al., 2011) . Few items were modified to contextualize elder abuse in Malaysian society. Content validation was then done through the opinion of two public health experts and two social workers. This was followed by translation and back-translation, and face validation. The instrument was finally pre-tested among 343 older individuals in Kuala Lumpur and Selangor via purposive sampling. Internal consistency was assessed using Cronbach's alpha (CA) reliability coefficient. For overall abuse, the CA was 0.54 (Rajini, 2016).

a) Physical abuse

Physical abuse was defined as one or more episodes of abuse occurring since the respondent turns 60 years, committed by a family member or someone in a position of trust. Eight questions are used to capture the occurrence(s), with a binary response of 'yes' or 'no'.

1. Has anyone ever tried to slap or hit you?

2. Has anyone pushed, shoved or slapped you?

3. Has anyone hit you, or tried to hit you with an object?

4. Has anyone ever kicked you, bit you, or punched you?

5. Has anyone ever burnt you or scalded you?

6. Has anyone ever given you drugs or excessive medication with the purpose of controlling you or making you drowsy?

7. Has anyone ever restrained you in any way such as by locking you in a room or tying you to a chair?

8. Has anyone ever threatened you with a knife or gun?

b) Financial abuse

Financial abuse was defined as one or more episodes of abuse or exploitation occurring since the respondent turns 60 years, by a family member or someone in a position of trust. Nine questions are used to capture the occurrence(s), with a binary response of 'yes' and 'no'.

1. Has anyone stolen your money/ things/ property or documents?

2. Has anyone prevented you from accessing your money/ things/ property or documents?

3. Has anyone forced or cheated you into handing over your money/ things/ property or pension book against your will?

4. Has anyone forced or cheated you into handing over the rights to your house/ property or pension book against your will?

5. Has anyone forced or cheated you into altering your will or any other financial document against your will?

6. Has anyone signed your name on a cheque/ pension book/ any financial documents against your will?

7. Has anyone misused the power of attorney given by you or forced/ tricked you into signing over powers of attorney?

8. Has anyone tried to or forced you to (but failed) in any of the previous attempts?

9. Has anyone stopped contributing to household expenses such as rent or food which was previously agreed upon?

c) Psychological abuse

Psychological abuse was defined as at least 10 (or more) incidents within one year since the respondent turns 60, perpetrated by someone in a position of trust. Alternatively, abuse was considered to have occurred if less than 10 incidents took place within a year but they were perceived by respondents as having serious impacts.

As a prelude to the actual questions, few standard lines were read out to respondents: "It doesn't matter how good our relationship is with other people, sometimes our family members or people we know and depend on will disagree and get angry with us.

Different people have different ways to deal with problems and disagreements." The following questions were then asked:

1. Has anyone called you harsh words, sworn at you or cursed at you?

2. Has anyone verbally threatened you?

3. Has anyone belittled you or put you down?

4. Has anyone repeatedly ignored you or didn't involve you?

5. Has anyone ever threatened to harm your loved ones?

6. Has anyone ever prevented you from seeing your loved ones, or even a doctor or nurse?

7. Has anyone ever removed or prevented you from accessing your hearing or walking aids?

These were followed by two extra items: 'how frequent' and 'how serious' the episode(s) is. Choices of answers for 'how frequent' are "once", "2-9 times" and "10 or more", whereas choices of response for 'how serious' are "not serious", "moderately serious" and "very serious".

d) Sexual Abuse

Sexual abuse was established if any one of the three questions put forth was answered affirmatively, and the episode was perpetrated by someone in a position of trust and occurs when the respondent has turned 60.

1. Has anyone spoken to you in an unwanted sexual manner?

2. Has anyone touched or tried to touch you in a sexual manner that was unwanted or without your consent?

3. Has anyone forced you or tried to force you to engage in sexual acts against your will?

e) Neglect

Neglect was considered to have happened when there were 10 or more occurrences of not receiving help within a year since turning 60 years, when the elder was unable to perform a specific task by himself. The tasks referred to both basic and complex activities of daily living, along with access to basic amenities. If there were less than ten incidents but they were perceived as 'serious' by the elder respondent, neglect was still considered to have occurred.

Items derived from two tools – The Katz Activities of Daily Living (Katz ADL) and Lawton Instrumental Activities of Daily Living Scale (Lawton IADL) – were used to operationalize neglect. The Katz ADL is a validated and commonly used instrument to measure an older adult's functional status and ability to perform daily activities independently in 6 domains: dressing, bathing, toileting, transferring, continence and feeding (Wallace & Shelkey, 2007). Permission was obtained from the author(s) to use the tool.

The Lawton Instrumental Activities of Daily Living Scale (Lawton IADL) on the other hand is an instrument developed to assess a set of independent living skills which are considered more complex than those assessed by Katz ADL (Graf, 2008). The physical and cognitive domains of this instrument have been validated, along with its cross-cultural applicability among older adults (Ng et al., 2006). Lawton IADL looks into 8 domains: using the telephone, shopping, preparing food, housekeeping, doing laundry, using transportation, handling medications and handling finances.

For this study, questions were specifically asked about the older adult's ability to perform the following, and whether he received adequate help if he was not able to:

1. Do grocery shopping

2. Prepare his own food

3. Do household chores

4. Take prescribed medication(s) accordingly

5. Drive or use public transportation for common, short journeys

6. Use the stairs

7. Use the toilet

8. Bathe and clean himself

9. Move around in the house

10. Feed himself

In addition to this, the interviewer enquired whether the respondent had access to, or was provided with basic amenities such as food, clean clothes, healthcare/ medications and shelter.

Respondents were then asked about the frequency of such incidents (if neglect was affirmed): "once", "2-9 times", or "10 times or more". They were also asked how serious the incidents were, with response options being "not serious", "moderately serious" or "very serious". The complete questionnaire is available as Appendix C.

3.7.2 Dependent variables

Three dependent or outcome variables in this study were mortality, sleep quality and chronic pain.

1. Mortality

Mortality – or death – is a unique and clearly defined event, which gives an instant depiction (though not entirely) of health status. In this study, all respondents – those with or without experience of EAN – were tracked 2.5 years (31 months) following the completion of baseline assessment. This was done using a national vital registration system, a source of mortality information with the advantages of having universal (Malaysian) population coverage and continuous operation.

In Malaysia, death reporting is mandatory before burial can take place. Reports are usually made directly by hospitals (healthcare providers) or by individuals to local authorities such as police. The standard gap between reporting of deaths and incorporation into the National Registry Department database is three days maximum.

Information on deaths was first gathered during the phone call interviews, as provided by family members and caregivers. The information was then cross-checked with the data provided by the National Registry Department (NRD) in December 2016. Cross-checking was done two times (separated by a three-week interval) by the main researcher, using the Identity Card number – a unique number series given to every Malaysian citizen. This was to ensure accuracy.

The dataset supplied by the NRD was in the Microsoft Excel format, with the following information: full name(s), IC number, status (alive or dead), date(s) of death, and cause(s) of death. The IC numbers were matched with the researcher's dataset, and information on mortality was cross-checked. The following steps were carried out whenever discrepancies were found:

a. If a respondent's status in the researcher's dataset was 'alive' but in the NRD database was 'dead', the full name, IC number and date of death were double-checked. If the full name and IC number matched and the date of death

corresponded to a period after the phone call interview, the respondent would be considered dead.

b. If a respondent's status in the researcher's dataset was 'dead', but in the NRD database was 'alive', the full name and IC number was double-checked for accuracy. A notification would then be sent to the NRD for clarification.

c. All non-responders (during the phone call interview) were considered alive except if shown as deceased in the NRD database.

Four additional variables were created in the SPSS 20.0 for Windows software for every respondent: 1) status ("dead" or "alive"); 2) date of death; 3) interval (number of days between the first interview and date of death), and; 4) cause of death. For respondents who were still alive (censored), the interval was counted based on the date of tracking (31 December 2016). This study investigated all-cause mortality, therefore discussions on specific causes of death are beyond the scope of this thesis. Moreover, it was found that 40% to 50% of deaths among our respondents were not medically certified, thus rendering high chances of inaccuracies and difficult interpretation (Yunus, Hairi, Choo, et al., 2017).

The diagram below demonstrates the steps taken to ascertain mortality among respondents.
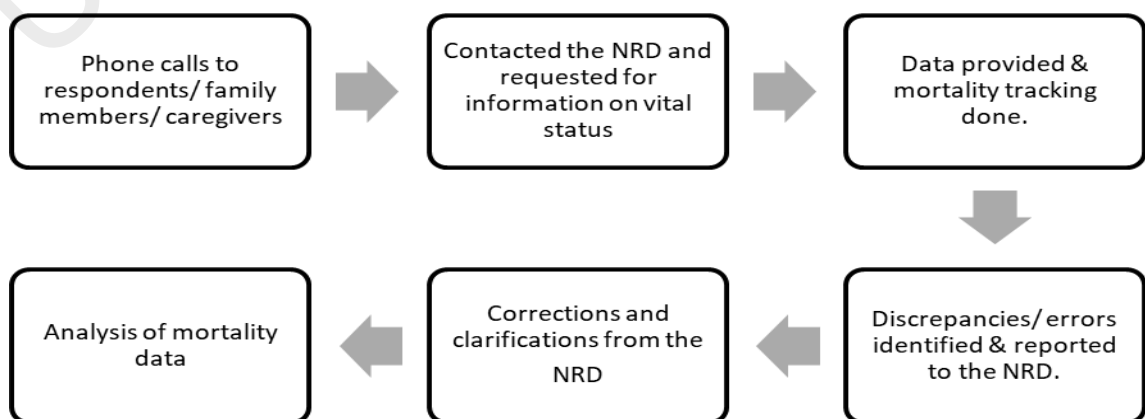
Figure 3.4: Steps to ascertain mortality during the follow-up period

2. Sleep quality

In this study, sleep was assessed by the Pittsburgh Sleep Quality Index (PSQI) (Buysse et al., 1989), one of the most widely and commonly used tools for measuring sleep quality, and whose psychometric properties have been studied and found to be appropriate (Carpenter & Andrykowski, 1998). The PSQI is a nineteen-item questionnaire measuring seven components of sleep – subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction – and yielding one global score ranging from 0 to 21. Higher scores indicate poorer sleep. A cut-off value of 5 is generally used, where those who score 5 or more are categorized as having poor sleep. The PSQI has been translated into various languages and is widely used in research studies (Shochat et al., 2007). Cross-cultural validation has also been conducted among Brazilian, Israeli, Nigerian, Italian, Korean and Arab samples (Aloba et al., 2007; Bertolazi et al., 2011; Curcio et al., 2013; Shochat et al., 2007; Suleiman et al., 2010). The original PSQI questionnaire (English) is available as Appendix E and the Malay version is available as Appendix G.

Pretesting and validation of tool

Introduction: The Malay version of PSQI has not been validated before, though it was used in a number of studies (Maniam et al., 2014; Nazatul et al., 2008; Zahari et al., 2015). A pilot study was therefore conducted among community-dwelling older adults from eight low-cost, subsidized government flats in Klang Valley. These flat buildings were built by the Ministry of Urban Wellbeing, Housing and Local Government during the resettlement programs for low-income Malaysians living in squatter areas.

Study participants: Study participants were: a) older Malaysians aged 60 and over; b) those who could communicate independently, and; c) those who had taken up

residency in the public housing for at least 12 months. On the other hand, we excluded those found to have severe depression (GDS scores of 12 or more) and cognitive impairment (MMSE scores of 17 or less).

Study procedures: A total of 239 residents, whose names were obtained through convenience sampling were invited to join the study. Detailed explanations were given to each respondent prior to the interview, and their verbal and written consent taken. The Malay version of PSQI, the GDS and MMSE were administered face-to-face by trained research assistants. After two weeks (14 days), the same questionnaires were re-administered.

Results: Out of 239 persons invited, 192 agreed to participate. Response rate was 80.3%. Those found to have GDS scores of 12 or more, and MMSE scores of 17 or less were excluded from analyses. The final sample size analysed was 183. The scale which consisted of seven components had a Cronbach's alpha of 0.50. The Intra-class correlation coefficient (ICC) of global PSQI scores was 0.57 (95%CI: 0.38, 0.70).

Coefficient alpha (Cronbach's alpha) has been said to be less accurate for the measurement of non-normal and leptokurtic data (as in this case) (Christmann & Van Aelst, 2006). An alternative to Cronbach's alpha as suggested by Guttman (Guttman, 1945), the Guttman's λ, was therefore calculated, giving a value of 0.76. For ICC, a range of 0.40 to 0.75 was considered 'fair to good' by Fleiss (Fleiss, 2011) whereas a cut-off value of 0.7 was suggested for Guttman's Lambda (Statistics How To, 2017). Details of the validation results are supplied in Appendix D.

3. Chronic pain

In this study, we defined chronic pain as:

'Pain that is persistently felt, every day or almost every day, at any parts of the body for more than three months. The pain experience must have occurred within the last six months.'

Each respondent was asked two questions to establish chronic pain and its severity. These two questions have been previously tested and validated among older Malaysians (Rafidah & Zaki, 2016) and used in a number of epidemiological studies (Ismail, 2016):

a. Within the last six months, did you experience any pain in any part of your body which was continuous every day, or almost every day, for at least three months?' A binary option of "Yes" or "No" was given.

b. If yes, does the pain interrupt your daily work or activities?

Five possible responses were offered according to the Likert scale: (1)"Not at all", (2)"To a little extent", (3)"To some extent", (4)"To a great extent", and (5)"Extremely disturbing".

3.7.3   Covariates

Other variables assessed were: a) socio-demographics; age, sex, ethnicity, household income and education level; b) physical function; 2.4-metre gait speed; c) health-related variables; self-rated health and chronic diseases; d) psychosocial variables; depression and social support, and; e) cognitive status.

Socio-demographic variables:

a. **Age** was calculated from the date of birth to the date of interview, and rounded to the nearest ten.

b. **Sex was** categorized into "Male" and "Female".

c. **Ethnicity** was categorized into "Malay", "Chinese", "Indian" and "Others".

d. **Income** was grouped into "Low" (monthly household income of less than RM1000 per month), "Medium" (monthly household income of RM1000 – RM2499 per month) and "High" (monthly household income of RM2500 and more).

e. **Education level** was categorized into "Low" (no formal education), "Medium" (entered elementary or high school) and "High" (entered college or university).

Physical function variable

a. **2.4-metre gait speed**

Walking speed – or gait speed – which has been regarded as the 'sixth vital sign' of geriatric assessment (Kuys et al., 2014), is a commonly used measure of physical function or physical capability among older adults (Camargo et al., 2016; Lusardi, Pellecchia, & Schulman, 2003). Among the common types of gait speed assessments are the 2.4-metre walk test (Bean et al., 2004; Shimada et al., 2013) and the 4-metre walk test (Maggio et al., 2016). Gait speed was reported to be a good predictor of adverse outcomes among older people such as disability (Perera et al., 2016), change in cognition (Best et al., 2015) and survival (Studenski et al., 2011).

In this study, respondents were asked to walk for 2.4 meters (with or without walking aids) with a one-metre start-up before time was recorded. Two markers were used to indicate the start and end of the 2.4-metre path. Each participant underwent the test two times, and the best score (the shortest time) was taken. Time was measured to the nearest 0.1 second using a stopwatch.

Health-related variables

a. **Self-rated health**

The self-rated health (SRH) is a widely used measure of general health status (Singh-Manoux et al., 2006). Characterized as a person's own appraisal of his general health, the SRH has been demonstrated to be a powerful predictor of morbidity and mortality in numerous empirical studies (Eriksson, Undén, & Elofsson, 2001). SRH was also said to "reflect indications of ill-health that are not bio-medically detectable or that are not included in the medical examination" (Eriksson et al., 2001). In this study, respondents were asked to rate their own overall health. Options given were (1)"Very poor", (2)"Poor", (3)"Good" and (4)"Very good" but during analyses the four categories were collapsed into "Poor" and "Good".

b. **Chronic diseases or co-morbidities**

Each respondent was asked whether he or she had any (or history) of the following conditions – (1) diabetes, (2) hypertension, (3) hypercholesterolemia, (4) any types of cancer, (5) arthritis, (6) coronary heart disease, (7) stroke and (8) congestive heart failure. The questions were put in the following words: 'Have you ever been told by the doctor that you have any of the following conditions…..?' and 'Are you taking any (or have been prescribed) medications for any of the following conditions…?' Medical jargons were avoided and simpler terms were used to make sure respondents were able to identify the chronic disease to which interviewers referred. A binary option of "Yes" and "No" was given. Chronic disease(s) was thus established based on self-report.

Psychosocial variables

a. **Depression**

Depression was measured using the 15-item Geriatric Depression Scale (GDS-15) (Burke, Roccaforte, & Wengel, 1991). Respondents were asked if they experienced a set of described symptoms in the last week, with a response of yes

or no. Scores of zero to four indicate no depression (normal), five to nine indicate mild depression and 10 or more indicate severe depression (Yesavage & Sheikh, 1986). In analysis however, GDS was treated as continuous data. The Malay version of GDS-15 was validated with satisfactory results: Cronbach's alpha was 0.84 and Intraclass Correlation Coefficient (ICC) was 0.68 (Teh & Hasanah, 2004).

b. **Social support**

The Duke Social Support Index (DSSI) measures multiple dimensions of social support and has been used extensively in aging studies (Koenig et al., 1993). A shorter version, the 11-item DSSI, has been demonstrated to be a valid and reliable alternative – with the advantage of being simpler and easier to administer – for studies in older adults (Goodger et al., 1999; Koenig et al., 1993). A validation study among older Malaysians which reported a Cronbach's alpha of 0.78 and ICC of 0.65, supported the suitability of 11-item DSSI in the Malaysian context (Ismail, 2016).

In this study, the 11-item DSSI was employed to assess social support, and higher scores indicated greater levels of social support.

Cognitive status

a. **Cognitive status** was determined using the Elderly Cognitive Assessment Questionnaire (ECAQ), a tool widely used to screen for cognitive impairment among older adults in developing countries (Kua & Ko, 1992). The ECAQ consists of 10 items, and scores can range from 0 to 10 (Sherina, Rampal, & Mustaqim, 2004). A score of 7 or more indicates normal cognition, 5-6 indicates borderline dementia, and 4 or less indicate probable dementia (Al-Jawad, Rashid, & Narayan, 2007). The Malay version of ECAQ has been previously validated (Kua & Ko, 1992). Cognitive status was measured mainly to exclude those with

severe cognitive impairment at the sampling stage, and not included as confounders in subsequent analyses

All covariates besides socio-demographics were selected based on literature review and fulfilment of criteria as confounders. A variable becomes a confounder when it meets the following conditions: 1) it is a risk factor for the outcome, independent of putative factor (exposure); 2) it is associated with the putative factor (exposure), and; 3) it is not in the causal pathway between exposure and outcome (Figure 3.5). Based on previous findings, health-related variables (SRH and chronic diseases), psychosocial variables (depression and social support) and physical function (gait speed) are all risk factors, or potential risk factors for mortality, sleep quality and chronic pain. In addition, they are associated with EAN.
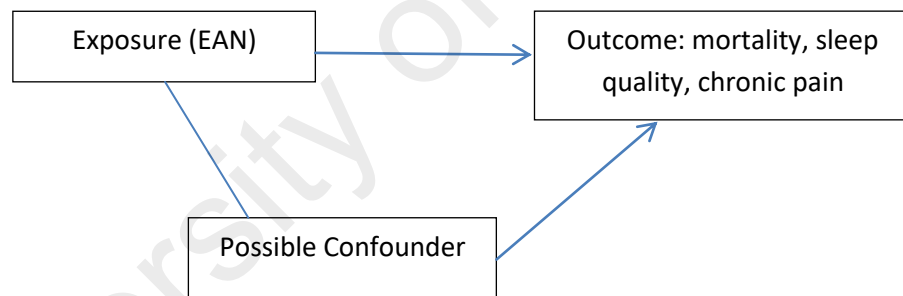
Figure 3.5: Relationships between exposure, outcome and confounder

For instance, gait speed is a risk factor for survival in old age (Studenski et al., 2011) and low physical function (which can be represented by gait speed) is associated with higher vulnerability to EAN (Dong & Simon, 2014). Similarly, while psychosocial variables (depression and poor social support) are risk factors for mortality and poor sleep (Alvaro, Roberts, & Harris, 2013; Blazer, 1982; Schulz, Drayer, & Rollman, 2002; Troxel, Buysse, Monk, Begley, & Hall, 2010), they are also associated with EAN (Johannesen & LoGiudice, 2013b). Health-related variables (chronic disease and SRH)

too, are risk factors for chronic pain (Yu, Tang, Kuo, & Yu, 2006) and associated with EAN (Johannesen & LoGiudice, 2013b).

