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# Chronic Disease and its Relationship with Elder Mistreatment

Ryan Wong

LOMA LINDA UNIVERSITY
School of Behavioral Health
in conjunction with the
Department of Psychology

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# Chronic Disease and its Relationship with Elder Mistreatment

by

Ryan Wong

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Each person whose signature appears below certifies that this doctoral project in his/her opinion is adequate, in scope and quality, as a dissertation for the degree Doctor of Psychology.

_____, Co-Chairperson
Bryan Cafferky, Assistant Professor of Counseling and Family Sciences

_____, Co-Chairperson
David Veermersch, Chair and Professor of Department of Psychology

_____
Grace J. Lee, Associate Professor of Psychology

_____
Elizabeth Preston Cisneros, Associate Professor of Psychology

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ABSTRACT

The relationship between chronic disease and elder mistreatment was investigated using a meta-analytic approach, where 48 studies were utilized for the random effects analysis of 178 effect size data. Twelve risk markers were combined into four categories: endocrine disease, heart disease, neurological disease, and other chronic diseases for comparative analysis of elder mistreatment. Neurological disease (*OR* = 1.51) was found to have a significantly stronger association with elder mistreatment when compared to the heart disease category (*OR* = 1.17) and the other chronic disease category (*OR* = 1.26). When specifically investigating emotional abuse, there was a significantly stronger association with emotional abuse (*OR* = 1.48) and neurological disease compared to emotional abuse (*OR* = 1.21) and other chronic diseases. These findings are discussed to offer suggestions to researchers and care providers to help offer more insight into the relationship of chronic diseases and elder mistreatment.

## Chapter 1 Chronic Disease and its Relationship with Elder Mistreatment

People aged 60 years or over have been estimated to account for 841 million people in 2013 by the United Nations World Population Prospects (United Nations, 2013). Based on this data, the number of elderly people around the world is projected to be more than 2 billion by 2050 (Paroli et al., 2020). In the United States, there is an increasing concern regarding later life issues as the baby boomer generation, or individuals born between the mid-1940s to the late 1960s, reach the age of retirement. These individuals will be retiring around the age of 60 to 65, and there are concerns regarding health care, caregiving needs, and elderly assistance programs (Raschick & Ingersoll-Dayton, 2004). The number of individuals that fall into this age range is estimated to be 76 million people, which would be one of the largest population age groups within the United States (Pollard & Scommegna, 2014).

As the U.S. population grows older, it has been estimated that by 2050, adults aged 65-84 years old will account for roughly 16% of the total population. Additionally, the number of adults over 85 years old has been estimated to grow to approximately 19 million individuals and will account for about 4.3% of the population by 2050 (U.S. Census Bureau, 2009). With such an unprecedented proportion of the U.S. population reaching the elder adult age category, there will be an increased burden on the healthcare system. There is a concern that this large population group may have the largest group of elders with chronic disease and neurological disease which can have a marked impact for elder mistreatment in general (Lin & Giles, 2013).

Yon and associates (2017) provide estimated prevalence rates of elder abuse in a multi-country comparison: Sweden (30.8%), Spain (29.3%), China (28.8%), South Korea (21.5%), U.S. (11.4%), Iran (14.7%), India (14%), Mexico (10.3%), Netherlands (5.6%), and United Kingdom (2.6%). At these current rates of elder mistreatment, it is estimated that there will be

about 330 million victims of elder mistreatment by 2050 around the world (Yon et al., 2017). These findings should be taken in context as these countries have varying levels of population age categories and may also be influenced by the cultural appropriateness to report instances of abuse (Selwood, Cooper, and Livingston, 2007). In 2003, the National Center of Elder Abuse estimated that between one and two million older adults were victims of some form of abuse in the U.S., with an estimation that more than half of these cases were not reported (Bonnie & Wallace, 2003). In 2014, it was found that about 10% of the current elder population in the United States experienced some form of abuse between 2013 and 2014 (Dong & Simon, 2014).

**Prevalence of Heart Disease**

The growth in the elder adult age category also means an increase in the overall diagnosis of heart disease as the prevalence of hypertension, coronary heart disease, heart failure, and stroke increases to 70-75% in persons aged 60-79 and to 79-86% among individuals aged 80 years or older (Lloyd-Jones et al., 2009). By the age of 70 years, the lifetime risk of having the first cardiovascular disease event is 34.9% for men and 24.2% for women (Lloyd-Jones et al., 1999). The prevalence of myocardial infarction is nearly a seven-fold increase in prevalence among individuals aged 65-74 compared to individuals aged 35-44 (National Heart, Lung, and Blood Institute, 2007).

Hypertension is one of the global chronic non-communicable diseases which has been increasing over the years. It is estimated that in 2010, one-quarter of the world's adult population had hypertension with a projected estimate that it would rise to about 29% by 2025 (Mittal & Singh, 2010). In a comparison between economically developed nations, the prevalence of hypertension is 37.3% compared to the prevalence of a developing nation which is 22.9% prevalence. It is estimated that by 2025, the number of individuals with hypertension in the

economically developing countries of the world will account for approximately 1.17 billion individuals, which will represent about three-fourths of the total world population with hypertension (Kearney et al., 2005). Given that the incidence of coronary heart disease increases with age among all older adults, regardless of race or gender (Arnold et al., 2005), it is imperative to learn the impact of this increased incidence of heart disease on elder mistreatment.

**Prevalence of Diabetes**

The incidence of diabetes increases with age until about age 65 years, where the incidence and prevalence begin to plateau (Sue Kirkman et al., 2012). The epidemic of type 2 diabetes is projected by the Centers for Disease Control and Prevention (CDC) to double in the next 20 years, due to the aging of the population (Boyle et al., 2010). The estimated current global prevalence of type 2 diabetes is approximately 150 million patients worldwide (Amos et al., 1997). The 2015 estimate of diagnosed and undiagnosed diabetes in elder adults aged 65 or older was 12 million individuals (Centers for Disease Control and Prevention, 2017). Other studies have projected that the number of diagnosed diabetes aged 65 or older will increase by four and a half times between 2007 and 2050 (Narayan et al., 2006). A projection for the prevalence of diabetes by 2025 is an estimated 300 million patients (King et al., 1998). These estimates provide a better understanding for diabetes has been cited as a huge burden by its increased associated risk with premature death and cardiovascular morbidity (Green et al., 2003). A previous study in 2015 found that elders that reported abuse to Adult Protective Services (APS) had a greater portion of metabolic syndromes with a prevalence of 22.4% with abuse and 10.7% without abuse (Dong & Simon, 2015).

**Prevalence of Neurological Disease**

In neurological disease, the most common diagnosis is Alzheimer's disease, which is a type of dementia found in 6% of elders older than 65 and 15-20% of elders older than 80 years of age in the U.S. (Alzate, 2018). In 2012, there was an estimate of 35.6 million people that live with dementia around the world. There has been an estimation that this amount is expected to double by 2030, and more than triple at the current estimated rates by 2050 (Waite, 2012).

It is estimated that there are 51 million U.S. citizens diagnosed with Alzheimer's disease and that there are about twice as many women affected with Alzheimer's disease than men (National Institute on Aging, 2019). Reviewing the rates of Alzheimer's disease in 2008, the incident rate was 10 cases for every 100 elders at minimum for North America, Europe, Japan, Brazil, Nigeria, Taiwan, and India for elders over the age of 65 (Ziegler-Graham et al., 2008). Based on a review of 27 other studies, the mean incidence rate for Alzheimer's disease is estimated to double every five years as an elder grows older past the age of 65 (Ziegler-Graham et al., 2008).

The second most common neurodegenerative disease is Parkinson's disease, which affects about 1.5% of the elders in the U.S. aged 65 years and older (Connor et al., 2015). Within the UK, there has also been evidence that almost 70% of people had to wait a year between noticing their symptoms and receiving a formal diagnosis of dementia. Additional review of these cases also suggests that only 43% of people with dementia have been formally identified in the UK (World Health Organization and Alzheimer's Disease International, 2012; Alzheimer's Society, 2012), which could potentially impact the projected rates of elder mistreatment.

## Elders and Chronic Disease

With the projection that there will be an estimated 2 billion people in the elderly population category by 2050 (Paroli et al., 2020) and the current projections of various chronic diseases, it is important to have a baseline understanding of the association between chronic disease and experiencing elder mistreatment. Specifically, this study aims to provide a meta-analytic benchmark for a growing, aging world population regarding the relationship between endocrine disease, heart disease, neurological disease, and other chronic diseases with the odds of being a victim of elder mistreatment.

## Defining Elder Mistreatment

Elder mistreatment is a general term used to refer to multiple types of abuse. It is an inclusive term that refers to physical abuse, emotional abuse, sexual abuse, financial abuse, neglect, and self-neglect. Elder mistreatment, as defined by the National Research Council, refers to (a) intentional actions that cause harm or create a serious risk for harm (whether or not harm is intended) to a vulnerable elder by a caregiver or other person who stands in a trust relationship to an elder or (b) failures by a caregiver to satisfy the elder's basic needs or to protect the elder from harm (National Research Council, 2003).