On the other hand, most of these variables are not in the causal pathway between EAN and outcomes investigated. Examples include the lack of evidence (or theoretical plausibility) to suggest that EAN causes low gait speed which in turn causes mortality, or that EAN causes chronic diseases which in turn causes poor sleep, or that EAN causes low social support (opposite direction of relationship is more plausible) which in turns causes chronic pain. One exception is depression. EAN has been shown to result in depressive symptomatology (Yunus, Hairi, & Choo, 2017), and this condition may increase the risks of death, though existing evidence is not clear and does not imply a direct relationship. Higher mortality among depressed diabetic patients was demonstrated in a study (no specification of older adults or those without diabetes) (Dooren et al., 2013), while another reported longitudinal associations between loneliness and mortality in old age (Steptoe, Shankar, Demakakos, & Wardle, 2013). Depression in turn, is associated with emotional loneliness (Peerenboom, Collard, Naarding, & Comijs, 2015).

3.8   Data collection

A follow-up assessment was carried out in a span of four months from 1 December 2015 to 30 March 2016 using telephone interviews.

3.8.1   Telephone-based interview

Telephone-based interview is a known technique of administering questionnaires and obtaining data for research purposes. It has the advantages of being less expensive, less time-consuming and simpler than face-to-face interviews. This technique has been considered an equally reliable method and comparable to physical administration of

questionnaires (Fenig et al., 1993; Rohde, Lewinsohn, & Seeley, 1997; Vallance et al., 2014). A number of studies have employed the telephone-based interview method while measuring sleep quality across different age groups including older adults (Bliwise et al., 2009; Brassington et al., 2000; Warman et al., 2011).

Variables assessed during the follow-up telephone interviews were sleep quality (PSQI) and chronic pain. Prior to the session, several meetings were held between the main researcher and research assistants for the following purposes:

a. to discuss the content of questionnaire, protocols and guidelines of telephone-based interviews
b. to ensure as much as possible that questions were asked in a standard manner
c. to discuss the appropriate response in cases of refusal
d. to discuss the appropriate ways of handling tricky situations (eg: respondent who claims he/she feels too tired to talk, or respondent who has mild hearing impairment, etc)

Phone calls were made in several rounds to ensure the highest amount of response. Whenever the respondent was absent (call picked up by someone else), information would be obtained from the nearest family member or caregiver with regards to the respondent's most convenient time. If he was too busy to talk, a second call would be made at his preferred time. If a respondent did not answer, a second call would be made on the next day at the same time, followed by the next day at a different time. If there was still no answer, the subsequent calls would be made after a gap of 1-2 weeks, on different days and timings (Vallance et al., 2014).

If the respondent was said to be travelling for a long period (more than 3 months) and did not carry a mobile phone, the caregiver would be interviewed instead, if deemed

suitable. A similar approach was taken if the respondent complained that he could not hear well or was feeling too tired to talk. Caregivers were asked first whether they felt comfortable and whether they 'knew enough' to give information on behalf of the respondent. If a caregiver did not feel comfortable or believed he/she may not be able to give accurate information, respondents were excluded from the survey. Proxy responses are not uncommon in epidemiological studies involving older adults, and have been shown to give acceptable and reliable results (Maxwell et al., 2015; Foran, McCarron, & McCallion, 2013).

In some cases, when the phone numbers given were wrong, the respondent living nearest to him/her (based on house address) would be contacted to obtain the correct number whenever possible. The research team adhered to the following guidelines while conducting telephone interviews:

1. Every conversation should begin with the caller introducing himself/ herself and stating clearly the purpose of the phone call.

2. Inform the respondent how long, on the average, the interview will take. In this study, it was approximately 12-15 minutes.

3. Obtain the respondent's verbal consent before proceeding with questions.

4. In case of refusal, do not insist that he/she should participate. Thank the respondent and end the call.

5. To maximize response, participants who are not contactable (in the initial attempts) should be called up to 10 - 12 times, before being excluded.

6. In cases of absence from home multiple times and when family members are unsure of respondent's free time, try to obtain mobile phone numbers.

7. Before ending the call, make sure every item in the questionnaire is answered. If missing data is noticed while the calling period is still on-going, make a second phone call to the respondent to complete the questionnaire.

Additional guidelines followed were based on recommendations by Musslewhite et al (Musslewhite et al., 2007). These include: a) confirming the identity of respondent before asking further questions; b) trying to always conduct the interview using a landline, and; c) ensuring that there is enough time for completion and not to proceed if the respondent is in a rush (Musselwhite et al., 2007). Non-response was categorized into "contact number not provided", "no answer", "wrong number", "no longer in service", "out of coverage", "refused", "deceased" and "others". The diagram below illustrates the flow of telephone-based interview conducted from December 2015 to March 2016:
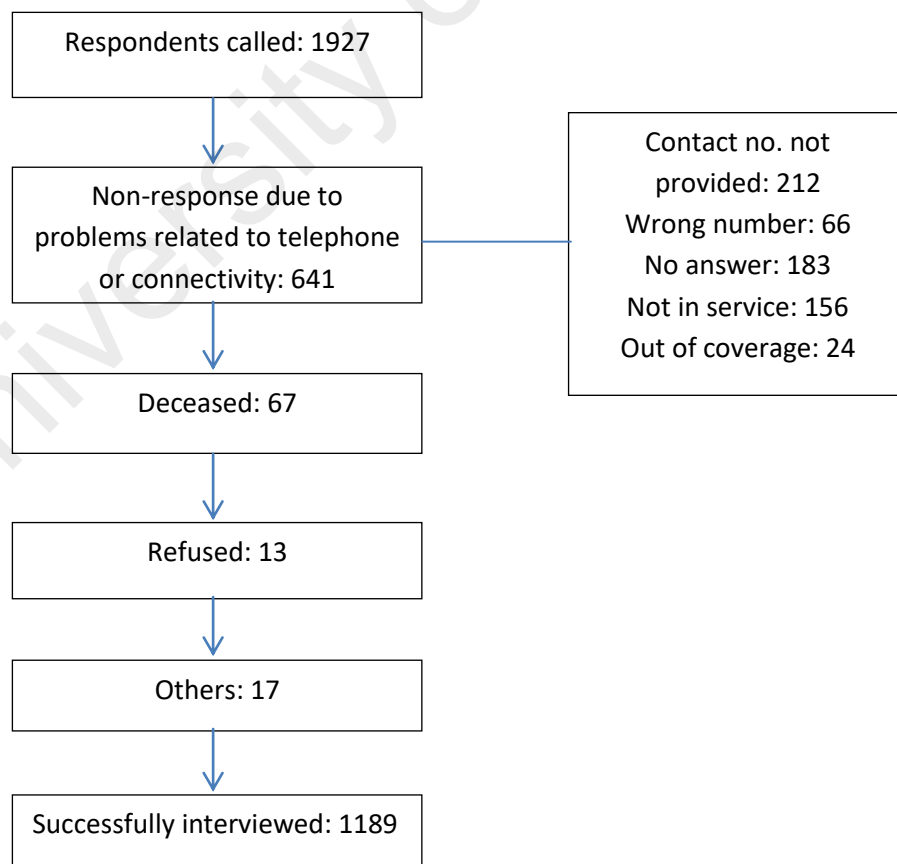
Figure 3.6: Flow chart of telephone-based interview

3.9   Data management

Following the telephone interviews, data entry was performed independently by two persons – one being the main researcher and the other, a research assistant. The manual double entry of data has been considered the gold standard for transferring data to electronic format (Paulsen, Overgaard, & Lauritsen, 2012). Data was transferred directly from questionnaire papers to the SPSS 20.0 software. It was then kept in four back-up files (separate devices) locked with passwords. Only the main researcher has access to the complete and final version of dataset.

Following data entry, the main researcher double-checked and compared both datasets to identify missing data, errors and discrepancies. Any missing data, errors or discrepancies were addressed by the following steps:

a. Going back to the original questionnaire papers.

b. Contacting the research assistant(s) for clarification.

c. Calling the respondent(s) if the telephone interviews were still on-going.

3.10   Ethics

This study was approved by the Medical Ethics Committee of University Malaya Medical Centre (MEC ref.no: 902.2). Among the ethical issues raised were the obligation on the interviewer/ researcher to take the right action upon identifying abuse victims, and the manner in which questions on EAN were asked owing to the sensitive nature of this subject. Study findings have shown that disclosure of abuse or identification of abuse victims may not necessarily be helpful, as it can worsen the existing problem through retaliation by the abuser or further isolation of the victims. The following actions were taken to address these ethical dilemmas:

a. We provided information on available sources of aid/social services to all suspected abuse victims. This included hotline numbers and contact numbers of social workers.

b. For severe cases, we referred suspected victims to social workers and healthcare workers in the nearest government health facility for further follow-up, with the permission from the respondent.

c. While asking EAN screening questions, the respondent was interviewed alone without the presence of any family members, to ensure privacy.

The limitation lied in our inability to ensure that suspected abuse victims whom we have referred, were indeed followed-up by healthcare providers or social workers, and whether they received the needed medical care and intervention.

3.11   Analytical approach

Complex sampling design and sampling weights calculation

This study employed a complex (multi-stage) sampling design as described before. Among the advantages of a complex sample (CS) are: a) a complete sampling frame of the population is not required; b) more economical and practical; c) ensures a representative sample, and; d) makes a step-by-step design of the sample possible (Jackson, 2015). The disadvantage on the other hand is that it may yield estimates of lower precision for a fixed sample sized, in comparison with simple random sampling (Jackson, 2015). In this study, weight was applied to the living quarters (LQ) selected in each enumeration block (EB). The total number of LQ in an EB is divided by the number of selected LQ. For example:

1. In EB 3, there are 56 LQ. A number of 16 LQ are randomly selected. So, the final weightage is $56/16 = 3.5$

2. EB 9, there are 68 LQ, from which 16 are randomly selected. The final weightage is thus calculated as $68/16 = 4.25$

An extra variable called 'weightage' was created for every respondent based on the calculations shown above in the SPSS 20.0 dataset, and included in multivariate analyses. The complete list of EB, LQ and final weightage values are available in Appendix H.

3.11.1 General statistical approach

For descriptive statistics, continuous data was reported in means and standard deviation (SD), whereas categorical data was reported in frequencies and percentages. Comparison between two and three groups of continuous variables was done using the independent sample t-test, paired sample t-test (if data is correlated) and ANOVA, respectively. The Pearson's Correlation Coefficient was employed to quantify associations between continuous variables, while Pearson's Chi Squared test was used to determine relationships between categorical variables. A statistical significant value was set at 0.05.

The initial step was to determine the response rate at baseline (T1) and follow-up (T2). Next, the characteristics of responders and non-responders were described and compared. This was to find out if non-responders had different characteristics than responders – an important aspect of longitudinal studies which can introduce bias to the results. Next, the mechanism of missing data was examined. A missingness variable was constructed in which 'response' was coded as 1 and 'non-response' was coded as 0. Cross-tabulations were performed between missingness and outcome variables, sleep

quality (dichotomized into 'good' and 'poor' sleep) and chronic pain. Binary logistic regression was then run to see which variable predicted missingness.

Missing data was subsequently addressed by multiple imputation (MI). In this study, the Markov Chain Monte Carlo (MCMC) multiple imputation method was employed (Schunk, 2008). This was followed by sensitivity analyses (described below under 'Outcome 2'). The basic socio-demographic characteristics of all study respondents were described and tabulated according to EAN status – abused or not abused.

3.11.2 Specific approach according to outcome variables

Outcome 1: Mortality

Results were first presented in a descriptive manner – comparing percentages of death between those abused and not abused. Percentages of death according to EAN sub-types were then demonstrated. This was followed by a dose-response relationship between clustering of EAN and mortality percentages.

Next, the Kaplan-Meier survival curve was constructed to enable 'time-to-event' analysis and comparison of survival probability between those abused and not abused. Hazard ratios, along with 95% confidence interval (CI) were then computed using Cox proportional hazard regression models, while adjusting for other confounders. Relationships between EAN subtypes and mortality risks were also checked, along with gender interaction.

Outcome 2: Sleep Quality

Descriptive results were presented first, which included mean PSQI scores and prevalence of poor sleep across EAN status and subtypes. Cross-sectional associations between EAN and PSQI scores were then quantified using generalized linear models

(GLiM). To assess the longitudinal relationship between EAN and sleep quality, or changes of sleep quality over two years comparing abused and non-abused respondents, generalized estimating equations (GEE) were employed. But prior to running GEE, multicollinearity was tested using the Variation Inflation Factor (VIF). Multicollinearity refers to "a state of very high intercorrelations or interassociations among the independent variables" (Lani, 2018) . This can be a result of including variables which are closely related to each other, or one that is derived from another variable. When present, multicollinearity can lead to bias in statistical inferences. For example, it may inflate the standard error, widen the confidence interval and distort the partial regression coefficients (Lani, 2018). In this study, a VIF cut-off value of 10 (or tolerance of 0.1) was used.

While running GEE, primary analysis was first performed with complete cases only, followed by a second analysis using imputed data. Subsequently, comparison of results was made to test the robustness of primary analysis and examine potential bias. There are two popular statistical methods of analysing longitudinal data: generalized linear mixed model (GLMM) and generalized estimating equations (GEE). Conventional, standard regression procedures are generally not used in (longitudinal) repeated measurements due to the violation of the popular assumption that 'all observations are independent'. GLMM and GEE on the other hand, take correlation into account. In this study, the GEE approach is opted to examine how abuse affects the trajectories of sleep quality, for the following reasons:

a) The focus of interest for this study is regression coefficient, and not variance components as in GLMM (Hubbard et al., 2010).

b) This study seeks to find estimation of mean effects (population average) and inference of the coefficients in the model, which are both the criteria of GEE. On the

other hand, the effects measured by GLMM are subject-specific. Our main objective here is to measure the changes of sleep quality (PSQI score) on the average, across all subjects, comparing two groups.

c) GEE offers more flexibility with regards to its assumptions, and it is more robust to model misspecification (error in correlation structure), as compared to GLMM (Ballinger, 2004).

Assumptions of GEE were checked and tested. The distribution of data (PSQI score) was set as 'Normal', the specific link function as 'Identity', and covariance structure 'unstructured' (more details are available in Chapter 4). Parameter estimates were reported along with 95% confidence intervals (CI) and p-values. The effect of each EAN subtype on PSQI score, and gender interaction were also tested.

Outcome 3: Chronic Pain

Descriptive results were first presented. Cross-sectional associations between EAN and chronic pain were estimated using GLiM. Longitudinal relationships were measured using GEE, with a binary outcome of "Yes" (chronic pain) and "No" (no chronic pain). Assumptions of GEE were checked and tested. The distribution of outcome variable was set as 'binomial', the link function as 'logit', and covariance structure 'unstructured'. Parameter estimates were reported along with CI and p-values. Multicollinearity was checked prior to running GEE. The effect of each EAN subtype on chronic pain and gender interaction were tested.

Similarly for chronic pain, sensitivity analyses were performed to compare results of primary analyses (with complete cases only) to those of imputed data.

CHAPTER 4: RESULTS

This chapter presents the findings of this study. It is divided into two main parts. Part I presents baseline response, follow-up response and EAN prevalence. Part II is divided into three sections: mortality of EAN, relationship between EAN and sleep quality, and relationship between EAN and chronic pain. The overall structure of result presentation is as follows:

Part I – Baseline Assessment and follow-up rate

a. Response rate at baseline and missing data

b. Descriptive characteristics of respondents at baseline

c. Follow-up rate and comparison of characteristics between respondents vs non-respondents at T2

d. Lifetime prevalence of EAN

Part II

Mortality of EAN

1. Descriptive analysis

2. Survival analysis: Kaplan-Meier curve, Log-rank test, Cox proportional hazards regression

Relationship between EAN and sleep quality

1. Descriptive analysis

2. Analysis of missing data (including chronic pain) and potential bias

3. Generalized Estimating Equations

Relationship between EAN and chronic pain

1. Descriptive analysis

2. Generalized Estimating Equations

4.1 Part I – Baseline Assessment

4.1.1 Response rate and missing data

Baseline assessment was carried out from November 2013 to July 2014. A total number of 2496 older adults were invited to participate in the study, from which 84.9% or 2118 agreed and were successfully interviewed. A number of 378 individuals did not join for a number of reasons: refusal - 124 (33%), lived elsewhere at the time of the survey - 49 (13%), were not at home over the multiple visits - 45 (12%), were unable to communicate independently - 42 (11%), passed away - 34 (9%), were not found - 23 (6%), had moved - 23 (6%). The remaining 38 (10%) were duplicates, unwell at the time of visit and had their addresses wrongly listed.

Cross-tabulations showed that non-respondents were different from respondents with regards to ethnicity and sex; Chinese and males were more likely to not participate compared to their Malay, Indian and female counterparts (Table 3). This limitation is discussed in Chapter 5. Screening of cognitive impairment (CI) using the Elderly Cognitive Assessment Questionnaire (ECAQ) excluded 191 individuals who scored 4 and less (regarded as having severe CI). The final sample size was 1927. The diagram below shows the flow of baseline response.
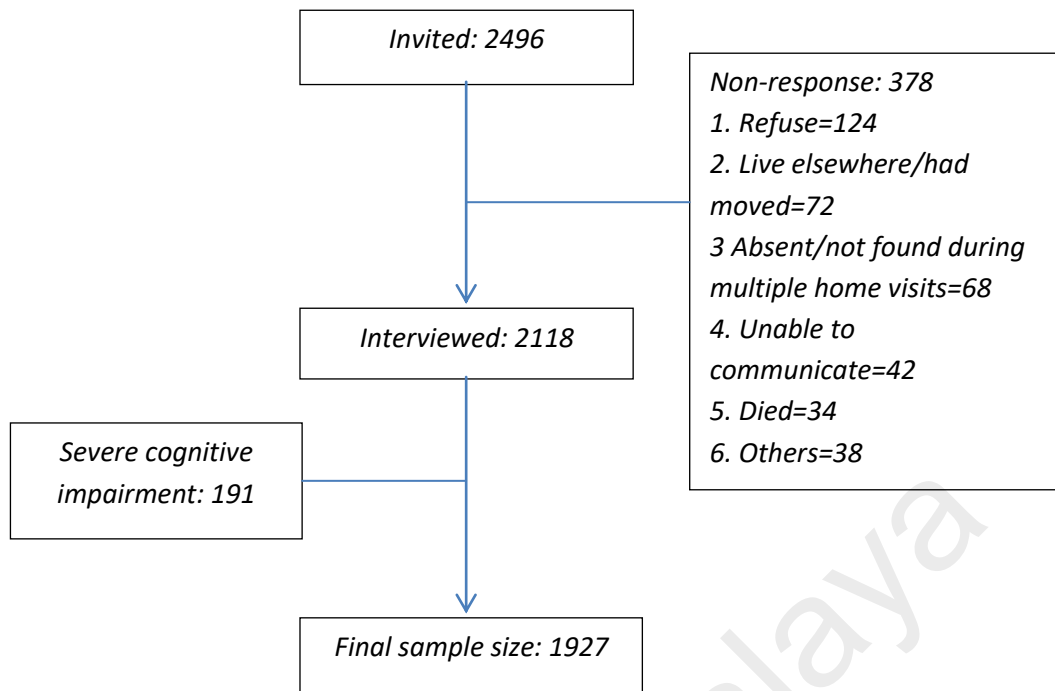
Figure 4.1: Flow chart of baseline response

Table 4.1: Characteristics of respondents vs. non-respondents at baseline (n=2496)

Variable	Respondents N (%)	Non-respondents N (%)	*P*
Age			0.13
60-69	979 (46.2)	167 (44.2)	
70-79	852 (40.2)	145 (38.4)	
80 and above	286 (13.5)	66 (17.4)	
Ethnicity			**<0.01**
Malay	2071 (97.8)	352 (93.1)	
Chinese	17 (0.8)	17 (4.5)	
Indian	30 (1.4)	9 (2.4)	
Sex			**<0.01**
Male	800 (37.8)	182 (48.1)	
Female	1318 (62.2)	196 (51.9)	

Analysis of missing data reveals that from all variables (socio-demographics, predictor and confounders), seven variables had missing values. Six of them had 2.0%

and less missing values, and one – gait speed – had 7.2% (n=139) missing values. The six variables were: a) GDS scores, 2.0% (n=39); b) number of co-morbidities, 0.1% (n=1); c) DUKE scores, 0.2% (n=4); d) education level, 0.4% (n=7); e) income group, 1.1% (n=22) and; f) self-rated health, 0.2% (n=3). Schafer suggested that missing values less than 5% are inconsequential (Schafer, 1999).

This however did not include dependent variables (mortality, sleep quality and chronic pain) as they would be addressed separately in Part II. Little's MCAR test shows a p-value of more than 0.05 for all variables with missing data except for gait speed. This indicates that the data is missing completely at random (MCAR) for six variables (GDS score, comorbidities, DUKE score, education level, income group and self-rated health) but not MCAR for gait speed.