Research suggests that victims of elder mistreatment tend to be much older, usually in the late 70s, and most of the victims are usually female (Biggs et al., 2009). Female victims of elder mistreatment are more likely to be abused by family members, children, or spouses (Lin & Giles, 2013). Teaster and colleagues (2006) found that 34.3% of male victims were mistreated by strangers or acquaintances, with a high prevalence of the mistreatment taking place in the elderly victim's own home (89.3%). The research into the racial and ethnic effects on elder abuse has had mixed results, as studies tend to vary by geographical location; thus, there is no clear

connection between race, ethnicity, or culture with the prevalence of elder abuse or neglect. Elders at risk for victimization are commonly socially isolated from the community and lack social support (Acierno et al., 2010). In general, an elderly victim is more likely to exhibit symptoms of being fearful, timid, agitated, or depressed (Anthony et al., 2009). Chronic disease can have an overall reduction of physical functioning, which increases the risk of social isolation and distress, which are common factors found in elder mistreatment (Dong et al., 2011; Dong et al., 2009; Biggs et al., 2009; National Research Council, 2003).

## Chapter 2 Theoretical Frameworks

### Theories of Frailty and Vulnerability

Chronic disease can reduce the functioning of an elderly individual which leaves them vulnerable to the risk of elder mistreatment. When there is a physical decline that impacts daily functioning, the elder begins to rely on the caretaker more, leaving them vulnerable to exploitation by the caregiver. This occurs in a gradual process as the chronic disease progresses, leading to a gradual decline in health where the elder slowly loses independence and self-efficacy. As the elder becomes more dependent upon caregivers for support, they may be placed in a position where saying "no" to a caregiver's demands would have significant negative repercussions on their well-being and safety (Taylor et al., 2014).

When the elderly face symptoms of dementia or have cognitive deficits due to the progression of Alzheimer's disease, diabetes, or heart disease, they may be left in a more vulnerable state both physically and psychologically. Elders who have been found to be frail are at an increased risk of disability, falls, dementia, hospitalization, requiring nursing care assistance, and increased health care utilization (Etman et al., 2012). As an elderly person becomes more dependent upon caregivers as the chronic disease progresses, there is an overall decrease in the elder's ability to protect themselves from elder abuse or elder neglect from their caretaker (Steinmetz & Amsden, 1983).

The transition from being an independent elder to one that requires a caregiver for assistance can gradually erode the elder's belief in their ability to act for themselves, and they can come to accept the circumstances rather than fight back (Taylor et al., 2014). As the cycle of care continues, an elder may feel like they have no control over their situation and that they have

less power to influence their caregiver. This cycle of dependence on the caregiver, due to chronic disease progression, may leave the elderly individual at increased risk of elder mistreatment.

**Theory of Learned Helplessness**

The dependency of an elder on the caregiver may lead to a pattern of learned helplessness where elder mistreatment may be embedded in a fixed routine. In cases where chronic disease impacts cognitive function, such as with diabetes in a hypo- or hyperglycemic state, the elder may also lack the cognitive ability to recognize the situation as abusive (Dong, 2005). In the learned helplessness theory, the elder may feel a reduced motivation to report the caregiver, call the police for help, or change the environment of elder mistreatment. When elders begin to perceive that they have impaired physical functioning and cognitive impairments, it may reduce their ability to engage in self-protecting behaviors which leaves them vulnerable to elder mistreatment (Dong & Simon, 2016). The pattern of helplessness can produce fear for the elderly, as they start to have anxiety which can lead to depressive symptoms, increasing risk of elder mistreatment.

The cyclical nature of an elder person being physically dependent upon a caretaker for support and the increased feelings of vulnerability, shame, and embarrassment may create a relationship where there is no easy solution to improve the elder's circumstances. When an elderly person starts to have serious health issues due to the progressive nature of chronic disease, the increase in the type and amount of care also creates more burden upon the caregiver to manage the escalating needs. An increase in burden for the caregiver can lead to stress and burnout, which increases the risk for elder mistreatment to occur. For some elders, the loss of the physical home environment can be very psychologically demoralizing as they have spent a lifetime working, fixing, and taking care of their home (Faulkner, 1982). When elders are moved

to a living assisted facility, the new and unfamiliar environment may feel uncomfortable and foreign. Additionally, the introduction of health care staff may also reduce their self-efficacy to manage and care for themselves. This pattern can result in a dependent relationship with the caregiver which leaves the elder powerless and vulnerable to elder mistreatment. It is therefore pertinent to investigate the association between chronic diseases and elder mistreatment.

## Chapter 3 Literature Review

### Heart Disease

There is a growing amount of research linking heart disease with frailty, which is a syndrome associated with an increased risk of disability, utilization of institutional care, and death from a marked loss of physiological functioning. In a study examining the blood pressure within the ankle region, there was a noticeable decline in functions of activities of daily living that reduced the ability of an elder to be independent (Newman et al., 2001). As elders become more frail, they lose the ability to function independently, which leads to greater reliance on assistance from family and caregivers. Thus, the progression of chronic disease for an elderly individual can put them at increased risk of elder mistreatment. This increased reliance upon family and caregivers can also lead to caretaker burden which has been associated with increased risk of elder mistreatment (Dyer et al., 2000). Also, elders with low social support have been found to have triple the likelihood of any form of elder mistreatment as reported by elder individuals (Acierno et al., 2010).

### Co-morbidity of Diabetes

Older adults aged 65 or more with diabetes have been found to have the highest rates of myocardial infarction, visual impairment, major lower-extremity amputation, and end-stage renal disease compared to any other age group. The adults aged 75 or older have even higher rates of these health complications compared to those aged 65-74 years old. The co-morbidity between diabetes and vascular functioning is also important to consider as older adults with diabetes also have an increased risk of acute and chronic microvascular and cardiovascular complications (Sue Kirkman, 2012). Hypoglycemia or low glucose levels in the bloodstream is linked with cognitive dysfunction in a bidirectional relationship as cognitive impairment also increases the risk of

hypoglycemia (Punthakee et al., 2012). The cognitive impact of having a history of severe hypoglycemia is also linked to an increased incidence of symptoms of dementia which can make it hard to distinguish between Alzheimer's disease and uncontrolled blood glucose levels (Whitmer et al., 2009). The progression of diabetes as a chronic disease can threaten the ability of an elder to care for themselves and results in the increased use of a caregiver. A study found that adults of non-white descent with risk markers of poor health and poor social support were significant predictors of neglect for people aged 60 or older (Acierno et al., 2010).

**Neurological Disease**

The progression of Alzheimer's disease creates symptoms of disorientation, memory loss and aphasia, and elders can become physically disabled, mute, or immobile near the end stages. These complications make it difficult for elders to care for themselves, and they may need daily living assistance as the disease worsens (Mitchell, 2008). In Parkinson's disease, the symptoms an elder may face include tremors, bradykinesia, and the loss of ability to maintain posture. Additionally, there may be issues in cognition, mood, and sleep, where problems with the autonomic nervous system can greatly reduce the quality of life for an elder (Connor et al., 2015). These neurological chronic diseases have a detrimental impact upon the health and ability for elders to function independently. The loss of independent functioning increases the likelihood that the elder will need a caregiver, and the progression of cognitive decline may increase the risk of elder mistreatment.

**Chronic Disease and Elder Mistreatment**

Data suggests that elders with a chronic disease are going to utilize more health services as a significant amount of the baby boomer generation retires. An increase of elderly individuals with diabetes, cardiovascular diseases, and neurological diseases may lead to an increase in the

need of institutionalized care or management assistance which can potentially impact the rates of elder mistreatment. Risk factors of poor physical health and poor social support have an associated increase in elder mistreatment (Johannesen & Logiudice, 2013; Acierno et al., 2010). This indicates that individuals within the general elderly population may need assistance from other sources, as utilizing family support may not be enough to help an elder adhere to the treatment regimen.

The daily management of medications and physical activities involved in caring for someone with chronic diseases contributes to caregiver burden, which may increase the risk of elder mistreatment. There is an association between having more caregiving responsibilities and an increased risk of elder mistreatment occurring (Hansberry, Chen, and Gorbien, 2005; Lachs and Pillemer 2004; Shugarman et al. 2003; Dyer et al., 2000; Reis and Nahmiash 1998). Therefore, there is a need to investigate the strength of the association between elder mistreatment and chronic disease, such as endocrine, heart, neurological, and other chronic diseases.

A meta-analytic approach can provide a comprehensive comparison between endocrine disease, heart disease, neurological disease, or other chronic diseases in order to improve the understanding of the relationship between these chronic diseases and the odds of elder mistreatment. If researchers and caretakers had a better comprehension of the relationship between chronic disease and its association with elder mistreatment, then new policies, prevention measures, and interventions could be created to improve the well-being of the growing number of elders around the globe.

## Chapter 4 Methods

A systematic and comprehensive literature search was conducted in order to meta-analyze risk markers of chronic disease associated with elder mistreatment. The inclusion of studies was determined by searching for studies from 1950-2019, with elders being defined as adults over age 55, have quantitative data, written in English, and have data that specifically measured elder abuse or elder neglect as the outcome. Studies that were excluded from the meta-analysis involved adults younger than age 55, qualitative data, or studies where elder abuse or neglect were not the outcome, such as an outcome variable of education or perception of elder mistreatment. The essential element was that the study contained quantitative data, the outcome variable is elder mistreatment, which included elder physical abuse, emotional abuse, financial abuse, sexual abuse, neglect, and self-neglect.