Comparison of basic characteristics between respondents with missing data and respondents with complete data with regards to gait speed showed that those with missing data were older and had higher comorbidities. However, since gait speed is not a main variable in this study (neither explanatory not outcome), we proceeded with an assumption of MAR (Missing at Random). Multiple imputation (MI) was therefore performed using the Markov Chain Monte Carlo (MCMC) method to avoid the exclusion of 139 respondents in analyses (unnecessary exclusion of cases leads to inefficiency and wastage of data), and the missing values in gait speed exceeds the cut-off suggested by Schafer, which is 5%. MI was chosen to address missing data in this study for having the following advantages:

a. It increases the efficiency of estimation as imputation values which are randomly drawn attempt to represent the distribution of the data (Rubin, 2004).

b. Valid inferences – ones that reflect the additional variability – are obtained by combining complete-data inferences in a straightforward manner (Rubin, 2004).

c. MI has been shown to produce results with unbiased and valid estimates, while preserving the sample size and statistical power (McCleary, 2002).

4.1.2 Descriptive characteristics of study respondents at baseline

From 1927 respondents, females comprised 60.8% (n=1172) while males comprised 39.2% (n=755). The mean age was 69.8 (SD=6.9) and the majority of participants were Malay, 96.9% (1868). When categorized into 'abused' and 'not abused', the mean age was 70.0 (SD=6.7) for those abused and 69.7 (SD=7.0) for those not abused. Slightly more than half of those abused were females (53.8%). Chi-square tests revealed associations between abuse and low income, depression and poor social support. Table 4.2 shows the socio-demographic characteristics of study respondents.

Table 4.2: Basic characteristics of study respondents at baseline according to abuse status

Variable	All N (%)	Abused N (%)	Not Abused N (%)	*P*
Age				
60-69	980 (50.9)	80 (51.3)	897 (50.8)	0.86
70-79	769 (39.9)	60 (38.4)	709 (40.1)	
80 and more	177 (9.2)	16 (10.3)	161 (9.1)	
Sex				
Male	755 (39.2)	72 (46.2)	682 (38.6)	0.06
Female	1172 (60.8)	84 (53.8)	1086 (61.4)	
Ethnicity				
Malay	1868 (96.9)	149 (95.5)	1716 (97.1)	0.29
Chinese	21 (1.1)	2 (1.3)	19 (1.1)	
Indian	30 (1.6)	5 (3.2)	25 (1.4)	
Others	8 (0.4)	0 (0)	8 (0.4)	

Table 4.2: (Continued)

Variable	All N (%)	Abused N (%)	Not Abused N (%)	*p*
Education level				
Low	238 (12.4)	13 (8.4)	225 (12.8)	0.26
Medium	1638 (85.3)	139 (89.7)	1496 (84.9)	
High	44 (2.3)	3 (1.9)	41 (2.3)	
Household income (RM/month)				
Low	1222 (64.1)	115 (74.7)	1106 (63.3)	**<0.01**
Middle	612 (32.1)	32 (20.8)	578 (33.1)	
High	71 (3.7)	7 (4.5)	64 (3.7)	
Chronic diseases				
Diabetes	531 (27.9)	50 (32.3)	481 (27.5)	0.21
Hypertension	1034 (53.8)	81 (51.9)	952 (54.0)	0.62
CHD	127 (6.6)	13 (8.4)	114 (6.5)	0.35
Stroke	46 (2.4)	6 (3.9)	40 (2.3)	0.21
Arthritis	387 (20.2)	38 (24.5)	349 (19.8)	0.17
Cancer	17 (0.9)	0 (0)	17 (1.0)	0.22
Self-rated health				
Poor	535 (27.8)	31 (32.7)	484 (27.4)	0.16
Good	1389 (72.2)	105 (67.3)	1281 (72.6)	
	Mean (SD)	Mean (SD)	Mean (SD)	
No. of co-morbidities	1.48 (1.34)	1.54 (1.40)	1.47 (1.33)	0.15
Depression (GDS)	3.96 (3.67)	4.80 (3.79)	3.89 (3.65)	**<0.01**
Physical function Gait speed	6.64 (2.7)	6.47 (1.9)	6.65 (2.7)	0.44
Social support (DUKE)	27.4 (3.3)	26.8 (4.1)	27.4 (3.1)	**0.02**

4.1.3 Follow-up rate and comparison between responders and non-responders

The phone interview successfully reached a total of 1189 respondents (out of 1927), giving a response rate of 61.7%. Reasons of non-response were presented earlier in Figure 3.6, Chapter 3. Non-responders were more likely to be older and have lower income and education, as illustrated in Table 4.3. The mean age of responders was 69.2 (SD: 6.6) and for non-responders 70.8 (SD: 7.4).

Table 4.3: Comparison of characteristics between responders and non-responders at T2

Variable	Responders N (%)	Non-responders N (%)	P
Age			
60-69	632 (53.2)	348 (47.2)	**<0.01**
70-79	471 (39.6)	298 (40.4)	
80 and above	86 (7.2)	91 (12.3)	
Sex			
Male	466 (39.2)	289 (39.2)	0.98
Female	723 (60.8)	449 (60.8)	
Ethnicity			
Malay	1159 (97.5)	709 (96.1)	0.08
Non-Malay	30 (2.5)	29 (3.9)	
Education level			
Low	104 (8.8)	134 (18.2)	**<0.01**
Medium	1050 (88.6)	588 (80.0)	
High	31 (2.6)	13 (1.8)	
Income group			
Low	719 (61.2)	503 (68.9)	**<0.01**
Middle	401 (34.1)	211 (28.9)	
High	55 (4.7)	16 (2.2)	

4.1.4   Prevalence of EAN

Overall, 8.1% (n=156) respondents reported having experienced abuse ever since they turned 60. Financial abuse was the most commonly occurring subtype, 4.8% (n=92). This was followed by psychological abuse, 3.4% (n=65), physical abuse, 1.2% (n=24), neglect, 1.1% (n=22) and sexual abuse, 0.3% (n=5). Table 4.4 shows the lifetime prevalence of EAN among study respondents, while Table 4.5 illustrates the prevalence according to clustering of abuse.

Table 4.4: Lifetime prevalence of EAN among rural Malaysian elders

Subtype of Abuse	Prevalence N (%)	95%CI
Financial		
All	92 (4.8)	3.9, 5.8
Male	41 (5.4)	3.8, 7.0
Female	51 (4.4)	3.2, 5.6
Psychological		
All	65 (3.4)	2.6, 4.2
Male	29 (3.8)	2.4, 5.2
Female	36 (3.1)	2.1, 4.1
Physical		
All	24 (1.2)	0.7, 1.7
Male	12 (1.6)	0.7, 2.5
Female	12 (1.0)	0.4, 1.6
Sexual		
All	5 (0.3)	0.1, 0.5
Male	1 (0.1)	-0.1, 0.3
Female	4 (0.3)	-0.01, 0.6
Neglect		
All	22 (1.1)	0.6, 1.6
Male	10 (1.3)	0.5, 2.1
Female	12 (1.0)	0.4, 1.6

Subtype of Abuse	Prevalence N (%)	95%CI
Overall EAN		
All	156 (8.1)	6.9, 9.3
Male	72 (9.5)	7.4, 11.6
Female	84 (7.2)	5.7, 8.7

Table 4.5: Lifetime prevalence of EAN according to clustering of abuse

Clustering of EAN	Prevalence N (%)	95% CI
One type		
All	118 (6.1)	5.0, 7.2
Male	55 (7.3)	5.4, 9.2
Female	63 (5.4)	4.1, 6.7
Two types or more		
All	38 (2.0)	1.4, 2.6
Male	17 (2.3)	1.2, 3.4
Female	21 (1.8)	1.0, 2.6

4.2   Part II: Mortality of EAN

4.2.1   Descriptive Analysis

Tracking was done in December 2016, two years and seven months (or 31 months) after completion of baseline assessment. Of all 1927 respondents, 10.7% (n=207) were confirmed deceased according to the data provided by the National Registry Department (NRD). A higher percentage of males died, 13.2% (n=100) as compared to females, 9.1% (n=107).

Among those abused or neglected, 14.7% (n=23) died whereas among those not abused, 10.4% (n=184) died. When grouped by sex, the percentage of death among male EAN victims was 18.1% (13) and 11.9% (10) among female victims. Deaths according to abuse subtypes were as follows: physical abuse (8.3%), psychological abuse (16.9%), financial abuse (18.5%) and neglect (9.1%). Sexual abuse was excluded from analysis due to the extremely small number of reported cases (n=5). Clustering of abuse has a positive correlation with percentage of mortality: 10.3% for no abuse, 12.0% for one type of abuse, and 21.1% for two types or more.

The mean age at death for EAN victims was 72.6 (SD: 7.1) and for those not abused, 75.7 (SD: 7.6). Gender comparison revealed that abused males on the average, died at the age of 72.2 (SD: 7.4) while those not abused died at the age of 76.0 (SD: 7.9), and abused females had a mean age at death of 73.1 (SD: 7.0) while those not abused had a mean age at death of 75.4 (SD: 7.2).
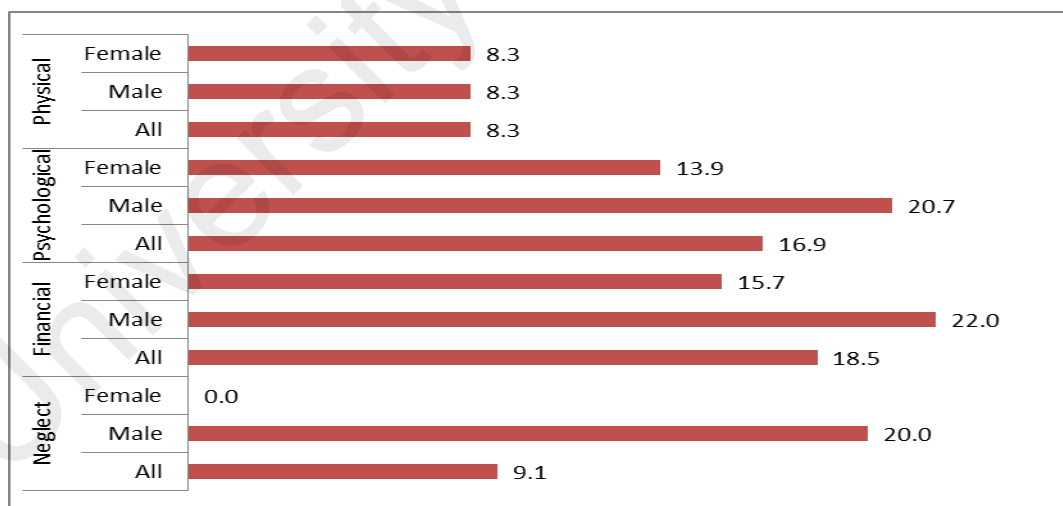
Figure 4.2: Percentage (%) of death by EAN subtype and gender
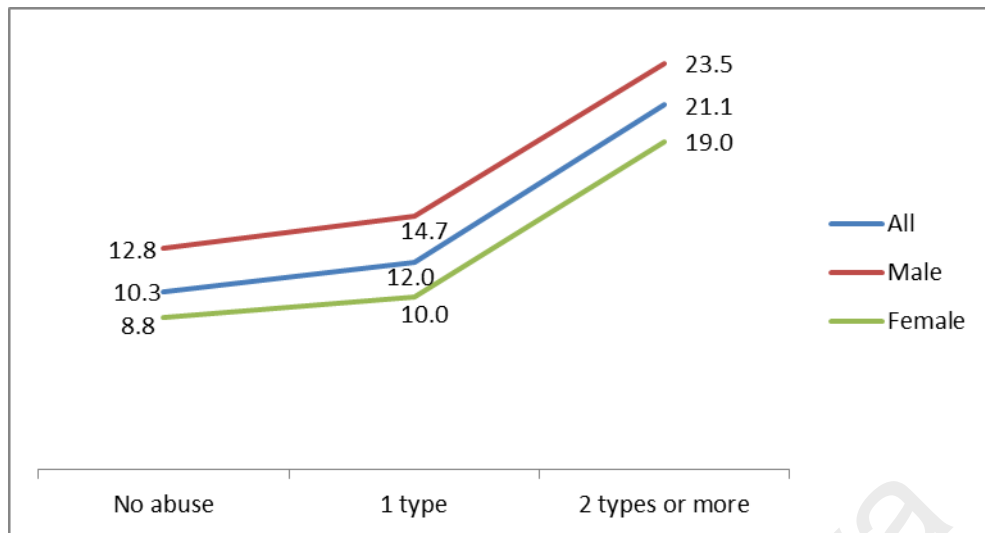
Figure 4.3: Percentage of death by clustering of EAN and gender

In Figure 4.2, with the exception of physical abuse, males had higher mortality proportions in all EAN subtypes. Similarly, in Figure 4.3, despite the three groups showing similar trends of increasing mortality percentages with clustering of EAN, male EAN victims had greater percentage of death at every level, compared to their female counterparts.

4.2.2   Survival analysis among abused and non-abused respondents

The interval, or period between the first interview date and event (death) ranged from nine to 1381 days. For clearer demonstrations of survival probability estimates, this interval was divided into five time periods, T1 to T5, with each period comprising 274.4 days. Table 4.6 shows the calculation of survival probability estimates for study respondents who were never abused, while Table 4.7 represents abuse victims.

Table 4.6: Survival probability estimates for older adults who are not abused

Time Period	At Risk	Died	Survived	K-M Survival Probability Estimate	95%CI
T1	1771	46	1725	1725/1771= 0.97	0.96, 0.98
T2	1725	48	1677	0.97 x (1677/1725)= 0.94	0.93, 0.95
T3	1677	59	1618	0.94 x (1618/1677)= 0.91	0.89, 0.92
T4	1618	31	1587	0.91 x (1587/1618)= 0.89	0.88, 0.91
T5	1587	0	1587	0.89 x (1587/1587)= 0.89	0.88, 0.91

1771 respondents were free of abuse at baseline

Table 4.7: Survival probability estimates for abused older adults

Time Period	At Risk	Died	Survived	K-M Survival Probability Estimate	95%CI
T1	156	6	150	150/156= 0.96	0.91, 0.98
T2	150	6	144	0.96 x (144/150)= 0.92	0.87, 0.95
T3	144	6	138	0.92 x (138/144)= 0.88	0.82, 0.92
T4	138	5	133	0.88 x (133/138)= 0.85	0.78, 0.90
T5	133	0	133	0.85 x (133/133)= 0.85	0.78, 0.90

156 respondents reported experience of abuse at baseline

From Table 4.6 and Table 4.7 above, comparison of survival probability estimates between the two groups can be made. For example, at T1 (within the first 274.4 days), the survival probability of those not abused was 0.97, just slightly higher than those

abused, 0.96. At T2, the survival probability of those not abused was 0.94 while abuse victims had a survival probability estimate of 0.92. At T3, the gap continued to widen as the survival probability of those not abused stood at 0.91 and that of abuse victims fell to 0.88. Overall, older adults who were not abused had greater probability of surviving at every stage, even though the difference was not huge. Between T4 and T5, both groups showed no change in estimates because no participant died within that time interval. Figure 4.4 compares the survival probability estimates between older adults who are abused and not abused.
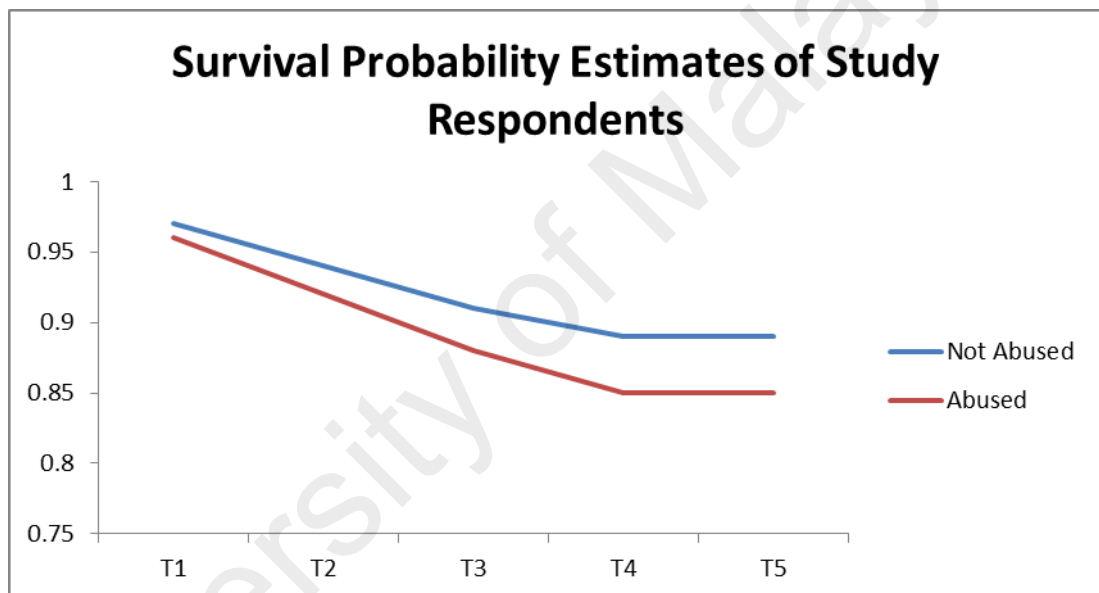
Figure 4.4: Survival probability estimates of study respondents throughout five time periods.

The Kaplan-Meier (KM) curve was then constructed, and displayed below:
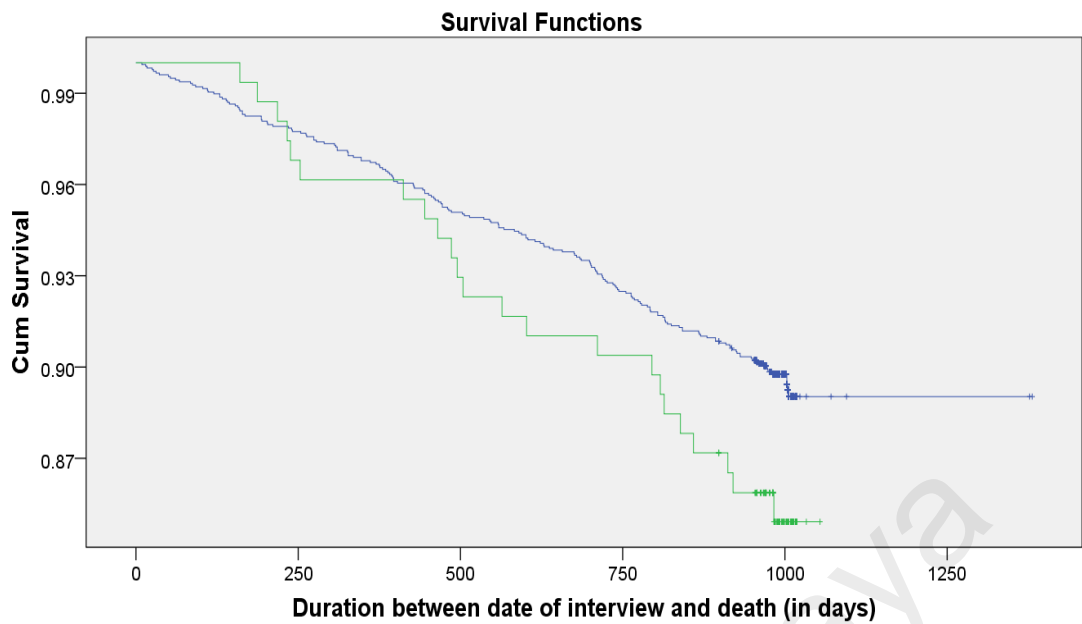
Figure 4.5: Kaplan-Meier curve depicting survival functions of study respondents
*blue line: not abused, *green line: abused*

The K-M curve shows the cumulative survival proportion against time for two groups of respondents: those abused and not abused. On the whole, older adults who were never abused appear to have higher survival functions (longer survival) than abuse victims. The shape of the two curves differ, with the upper curve being more smooth and continuous while the lower one is more stepwise. This can be due to the smaller sample size of older adults who comprise the abused group (156) as compared to those not abused (1771). The mean for survival time for those not abused is 1290.2 days (SE: 6.7), while the mean for abuse victims is 981.1 days (SE: 16.2). Median values could not be determined as the number of deaths did not reach 50% within the follow-up period. Percentage of death was 10.4% for those not abused and 14.7% for abuse victims.

The log-rank (Mantel-Cox) test revealed a Chi-Square value of 2.79 and a p-value of 0.095, indicating no significant difference between the survival functions of both groups. There is a visible crossing point between the two survival curves in the initial

phase, and this can imply a violation of the proportional hazard assumption which may render the log-rank test less powerful. Further elaborations on this matter are provided in Chapter 5 (Discussion). An alternative to log-rank test, the Gehan-Breslow test produces a Chi-Square value of 2.82 and a p-value of 0.093, still indicating that the survival distribution between the two groups is not significantly different.

4.2.3 Cox Regression

The first step in performing Cox regression is testing the model assumptions. There are two key assumptions for Cox regression: non-informative censoring and proportional hazards (PH) over time. To satisfy the former, the mechanism giving rise to censorship (of subjects) must not be related to the probability of the event (death) occurring. In this study, censored individuals are those who remained alive after tracking of mortality was done in December 2016, while 'event' refers to death as confirmed by the NRD data. No respondent is considered lost to follow-up as the NRD regularly updates its information and reporting of death is mandatory in Malaysia. The censoring of respondents therefore can be regarded as independent of the probability of death.

For the second assumption, SPSS 20.0 software is used to perform the 'Delgado Test'. First, covariate of interest are defined as time-dependent [covariate*LN(T_)]. Then, both the time-fixed covariate and the recently computed time-dependent covariate (T_COV_) are introduced in the Cox regression model. "If the time-dependent covariate is not statistically significant ($p>0.05$), the PH assumption is maintained". This method was suggested by Delgado et al (Delgado et al., 2014).

Tests were run for each continuous and categorical variable, all of which gave p-values of more than 0.05. Results were as follows: age ($p=0.41$), sex ($p=0.06$), ethnicity

(p=0.56), number of co-morbidities (p=0.76), gait speed (p=0.94), GDS scores (p=0.35), DUKE scores (p=0.76), EAN status (p=0.55), education level (p=0.57), income group (p=0.60) and self-rated health (p=0.75). The proportional hazard assumption was thus considered met. Table 4.8 below demonstrates results of Cox regression models.

Table 4.8: Cox regression models showing hazard ratios for all study variables

Variable	B	SE	p-value	Exp(β)	95%CI
Age	0.06	0.01	**<0.01**	1.06	1.04, 1.09
Sex [male] [female]*	0.59	0.16	**<0.01**	1.81	1.33, 2.46
Ethnicity [Malay] [Non-Malay]*	-0.04	0.39	0.92	0.96	0.45, 2.07
Income group [low] [middle] [high]*	0.19 -0.05	0.47 0.48	0.68 0.91	1.22 0.95	0.48, 3.09 0.37, 2.44
Education level [low] [medium] [high]*	0.03 -0.29	0.57 0.53	0.96 0.58	1.03 0.74	0.34, 3.12 0.26, 2.10
No. of co-morbidities	0.16	0.05	**<0.01**	1.17	1.06, 1.29
Self-rated health [poor] [good]*	0.51	0.15	**<0.01**	1.67	1.25, 2.23
Gait speed	0.05	0.02	**0.01**	1.06	1.01, 1.10
GDS scores	-0.01	0.02	0.69	0.99	0.95, 1.03

Variable	B	SE	p-value	Exp(β)	95%CI
DUKE scores	-0.04	0.02	**0.04**	0.96	0.92, 0.99
Abuse [Yes] [No]*	0.26	0.22	0.25	1.29	0.83, 2.00

reference group, Deviance (likelihood ratio) chi-square=136.22, p<0.01 Log likelihood=2969.09

After adjustment for potential confounders, six variables were found to significantly contribute to higher hazard ratios (risk of dying): age, sex, co-morbidities, self-rated health, gait speed and social support. Every unit increase in age contributed to a 6% greater risk of mortality while males had an 80% higher chance of dying compared to their female counterparts. Similarly, every unit increase in chronic disease gave an additional 17% risk of dying. Older adults who rated their health as poor have a 67% higher risk of mortality in comparison to those who rated their health positively. For physical function, the chance of dying increased by 6% for every unit increase in walking speed. In other words, having slower gait is related to shorter survival.

Conversely, social support showed a protective effect – risk of dying was reduced by 4% for every unit increase in DUKE score. Abuse experience on the other hand, did not significantly cause greater risks of mortality. Nevertheless, the survival and hazard plots generated from Cox models which depicted the cumulative functions on a linear scale as illustrated in Figure 4.6 and Figure 4.7 below, indicated lower survival and higher hazards for abuse victims compared to those not abused.
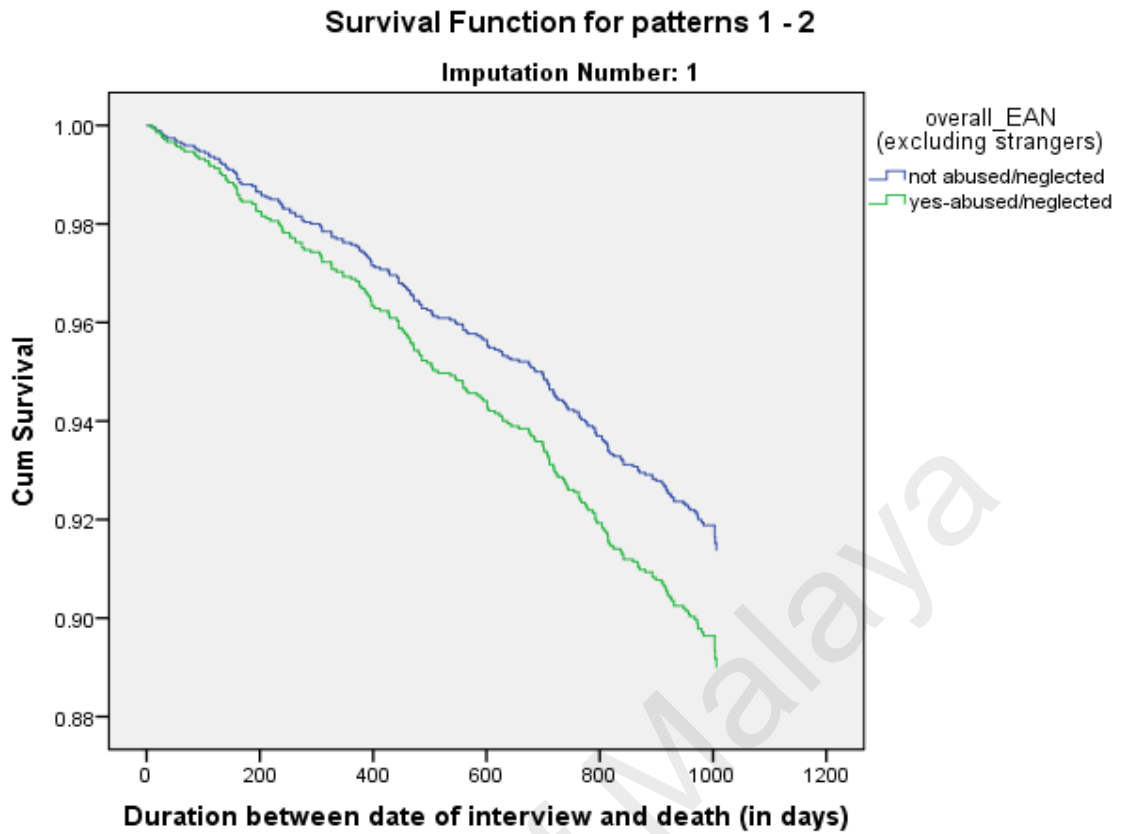
Figure 4.6: Survival plot based on Cox models comparing older adults by abuse status
Only the plot from imputation 1 is shown here. Altogether there are five plots derived from five imputed datasets. The other four plots are approximately similar
(Appendix H)
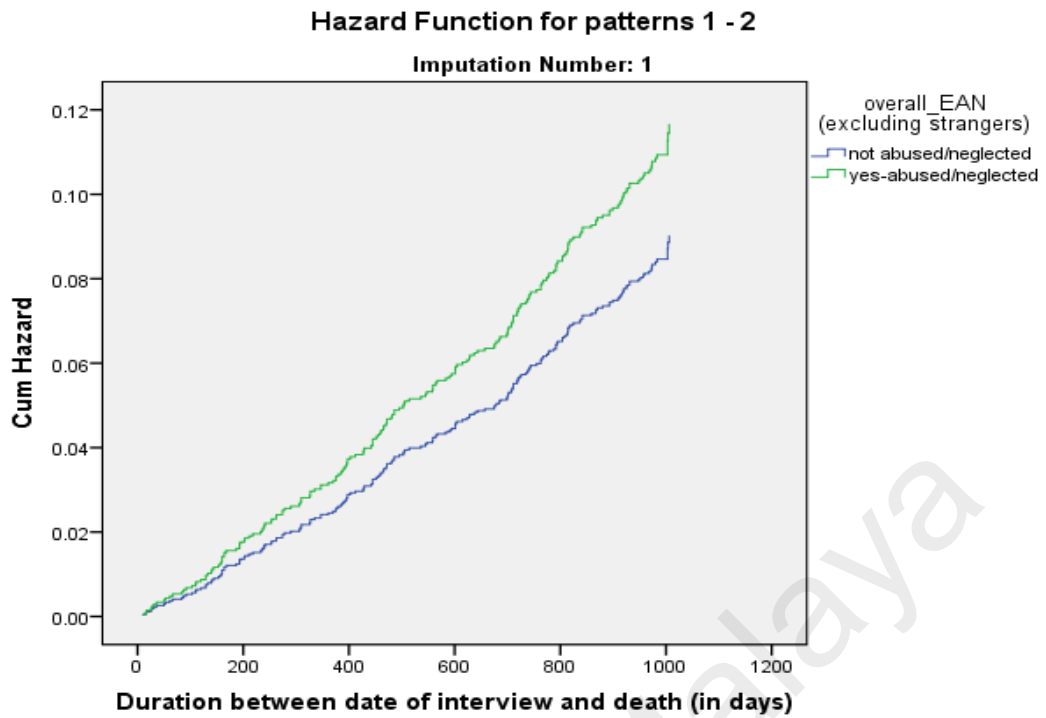
**Figure 4.7: Hazard plot based on Cox models comparing older adults
by abuse status**
**Only the plot from imputation 1 is shown here. Altogether there are five plots derived
from five imputed datasets. The other four plots are approximately similar*
(Appendix I).

Hazard ratios by EAN subtypes and clustering of abuse

Similar Cox regression models were built but this time the variable 'Abuse' was

replaced by each subtype, one by one. This was followed by replacing 'Abuse' with

'Number of abuse' (None, 1 type, 2 type or more). Results were adjusted for similar

confounders as before.

Table 4.9: Cox regression showing hazard ratios of EAN subtypes

EAN Subtype/ clustering	β	Standard Error	p-value	Exp(β)	95%CI
Physical	0.19	0.71	0.87	1.13	0.28, 4.48
Psychological	-0.36	0.31	0.25	0.69	0.38, 1.29
Financial	-0.41	0.26	0.11	0.67	0.40, 1.10
Neglect	0.05	0.72	0.94	1.06	0.26, 4.32
1 type of abuse	-0.57	0.36	0.12	0.57	0.28, 1.16
2 types or more	-0.48	0.41	0.23	0.62	0.28, 1.37

None of the EAN subtypes or clustering group showed statistically significant increase in risk of death. Further discussions are available in Chapter 5. The hazard plots for each subtype and clustering group are provided below.
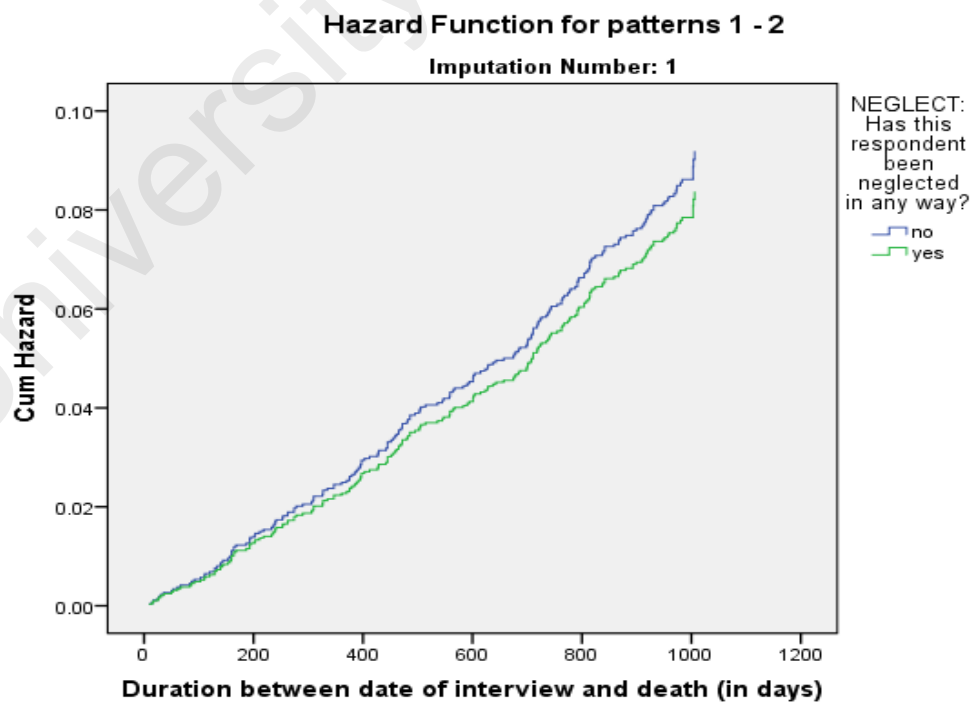
Figure 4.8: Hazard plot for neglect victims vs. those not neglected
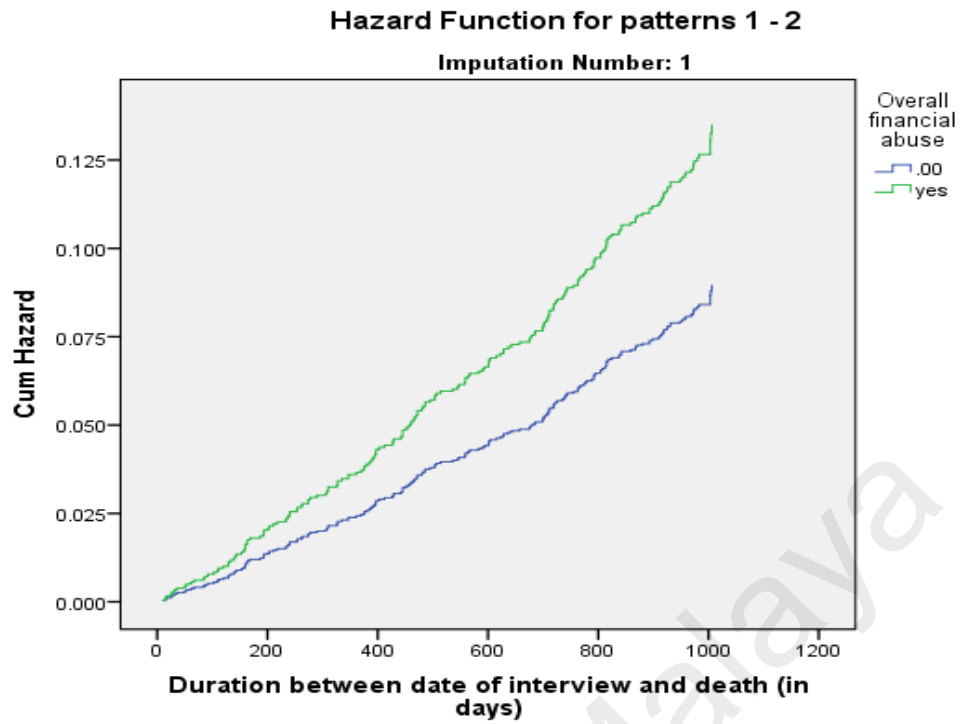
Figure 4.9: Hazard plot financial abuse victims vs. those not abused
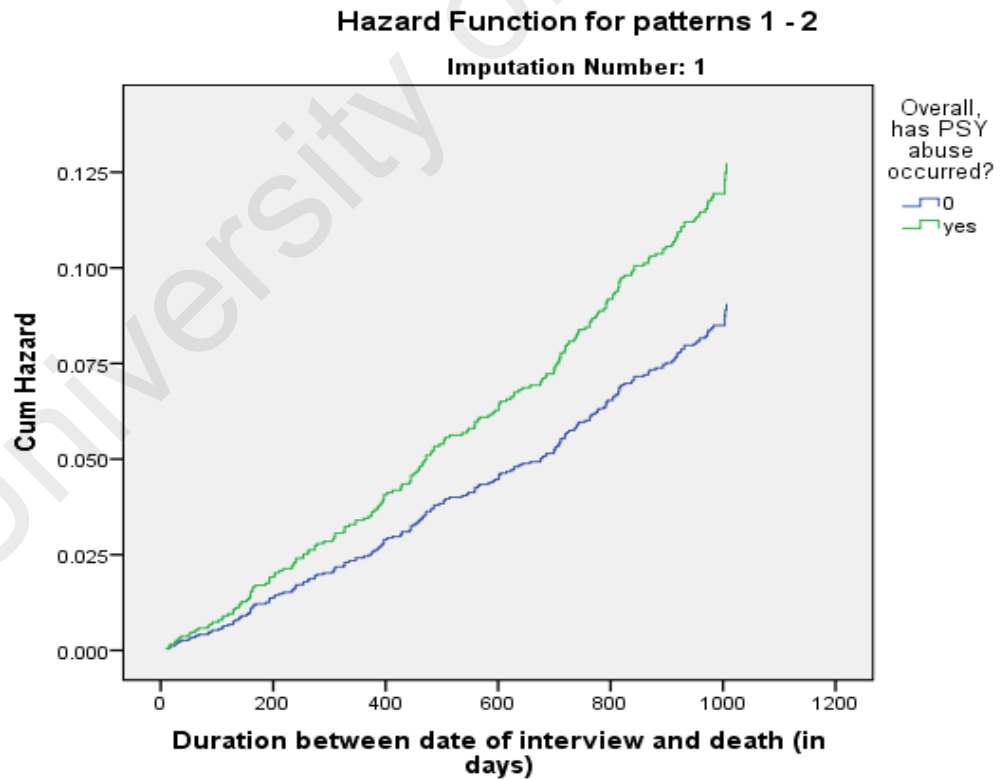
Figure 4.10: Hazard plot for psychological abuse victims vs. those not abused
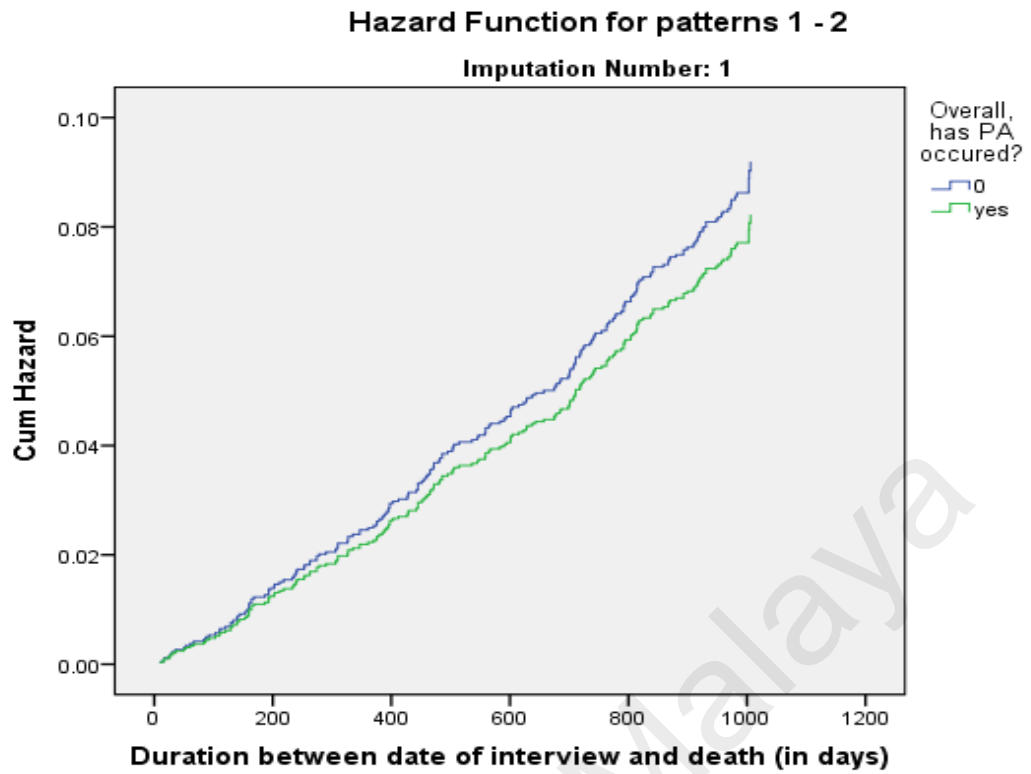
Figure 4.11: Hazard plot for physical abuse victims vs. those not abused
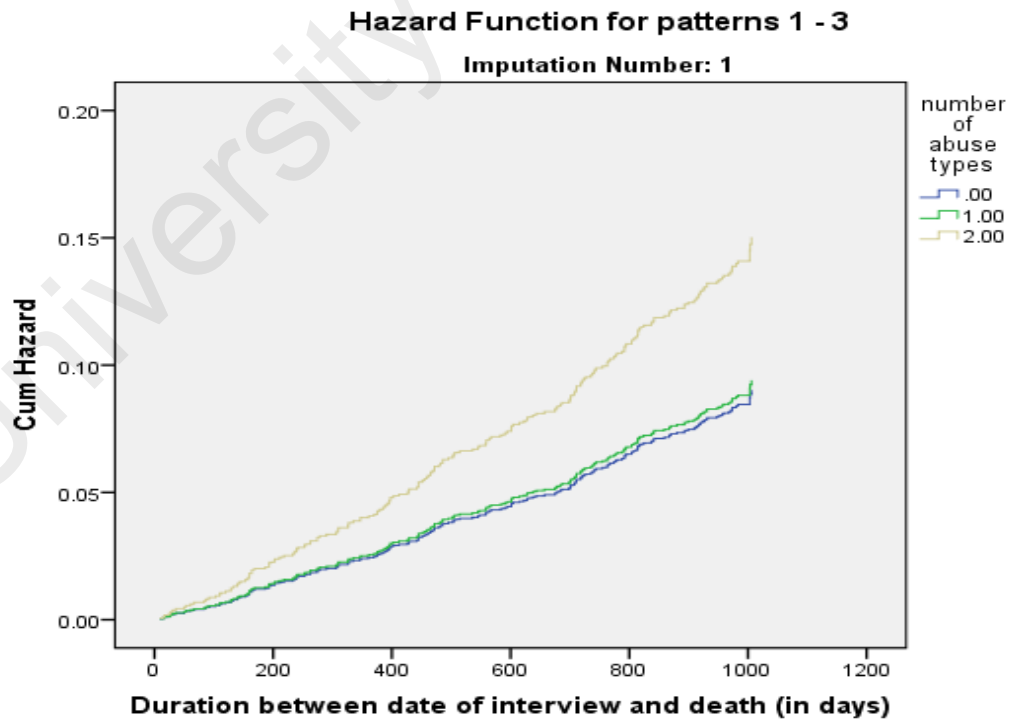
Figure 4.12: Hazard plot for clustering of abuse comparing 3 groups – not abused, 1 type of abuse and 2 types or more.