### Database Search and Screening

The following databases were used to search for studies from 1950-2019 regarding elder mistreatment: Academic Search Premier, Google Scholar, PsychArticles, PsychInfo, PubMed, Social Science Index, and Web of Science. The key search words included: *elder abuse, elder mistreatment, elder neglect, aging and abuse, granny battering, ageism, abuse and neglect and elderly, nursing home abuse, mistreatment and age, mistreatment and elder*. The studies were screened multiple times throughout the identification process to ensure that all eligible studies matched the established inclusionary and exclusionary criteria. The effect sizes could be reported via: means and standard deviations, correlations, odds ratios, z-scores, Cohen's *d*, N's and percentages, and various other effect sizes.

The comprehensive database search found 39,381 potential studies for analysis. From these studies, 9,151 were excluded due to duplication. The 30,230 remaining studies were

reviewed through the title and abstract where an additional 27,729 studies were excluded as these did not report quantitative data related to elder mistreatment. The remaining 2,501 studies were screened on the criteria of ensuring *a priori* inclusion and exclusion criteria of: measuring elder abuse/neglect (55%), reporting quantitative data (30%), reporting risk markers only associated with elderly/caregiver sample (8%) and if the study reported uninteresting risk markers (7%). When a study reported unusable effect sizes, the authors were contacted to obtain additional effect size information and less than 10% of these authors responded to our requests. A total of 247 studies were included in a large meta-analysis regarding elder mistreatment overall. From this large study pool, another 199 studies were excluded, as they did not report data related to chronic disease and elder mistreatment. There were a total of 48 studies selected for inclusion for analysis, which resulted in 178 chronic disease effect sizes (see Figure 1).

**Coding Process**

A code sheet was created which had 43 items to gather information from each study that matched the inclusionary criteria. Items on the code sheet included: publication type, study's findings, sample population demographics, data collection methods, prevalence rates of subtypes of elder mistreatment, and the coder's subjective rating of the study. The code sheets were used to determine the direction of violence as elder mistreatment can occur from a caregiver or the elder may themselves be a perpetrator towards the caregiver. The code sheets also included specific effect size sheets where coders recorded the data from the study to be analyzed as an aggregated effect.

A codebook was created to guide coders who may have had questions throughout the meta-analysis process. The codebook focused on definitions of key terms, highlighting the

necessary information for coding data in the correct form, and other specifics related to assisting coders throughout the meta-analytic process.

**Cross Coding**

One important step in meta-analysis was the use of cross coding to ensure that the studies were thoroughly inspected for inclusionary and exclusionary criteria (Borenstein et al., 2009). Thus, a team of graduate students at Loma Linda University coded studies, entered data, and meta-analyzed the data. The process of cross coding included having two individuals independently complete the code sheets for each study and meet with a partner to review all the items in the code sheet. During this process, when there was an issue that was unclear, the researchers discussed with each other and jointly arrive at a conclusion as to how to resolve discrepancies. The process of cross coding decreased the chance that data would be incorrectly entered into the final database.

**Statistical Software**

Chronic disease risk markers were coded with important contextual components, such as type of mistreatment (e.g. physical, emotional, financial, sexual, neglect, or self-neglect), direction of violence (victimization or perpetration), and type of chronic disease. The data was entered into excel sheets and used to compute multiple effect sizes for the data using Comprehensive Meta-Analysis (CMA) (Version 3.3.070, Computer Software). Several studies contained multiple effect sizes which were then categorized together to produce one effect size that was representative of each chronic disease risk marker from each study. The findings were compared to epidemiological studies of odds ratio's interpreted with the values being equivalent for Cohen's $d = 0.2$ (small) equal to an $OR = 1.68$, Cohen's $d = 0.5$ (medium) equal to an $OR = 3.47$, and Cohen's $d = 0.8$ (large) equal to an $OR = 6.71$ (Chen et al., 2010).

**Publication Bias**

For this meta-analysis, two different tests were used to evaluate the possibility of publication bias: the trim and fill test (Duval & Tweedie, 2000) and the fail-safe N (Orwin, 1983; Rosenthal, 1979). The trim and fill test was used to assesses for publication bias by using a funnel plot to evaluate the asymmetrical distribution of the included studies. This test is able to plot the number of potential missing studies and provides a corrected mean effect size estimate based on the "inclusion" of these missing studies (Duval & Tweedie, 2000). Fail-safe Ns were conducted for endocrine disease, heart disease, neurological disease, and other chronic diseases with elder mistreatment, to evaluate how many null studies would be needed to pull the significance of the mean effect size above the $p < .05$ threshold (Orwin, 1983; Rosenthal, 1979).

**Tests of Heterogeneity**

In meta-analysis, the two tests that can be used to test heterogeneity are the *Q* statistic and the $I^2$ index. The *Q* statistic is sensitive to the ratio of the observed variation to the within-study error as it computes the deviation of each effect size from the mean, squares it, and weighs this by the inverse-variance for a study which is summed to yield a weighted sum of squares. The *Q* statistic is, therefore, a standardized measure that does not depend on the metric effect size. Rather, it is the observed weighted variance of the sum of squares which can be used to attribute the differences in the true effects from study to study by subtracting the degrees of freedom (*df*) from the *Q* value. This implies that *Q* is a reflection of excess dispersion and is a sum, rather than a mean, where it depends strongly on the number of studies in the analysis. The *Q* statistic can be used to assess the viability of the null hypothesis where a significant *p*-value provides evidence that the true effects vary (Borenstein et al., 2009).

The $I^2$ index is a proportion of the observed variance that reflects variance in true effect sizes rather than sampling error. The $I^2$ index is a measure of inconsistency across the findings of the studies and is not a measure of real variation across the underlying effects. The statistic $I^2$ can be viewed as a statistic of the form of the ratio of true heterogeneity to total variance across the observed effect estimates. Therefore, the $I^2$ index reflects the extent of overlap of confidence intervals, which is not dependent on the actual location or spread of the true effects. The $I^2$ index enables the discussion of the amount of variance on a relative scale as $I^2$ can be used to determine what portion of the observed variance is real. For example, if $I^2$ is near zero, then the observed variance is spurious, and there is nothing to explain; however if $I^2$ is large, then it could be used to speculate about reasons for the variance, and possibly to apply techniques such as a subgroup analysis or meta-regression to try to explain it (Borenstein et al., 2009).

**Fixed effect vs Random effects**

In meta-analysis, there are two approaches for aggregating effect sizes which are fixed effect and random effects. Fixed effect analysis assumes that the true effect size is the same in all studies, and an aggregate effect size is therefore an estimate of the common effect size accounting for within-study differences. Random effects analysis assumes that the true effect size varies from study to study and that the studies in the analysis represent different random sample effects that could have been observed, indicating that the summary effect accounts for both within-study and between-study differences (Borenstein et al., 2009).

For this meta-analysis, the random effects analysis was selected because each study provided information about effect sizes from different populations, and this method was sure to account for both within-study variance and between-study variance. The random effects analysis

estimated the mean effect in a range of studies, and this method did not allow the overall estimate to be overly influenced by any one study (Borenstein et al., 2009).

**Plan of Analysis**

First, the 12 chronic disease risk markers were grouped into four broader categories for analysis: Endocrine Disease, Heart Disease, Neurological Disease, and Other Chronic Conditions. These disease risk markers were grouped into categories as determined by similar medical root causes of physiological symptoms for comparative analysis of elder mistreatment. Odds ratios were conducted for each disease category to compare the odds of experiencing mistreatment if elders had the disease risk marker versus elders who did not have the disease risk marker. The endocrine disease category contained three risk markers: diabetes, overweight and obesity, and endocrine diseases. The risk marker endocrine diseases included kidney diseases which impaired hormones and metabolic functioning. The heart disease category includes two risk markers: hypertension and cardiovascular disease. The neurological disease category includes five risk markers: stroke, dementia, neurological diseases, Parkinson's disease, and Alzheimer's disease. The other chronic conditions category included two risk markers: other chronic illness/conditions, and two or more chronic conditions.

Next, standard publication bias tests were conducted (Duval and Tweedie's trim and fill and classic fail-safe N) to evaluate possible publication bias for each of these four broad categories. Then, aggregate effect sizes were calculated to establish the strength of the link for each of the four categories (Endocrine Disease, Heart Disease, Neurological Disease, and Other Chronic Conditions) to elder mistreatment. Next, each broad category of chronic disease was measured to specific types of elder mistreatment (physical, emotional, financial, sexual, neglect, and self-neglect. Then, an effect size was calculated for each of the 12 specific chronic disease

risk markers within these four categories. Finally, a moderator analysis was conducted to compare the four broad chronic disease categories in order to ascertain whether certain broad categories had a significantly stronger link to elder mistreatment, compared to other broad categories.

## Chapter 5 Results

### Study Characteristics

There were 48 included studies measuring chronic disease risk markers, which yielded 178 effect sizes linked with elder mistreatment. The sample size of these studies ranged from $n$ = 123 to $n$ = 160,676, resulting in an overall meta-analytic sample of $n$ = 390,785.

Sixteen of the studies (33.33%) were sampled from the United States, seven of the studies (14.58%) were sampled from China and Hong Kong, three of the studies (6.25%) were sampled from Malaysia, three of the studies (6.25%) were sampled from Canada, two of the studies (4.16%) were sampled from Brazil, two of the studies (4.16%) were sampled from Turkey, and the remaining studies (31.27%) were from Netherlands, Czech Republic, Iceland, United Kingdom, France, Italy, Germany, Denmark, Finland, Norway, Sweden, Portugal, Japan, South Korea, Greece, Lithuania, Spain, Iran, and New Zealand. Thirty of the studies (62.5%) used convenience sampling, ten of the studies (20.83%) used representative sampling, and the remaining eight studies (16.67%) used randomized sampling. Thirty of the studies (62.5%) used their own non-standardized instruments, such as questionnaires and surveys, to measure elder mistreatment. Eighteen of the studies (37.5%) used standardized instruments such as the Conflict Tactic Scale (CTS), Vulnerability to Abuse Screening Scale (VASS), or the Minimum Data Set - Home Care (MDS-HC).

### Publication Bias

Using random-effects, the Duval and Tweedie's trim and fill results for each of the four broad categories of chronic diseases (Table 2) plotted 2 potential missing studies for endocrine disease (Figure 2), no potential missing studies for heart disease (Figure 3), 1 potential missing studies for neurological disease (Figure 4), and 9 potential missing studies for other chronic

diseases (Figure 5). In each instance, the impact of these potential missing studies was trivial (Borenstein et al., 2009), which suggests that the mean effect sizes for overall endocrine disease, heart disease, neurological disease, and other chronic conditions are reasonably robust against publication bias.

Next, classic fail-safe Ns were conducted for each of the four broad categories of chronic diseases in order to evaluate the number of null studies needed to make the aggregate effect size non-significant (Rosenthal, 1979). The resulting fail-safe Ns for endocrine disease, heart disease, neurological disease, and other chronic disease categories exceeded the recommended benchmark (5k + 10), which also indicates the resulting mean effect sizes are robust against publication bias (Table 2).

**Aggregate Effect Size for Broad Categories of Chronic Disease Risk Markers**

The mean effect size (ES) for the link between endocrine disease and elder mistreatment resulted in an odds ratio of 1.38 (95% CI 1.24 - 1.54, $k$ = 37), which is considered less than small in magnitude (Table 3). The mean ES for the link between heart disease and elder mistreatment resulted in an odds ratio of 1.17 (95% CI 1.05 - 1.30, $k$ = 32), which is considered less than small in magnitude (Table 3). The mean ES for the link between neurological disease and elder mistreatment resulted in an odds ratio of 1.51 (95% CI 1.38 - 1.66, $k$ = 44), which is considered less than small in magnitude (Table 3). The mean ES for the link between other chronic diseases and elder mistreatment resulted in an odds ratio of 1.26 (95% CI 1.17 - 1.36, $k$ = 69), which is considered less than small in magnitude (Table 3).

However, there was a substantial amount of heterogeneity for the aggregate effect size for endocrine disease ($Q^w$ = 697.20, $p$ <.001, $I^2$ = 94.84). This suggests that 95% of the variance in the endocrine effect sizes was due to between-study variance. Heart disease also had a

substantial amount of heterogeneity ($Q^w$ = 331.85, $p$ <.001, $I^2$ = 90.66), which suggests that 91% of the variance in the heart disease effect sizes was due to between-study variance. Neurological disease had a substantial amount of heterogeneity ($Q^w$ = 263.80, $p$ <.001, $I^2$ = 83.70), which suggests that 84% of the variance in the neurological disease effect sizes was due to between-study variance. Other chronic diseases had a substantial amount of heterogeneity ($Q^w$ = 468.42, $p$ <.001, $I^2$ = 85.48), which suggests that 85% of the variance in the other chronic disease effect sizes was due to between-study variance. Thus, a deeper exploration of potential moderators, such as specific types of elder mistreatment and specific diseases within these categories linked with these chronic diseases was warranted in order to help explain this substantial between-study heterogeneity.

Next, each category of chronic disease was linked with various types of elder mistreatment (i.e. physical, emotional, financial, sexual, neglect, and self-neglect). Endocrine disease was found to have a large discrepancy of magnitude depending on the type of elder mistreatment, the strongest link was with neglect (*OR* = 1.83, 95% CI 1.56 – 2.16, *k* = 3) and the weakest link was with sexual abuse (*OR* = 0.29, 95% CI 0.07 – 1.24, *k* = 1). Heart disease was found to have varying magnitudes depending on the type of elder mistreatment, the strongest link was with physical abuse (*OR* = 1.26, 95% CI 1.05 – 1.30, *k* = 4) and the weakest link was with aggregate abuse (*OR* = 1.11, 95% CI 1.00 – 1.23, *k* = 17). Neurological disease also had varying magnitudes depending on the type of elder mistreatment, the strongest link was with aggregate abuse (*OR* = 1.64, 95% CI 1.38 – 1.66, *k* = 19) and the weakest link was with financial abuse (*OR* = 1.39, 95% CI 1.12 – 1.71, *k* = 5). Other chronic diseases also had a varying magnitudes depending on the type of elder mistreatment; the strongest link was with physical abuse (*OR* =

1.41, 95% CI 1.17 – 1.36, *k* = 10), and the weakest link was with financial abuse (*OR* = 1.05, 95% CI 0.82 – 1.34, *k* = 9).

**Specific Chronic Disease Risk Markers Associated with Elder Mistreatment**

Next, each of the relationships between specific chronic diseases (within each category of diseases) and elder mistreatment were measured. The endocrine disease category contained the three risk markers of diabetes, obesity, and endocrine disease. The strongest risk marker within this category linked with elder mistreatment was with diabetes (*OR* = 1.47, 95% CI 1.29 – 1.68, *k* = 19), followed by obesity (*OR* = 1.14, 95% CI 0.99 – 1.31, *k* = 15), and the weakest link was with endocrine disease (*OR* = 1.11, 95% CI 0.43 – 2.86, *k* = 1; see Table 4).

The heart disease category contained the two risk markers of cardiovascular disease and hypertension. The strongest risk marker within this category linked with elder mistreatment was with cardiovascular disease (*OR* = 1.35, 95% CI 1.20 – 1.51, *k* = 13), and the weakest link was with hypertension (*OR* = 1.09, 95% CI 0.98 – 1.21, *k* = 19).

The neurological disease category contained the five risk markers of dementia, neurological disease, Parkinson's disease, and Alzheimer's disease. The strongest risk marker within this category linked with elder mistreatment was with stroke (*OR* = 1.59, 95% CI 1.37 – 1.86, *k* = 12), followed by dementia (*OR* = 1.54, 95% CI 1.21 – 1.95, *k* = 19), followed by neurological disease (*OR* = 1.43, 95% CI 1.27 – 1.61, *k* = 9), next was Parkinson's disease (*OR* = 1.40, 95% CI 1.09 – 1.80, *k* = 2), and the weakest link was with Alzheimer's disease (*OR* = 0.99, 95% CI 0.48 – 2.04, *k* = 2).

Other chronic diseases category contained the two risk markers of other chronic illness/conditions and two or more chronic conditions. The strongest risk marker within this category linked with elder mistreatment was with other chronic conditions (*OR* = 1.28, 95% CI

1.17 – 1.40, *k* = 53), and the weakest link was with two or more chronic conditions (*OR* = 1.22, 95% CI 1.05 – 1.42, *k* = 16).

**Comparison of Broad Categories of Chronic Disease Risk Markers**

Finally, broad categories of chronic diseases were compared to determine whether certain categories had stronger relationships with elder mistreatment—which resulted in several significant differences. The neurological disease category (*OR* = 1.51, 95% CI 1.38 – 1.66, *k* = 44) had a significantly stronger link to elder mistreatment ($Q^b$ = 12.16, *p* < .000), compared to heart disease category (*OR* = 1.17, 95% CI 1.05 – 1.30, *k* = 32). The results also indicated that the neurological disease aggregate abuse (*OR*=1.64, 95% CI 1.35 – 1.99, *k* = 19) had a significantly stronger link to aggregate abuse *(*$Q^b$ = 11.94, *p* <.000) than the heart disease aggregate abuse (*OR* = 1.11, 95% CI 1.00 – 1.23, *k* =17). The results also indicated that the neurological disease aggregate abuse (*OR*=1.64, 95% CI 1.35 – 1.99, *k* = 19) had a significantly stronger link to aggregate abuse *(*$Q^b$ = 4.63, *p* <.003) than the endocrine disease aggregate abuse (*OR* = 1.20, 95% CI 0.97 – 1.47, *k =11*).The neurological disease category (*OR* = 1.51, 95% CI 1.38 – 1.66, *k* = 44) had a significantly stronger link to elder mistreatment ($Q^b$ = 8.41, *p* < .003), compared to the other chronic disease category (*OR* = 1.26, 95% CI 1.17 – 1.36, *k* = 69). The results also indicated that the neurological disease emotional abuse (*OR*=1.48, 95% CI 1.33 – 1.65, *k* = 6) had a significantly stronger link to emotional abuse *(*$Q^b$ = 4.59, *p* <.032) than the other chronic disease category (*OR* = 1.21, 95% CI 1.04 – 1.41, *k = 15*) to emotional abuse. The endocrine disease category (*OR* = 1.38, 95% CI 1.24 – 1.54, *k* = 37) had a significantly stronger link to elder mistreatment ($Q^b$ = 4.59, *p* < .032), compared to the heart disease category (*OR* = 1.17, 95% CI 1.05 – 1.30, *k* = 32). The results also indicated that the endocrine disease neglect (*OR*=1.83, 95% CI 1.56 – 2.16, *k* = 3) had a significantly stronger link to neglect *(*$Q^b$ = 13.02, *p*

<.000) than the heart disease neglect (*OR* = 1.26, 95% CI 1.11 – 1.43, *k* = *6*). The results also indicated that the other chronic disease aggregate abuse (*OR*=1.41, 95% CI 1.23 – 1.63, *k* = 24) had a significantly stronger link to aggregate abuse *($Q^b$* = 7.38, *p* <.006) than the heart disease aggregate abuse (*OR* = 1.11, 95% CI 1.00 – 1.23, *k* = *17*).