From the hazard curves, it can be generally observed that greater risks of death were obvious among financial and psychological abuse victims, whereas for neglect and physical abuse victims, the hazard was almost similar to those not abused. On the other hand, older adults who experienced 2 or more types of abuse are at higher risks than those who are not abused, or abused in a single dimension.

Interaction effects between gender and abuse on mortality

Using similar Cox models and variables, tests were re-run with an additional component, 'abuse*sex' entered into the covariate box. This was to look for any possible interaction between abuse and sex in affecting hazard ratios. The result however, did not show any interaction (β: -0.09, SE: 0.45, p-value: 0.84, Exp(β): 0.91, 95%CI: 0.38, 2.21). It can be concluded thus from this study that there was no interaction between abuse and sex on risks of mortality.

4.3   EAN and sleep quality

4.3.1   Baseline Results

Sleep quality in this study was measured using the PSQI. At baseline, 280 respondents had missing PSQI scores out of the actual sample size of 1927, comprising 14.5%. When analysed, those whose scores were missing were more likely to be older and non-Malays. Table 4.10 compares the basic characteristics between those with missing PSQI scores and those with complete data.

Table 4.10: Comparison between respondents with missing PSQI score and respondents with complete score.

Variable	Not missing N (%)	Missing N (%)	*P*
Age			
60-69	857 (52.1)	123 (43.9)	**0.04***
70-79	642 (8.9)	127 (45.4)	
80 and above	147 (3.9)	30 (10.7)	
Sex			
Male	655 (39.8)	100 (35.7)	0.19
Female	992 (60.2)	180 (64.3)	
Ethnicity			
Malay	1605 (97.4)	263 (93.9)	**<0.01***
Non-Malay	42 (2.6)	17 (6.1)	
Income			
Low	1067 (64.8)	177 (63.2)	0.44
Middle	523 (31.8)	89 (31.8)	
High	57 (3.5)	14 (5.0)	

Little's MCAR test gave a p-value of less than 0.05, indicating that missing data was not completely at random. Cross-tabulations and bivariate analyses (of available data) between the following variables however, showed no significant associations: 1) PSQI scores and age; 2) sleep quality (good sleep vs. poor sleep) and age group; 3) sleep quality and ethnicity, and; 4) exposure status (abuse vs. not abused) and likelihood of missingness. In other words, even though respondents with missing PSQI scores were older and more likely to be non-Malay, available PSQI scores and sleep quality did not differ according to age and ethnicity. We therefore assumed that missing data could be MAR, and thus addressed by multiple imputation.

Overall, the average PSQI score for all study respondents was 4.27 (SD: 2.64). For those not abused, mean PSQI score was 4.22 (SD: 2.61) while for those abused it was

4.85 (SD: 2.97). Independent sample t-test showed a significant difference between the two groups, with a p-value of 0.02. Using five as the cut-off score for differentiating between poor and good sleep (Buysse et al., 1989), the prevalence of poor sleep on the whole was 35.0% (n=576). Among EAN victims, 43.6% (n=58) had poor sleep while among those not abused, the prevalence stood at 34.2% (n=518).

When categorized according to EAN subtypes, mean PSQI score for neglect was 6.05 (SD: 3.59), physical abuse 5.15 (SD: 2.23), psychological abuse 5.04 (SD: 3.03), and financial abuse 4.39 (SD: 2.55). Clustering of abuse shows a graded relationship with PSQI scores: 4.22 (SD: 2.61) for no abuse, 4.51 (SD: 2.87) for 1 type of abuse, and 4.94 (SD: 2.40) for 2 types or more. Table 4.11 demonstrates the mean PSQI scores of study respondents according to EAN status and subtypes, while Figure 4.13 illustrates the prevalence of poor sleep according to EAN subtype. Table 4.12 shows the dose-response relation between EAN clustering and mean PSQI score.

Table 4.11: Mean PSQI scores according to EAN status and subtypes.

EAN status/ subtype	N	Mean PSQI score	95%CI
Not abused	1514	4.22	4.09, 4.35
Abused			
Overall	133	4.85	4.34, 5.35
Physical	20	5.15	4.11, 6.19
Psychological	54	5.04	4.21, 5.86
Financial	80	4.39	3.82, 4.95
Neglect	19	6.05	4.32, 7.78
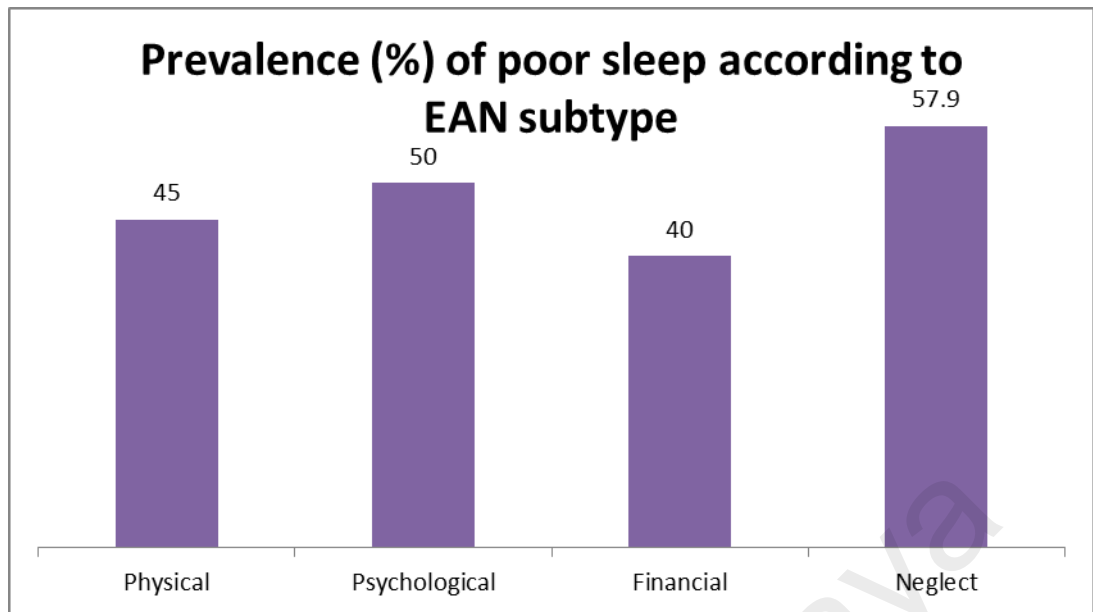
Figure 4.13: Prevalence (%) of poor sleep according to EAN subtypes

Table 4.12: Graded relationship between EAN clustering and mean PSQI score

EAN status/ clustering	Mean PSQI score
No abuse	4.22
1 type	4.51
2 types or more	4.94

PSQI score on the average was 4.26 (SD: 2.57) for males and 4.28 (SD: 2.69) for females. For male EAN victims, mean score was 5.00 (SD: 2.79) whereas for abused females, it was 4.73 (SD: 3.12). Table 4.13 compares mean PSQI scores between males and females according to EAN status.

Table 4.13: Gender differences in PSQI scores according to EAN status and subtype

Abuse status/ subtype		Mean PSQI score	
		Male (SD)	**Female (SD)**
No abuse		4.19 (2.54)	4.25 (2.65)
Abuse	Any type	5.00 (2.79)	4.73 (3.12)
	Physical	4.89 (1.45)	5.34 (2.76)
	Psychological	5.61 (3.38)	4.61 (2.72)
	Financial	4.59 (2.46)	4.24 (2.63)
	Neglect	5.33 (2.54)	6.70 (4.37)

On the average – similar to EAN victims (any type) – females who were not abused had a higher mean PSQI score than males. When categorized into subtypes, females who experienced physical abuse and neglect had poorer sleep than male victims. On the other hand, male victims of psychological and financial abuse had worse quality sleep than their female counterparts. Cross-sectional analyses using generalized linear models (GLiM) to examine associations between EAN and sleep quality gave the following results:

Table 4.14: Associations between variables of interest and PSQI scores using GLiM

Variables	B	SE	95% CI	*P*
Age	-0.001	0.001	-0.010, 0.010	0.97
Sex [male] [female]*	0.010	0.006	-0.004, 0.020	0.17
Ethnicity [Malay] [Non-Malay]*	0.002	0.020	-0.044, 0.049	0.91

Table 4.14: (Continued)

Variables	B	SE	95% CI	*P*
Income group				
[low]	-0.021	0.016	-0.053, 0.011	0.20
[middle]	-0.029	0.016	-0.061, 0.030	0.07
[high]*				
Education level				
[low]	-0.026	0.022	-0.070, 0.018	0.25
[medium]	-0.026	0.023	-0.073, 0.021	0.26
[high]*				
No. of co-morbidities	-0.010	0.002	-0.010, -0.003	**0.05**
Self-rated health				
[poor]	-0.019	0.006	-0.031, -0.010	**<0.01**
[good]*				
Gait speed	-0.001	0.001	-0.003, 0.002	0.49
Depression	-0.001	0.001	-0.003, 0.001	0.25
Social support	0.001	0.001	0.001, 0.003	0.09
Abuse				
[Yes]	-0.020	0.008	-0.036, -0.005	**0.01**
[No]*				

reference group, Deviance/df: 0.95, Pearson's Chi-Square/df: 0.95 , AIC=3286.06

Three variables were found to be significantly associated with poor sleep quality: co-morbidities, self-rated health and abuse. Older adults who reported having experienced abuse since the age of 60, had more chronic diseases and rated their health negatively were more likely to have poorer sleep quality than those who were not abused, had few or no chronic diseases and rated their health as 'good'.

4.3.2   Two-year Follow-up Response Rate and Results

Follow-up call was conducted two years (24 months) following baseline assessment. Overall, mean PSQI score was 2.81 (SD: 1.78) for all study respondents. EAN victims had a mean score of 3.47 (SD: 1.91) while those not abused had a mean score of 2.75 (SD: 1.76). Independent sample t-test comparing those abused and not abused showed a significant difference ($p=<0.01$). Figure 4.14 and 4.15 demonstrate changes of PSQI scores over two years according to EAN status and subtypes.
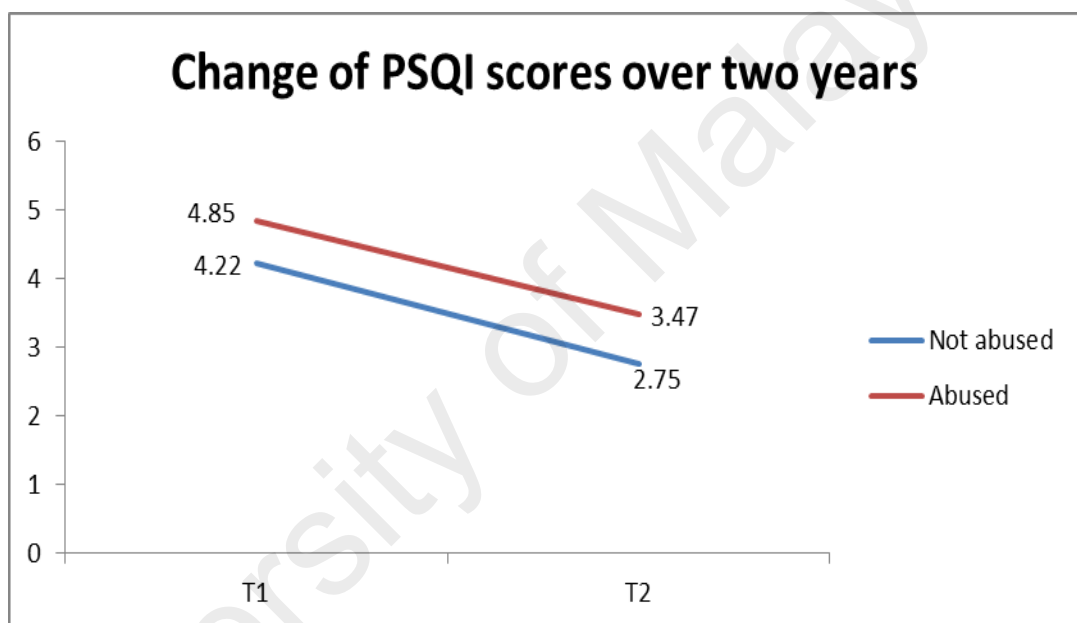
Figure 4.14: Change of PSQI scores over two years among those abused and not abused
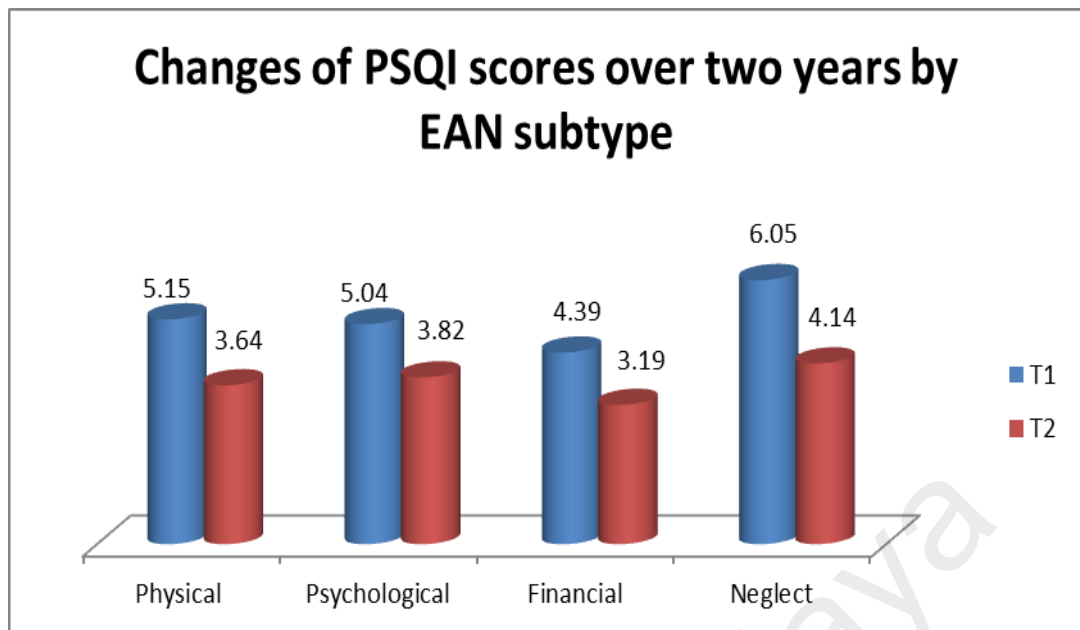
Figure 4.15: Change of PSQI scores over two years according to EAN subtype

Figure 4.14 indicated that over a period of two years, there has been slight improvement of sleep quality (as reflected by decrease in PSQI score) among both groups, abused and not abused. However, despite the drop in PSQI score, EAN victims still had poorer sleep quality than those not abused throughout both stages (baseline and follow-up). Figure 4.15 depicted a similar trend; PSQI scores drop across all EAN subtypes over two years. For both males and females, PSQI scores also dropped regardless of EAN status. Nevertheless, scores of abuse victims were higher at T1 (baseline) and remained higher at T2 (after two years) in both sexes (Table 4.15).

Table 4.15: Changes of PSQI score over two year according to sex

Sex	Status	T1	T2
Male	Abused	5.0	3.35
	Not abused	4.18	2.64
Female	Abused	4.73	3.57
	Not abused	4.24	2.83

4.3.3   Dropouts and Missing Data at T2

Attrition is a common problem in longitudinal design. In this study, 38.3% respondents were considered to have dropped out, while 61.7% were successfully interviewed. Table 4.3 in the previous section demonstrated that non-responders at T2 were older, and had lower income and education.

Understanding the mechanism of missing data thus is crucial due to the potential bias that can be caused. PSQI and chronic pain at T2 had 738 missing values, which consisted of 38.3% of overall number of respondents. Little's MCAR test gave a Chi-Square value of 169.00 and a p-value of <0.01, denoting that missing data was not completely at random (not MCAR). A definitive conclusion of whether missing data was MAR (missing at random) or MNAR (missing not at random), according to many studies, is extremely difficult, and often remains an assumption.

However, to determine the best possible assumption of missingness mechanism, relationships between missingness and variables of interest (dependent and independent) were tested. Table 4.16 illustrates cross-tabulation results between missingness ('response' coded as 1 and non-'response' coded as 0) and dependent variables (sleep quality and chronic pain). Cross-tabulation was also performed between missingness and EAN status.

Table 4.16: Cross-tabulation between missingness and variables of interest

Variable	Response (%)	Non-response (%)	p-value
Good sleep	55.0	54.7	0.91
Poor sleep	45.0	45.3	
Chronic pain	19.3	22.3	0.12
No chronic pain	80.7	77.7	
Abuse	7.2	9.5	0.08
No abuse	92.8	90.5	

There were no associations between the outcome variables – sleep quality and chronic pain – with missingness. This implied that non-respondents were not more likely to be missing due to differences in sleep quality or chronic pain. In addition, there was also no relationship between EAN status and probability of missingness.

Logistic regression, one of the methods to assist in differentiating between MAR and MNAR (Fielding et al., 2009), was then run. The key assumptions of binary logistic regression were first tested: a) samples must be selected randomly – in this study, sampling of households was done randomly following a random selection of 156 enumeration blocks; b) observations must be independent of each other – our study design and methods as explained earlier ensured that this assumption has been met; c) a large sample size is needed, with some studies recommending at least 30 cases per variable – in this study, there are altogether eleven predictor variables. The sample size at T2 is 1189, which has exceeded the required amount; d) there must be no or little multicollinearity between predictor variables – using 10 as the cut-off for Variance Inflation Factor (VIF) or 0.10 for tolerance, collinearity diagnostic tests were run using SPSS 20.0 and all variables had VIF ranging from 1.026 to 1.153. It can be concluded thus that there is no multicollinearity.

Table 4.17 shows results of logistic regression analyses to test for associations between variables of interest and missingness. Exposure, outcome, socio-demographic and health-related variables were included.

Table 4.17: Binary logistic regression showing relationships between variables of interest and missingness.

Variable	B	SE	Exp(B)	p	95%CI
Age	-0.014	0.008	0.986	0.086	0.97, 1.00
Sex [male] [female]*	-0.181	0.115	0.834	0.113	0.67, 1.04
Education level [poor] [medium] [high]*	-0.754 0.002	0.462 0.435	0.470 1.002	0.102 0.997	0.19, 1.16 0.43, 2.35
Income group [poor] [middle] [high]*	-0.785 -0.532	0.358 0.360	0.456 0.587	**0.028*** 0.139	0.23, 0.92 0.29, 1.19
No. of co-morbidities	-0.001	0.041	0.999	0.983	0.92, 1.08
Self-rated health [poor] [high]*	-0.056	0.125	0.945	0.651	0.74, 1.21
PSQI score	-0.002	0.020	0.998	0.931	0.96, 1.04
Chronic pain	-0.185	0.135	0.831	0.169	0.64, 1.08

reference group

The logistic regression model was statistically significant, x^2=45.31 (p<0.01). The Hosmer and Lemeshow test of the goodness-of-fit suggests that the model was a good fit to the data, with a p- value of 0.25 (>0.05). The model explained 4% (Nagelkerke R Square=0.04) of the variation of missingness. Missingness can be predicted by observed

data in income group. That is, those with lower income were more likely to drop out. Other variables, including the outcomes of interest – PSQI score and chronic pain – were not related to missingness. Further cross-tabulations between outcome variables (sleep quality and chronic pain) and income also did not show any significant differences. We therefore assumed the missing data mechanism to be MAR.

4.3.4   Longitudinal analysis of EAN and sleep quality

Primary analysis – GEE using complete cases only

A number of assumptions need to be met prior to running GEE. First, the responses are from a distribution in the exponential family with a specified mean. Second, the mean is a linear function of a predictor, and this can be obtained by using a specific link function. Third, a covariance structure for the responses must be specified. Fourth, cases are dependent (correlated) within subjects and independent between subjects (Brady, 2012).