## Chapter 6 Discussion

The purpose of this meta-analytic study was to measure the relationship between chronic diseases and being a victim of elder mistreatment. Using 178 unique effect sizes (ES) gleaned from 48 studies, chronic diseases linked with elder mistreatment were framed within four larger categories of chronic diseases: Endocrine Disease, Heart Disease, Neurological Disease, and Other Chronic Diseases. This was the first meta-analysis to measure how strongly various chronic diseases were linked with elder mistreatment with a specific analysis into the magnitude of physical abuse, emotional abuse, financial abuse, sexual abuse, neglect, and self-neglect. This was also the first meta-analytic study to test whether certain chronic disease categories were more strongly linked with elder mistreatment. These meta-analytic benchmarks can help theorists, researchers, healthcare providers, and caregivers develop a deeper understanding of the relationship between chronic disease and elder victimization.

These findings for the aggregate effect size (ES) for endocrine disease, heart disease, neurological disease, and other chronic diseases were all found to be significantly related to being a victim of elder mistreatment, yet these effect sizes are considered less than small in magnitude (Chen et al., 2010). However, several well-cited child abuse and intimate partner violence meta-analyses have found important risk markers which are small or less than small in magnitude (Smith-Marek et al., 2016; Stith et al., 2009; Wolfe et al., 2003). Furthermore, given the increasing rise of the elder world population to 2 billion by 2050 (Paroli et al., 2020) and the increase in chronic diseases as elders age, these meta-analytic outcomes still have important implications for future understanding of elder mistreatment.

**Theory of Self-Efficacy**

The significant difference between the odds ratios for heart disease and neurological disease might be explained due to the potential perception of control an elder has regarding their current health trajectory. Elders with heart disease still have a high functional capacity to change the trajectory of their disease as they can increase cardiovascular exercise, reduce their caloric intake, practice reducing stressors that raise their blood pressure (Lloyd-Jones et al., 2009). However, when comparing the amount of perceived self-efficacy an elder has with a neurological disease, the number of control variables are reduced as there is a sense that the body will naturally degrade over time (Lovestone & Howard, 1997; Jorm, 1995; Goldberg & Huxley, 1992). Research has found that elder adults who are more vulnerable, sick, physically weaker, and have more self-care deficits may become victims of violence more often (Filipska et al., 2020). This research also supports how there was a significant difference in the odds ratio between endocrine disease and heart disease as the management of diabetes can be difficult for elders to perform on their own. Similarly, caregivers may struggle with managing diabetes in addition to assisting an elder in the areas of finance, hygiene, and meal preparation.

With neurological disease, there is an increase in functional dependency which may change caretakers' perceptions that an elder is a burden and increase the risk of physical abuse (Acierno et al., 2010; Munsur et al., 2010; Dong et al., 2008). There are possible adjustments that an elder can make to reduce the risk of Alzheimer's disease, such as changing their diet and increasing cognitive activities to prevent memory loss (National Institute on Aging, 2019). However, there is still the degradation of the physical brain that can change the perception of how much control an elder really has over their current health status. As the symptoms of the neurological disease increase, then the elder will have increased risk factors of functional

dependence, poor health, cognitive impairments, isolation, and more dependence upon a caretaker which can lead to increased risk of elder mistreatment (Pillemer et al., 2016; Sethi et al., 2011).

**Theory of Learned Helplessness**

The significant difference between neurological disease and other chronic disease might be attributed to the theory of learned helplessness. When an elder is diagnosed with a chronic disease and informed by the medical team that their body is physically frail, there is often an initial sense of helplessness. The elder may feel overwhelmed by the treatment plan to slow the progression of a neurological condition and struggle with the initial feelings of helplessness. Previous theories have suggested there is a "giving up-given up" complex as elders feels helpless and hopeless by their condition, so they may be less likely to try to change their habits (Engel, 1967). This theory also applies to the significant difference in the odds ratios for other chronic diseases when compared to heart disease, as there is plenty of information on how to manage the heart. However, when an individual is diagnosed with a lesser known chronic condition, it may be more difficult to find helpful information on how to manage the condition.

Unlike other chronic diseases, neurological diseases are unique in that these diseases do not have clearly defined interventions which prevent the onset of worsening symptoms (Connor et al., 2015). Thus, for neurological diseases such as Parkinson's and Alzheimer's disease, the onset of symptoms overlaps with a diminished sense of control over one's environment which is related to feelings of depression. Affective symptoms of depression, such as apathy and anxiety are commonly found in psychological disturbances in elders with Alzheimer's disease (Zhao et al., 2016). The physiological decline from neurological diseases would contribute to a diminished self-esteem and a reduced sense of control over one's life. These impairments to

activities of daily living contribute to feeling depressed, and individuals with depression have been found to be less likely to engage in positive health behavior changes of exercise and diet changes (Cassidy et al., 2010). Furthermore, these impairments can create a dependence on others as the elder would require assistance from a caregiver which is associated with an increased risk of elder mistreatment.

**Chronic Disease Risk Markers**

The outcomes of this meta-analytic study provide insight into the relationship of elder mistreatment with regards to the co-occurrence of specific chronic diseases. Diabetes was found to have the highest increased risk of elder mistreatment in the endocrine disease category, along with stroke for the heart disease category, and dementia for the neurological disease category. Diabetes can progress to later stages where there are cognitive difficulties (Punthakee et al., 2012), and the elder may be more prone to increased risk of elder mistreatment. Similarly, hypertension is associated with an impact upon activities of daily living (Newman et al., 2001), and the progression of hypertension leading to a stroke can increase the risk of mistreatment as the elder may have to rely on social support for assistance (Acierno et al., 2010). The progression of Alzheimer's disease has also been found to be difficult for elders to care for themselves (Mitchell, 2008) which may be even more difficult with the onset of dementia symptoms and the increased reliance upon a caregiver for support (Dyer et al., 2000). Studies have found that older adults in poor physical conditions with a somatic illness have less ability to seek assistance when experiencing violence. As elders age, there is a greater tendency to be dependent upon others for daily living and financial support, which can make an elder vulnerable to mistreatment (Munsur et al., 2010; Dong et al., 2008). The risk markers of diabetes, stroke, and cardiovascular disease

were found to have the highest odds of increased risk of elder mistreatment which is consistent with the literature as these chronic diseases are difficult to manage alone.

**Limitations**

There are several important limitations for this meta-analytic study, which should appropriately temper interpretations and implications. First, this was a cross-sectional meta-analysis, and there are no causal implications or temporal components to the aggregated effect sizes. Secondly, due to the nature of coding risk markers as present or absent, there is a lack of details regarding the severity and duration of disease. Thirdly, , there is the common file drawer problem common to meta-analyses, regarding the possibility that studies with additional effect size data were missed which would decrease the power of this analysis and increase sampling error (Peterson & Brown, 2005).

During the article screening process, several authors were contacted to request usable effect size data for this meta-analysis as their published articles may not have usable data, but only about 10% of authors responded with their data. In order to improve the future of meta-analytic research, it would be beneficial to include correlation tables for every quantitative paper so that a larger sample of articles can be included in future meta-analyses.

In this meta-analysis, there were a limited number of effect size (ES) data for specific types of elder mistreatment, and some meta-analytic links between risk markers and elder mistreatment are missing or underpowered. For example, no studies were found to measure heart disease risk markers with financial abuse and sexual abuse, nor was there any found for neurological disease and sexual abuse. Likewise, some of the specific chronic disease effect sizes are likely underpowered due to lack of available research or usable effect sizes.

There are also methodological limitations with the studies included in this analysis as 62.5% of the studies used their own non-validated measure to assess for various forms of elder mistreatment. As many studies did not use a standardized instrument to measure elder mistreatment, the frequency or severity of the reported mistreatment cannot be considered. Additionally, 62.5% of the studies also used convenience sampling from their local research institutions, which may impact the representativeness of the elder mistreatment data for various countries or cities.

For many of the articles used in the analysis, the duration of a chronic disease diagnosis or the severity of the chronic disease symptoms were often not assessed. The meta-analysis effect sizes could be influenced in various ways as the data could reflect different stages of disease progression, depending upon the time at which an elder participated in one of the studies.

**Unique Strengths**

The biggest strength of this study is that it includes effect sizes which reflect elder population samples from many countries throughout the world. Thus, these effect sizes represent global meta-analytic benchmarks. This study was also the first meta-analysis to compare different categories of chronic disease with elder mistreatment effect sizes to provide a rank ordered magnitude of elder mistreatment. This meta-analysis has also provided insight into the current relationship between chronic diseases and elder mistreatment as it can help inform the medical community about the odds of increased risk of elder mistreatment given a particular chronic disease.