It can be reasonably assumed that the first and second assumptions were met. PSQI scores in this study had an approximately normal distribution and thus the 'identity link' was deemed most appropriate. To fulfil the third assumption, the covariance structure 'unstructured' was chosen, to allow for all possible correlations between within-subject responses and included them in the estimation of the variances (Fitzmaurice, Laird, & Rotnitzky, 1993). However, other alternatives (autoregressive, exchangeable, independent) were also tested, one by one, to find out which structure gave the best model fit. The lowest QIC score is judged to be the best (Ballinger, 2004). The fourth assumption was considered met given the study design; correlations within subjects existed due to the repeated measurements (of PSQI) on the same respondents at T1 and T2, but each respondent was independent of each other.

GEE analysis were then run using the long data format, obtained through the 'Restructure' procedure in SPSS 20.0 (Lacroix & Giguère, 2006). For this primary analysis, only complete cases were included (n=1189). Multi-collinearity between predictor variables was checked before running GEE, and no multi-collinearity was found.

Table 4.18: Results of GEE using complete cases only to examine the longitudinal relationships between variables of interest and sleep quality

Parameter	B	SE	95%CI	*P*
Sex [male] [female]*	-0.043	0.105	-0.25, 0.16	0.68
Age	-0.003	0.009	-0.02, 0.01	0.69
Ethnicity [Malay] [Non-Malay]*	-0.796	0.493	-1.76, 0.17	0.11
Education level [low] [medium] [high]*	0.055 -0.05	0.344 0.272	-0.62, 0.73 -0.58, 0.48	0.87 0.85
Income group [low] [middle] [high]*	0.358 0.565	0.242 0.242	-0.12, 0.83 0.09, 1.04	0.14 **0.02**
No. of comorbidities	0.138	0.041	0.06, 0.22	**<0.01**
Self-rated health [poor] [good]*	0.419	0.132	0.16, 0.68	**<0.01**

Table 4.18: (Continued)

Parameter	B	SE	95%CI	*P*
GDS score	0.041	0.013	0.02, 0.07	**<0.01**
DUKE score	-0.014	0.016	-0.05, 0.02	0.39
Gait speed	0.052	0.031	-0.01, 0.11	0.09
Abuse [Yes] [No]*	0.468	0.195	0.09, 0.85	**0.02**

reference group, Quasi Likelihood Under Independence Model Criterion (QIC)=12146.28, Corrected QIC (QICC)=12138.95

The correlation structure type 'unstructured' gave the lowest QIC value, so it was regarded as the best choice (other QIC values are not shown). From Table 4.17, five variables were shown to affect changes in sleep quality over two years: income, number of co-morbidities, self-rated heath, GDS score (depression), and EAN. The middle-income class (of older adults) experienced worsening sleep quality compared to the high-income group. Surprisingly however, low income did not significantly contribute to decline in sleep quality. Higher number of chronic diseases led to poorer sleep and those who rated their health negatively showed a similar outcome. As GDS scores increased (greater level of depression), sleep quality deteriorated. The main variable of interest, EAN, significantly affected PSQI score – abuse victims experienced declining sleep quality compared to those who were not abused over a span of two years.

Taking into account that the above analysis included only complete cases, no definitive conclusions could be derived yet given the possibility of bias. The next step was to perform multiple imputation (MI) of missing data, followed by re-analysis and comparison of results.

Table 4.19: Results of GEE after Multiple Imputation to examine longitudinal relationships between variables of interest and sleep quality

Parameter	B	SE	95%CI	*P*
Sex [male] [female]*	-0.018	0.093	-0.20, 0.17	0.85
Age	-0.002	0.007	-0.02, 0.01	0.74
Ethnicity [Malay] [Non-Malay]*	-0.378	0.317	-1.00, 0.25	0.23
Education level [low] [medium] [high]*	-0.015 -0.127	0.319 0.312	-0.66, 0.63 -0.78, 0.52	0.96 0.69
Income group [low] [middle] [high]*	0.285 0.492	0.219 0.229	-0.15, 0.72 0.04, 0.95	0.19 **0.03**
No. of comorbidities	0.127	0.036	0.06, 0.19	**<0.01**
Self-rated health [poor] [good]*	0.381	0.119	0.14, 0.62	**<0.01**
GDS score	0.031	0.013	0.01, 0.06	**0.02**
DUKE score	-0.018	0.015	-0.05, 0.01	0.22
Gait speed	0.028	0.024	-0.02, 0.08	0.25
Abuse [Yes] [No]*	0.495	0.164	0.17, 0.58	**<0.01**

reference group, (-) value indicates decline in PSQI score
Quasi Likelihood Under Independence Model Criterion (QIC)=20912.54
Corrected QIC (QICC)=20908.71

Comparison between pre and post MI analyses with GEE showed that the same five variables consistently significantly affected sleep quality: abuse, number of chronic diseases, self-rated health, depression and income. This indicated that dropouts (missing data) had not caused substantial or serious biases to results. Next, relationship between EAN subtypes and sleep quality was examined. GEE was re-run with similar predictor variables except for EAN, which was replaced by its four subtypes – physical, psychological, financial and neglect – one by one.

Table 4.20: GEE examining longitudinal relationships between EAN subtypes and sleep quality

EAN subtype	B	SE	95%CI	*P*
Physical	0.71	0.316	-0.09, 1.66	0.08
Psychological	0.637	0.229	0.19, 1.09	**<0.01**
Financial	0.155	0.210	-0.27, 0.58	0.47
Neglect	1.13	0.506	0.14, 2.13	**0.03**

Quasi Likelihood Under Independence Model Criterion (QIC)=20758.78
Corrected QIC (QICC)=20753.76

Results from Table 4.19 showed that of all EAN subtypes, psychological abuse and neglect affected sleep quality (PSQI score) more than others. To understand if sex played a role in how EAN caused decline in sleep quality, a similar GEE model was constructed but this time it included interaction between EAN and sex ("EAN*sex" inserted into the box while specifying the model). None of the results however was statistically significant, thus implying similar impacts of EAN on sleep quality in both males and females.

4.4   EAN and Chronic Pain

4.4.1   Baseline results

The prevalence of chronic pain was 20.4%. Among those abused, 30.1% reported having chronic pain compared to 19.6% among those not abused. In terms of severity, 36.2%, 19.1% and 44.7% EAN victims had mild, moderate and severe chronic pain respectively, while 44.7%, 18.7% and 36.3% of those not abused had mild, moderate and severe chronic pain respectively. The options from the Likert scale for the question 'Does the pain interrupt your daily activities?' during the interview were 'Not at all' and 'To a little extent' were collapsed into 'Mild', 'To some extent' was categorized as 'Moderate' and the last two options, 'To a great extent, and 'Extremely disturbing' were collapsed into severe.

Figure 4.16 compares the prevalence of chronic pain severity among respondents.
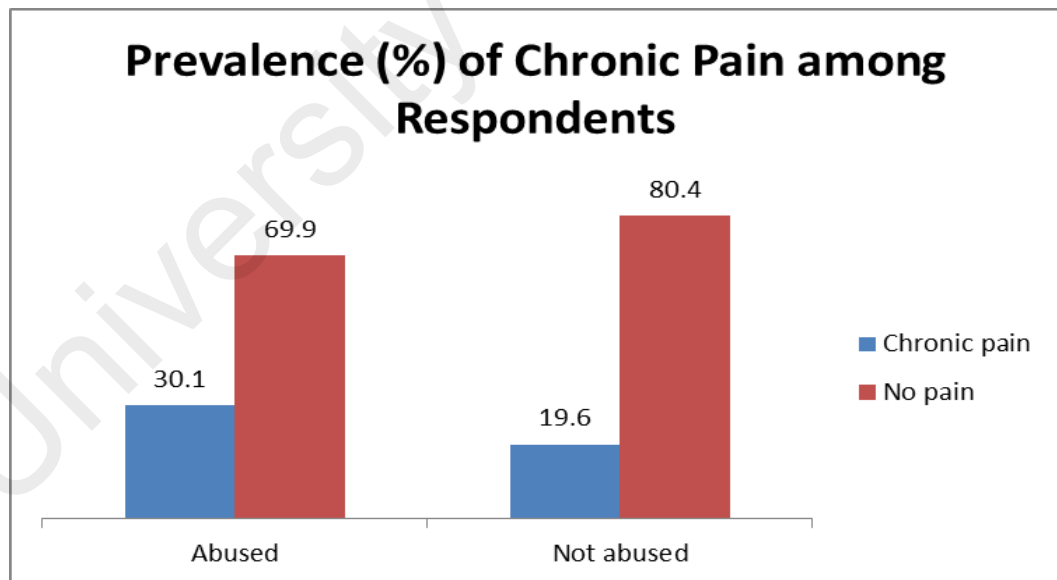
Figure 4.16: Comparison of chronic pain prevalence (%) between those abused and not abused

To test the cross-sectional associations between EAN (along with other potential confounders) and chronic pain, generalized linear models were used. Table 4.21 shows the relationships between variables of interest and chronic pain.

Table 4.21: Generalized linear models (GLiM) assessing the relationships between EAN and chronic pain (n=1927)

Variable	OR	SE	95% CI	*P*
Age	1.03	0.01	1.01, 1.05	**<0.01**
Sex [male] [female]*	0.96	0.13	0.75, 1.25	0.79
Ethnicity [Malay] [non-Malay]*	0.73	0.33	0.39, 1.40	0.36
Education level [low]	0.19	0.44	0.08, 0.47	**<0.01**
[medium] [high]*	0.26	0.40	0.12, 0.57	**<0.01**
Income group [low]	4.81	0.49	1.80, 12.68	**<0.01**
[middle] [high]*	2.83	0.49	1.07, 7.46	**0.04**
Co-morbidity	1.46	0.05	1.33, 1.59	**<0.01**
Self-rated health [poor] [good]*	1.40	0.13	1.08, 1.80	**0.01**
GDS score	1.06	0.02	1.03, 1.09	**<0.01**
DUKE score	1.01	0.02	0.97, 1.05	0.55
Gait speed	1.04	0.02	1.00, 1.09	**0.05**
Abuse [Yes] [No]*	1.52	0.20	1.03, 2.27	**0.03**

reference group, Deviance: 1727.51, Pearson Chi-square: 1806.35, Akaike's Information Criterion (AIC): 1755.5

Eight variables were significantly associated with chronic pain: age, education, income, comorbidities, SRH, depression, gait speed and EAN. Those who were older, had lower income, reported more chronic diseases, and rated their health as poor were more likely to have chronic pain compared to their counterparts who were younger, wealthier, had less comorbidities and rated their health positively. Similarly, older adults with higher GDS scores (depressed), slower walking speed and experience of abuse in late life demonstrated greater odds of having chronic pain when compared to those who were not depressed, had higher walking velocity and were never abused. Interestingly, older adults from the lower and medium education background appeared to have lower odds of having chronic pain than those with higher level of education.

4.4.2 Longitudinal analyses

At baseline, 393 respondents were found to have chronic pain and thus were excluded from longitudinal analysis. This was done to ensure that all respondents analysed were free from the outcome of interest at the beginning. A total of 230 from this amount were among those followed-up. Longitudinal analysis with complete cases therefore involved 959 respondents while GEE using imputed data included 1534 individuals. Collinearity diagnostic tests revealed no multi-collinearity between any of the predictor variables.

Table 4.22: GEE showing longitudinal relationships between variables of interest and chronic pain using complete cases only (n=959)

Variable	RR	SE	95% CI	*P*
Age	1.02	0.0095	1.00, 1.02	**0.05**
Sex [male] [female]*	0.72	0.1284	0.56, 0.93	**0.01**
Ethnicity [Malay] [non-Malay]*	2.53	0.544	0.87, 7.35	0.08
Education level [low] [medium] [high]*	0.88 0.97	0.452 0.401	0.36, 2.15 0.44, 2.13	0.79 0.95
Income group [low] [middle] [high]*	0.91 1.27	0.288 0.288	0.52, 1.60 0.72, 2.24	0.74 0.40
Co-morbidity	1.16	0.042	1.07, 1.26	**<0.01**
Self-rated health [poor] [good]*	1.44	0.127	1.12, 1.84	**<0.01**
GDS score	1.02	0.015	0.98, 1.05	0.23
DUKE score	0.96	0.016	0.93, 0.99	**0.03**
Gait average	1.04	0.022	0.99, 1.08	0.07
Abuse [Yes] [No]*	1.18	0.213	0.78, 1.79	0.43

*reference group, QIC=1643.71, QICC=1650.08

Five variables were found to cause higher risks of developing chronic pain: age, sex, comorbidities, self-rated health and social support. Increasing age, female gender, higher number of chronic diseases and poor self-rated health all resulted in greater risks of chronic pain incidence, while social support exerted a protective effect. Age however, showed a borderline p-value. Abuse did not show any significant relationship with chronic pain.

Table 4.23: GEE showing longitudinal relationships between variables of interest and chronic pain using imputed data (n=1534)

Variable	RR	SE	95% CI	*P*
Age	1.02	0.008	0.99, 1.03	0.06
Sex [male] [female]*	0.73	0.121	0.57, 0.93	**0.01**
Ethnicity [Malay] [non-Malay]*	2.11	0.463	0.84, 5.32	0.11
Education level [low] [medium] [high]*	1.23 1.23	0.510 0.464	0.44, 3.42 0.48, 3.10	0.69 0.65
Income group [low] [middle] [high]*	0.85 1.21	0.288 0.284	0.48, 1.51 0.69, 2.14	0.58 0.48
Co-morbidity	1.16	0.043	1.06, 1.26	**<0.01**
Self-rated health [poor] [good]*	1.38	0.124	1.08, 1.77	**0.01**
GDS score	1.02	0.016	0.99, 1.06	0.13
DUKE score	0.96	0.016	0.93, 1.00	0.06
Gait average	1.04	0.024	0.99, 1.10	0.08

Variable	RR	SE	95% CI	*P*
Abuse [Yes] [No]*	1.14	0.173	0.81, 1.60	0.45

reference group, QIC=2632.28, QICC=2638.67

Both analyses (complete case and imputed data) in Table 4.22 and Table 4.23 demonstrated fairly consistent results. On the average, MI increased the precision of estimates which could be seen through smaller standard errors across variables. Sex (female), higher co-morbidities and poor SRH consistently contributed to higher risks of developing chronic pain. In complete case analysis, social support was shown to have a protective effect but its p-value crossed the significance cut-off in the second GEE model, with a small margin. Similarly, there was a slight variation in p-value of age when comparing the first and second models. EAN did not result in higher risk of chronic pain, and this was consistent throughout both GEE models.

The relationships between EAN subtypes and chronic pain were tested using a similar GEE model, in which EAN was replaced by each abuse subtype, one by one.

Table 4.24: GEE showing longitudinal relationships between EAN subtypes and chronic pain

EAN subtype	RR	SE	95% CI	*P*
Physical	1.44	0.49	0.56, 3.67	0.46
Psychological	0.88	0.40	0.42, 1.64	0.74
Financial	1.79	0.31	0.97, 3.31	0.06
Neglect	0.15	1.07	0.05, 0.44	0.08

Quasi Likelihood Under Independence Model Criterion (QIC)=6943.90, Corrected QIC (QICC)=6782.31

None of the EAN subtypes had significant relationship with higher risks of developing chronic pain. However, financial abuse and neglect were closer to statistical significance, compared to other subtypes.

CHAPTER 5: DISCUSSION

This chapter provides critical discussion on, and insight into the findings of this study. It clarifies all possible issues that may arise from (Results) and offers a number of perspectives in the interpretation of results. This chapter is divided into three parts. Part I explains the baseline findings and lifetime prevalence of EAN. Part II discusses the relationships between EAN and outcome variables, and Part III deals with the study limitations.

As mentioned in the beginning of this thesis (Chapter 1), the overarching aim of this study was to examine the health consequences of EAN. Phase I which consisted of systematic review concluded that outcomes of EAN with the strongest evidence were premature mortality, depression and anxiety. Sleeping disturbance and chronic pain, despite having huge relevance to ageing and abuse fell into the 'limited evidence' category, and have not been adequately explored. This study thus adds to the existing literature of EAN by investigating the (longitudinal) impact of abuse in late life on mortality (among an underrepresented older population), sleep quality and chronic pain. In addition, we examined the effect of each EAN subtype on the three outcomes, along with the presence (or absence) of gender interaction. Another objective was to estimate the lifetime prevalence of EAN, which has not been established before.

Like other longitudinal studies conducted among older adults, the main challenge we faced was attrition during the follow-up assessment (Bowling & Iliffe, 2011). Further examination revealed that those lost to follow-up were older, and had lower income and education. All these were likely to have caused potential systematic bias to our results, as observed data may not represent the true characteristics of the studied population. We addressed these potential biases through attempts to understand the mechanism of

missing data, followed by multiple imputation and sensitivity analyses, which are the two common procedures employed in other epidemiological studies facing similar problems (Thomas, 2015).

5.1   Baseline findings and lifetime prevalence of EAN

From the tabulation of basic characteristics of respondents in Table 4.2, EAN was found to be associated with low income, depression and poor social support. Previous findings corroborated these relationships. A systematic review which included 49 studies on EAN revealed that low income, psychiatric or psychological problems and poor social support were among the most consistent risk factors of EAN (Johannesen & LoGiudice, 2013). Similarly, in another review the protective role of social support against EAN was highlighted, while low-income and poor mental health were listed as risk factors with strong evidence (Pillemer et al., 2016).

The prevalence of EAN in this study was defined as any occurrences of abuse from the age of 60 onwards. Thus, it was termed lifetime EAN. This is in contrast with many prevalence studies in the existing literature which use 'the last 12 months' as the cut-off for establishing a case of EAN. In our study, the overall lifetime EAN prevalence is 8.1%, while the prevalence for physical, psychological, financial, sexual and neglect are 1.2%, 3.4%, 4.8%, 0.3% and 1.1% respectively. Among all EAN subtypes in rural Malaysia therefore, financial abuse was the most common.

A number of studies have taken a similar, or a slightly modified approach, while estimating EAN prevalence. For instance, Vandenberk et al in a study in Belgium reported that 19.7% elder respondents experienced abuse or mistreatment ever since they turned 60, while the prevalence of physical, psychological, financial, neglect and sexual abuse was 2.5%, 6.9%, 7.6%, 3.0% and 1.0% (Vandenberk, Opdebeeck, &

Lammertyn, 1998).The most frequently occurring EAN type was also financial. Eriksson (2001) on the other hand defined EAN prevalence as abuse episodes that took place from the age of 65. He found that 16% older women and 13% older men in Sweden had experienced abuse. The prevalence of physical abuse was 1.4%, psychological 6.4%, financial 1.0% and neglect 3.0%. Sexual abuse was not included (Eriksson, 2001).

In Finland, Kivela et al estimated the EAN prevalence – defined as mistreatment 'from the age of retirement' – at 6.7%; physical 2.0%, psychological 4.6% and financial 1.4% (Kivelä et al., 1993). Another study reported that 2 in 10 older adults admitted having been abused since turning 60 years (Teaster & Lipke, 2015), whereas a study specifically investigating financial abuse (from the age of 60) stated 4.7% as the prevalence (Peterson et al., 2014).

Prevalence studies which include only episodes within the 'last twelve months' revealed a variety of estimates. A recent systematic review and meta-analysis by Yon et al reported the pooled prevalence rate for overall EAN at 15.7% while for physical, psychological, financial, sexual and neglect, the pooled prevalence were 2.6%, 11.6%, 6.8%, 0.9% and 4.2% respectively (Yon et al., 2017). Ultimate comparison between our findings and other studies remain difficult given the heterogeneity in definition (prevalence period) and methodology (tool of assessment). For example, even though Vandenberk et al assessed EAN from the age of 60, cases were established using questions not from a specific validated scale. Similarly, Kivela utilized his own questions, on top of the rather 'vague' prevalence period given as 'age of retirement'. Our study on the other hand, utilized modified CTS (Conflict Tactics Scale) as the tool of assessment. A similar problem arises if comparison were to be made between our results and studies which use different prevalence periods. Other than 'the last 12

months' or 'the past year', prevalence periods that have been used include 'within last month' (Oh et al., 2006), 'recently'(Ogg & Bennett, 1992), 'the last four years'(Wetzels & Greve, 1996), and 'the last five years' (Hirsch & Brendebach, 1999).

A consistent trend across almost all the studies mentioned above is that sexual abuse is the least common EAN subtype. However, to enable a meaningful comparison of prevalence rates across studies or countries, there has to be a consensus among researchers, or standardization of definition and methods (tool). A more elaborate discussion on this subject is beyond the thesis scope.