Regarding the formation of policy, previous suggestions have been made that primary agencies of elder mistreatment should explore ways to creating a common database to explore new program initiatives, support groups, family counseling, and other appropriate services

(Pillemer et al., 2006). The findings of this project provide evidence that there is an association of increased risk of elder abuse for chronic diseases, and it might be helpful to provide education, family counseling, and other services such as respite support to assist caregivers of elderly individuals. Additional training for hotline counselors, police and fire rescue workers, health and social services workers should be created to help train professionals to recognize that a chronic disease diagnosis may be associated with increased risk of elder mistreatment. The training should recognize risk factors across ethnicity, culture, substance abuse, sexual abuse, and provide guidelines to aid physicians and others in detecting and intervening in abusive situations (Pillemer et al., 2006). One of the things that has been identified as lacking in the current focus for elder mistreatment has been the lack of services that focuses on the perpetrator and the special dynamics of the abuse situation (Pillemer et al., 2006). Future policy and programs should be created to identify how to support perpetrators as they have a burden of providing care to an elderly individual with a chronic disease. Perpetrators may benefit from services that include family counseling, support groups, and respite care services to intervene in and prevent future elder mistreatment.

**Implications**

The findings of the meta-analysis provide important clinical support for the elder population as neurological disease has a significantly stronger association with elder mistreatment compared to other chronic diseases. Furthermore, clinicians and healthcare providers could play closer attention to elders with certain chronic disease risk markers (e.g. diabetes, stroke, dementia had larger effect sizes).This finding can help provide evidence for social assistance programs for elders with neurological disease as they appear to have a stronger risk of elder mistreatment.

The current theory of understanding elder mistreatment contains many factors related to activities of daily living, social support, and depression ratings (Dong et al., 2008; Dyer et al., 2000). New theories should be explored to help better understand how chronic diseases have different psychological implications on the individual elder, the perceived control over their chronic disease, and how the burden of caregiving can be better measured with various treatment regiments of chronic diseases. The implications of these theories would require the use of more standardized instruments to measure elder mistreatment with a temporal measurement of chronic disease progression.

Given that neurological disease was found to have a stronger link with elder mistreatment compared to other chronic diseases, then health care providers should pay special attention to the possibility of elder mistreatment when communicating with elders and providing social services to assist elders with neurological diseases. It would also be helpful in future research to investigate whether elders with certain diseases experience more frequent or potentially more severe mistreatment due to the progressive nature of disease. The factors of the perceived control, depression, and the emotional stability for elders with neurological diseases need to be better explored in future research to help prevent and intervene for elder mistreatment.

**Table 1**

*Description of studies included in chronic disease and elder mistreatment meta-analysis*

| Study Author, Year | Overall N in Sample | Prevalence Rates | Geographic Location of Sample | Instrument for Violence Measurement | Risk Markers Measured |
|---|---|---|---|---|---|
| Abrams et al., 2002 | 2161 | None Reported | United States | Questionnaire | HDNEG |
| Acierno et al., 2010 | 774 | None Reported | United States | Questionnaire | OCDEMO, OCDFIN, OCDNEG, OCDPHY |
| Baker et al., 2009 | 160,676 | None Reported | United States | Questionnaire | EDEMO |
| Belisario et al., 2018 | 705 | Overall Abuse and Neglect - 21.13%, Combined Physical Abuse - 7.9%, Combined Emotional Abuse - 20.9%, | Brazil | Translated CTS | OCDEMO, OCDPHY |
| Blay et al.Rio de Janeiro, 2017 | 202 | Overall Abuse and Neglect - 13.30% | Brazil | Questionnaire | EDALL |
| Cannell et al., 2015 | 154902 | None Reported | United States | Questionnaire | NDEMO, NDPHY |
| Cooper et al., 2006 | 3881 | Overall Abuse and Neglect - 4.6%, | Netherlands, Czech Republic, Iceland, United Kingdom, France, Italy, Germany, Denmark, Finland, Norway, and Sweden | Questionnaire | NDALL |
| Cooper et al., 2010 | 220 | None Reported | United Kingdom | Modified CTS | NDALL, OCDALL |

| | | | | | |
|---|---|---|---|---|---|
| Dasbas & Isikhan, 2019 | 309 | Overall Abuse and Neglect - 70.9%, Physical - 4.2%, Emotional - 64.1%, Sexual - 0.3%, Financial - 12.6% | Turkey | Questionnaire | OCDALL |
| Dong & Simon, 2013 | 6674 | Overall Abuse and Neglect - 0.83%, Physical - 0.28%, Emotional - 0.67%, Financial - 0.97%, Neglect - 0.75% | United States | Questionnaire | OCDALL, OCDEMO, OCDFIN, OCDNEG, OCDPHY |
| Dong et al., 2009 | 141 | Overall Abuse and Neglect - 40.7%, | China | Vulnerability to Abuse Screening Scale (VASS) | HDNEG, NDNEG |
| Fang et al., 2019 | 1002 | Physical - 0.80%, Emotional - 39.70%, Financial - 33.20%, Neglect - 47.60% | China | Revised Conflicts and Tactics Scale | NDEMO, NDFIN, NDNEG, OCDEMO, OCDFIN, OCDNEG |
| Fisher & Regan, 2006 | 842 | Overall Abuse and Neglect - 47%, Physical - 4%, Emotional - 45%, Sexual - 3% | United States | Women's Health and Relationship Survey (WHRS) | OCDALL, HDALL |
| Friedman et al., 2011 | 164 | None Reported | United States | ICD-9-CM | OCDALL HDALL |
| Gil et al., 2015 | 1123 | Overall Abuse and Neglect - 12.30%, Physical - 2.30%, Sexual - .20%, Financial 6.30%, Neglect - 0.40% | Portugal | Questionnaire | OCDALL |
| Gironda et al., 2016 | 652 | None Reported | United States | Questionnaire | NDALL |
| Jackson & Hafemeister, 2011 | 2142 | None Reported | United States | Questionnaire | NDFIN, NDNEG, NDPHY, |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | OCDFIN OCDNEG, OCDPHY |
| Kishimoto et al., 2013 | 123 | Overall Abuse and Neglect - 30%, Physical 1.20%, Emotional - 11% | Japan | Modified CTS | NDALL |
| Kissal & Beser, 2011 | 331 | Overall Abuse and Neglect - 13.30%, Physical 4.20%, Emotional - 9.40%, Sexual - 0.90%, Financial - 2.10%, Neglect 8.20% | Turkey | Questionnaire | OCDALL |
| Lachs et al., 1997 | 2812 | Overall Abuse and Neglect - 1.6%, Physical - 0.30%, Financial - 0.28%, Neglect - 1% | United States | Questionnaire | OCDALL |
| Lai, 2011 | 2272 | Overall Abuse and Neglect - 4.50%, | Canada | Questionnaire | OCDALL |
| Lee & Kim, 2014 | 1023 | Neglect - 22.80% | South Korea | Questionnaire | OCDNEG |
| Mankovik et al., 2014 | 960 | Overall Abuse and Neglect - 32%, Physical 5.70%, Emotional - 25.70%, Sexual - 0.20%, Financial - 12%, Neglect 6.50% | Macedonia | Questionnaire | EDALL, HDEMO |
| Mawar et al., 2018 | 222 | Overall Abuse and Neglect - 24.30%, Physical 1.40%, Emotional 22.90%, Financial - 5.80% | India | Questionnaire | EDALL |

| | | | | | |
|---|---|---|---|---|---|
| Melchoirre et al., 2016 | 4467 | Overall Abuse and Neglect - 22.10%, Physical - 2.70%, Emotional - 19.40%, Sexual - 0.70%, Financial - 3.80% | Germany, Greece, Italy, Lithuania, Portugal, Spain | Questionnaire | EDALL, EDFIN |
| Miszkurka et al., 2016 | 799 | Physical 0.60%, Emotional - 18%, | Canada | HITS | EDPHY |
| Niak et al., 2008 | 200 | None Reported | United States | Questionnaire | OCDNEG |
| Ogioni et al., 2006 | 4630 | Overall Abuse and Neglect - 10%, Physical - 6.30% | Italy | MDS-HC | HDALL |
| Olofsson et al., 2012 | 9360 | None Reported | Sweden | Questionnaire | EDEMO, HDEMO, HDPHY |
| Park et al., 2018 | 10674 | None Reported | South Korea | Questionnaire | OCDEMO |
| Perez-Carceles et al., 2009 | 460 | Overall Abuse and Neglect - 44.60%, Physical - 2.40%, Emotional - 20.70%, Sexual - 1.30%, Financial - 7.20%, Neglect - 17% | Spain | Questionnaire | OCDALL |
| Piri et al., 2018 | 260 | (Female only) Overall Abuse and Neglect - 90.40%, Physical - 13.80%, Emotional - 63.50%, Financial - 35.40%, Neglect - 38.50% | Iran | Domestic Elderly Abuse Questionnaire | OCDALL |
| Schiamberg et al., 2012 | 452 | Physical - 24%, Sexual - 3.90% | United States | Questionnaire | NDPHY |
| Shugarman et al., 2003 | 701 | Overall Abuse and Neglect - 4.70%, | United States | MDS-HC | NDALL |

| | | | | | |
|---|---|---|---|---|---|
| Sooryanarayana el al., 2017 | 1927 | Overall Abuse and Neglect - 4.50%, Physical - 0.05%, Emotional - 2.20%, Sexual - 0.10%, Financial - 2% | Malaysia | Questionnaire | OCDALL |
| Tierney et al., 2004 | 139 | Overall Abuse and Neglect - 21.60%, | Canada | Questionnaire | NDNEG |
| Tobiasz-Adamczyk et al., 2014 | 518 | Physical - 2.50%, Emotional - 8.40%, Financial - 4.80%, Neglect - 13% | Poland | Questionnaire | OCDALL, OCDEMO, OCDFIN |
| Vandeweerd & Paveza, 2006 | 330 | Physical - 73.90%, Emotional - 74.20% | United States | Conflict and Tactic Scale (CTS) | NDEMO |
| Vandeweerd et al., 2013 | 330 | Physical - 17.20%, | United States | Conflict and Tactic Scale (CTS) | NDPHY |
| Wu et al., 2012 | 2000 | Overall Abuse and Neglect - 36.20%, Physical - 4.90%, Emotional - 27.30%, Financial - 2%, Neglect - 15.80% | China | Screening Test and Vulnerability to Abuse Screening Scale | OCDEMO |
| Yan & Chan, 2012 | 937 | Physical - 2.50%, Emotional - 36.10%, Sexual - 1.20%, | China | Revised Conflicts and Tactics Scale 2 (CTS2) | OCDEMO, OCDPHY, OCDSEX |
| Yan & Kwok, 2011 | 122 | Overall Abuse and Neglect - 62.30%, Physical - 18%, Emotional - 62.30%, | Hong Kong | Chinese version of the Revised CTS2 | OCDEMO, OCDPHY |

| | | | | | |
|---|---|---|---|---|---|
| Yan & Tang, 2004 | 276 | Overall Abuse and Neglect - 27.50%, Physical - 2.50%, Emotional - 26.80% | Hong Kong | Chinese version of the Revised CTS2 | OCDALL, OCDEMO, OCDPHY |
| Yan, 2014 | 149 | Overall Abuse and Neglect - 42.30%, Physical - 15.40%, Emotional - 40.30% | Hong Kong | Revised Conflicts and Tactics Scale 2 (CTS2) | OCDEMO, OCDPHY |
| Yeung et al., 2015 | 2946 | Overall Abuse and Neglect - 18%, | New Zealand | Questionnaire | OCDALL |
| Yunus et al., 2018 | 1927 | Overall Abuse and Neglect - 8.10% | Malaysia | Questionnaire | HDALL, OCDALL |
| Yunus et al., 2019 | 1927 | None Reported | Malaysia | Questionnaire | HDALL, OCDALL |
| Zhang et al., 2012 | 941 | Overall Abuse and Neglect - 22.80 | United States | Questionnaire | OCDALL |

*Note:* EDALL = Endocrine Disease aggregated abuse, EDEMO = Endocrine Disease emotional abuse, EDPHY = Endocrine Disease physical abuse, EDFIN = Endocrine Disease financial abuse, EDNEG = Endocrine Disease neglect, HDALL = Heart Disease aggregated abuse, HDEMO = Heart Disease emotional abuse, HDPHY = Heart Disease physical abuse, HDFIN = Heart Disease financial abuse, HDNEG = Heart Disease neglect, NDALL = Neurological Disease aggregated abuse, NDEMO = Neurological Disease emotional abuse, NDPHY = Neurological Disease physical abuse, NDFIN = Neurological Disease financial abuse, NDNEG = Neurological Disease neglect, OCDALL = Other Chronic Diseases aggregated abuse, OCDEMO = Other Chronic Diseases emotional abuse, OCDPHY = Other Chronic Diseases physical abuse, OCDFIN = Other Chronic Diseases financial abuse, OCDSEX = Other Chronic Diseases sexual abuse, OCDNEG = Other Chronic Disease neglect

**Table 2**

*Duval and Tweedie's trim and fill (random effects) and classic fail-safe N for chronic disease categories of risk markers associated with elder mistreatment*

| Risk Marker Category | *k* | Trim and Fill Imputed Studies | Classic Fail-Safe N |
|---|---|---|---|
| Endocrine Disease | 36 | 2 | 1229 |
| Heart Disease | 32 | 0 | 351 |
| Neurological Disease | 44 | 1 | 3936 |
| Other Chronic Diseases | 66 | 9 | 2489 |

**Table 3**

*Risk markers ranked within each chronic disease categories of risk markers associated with various types of abuse and neglect*

| Types of Elder Mistreatment | *k* | Mean *OR* | 95% LL | 95% UL |
|---|---|---|---|---|
| **Endocrine Disease** | **36** | **1.38** | **1.24** | **1.54** |
| Neglect | 3 | 1.83 | 1.56 | 2.16 |
| Physical Abuse | 11 | 1.61 | 1.11 | 2.33 |
| Emotional Abuse | 9 | 1.28 | 1.06 | 1.54 |
| Financial Abuse | 1 | 1.27 | .84 | 1.92 |
| Aggregate Abuse | 11 | 1.20 | .97 | 1.47 |
| Sexual Abuse | 1 | .29 | .07 | 1.24 |
| **Heart Disease** | **32** | **1.17** | **1.05** | **1.30** |
| Physical Abuse | 4 | 1.26 | .81 | 1.94 |
| Neglect | 6 | 1.26 | 1.11 | 1.43 |
| Emotional Abuse | 5 | 1.12 | .84 | 1.47 |
| Aggregate Abuse | 17 | 1.11 | 1.00 | 1.23 |
| **Neurological Disease** | **44** | **1.51** | **1.38** | **1.66** |
| Aggregate Abuse | 19 | 1.64 | 1.35 | 1.99 |
| Neglect | 10 | 1.54 | 1.27 | 1.88 |
| Physical Abuse | 4 | 1.51 | .58 | 3.89 |
| Emotional Abuse | 6 | 1.48 | 1.33 | 1.65 |
| Financial Abuse | 5 | 1.39 | 1.12 | 1.71 |
| **Other Chronic Diseases** | **66** | **1.26** | **1.17** | **1.36** |
| Physical Abuse | 10 | 1.41 | 1.03 | 1.91 |
| Aggregate Abuse | 21 | 1.41 | 1.23 | 1.63 |
| Neglect | 7 | 1.28 | .90 | 1.83 |
| Emotional Abuse | 15 | 1.21 | 1.04 | 1.41 |
| Sexual Abuse | 4 | 1.13 | .56 | 2.31 |
| Financial Abuse | 9 | 1.05 | .82 | 1.34 |

*Note:* *k* = number of effect sizes; *OR* = odds ratio; 95% LL = lower limit, UL = upper limit; Aggregate Abuse = generic mistreatment that was undifferentiated

**Table 4**

*Risk markers ranked within each chronic disease categories for an overall odds ratio for elder mistreatment*

| Risk Markers | *k* | Mean *OR* | 95% LL | 95% UL |
|---|---|---|---|---|
| **Endocrine Disease** | | | | |
| Diabetes | 19 | 1.47 | 1.29 | 1.68 |
| Obesity | 15 | 1.14 | 0.99 | 1.31 |
| Endocrine Disease | 1 | 1.11 | 0.43 | 2.86 |
| **Heart Disease** | | | | |
| Cardiovascular Disease | 13 | 1.35 | 1.20 | 1.51 |
| Hypertension | 19 | 1.09 | 0.98 | 1.21 |
| **Neurological Disease** | | | | |
| Stroke | 12 | 1.59 | 1.37 | 1.86 |
| Dementia | 19 | 1.54 | 1.21 | 1.95 |
| Neurological Disease | 9 | 1.43 | 1.27 | 1.61 |
| Parkinson's Disease | 2 | 1.40 | 1.09 | 1.80 |
| Alzheimer's Disease | 2 | 0.99 | 0.48 | 2.04 |
| **Other Chronic Diseases** | | | | |
| Other Chronic Illness/Condition | 51 | 1.28 | 1.17 | 1.40 |
| Two or more Chronic Conditions | 16 | 1.22 | 1.05 | 1.42 |

*Note:* *k* = number of effect sizes; *OR* = odds ratio; 95% LL = lower limit, UL = upper limit