5.2 Health outcomes of EAN

On the whole, the relationship between elder abuse and health consequences can be viewed through the lens of the conceptual framework suggested by Anetzberger (Figure 1.2, Chapter 1). In this model, the negative effects of abuse in old age encompass physical, mental, social and behavioural health. At the same time, these outcomes are influenced by various factors such as individual perception, cultural norms, cohort experiences and nature of abuse. Our study findings – both from the systematic review and prospective cohort phase – support the relationship between EAN and adverse health impacts in different domains. The influences of cultural background and cohort experiences were among the underlying motivations of this study, that is to see if EAN outcomes differ in a Malaysian older population when compared to western elders who have been relatively more represented in EAN literature.

5.2.1 EAN and Mortality

From the existing literature, premature mortality as a consequence of abuse in late life is well-established. The relationship between EAN and higher risks of death echoes that of two other domains of family violence: child abuse (Kelly-Irving et al., 2013) and

intimate partner violence (IPV) (Plichta, 2004). In four population-based longitudinal studies, elder abuse victims were shown to have greater risks of mortality compared to those who were not abused (M. W. Baker et al., 2009; Dong et al., 2009; Lachs et al., 1998; Schofield et al., 2013). This was regardless of EAN subtype and gender. A systematic review on the health outcomes of EAN ranked premature mortality as the most scientifically credible consequence of elder abuse (Yunus, Hairi, & Choo, 2017).

Descriptive analyses in this study pointed to a possible link between EAN and mortality. Percentage of death was higher among those abused than those not abused. Similarly, a graded relationship was demonstrated between proportion of death and clustering of abuse – death percentage increases with additional number of EAN subtype. This means older adults who were abused in multiple dimensions (eg: physical and pscyhological) died in higher percentages relative to those abused in a single dimension (eg: only psychological). Similar trends were seen in the dose-response curves across gender (male and female), even though men had higher death percentages at all stages.

How EAN as a form of chronic stressor is linked to mortality can be explained in a number of ways. First, physical abuse which causes direct and severe injuries can be fatal. However, for other EAN subtypes, the mechanism leading to premature death is more subtle and occurs in a process. At the molecular level, continuous and prolonged emotional stress as a result of abuse adversely affects physiological processes in the body in the following ways: a) acceleration of telomere shortening (telomere length is associated with life span) (Epel et al., 2004); b) interference with endocrine response systems, and; c) disruption of the immune system and inflammatory processes (Cohen, Janicki-Deverts, & Miller, 2007). Stress is associated with various illnesses such as

cardiovascular diseases (Dimsdale, 2008), cancer (Soung & Kim, 2015) and autoimmune diseases (Stojanovich & Marisavljevich, 2008).

Interestingly, our results showed that percentage of death was highest among financial abuse victims. Monetary exploitation or financial deprivation could lead to various consequences such as restricting an older adult's access to healthcare, limiting his mobility and weakening his purchasing power which is essential for a decent livelihood. All these would result in social isolation, deterioration of living condition and exacerbation of existing illnesses, with an eventual outcome of death (Yunus et al., 2017). In addition, financial exploitation often occurs repeatedly for a long period because the perpetrator – usually a close family member or relative – lives in close proximity to the victim and thus has continuous access to his belongings. This chronicity should be taken into consideration in order to understand the dynamics behind the mortality of financial abuse.

The survival analysis (Kaplan-Meier curve) we performed demonstrated a clear divergence of survival curves between EAN victims and their non-abused counterparts. Abuse victims had shorter survival periods than those who had not experienced abuse, with a mean survival time of 981.1 days for EAN victims and 1290.2 for those not abused. Difference in the shapes of curves – stepwise in EAN victims and smooth in those not abused – can be explained by the disparity in sample size. While there were 1771 respondents who were free of abuse, the EAN sample was only 156.

At the initial stage (at approximately 250 days), the two survival curves intersected. The 'non-abused' curve which appeared to be lower at the beginning of the study took a higher position, and continued to remain 'high' throughout the plot. On the contrary, the 'victim curve' which initially seemed to have higher survival assumed a 'lower' position after the crossing point, and continued to drop thereafter. This crossing

phenomenon can have two possible interpretations. First, early crossing can be a coincidence of random sampling which means the assumption of proportional hazard is still valid (Adams, 2017). Such intersection can be due to chance because "all it needs is for the first death to occur in the group whose curve is destined to be the higher one" (MedStats, 2006). This is very likely in our case given the large sample size of those not abused. Moreover, it is reasonable to assume that the effect of EAN on mortality risk will manifest only after a certain period of time, thus obscuring any difference in the initial phase. In addition, the test proposed by Delgado et al (explained in Section 4.2.3, Chapter 4) was run and results showed that the proportional hazard assumption was met.

Second, crossing curves may denote a violation of the proportional hazard assumption. If this is true, the log-rank test is less powerful (Bouliotis & Billingham, 2011). Crossing of survival curves "is generally a result of the survival times having greater variance in one group than another" (Bouliotis & Billingham, 2011). When crossing point occurs at the early stage, the Gehan-Breslow test – one of the different weighting methods for the generalized Wilcoxon test – has been proposed as a better alternative to the conventional log-rank test to detect the overall and true difference between two survival curves (Jurkiewicz & Wycinka, 2011). In this study, both the log-rank and Gehan-Breslow test gave non-significant results: p-values of 0.095 for log-rank and 0.093 for Breslow.

It can be concluded thus that the survival time between abused and non-abused respondents did not differ upon tracking after 31 months. However, taking into account the existing previous studies which have demonstrated greater mortality risks among elder abuse victims, the most plausible explanation is that our study's follow-up period may be too short to allow adequate number of deaths to occur in order to give

statistically meaningful results. In the other four longitudinal studies, mortality was tracked after 6.9 years in Dong et al (Dong et al., 2009), 7.5 years in Baker et al (M. W. Baker et al., 2009), 9 years in Lachs et al (Lachs et al., 1998) and 12 years in Schofield et al (Schofield et al., 2013). In our case, tracking of mortality was done approximately 942 days (on the average) after study enrolment, which was equivalent to 2.6 years.

Similarly, Cox regression did not show a significant relationship between EAN and risk of mortality which again can be due to the short period of this study. Other variables found to significantly contribute to higher hazard ratios were age, sex, number of chronic diseases, self-rated health (SRH), gait speed and social support. Past findings have supported these variables as predictors of mortality among older adults (Mossey & Shapiro, 1982; John et al., 2014; Steptoe et al., 2013; Studenski et al., 2011).

With regards to the relationships between specific EAN subtypes and mortality, comparison between our results and other findings is difficult. This is because all the four longitudinal studies (as previously mentioned) investigating mortality among EAN victims did not make any explicit comparison across EAN subtypes. With the exception of one (Baker et al), all treated elder abuse as a single entity. Baker et al compared physical and verbal (psychological) abuse and reported that while both caused higher hazard ratios, the impact of physical abuse was greater (M. W. Baker et al., 2009). It is unclear however whether a similar pattern is applicable to males as the study subjects were limited to older women. Our findings showed no difference in the relationship between EAN and mortality across all subtypes.

Gender interaction, or the influence of sex on the relationship between EAN and mortality risks, has not been adequately explored. Even though studies confirmed that EAN is a significant predictor of death, whether its impact is equal among abused males and females is unclear. In this study, there was no gender interaction elicited by the Cox

model. The previous four studies did not make any comparison between their male and female study subjects. In addition, two of them (Baker et al and Schofield et al) studied only female subjects, rendering gender comparison impossible. Future research can explore this issue to determine if one sex, for instance, is more vulnerable to death than another when abused or neglected. Such possibility cannot be ruled out given the well-documented evidence on the differences between men and women in coping style and bodily reaction to stress (Kudielka & Kirschbaum, 2005; Matud, 2004).

5.2.2   EAN and Sleep Quality

The prevalence of poor sleep in this study was 35%, while among EAN victims, it stood at 43.6%. A number of studies have investigated sleep problems among older adults, but comparison remains a great challenge due to the differences in tools of assessment and method of data collection. Some however, had employed the PSQI and gave different prevalence estimates. For instance, 25.7% elders in Taiwan were found to have poor sleep (Yao et al., 2008). Another study in Shanghai reported that 41.5% older adults experienced low sleep quality (Luo et al., 2013). The prevalence in Korea on the other hand was 60% (Park, Yoo, & Bae, 2013), while in Turkey it was 60.3% (Orhan et al., 2012) and Hong Kong, 77.7% (Lo & Lee, 2012).

Other studies adopted different assessment tools or focussed on certain aspects of sleep problems. For example, Morin et al measured insomnia and found that the prevalence among older adults ranged between 12% and 40% (Morin, Mimeault, & Gagné, 1999). Over 50% older Americans had sleeping disturbances when assessed using the five 'common sleep complaints' questions (Foley et al., 1995), while another study – with slightly modified questions – reported a range of prevalence between 18.9% to 40.0% (Ganguli, Reynolds, & Gilby, 1996).

Measurement of PSQI score after two years revealed a downward trend, which indicated that sleep quality improved on the average, in both groups – abused and not abused – even though the score remained higher for EAN victims. This was in contrast with the existing literature which suggests that sleep quality declines as one gets older, or that sleep disturbances become more common in old age (Kay & Dzierzewski, 2015; Miyata et al., 2013; Roepke & Ancoli-Israel, 2010). Worsening of sleep quality can be due to the impact of aging on sleep architecture, which caused quantitative and qualitative changes in sleep (Bombois et al., 2010). We hypothesized earlier that PSQI scores would increase over the span of two years. However, results showed the opposite. Several explanations are offered as follows.

First, a follow-up period of two years may not be adequate for the changes (decline) in sleep quality to fully manifest. A longer period thus may be needed for the actual pattern to be visible. The drop in PSQI score (from T1 to T2) could be part of the fluctuation of sleep quality, which might be temporary in nature, before an upward trend is resumed. Second, some researchers argued that sleep problems are not an inherent part of the aging process, and that many older adults have good sleep quality until the end of their lives (Rodriguez, Dzierzewski, & Alessi, 2015). This means sleep quality does not necessarily decline with age. Third, the effect of non-participation of the older and lower socio-economic respondents at T2 could have possibly resulted in 'healthy survivor effect'. It is a common phenomenon in longitudinal studies of older people that the most vulnerable members drop out, leaving the healthier respondents (Bowling & Iliffe, 2011; Kelfve, 2015).

Fourth, the different methods of data collection we employed – face-to-face interview at T1 and telephone interview at T2 – could have affected the quality of data and accuracy of sleep assessment. Holbrook et al elaborated in great details their

concern about the comparability of data between telephone interviews to face-to-face methods (Holbrook, Green, & Krosnick, 2003). It was argued that face-to-face interviews are likely to contribute to better data quality because non-verbal engagement – which does not occur in telephone interviews – motivates the respondents to devote more effort in generating optimal answers. In addition, interviewers are "able to observe nonverbal cues exhibited by respondents indicating confusion, uncertainty, or waning motivation, and they can react to those cues in constructive ways, reducing task difficulty and bolstering enthusiasm" (Holbrook et al., 2003). Face-to-face methods also enable the interviewers to "observe events that might distract the respondent (e.g., the presence of another person) and may be able to react to overcome or avoid that distraction" (Shuy, 2003).

On the other hand, among the reasons why accuracy of data can be compromised in telephone interviews are: 1) the tendency for interviewers to speak quickly due to the limited time allocated, thus prompting the respondents to do the same. In such circumstance, they have less time to carefully formulate answers, and have greater difficulty to understand the questions: 2) respondents are likely to multi-task while being interviewed, which increases the likelihood of satisficing; 3) studies showed that when compared to face-to-face interviews, respondents who answer questions through phone calls are more likely to exhibit systematic response bias in the forms of acquiescence (tendency to agree), giving 'No opinion response', non-differentiation, lower engagement and greater social desirability (giving answers that make one looks more favourable) (Holbrook et al., 2003).

Similar drawbacks of telephone interviews have been raised in other studies (Carr & Worth, 2001). Among older adults particularly, this method has been shown to give higher numbers of 'don't know' responses than in-person interviews (Wenger, 2002).

Other issues raised were response style biases said to be more prevalent among the older and lower-income group, and how certain limitations faced by older adults could have affected interview results, such as hearing impairment and difficulty to comprehend questions (Clark, Rogers, & Allen, 2010). Our findings showed a downward trend of PSQI score (improvement of sleep quality) over a span of two years, which was contradictory to what we expected. This can be due to any of the reasons above, but the definitive answer remains unclear. Future research investigating the trend of sleep quality among older adults, and how different data collection methods can affect data accuracy and reliability, will shed more light on this issue.

GEE models with and without imputed data gave consistent results – EAN significantly contributed to decline in sleep quality (increase in PSQI score). The relationship between abuse and poor sleep can be understood more clearly if EAN is viewed as a form of chronic stressor. As "sleep is naturally restricted to times and places that feel safe", any kind of emotional arousal or feelings of threat inhibit sleep. Adverse events are said to cause high levels of emotional arousal which in turn, result in sleep difficulties (Dahl & Lewin, 2002). Similarly, exposure to psychological distress has been shown to increase the risk of insomnia (Drake, Pillai, & Roth, 2014). Depression, which is both a risk factor for, and an outcome of EAN, is associated with excessive worry, rumination and negative attributions that interfere with sleep (Noll et al., 2005). Using the polysomnograph (PSG), experimental stress was demonstrated to cause "decreases in slow wave sleep, REM sleep, and sleep efficiency (SE), as well as increases in awakenings" (Kim & Dimsdale, 2007). At the molecular level, acute and chronic psychological stress increase the concentration of a pro-inflammatory cytokine, IL6 (interleukin 6), which causes sleep-related symptoms and fatigue (Rohleder, Aringer, & Boentert, 2012).

Across EAN subtypes, psychological abuse and neglect were found to cause decline in sleep quality, while physical abuse and financial abuse did not. The impact of psychological abuse on sleep can be largely understood via the mechanism explained above, but the pathway through which neglect affects sleep quality may differ. Apart from experiencing emotional distress, older adults who are physically abandoned may be subjected to poor or unfit living conditions which make it impossible for them to obtain proper, comfortable sleep. Neglect also encompasses the failure to provide an older adult access to healthcare when needed and ensure supply of medications for those with chronic diseases. This component of neglect can lead to exacerbation of existing illnesses and deterioration of health which subsequently worsen quality of sleep. In addition, emotional loneliness – a likely common phenomenon among neglected older adults – has been reported to adversely affect sleep (McHugh & Lawlor, 2013). In the other two domains of family violence, child abuse and IPV, sleep disturbances as an outcome have been well-documented (Dillon et al., 2013; Greenfield et al., 2011).

The associations between self-rated health, number of chronic diseases and depression with poor sleep as shown in both GEE models have been corroborated in previous studies (Alvaro et al., 2013; Geiger, Sabanayagam, & Shankar, 2012; Hayashino et al., 2010). It is interesting to note however, that middle income elders – and not low income elders – had greater decline in sleep quality compared to their high income counterparts. Existing literature shows conflicting evidence pertaining to the link between income and poor sleep. While some studies reported low income as being associated with poor sleep (Grandner et al., 2010; Patel et al., 2010), others found no association between income and sleep quality (Li et al., 2013). A systematic review on risk factors for sleep disturbances among older adults classified low socioeconomic status as 'less robust' evidence (Smagula et al., 2016).

The relationship between income – whether low or middle – and sleep quality deserves further investigation. Again, we do not rule out the possibility of our results being affected by the huge number of dropouts mainly among respondents from the lower income background. Binary logistic regression (Table 4.16, Chapter 4) showed that low-income was the only variable predicting missingness at T2. Interpretation of our findings with regards to the relationship between income and sleep quality therefore, should be made with this limitation taken into account.

To the best of our knowledge, there are only two studies addressing EAN and sleep disturbances to this date, one was conducted in rural Malaysia (part of our study) and another in Sweden (Yunus et al., 2017; Olofsson et al., 2012). Olofsson et al measured the association between abuse and sleeping problems and reported significant relationships between the two. However, the OR (odds ratio) for male respondents were higher than their female counterparts in physical and psychological abuse (Table 2.1, Chapter 2) (Olofsson et al., 2012). This could denote that older men are more vulnerable to sleeping problems when abused compared to older women. However, the cross-sectional design employed was a great impediment to a more definitive conclusion as to whether there was any real gender interaction. On the contrary, female gender is listed as one of the most consistent risk factors for poor sleep in a systematic review (Smagula et al., 2016).

Our study on the other hand did not find any gender interaction with EAN in affecting sleep quality in longitudinal analyses, whereas descriptive analyses showed mixed results – higher PSQI scores in males who are psychologically and financially abused, but higher PSQI scores in females who are physically abused and neglected. Future studies ought to explore this subject in order to understand the possible differences between abused males and females in manifesting sleeping problems.

5.2.3 **EAN and chronic pain**

Investigation of a nationally representative Malaysian sample reported that 15.2% older adults had chronic pain, but it was more common in rural areas (Zaki & Hairi, 2014). Our higher finding – 20.4% – thus can be due to the study setting (rural area). Different prevalence rates had been cited across countries, such as 31.2%, 42.0% and 69.2% among Norwegian, Taiwanese and Spanish elders respectively (Miró et al., 2007; Rustøen et al., 2005; Yu, Tang, Kuo, & Yu, 2006). These variations however, may be explained by heterogeneity in study methods.

Findings from cross-sectional analyses using GLiM were fairly consistent with prior studies. Increasing age, low income, depression, poor SRH and comorbidities were all associated with chronic pain (Abu-Saad Huijer, 2010; Arnow et al., 2006). Similarly, the association between EAN and chronic pain echoed what Fisher and Regan demonstrated; those abused were more likely to have chronic pain, or vice versa (Fisher & Regan, 2006). There has been no other study looking into EAN and chronic pain, to the best of our knowledge. A visible contrast however, was our finding related to education level. While many studies reported associations between low education level and chronic pain (Yu et al., 2006; Eriksen, Jensen, Sjøgren, Ekholm, & Rasmussen, 2003) our study showed the opposite.

This unusual finding can be attributed to two possible factors: age and personal health behaviour. First, even though the relationship between low education level and chronic pain has been demonstrated to apply to the general population, studies also suggested that pain perception diminishes with age, and that many older adults do not take pain seriously, thinking that pain at this is age is expected and should be tolerated (Afolayan, Oyeleye, Adebiyi, Durojaiye, & Bitrus, 2015). Second, formal education affects health behaviour by increasing one's awareness about his or her health needs,

willingness to report health experiences, and ability to express oneself more clearly (Zimmerman, Woolf, & Haley, 2015). Our results thus do not necessarily mean those with higher levels of education actually have more chronic pain, but indicate a greater insight and tendency to communicate pain experiences among this group. The relationship between educational level and chronic pain in old age therefore, may not be as straightforward.

Longitudinal analyses of both datasets (complete cases and imputed data) showed consistent results across all variables including EAN, with the exception of age and social support. Sex (female), chronic diseases and poor SRH were found to cause higher risks of developing chronic pain, in line with previous findings (Arnow et al., 2006; Elliott et al., 1999). The apparent, very small inconsistencies in age and social support on the other hand, should not indefinitely exclude these two variables from the list of potential causes of chronic pain. Existing studies show that age predicts chronic pain (Elliott et al., 1999), whereas social support influences pain, pain perception and coping ability (Evers & Bijlsma, 2003; Zhou & Gao, 2008). These irregularities may have been caused by the short follow-up period (more time is probably needed for the effects of age and social support to fully manifest) or dropouts among the lower socio-economic group.

EAN on the other hand – despite having a significant association with chronic pain in cross-sectional analysis – did not result in greater risks of developing chronic pain in longitudinal assessments. Here, two crucial points are worth mentioning. First, cross-sectional associations do not imply cause and effect relationships. Therefore, it could be that abuse in late life plays no role in causing chronic pain, rather it is chronic pain that makes older adults more vulnerable to abuse. This can be due to the physical limitation it causes and greater demand for care associated with it. Studies have shown that poor

physical health, functional dependency and caregiver burden are risk factors for EAN (Johannesen & LoGiudice, 2013a; Lachs et al., 1997). Second, the cause of chronic pain remains unclear to this day (Peplinskie, 2016). While some studies suggest that stress or adverse life events are antecedents to chronic pain (Otis, Keane, & Kerns, 2003; Van Houdenhove & Egle, 2004), others demonstrated that psychological distress is not a cause but an outcome of chronic pain (Breen, 2002; Fishbain, Cutler, Rosomoff, & Rosomoff, 1997; Gamsa, 1990). Our results thus appear to refute the 'stress as antecedent' theory, and support the latter. Likewise, sub-analysis of EAN subtypes also showed no longitudinal relationship between EAN and chronic pain.

5.3   **Study limitations**

Our findings and their interpretations in this thesis should be viewed in the light of a number of constraints. First, baseline non-responders were more likely to be Chinese and males. It is unclear thus how results would be affected had these differences not existed. This is because manifestations of health symptoms and bodily expressions – including sleep patterns and chronic pain – are said to differ across ethnicities and cultural norms (Jean-Louis et al., 2001; Kirmayer, Young, & Robbins, 1994). However, our high response rate (84.9%) and the fact that Malays in general predominate the rural areas help to ensure that our results are still relevant and generalizable to other parts of rural Malaysia.

Second, the prevalence estimate of lifetime EAN – 8.1% – is likely an underestimate due to the exclusion criteria applied. Older adults who were unable to communicate independently and had severe hearing or cognitive impairment were not included, when these groups are actually at higher risks of abuse (Johannesen & LoGiudice, 2013;Yan, Chan, & Tiwari, 2015). Similarly, exclusion of these groups may have led to an underestimation of the prevalence of poor sleep and chronic pain.

Third, validation of the Malay PSQI was conducted mainly among the low income elders as described in Chapter 2 (Methods and Materials). This may have resulted in potential bias as the middle and high income group were not represented. Nevertheless, the majority of our respondents were classified as 'low income' based on their household earning whereas the high income group comprised only 3.7%.

Fourth, attrition rate at T2 can be considered high (38.3%) and despite our MAR assumption for the missing data, we cannot rule out the possibility of bias in the results. We tried to compensate for this possible selection bias through multiple imputation (MI) and sensitivity analyses – two common methods often used to address missing data and non-response bias in longitudinal studies (Carpenter, Kenward, & White, 2007; Sterne et al., 2009). Nevertheless, we are aware that these statistical procedures not free from drawbacks, and therefore may not yield full precision.

Fifth, information bias with regards abuse experiences and chronic diseases cannot be ruled out. This is because EAN and co-morbidities were ascertained using self-reports and not validated by a second source such as social welfare or medical record. Recall bias can be an issue, where respondents might not remember what diseases they have, or confuse one health condition with another. However, in establishing co-morbidities, we took the following steps to minimize possibility of errors: a) double-checking the presence of chronic diseases with the caregiver or family member if the respondent had doubt; b) asking about the medications respondents take, in order to check if they were consistent with the illness; c) using layman terms (avoiding jargons) to ensure respondents understood the questions and were able to give correct information.

Sixth, the follow-up period in this study is short relative to other similar studies which looked into the health impacts of EAN. This may have contributed to 'incomplete

results' or 'partial results' which render definitive conclusions vague. How this short period may have affected each outcome has been elaborated in the previous section.

Seventh, there were ten proxy respondents during the follow-up telephone interview. The most common reason for using a proxy respondent was mild hearing impairment and respondents 'not feeling well enough' to be interviewed on the phone. Studies comparing answers from proxy respondents to self-reports have given mixed results. While some question the accuracy and reliability of proxy respondents' answers, others suggest that proxy results are fairly consistent with those of self-reports (Andresen, Vahle, & Lollar, 2001; Neumann, Araki, & Gutterman, 2000). However, the number of proxy respondents in this study, ten or 0.008%, can be considered extremely small and negligible, and thus unlikely to pose any serious bias to our findings. Last but not least, the method of data collection at T2 was different than the method used at baseline (face-to-face interview), and this could have possibly resulted in systematic response bias as discussed before.

5.4   **Study strengths**

One of the main strengths of this study is that our respondents are representative of the rural older Malaysian population, given that the sampling frame was derived from the national census. Second, at baseline we employed a face-to-face data collection method with active engagement of local community and personalized contact in order to maximize response. Similarly, prior to follow up assessment we remained in touch with the participants through phone calls at designated intervals. In addition, we employed validated scales wherever possible, while using the modified CTS which has been suited for the Malaysian context. Last but not least, to the best of our knowledge, this is among

the first few population-based, longitudinal studies investigating EAN in the Asian region.

5.5   **Implications of study findings**

Overall, the study findings demonstrate the various adverse health impacts of abuse in late life. These health outcomes indirectly imply the cost EAN is causing to individuals, families, society, the healthcare system and social services. Even though our study may contribute more to discussions on tertiary prevention, the findings presented are also useful for primary and secondary prevention of EAN. Unlike primary prevention which refers to actions taken to prevent the occurrence of a health event, and secondary prevention which refers to early detection of a health event and prevention of its progression, tertiary prevention is defined as initiatives to prevent death or disability associated with the health event (Kirk, Terry, Lokuge, & Watterson, 2017). Therefore, in the case of EAN, tertiary prevention comprises efforts to avoid or reduce the risks of mortality, and lessen the subsequent debilitating effects of health conditions (e.g., poor sleep) associated with it.

5.5.1   **Clinical Implications**

Tertiary prevention can be carried out at the level of community, healthcare and policy. In the clinical setting, healthcare providers (HCP) who come into contact with older adults on a regular basis (eg: nurses, primary care physicians, geriatricians, emergency doctors, family medicine specialists and general practitioners) need to be well-trained in the subject of EAN and management of abuse victims. Understanding the health sequel of EAN enable HCP to provide necessary support, such as making early referrals to relevant disciplines either before the health condition emerges or as rehabilitative measures. This indicates the need for, and the importance of a multi-

disciplinary involvement to manage abuse victims (Lachs & Pillemer, 2015). Due to its complexity, EAN management may entail geriatrics, clinical psychology, psychiatry, family medicine and social welfare.

With the growing evidence of EAN health outcomes, HCP are able to anticipate 'what comes next' for abuse victims. This knowledge is crucial for planning and upgrading certain aspects of services provided for victims (patients) and family members. For instance, some modifications can be done to current, standard practices in counselling, cognitive behavioural therapy (CBT) and family mediation by incorporating new information. Accordingly, this calls for a continuous training of HCP so that management guidelines are based on the latest and most robust scientific findings.

Even though it is imperative to prevent recurrence of EAN once it has happened, in many circumstances, it is not easy to put a stop to it, especially if older adults refuse any forms of intervention (ASA, 2018). In such a case, the focus shifts to ethical issues and mitigation of harm. HCP need to be well-versed with the ethical dilemmas surrounding the subject of EAN, such as older adults' right to autonomy and self-determination, possible reasons of refusing interventions and concerns with cognitive capacity, and act accordingly. Intervention may be warranted regardless of the victim's choice if proper assessment demonstrates cognitive impairment and inability to make sound decisions (Culo, 2001). On the other hand, refusal of intervention by a cognitively intact victim should not stop HCP from offering further support in order to prevent escalation of abuse and minimize harm. For example, the victim can be provided with necessary information and skills on how and where to seek help, or HCP can discuss with victim's social network to be 'vigilant observers' in order not to allow escalation of abuse (ASA,

2018). Whenever possible, caregiver intervention needs to be given equal importance, and this can be in the form of cognitive behavioural methods (Wolfe, 2003).

5.5.2 **Public Health Implications**

At the community level, tertiary prevention of EAN can range from specific services for abuse victims to systematic, coordinated initiatives involving multiple community agencies. Specific services include hot lines, emergency shelters for repeated EAN victims, emergency fund and support groups. An example of systematic, coordinated initiative is the multiservice program by the San Francisco Consortium for the Prevention of Elder Abuse (NCEA, 2001). In this program, stakeholders from major service entities meet once a month to review and assess elder abuse cases, and plan for assistance and support for these victims in an integrated, holistic manner. The stakeholders include professionals from case management, family counselling, mental health, geriatrics, civil law, law enforcement, financial management, and adult protective services (NCEA, 2001). On the other hand, for caregivers, assistance in the form of support groups, counselling, homemaking assistance, volunteer buddy/ advocates and training on caregiving have been suggested as promising intervention methods to reduce EAN or prevent its escalation (Hiatt & Jones, 2000; Nahmiash & Reis, 2001).

In terms of policies to address EAN, situations vary from one country to another. Some countries have clear and specific policies on combatting elder abuse, while some others employ more general policies on older adults without specifying EAN. There are also countries which focus on acts and legislations as ways to address this issue. Policies can differ according to their orientations. They can be aimed at prevention (before EAN occurs) or protection (of EAN victims and survivors). An example of a specific policy on EAN is the Age Action National Elder Abuse Policy (2014) in

Ireland (Action, 2014). It outlines the procedures and guidelines on appropriate responses to disclosures or suspicion of elder abuse, for relevant personnel (health care providers, volunteers, etc). Examples of legislations include the Law for the Elderly Adult Person in Costa Rica (1999), the Elder Law in Equador (1991), the Elder Justice Act in America, the Finnish Act on Restraining Orders in Finland (1999), and the 2002 Law for the Rights of Elderly Adults in Mexico (Penhale, 2015).

In Malaysia, the National Policy for Older Persons (2011) was formulated following review of the older version of the policy in 1995 (Hamid, 2008). The policy aims to empower individuals, families and communities to provide friendly services for older persons effectively and efficiently, and to ensure enabling and supportive environments for the well-being of older persons. To facilitate its implementation and monitoring, the National Advisory and Consultative Council for Older Persons was set up. Under this council, there are seven sub-committees: health, social and recreational, education and spirituality, housing and environment, economy, employment, and research and development. No specification has been made for EAN, but the policy employs intergenerational solidarity as one of the strategies besides others, and attempts to promote the larger determinants of older adults' well-being (Hamid, 2008).

Whether or not this national policy is fully successful in protecting and ensuring the well-being of senior citizens is yet to be seen, but progress and achievements have been made from time to time. Nevertheless, the lack of strategy exclusive for EAN may have left some gap or loophole in safeguarding the welfare and security of older adults who are either abuse victims or at risk of abuse. Our study findings from Phase I and Phase II clearly indicate that abuse in late life is highly detrimental to health, and that despite the presence of the mentioned policy, EAN is occurring at significant rates. This reflects a need for enhancement of current policy, derived from the latest research evidence. At

the moment, components of the National Policy for Older Persons (2011) mostly entail primary prevention, with little ramifications on secondary or tertiary level prevention. Highlighting the health consequences of EAN therefore points to the relevance of rehabilitative measures that can be incorporated into policies, in order to assist victimized older adults in 'bouncing back' and rebuilding their lives after going through adverse life events.

Another form of tertiary prevention is law or legislation, in which acts are enacted to bring perpetrators to justice and thus deterring recurrence of offences, and protecting the victim from further harm (Goodmark, 2017). While such laws exist in a number of nations (as mentioned above), many countries do not have laws specific to EAN. Phillipson and Slater hold the view that for countries with sufficient protection within existing powers and statutes for all adults, there is no need for a separate law for vulnerable adults including older individuals (Phillipson, 1993; Slater, 1994). On the contrary, specific acts for elder abuse are regarded as necessary by some, as it would serve those most in need more appropriately, given that socially disadvantaged elders usually face difficulties in accessing and benefitting from ordinary laws and services (Penhale, 2015).

As elaborated in Chapter 1 (1.3.5 Current Scenario in Malaysia), there are two acts relevant to EAN in the local context: the DVA 1994 and the Penal Code. However, criticism has been put forward with regards the effectiveness of these existing laws in combatting EAN, as they are deemed inadequate, lack specificity and not fully compatible with the nature of EAN (Bidin, 2015; Jamaluddin, 2015). Our study findings offer some insight into the debate on whether a specific law pertaining to EAN is needed within the Malaysian context, and the question of what the act should cover. First, roughly one in ten older adults experience abuse, while the magnitude of

unreported cases is unknown. Such a significant amount warrants critical reflection and analyses by stakeholders on whether punitive approach has a role in curbing further increase in EAN cases. Second, the most common subtype of EAN found was financial abuse. As the nature of financial exploitation in old age can be rather complex and possibly aggravated by cognitive issues and the availability of faceless, virtual transactions in modern banking, a new act may be needed if existing laws have not taken into account all possibilities. Third, the severity of health impacts of EAN (including mortality) may justify a tough penalty for abusers, and make it compulsory for the victim's guardian or family members to ensure his/her access to rehabilitative and health services.

Nevertheless, it is important to note here that the legal approach is not always the best solution or ultimate remedy to situations of abuse and family violence (Callahan, 1988). Researchers and other stakeholders need to be highly sensitive to the cultural contexts, norms and values of a given community in order to decide what is best for the victim in the long run.

CHAPTER 6: CONCLUSION

This chapter summarizes the key contributions of this thesis to existing EAN literature and lists a number of recommendations for future research, healthcare services and policy.

The overarching purpose of this study was to investigate the health consequences of EAN, first by systematically searching existing, relevant literature and summarizing the latest evidence, and second by measuring the longitudinal relationships between abuse in late life and mortality, sleep quality and chronic pain. In general, all the findings from the prospective cohort phase can be considered new, for this study is among the first few which assess the health outcomes of EAN in a developing region. Through the lens of EAN literature, the rural older Malaysian community is considered under-represented.

Specific findings have unique contributions too. First, we found that within a span of two years, mortality risk did not differ according to abuse status or subtypes. Current literature supports the link between EAN and premature death (Yunus, Hairi, & Choo, 2017). Our findings did not indicate the opposite, but suggested that the effect of EAN on death only manifests after a certain period of time, and that within a shorter span, risks of mortality can be masked. Second, EAN was significantly associated with decline in sleep quality, especially among those who experienced psychological abuse and neglect. This shows that different EAN subtypes can have different impacts on health, and treating EAN as a single entity (while investigating health outcomes) can lead to biased conclusions. Third, our results showed no longitudinal relationship between EAN and chronic pain.

Based on the experience, findings and limitations of our study, a number of recommendations can be offered to guide EAN researchers and the direction of future studies. First, given that our study is limited to the rural older population, a nationally representative study is needed so that results can be generalized to both urban and rural Malaysian elders. Second, EAN subtypes need to be considered and separately analysed in determining the health impacts of EAN. This is because one subtype is distinct from another. Third, future research should include healthcare utilization patterns and frequencies while measuring EAN health outcomes, as this can assist in estimation of costs associated with EAN. Stakeholders like policy-makers, private entities and health economists usually rely on financial costs in order to make decision. For instance, if health expenditures related to EAN is huge, it is worth investing more aggressively in prevention to avoid greater expenses in the future (Masters, Anwar, Collins, Cookson, & Capewell, 2017). Fourth, there is still a wide range of health conditions whose relationship with EAN has not been explored, or has been inadequately investigated (with limited evidence). Therefore more population-based, longitudinal studies are needed especially among non-western, developing older populations. Fifth, since EAN is a complex phenomenon and its health outcomes are influenced by victims' perception and culture (as illustrated in the conceptual framework), cross-cultural health manifestations of EAN are among areas that deserve more research. For instance, how pain is perceived and tolerated varies from one culture to another (Edwards, Doleys, Fillingim, & Lowery, 2001). Thus, future research should include qualitative methods to supplement quantitative approaches.

To maximize the efficiency and impact of future EAN research, a multidisciplinary involvement is needed. This may include public health practitioners, epidemiologists, statisticians, clinicians, nurses, psychologists, social workers and legal experts. Consulting HCP or including them at the planning stage is helpful, so that research can

be planned according to the needs and priorities of healthcare services. Other than that, researchers should be actively engaged in the " policy-making process, presenting research in ways that fit with the political context of the day, and, where necessary, using research evidence in public health advocacy in order to influence political priorities more directly" (Nutbeam & Boxall, 2008).

For healthcare services and providers, evidence on the various health impacts of EAN necessitates the involvement of multidisciplinary teams in managing abuse victims. Clear and standard guidelines should be made available on how to report, refer and treat EAN victims according their needs and situations. While it is crucial for HCP to be continuously trained on how to detect EAN (either through risk factors or clinical manifestations), provision of rehabilitative services is equally important for those who have gone through recurrent, multiple episodes of abuse. Healthcare practitioners who come into contact with older adults on a regular basis such as nurses, emergency physicians, primary care physicians, geriatricians and family medicine specialists need to be updated from time to time with the latest research findings and evidence pertaining to EAN, in order to enhance their quality of service. This can be done through the creation of working groups which involve both HCP and researchers, or regular meetings to promote bilateral communication and exchange of knowledge. Last but not least, given the magnitude and significance of the problem, incorporation of EAN into the medical syllabus is perhaps critical to ensure that doctors are familiar with the issue and know to respond appropriately (Heath, Dyer, Kerzner, Mosqueda, & Murphy, 2002).

Public policy can be a powerful tool in creating changes in society. Among the impacts of policies include provision of new services, allocation of funds and resources to certain sectors, implementation of systematic, coordinated programs to achieve

specific objectives, cessation of certain practices or services which are wasteful or dangerous, and enactment of new acts and legislations. We offer several recommendations for the enhancement of current policy based on our study findings. First, it is perhaps vital that the national policy targeting at senior citizens officially acknowledge the subject of EAN. This will be the first step, from which subsequent plans and strategies can be formulated. Second, there should sufficient allocation of resources to support community-based organizations, home care institutions and family members who are involved in delivering services and caring for older adults. Such resources may be in the forms of physical infrastructures, funds, financial incentives, tax exemption and many more. For institutions that deliver care and provide shelter for vulnerable older adults or survivors of EAN, integration of health services (including mental health) should be facilitated. Third, provision of certain services that act as channels for older adults to seek help in times of distress should be ensured. This may include helplines, virtual counselling or home visits by social workers in cases of abuse, to deter escalation of violence.

Fourth, even though awareness-raising activities through public campaigns and mass media are largely regarded as primary prevention, these initiatives can function at the tertiary level when the information is targeted at EAN victims or older survivors of family violence. Such campaigns can offer information on how and where to seek help, emphasize older adults' rights, educate elders how to handle abusive or difficult situations, teach measures to increase resilience and self-esteem, and finally highlight healthy lifestyles and practices for 'bouncing back' from adverse events. Fifth, research activities related to EAN should be encouraged and promoted through grants or other forms of assistance (Dong, 2013). This is important to generate evidence on which decisions are based at the higher level.

Sixth, considering the context of today's Malaysia, that is, the inadequacy of existing laws and the lack of a clear legal framework to protect older adults, a new act which is specific to EAN needs to be developed at best, or continues to be debated at least. The new act, if deemed appropriate, should address issues such as elder neglect (which is not covered by the DVA 1994), obligations of adult children towards their parents, family mediation in the case of EAN, and newly emerging matters relevant to the nature of elder abuse. The existing Islamic Family Law Act 1984 (Section 60) should be refined or made more explicit by including old parents in the category of people who deserve maintenance. The conditions laid such as being incapacitated, having physical or mental injury and ill-health should be relaxed as not to make it difficult for neglected older adults, or elders in need, to claim their rights to maintenance. The limitation however, lies in the fact that the Shariah legal system in Malaysia covers only Muslims. Mere emphasis on this act will exclude the non-Muslims and deprive them from a similar privilege. Therefore, refining existing laws within the civil legal system or enacting a new one that can ensure the rights of older adults to maintenance is equally important. For instance, in Taiwan, India and Singapore, legislations are enforced to make it an offence for children not to support their old parents, while other countries like Hong Kong favours incentives to a punitive approach (Kim, 2009). New laws can also be developed to stipulate and enforce the roles of stakeholders – the state, service providers, non-governmental organizations and others – in working synergistically to prevent EAN at primary, secondary and tertiary levels.

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LIST OF PUBLICATIONS AND PAPERS PRESENTED

Publications:

1. Yunus, R. M., Wazid, S. W., Hairi, N. N., Choo, W. Y., Hairi, F. M., Sooryanarayana, R., ... & Mohamad, Z. L. (2017). Association between elder abuse and poor sleep: A cross-sectional study among rural older Malaysians. *PloS one*, 12(7), e0180222.

2. Yunus, R. M., Hairi, N. N., & Choo, W. Y. (2017). Consequences of Elder Abuse and Neglect: A Systematic Review of Observational Studies. *Trauma, Violence, & Abuse*, 1524838017692798.

3. Yunus, R. M., Hairi, N. N., Choo, W. Y., Hairi, F. M., Sooryanarayana, R., Ahmad, S. N., ... & Mohamad, R. (2017). Mortality among elder abuse victims in rural Malaysia: A two-year population-based descriptive study. *Journal of Elder Abuse & Neglect*, 29(1), 59-71.

4. Choo, W. Y., Hairi, N. N., Sooryanarayana, R., Yunus, R. M., Hairi, F. M., Ismail, N., ... & Othman, S. (2016). Elder mistreatment in a community dwelling population: the Malaysian Elder Mistreatment Project (MAESTRO) cohort study protocol. *BMJ open*, 6(5), e011057.

5. Yunus, R. M., Hairi, N. N., Choo, W. Y., Hairi, F. M., … & Bulgiba, A. (2018). Elder Abuse and Chronic Pain: Cross-sectional and longitudinal results from the PEACE study. *Journal of the American Geriatrics Society*. Accepted for publication on 20 February 2018.

Paper presentations:

1. Kyoto Global Conference for Rising Public Health Researchers (KGC 2017)
   Kyoto University School of Public Health
   Oral presentation: Addressing Elder Abuse and Neglect Using an
   Interdisciplinary Approach
   5-6 December 2017

2. ASEAN Regional Conference on Elder Abuse and Neglect (ARCEN) 2017
   Faculty of Law, University of Malaya
   Oral presentation: Health Impacts of Elder Abuse and Neglect
   14-15 September 2017

3. International Health Conference 2017
   University of Oxford, England
   Oral presentation: How Elder Abuse Affects Sleep Quality
   29 June 2017 - 1 July 2017

4. The Association of Asia-Pacific Rim Universities (APRU) Global Health Workshop 2016
University of New South Wales, Sydney
Oral presentation: Consequences of Elder Abuse: A systematic review of observational studies
28 September 2016 - 1 October 2016