**Figure 1**

*Flowchart of data collection*

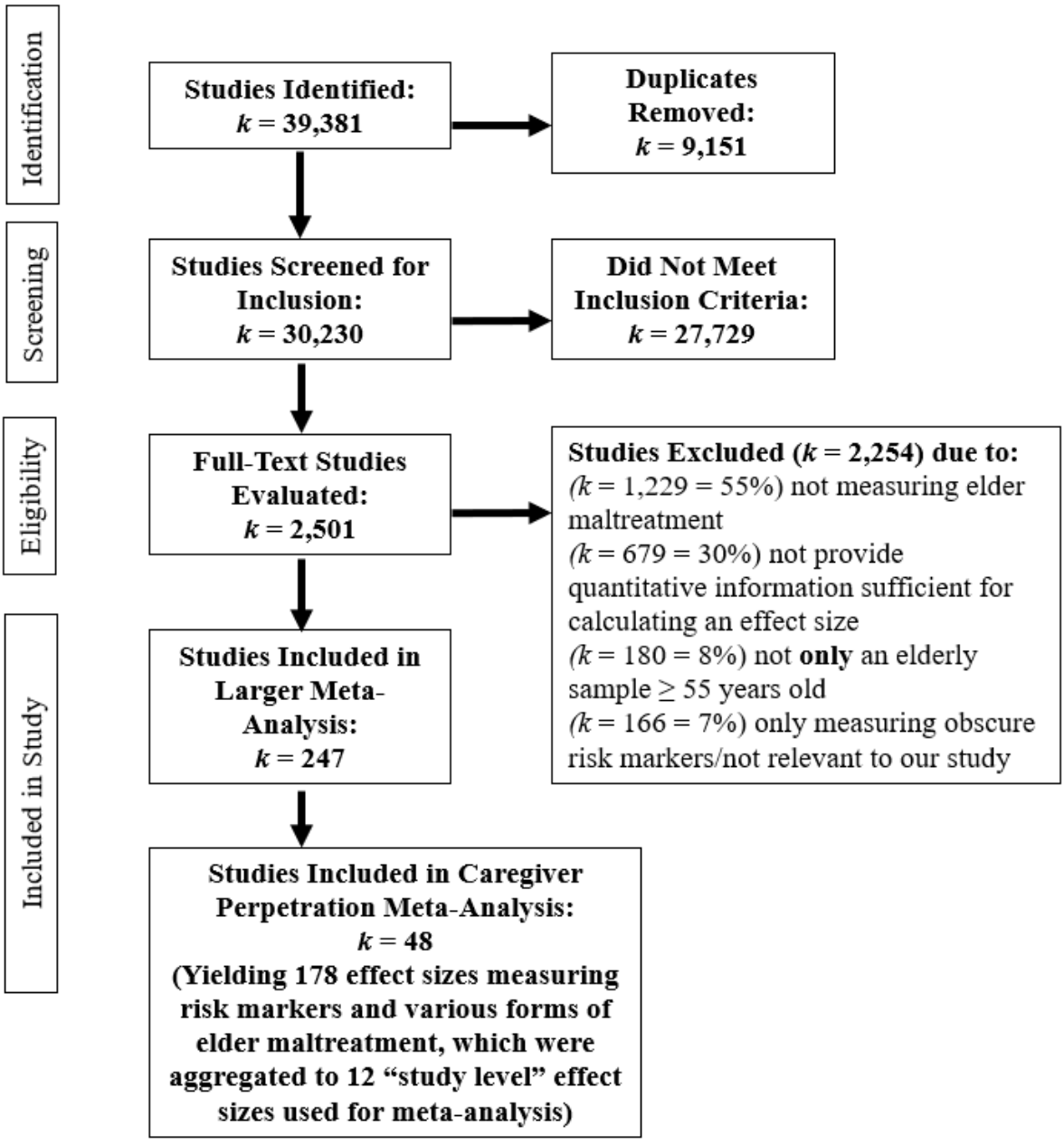

**Figure 2**

*Funnel plot for endocrine disease risk markers*

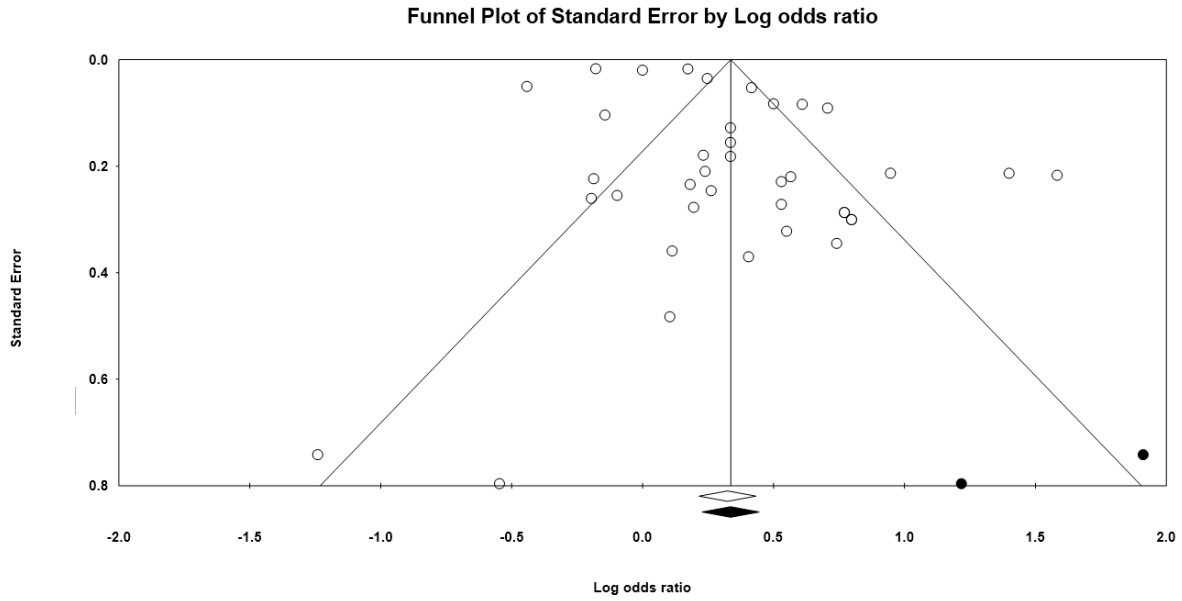

**Figure 3**

*Funnel plot for heart disease risk markers*

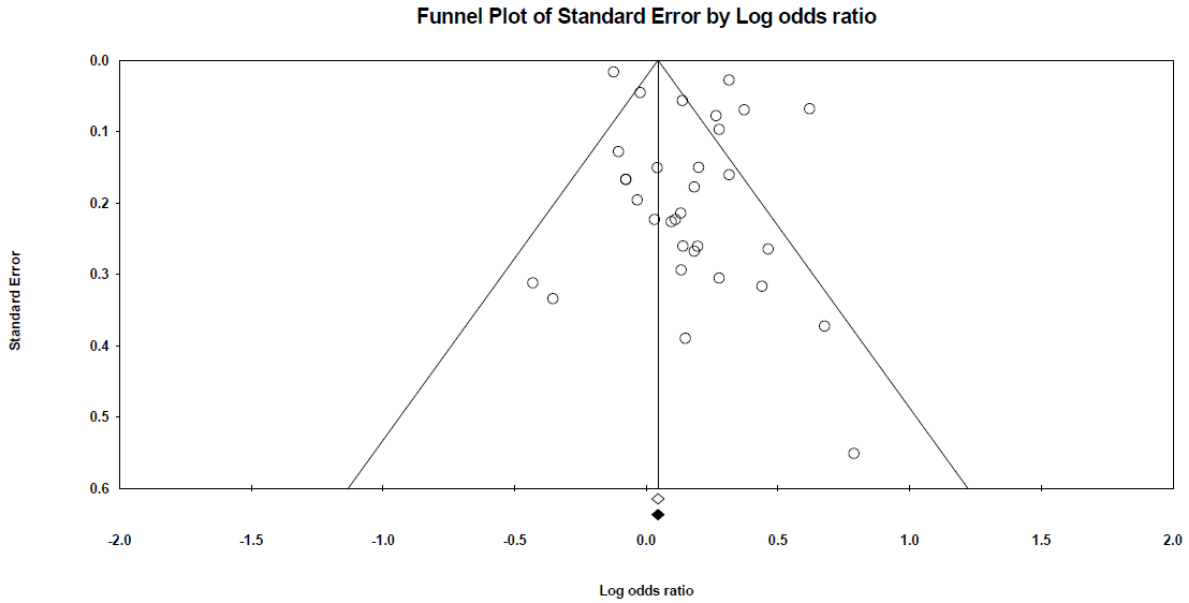

**Figure 4**

*Funnel plot for neurological disease risk markers*

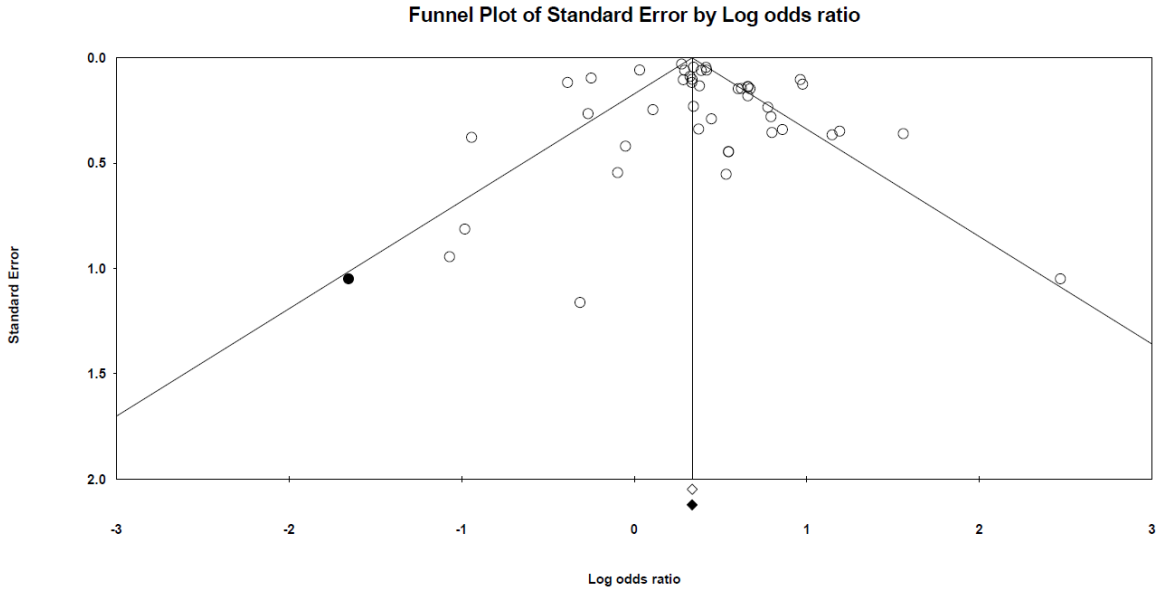

**Figure 5**

*Funnel plot for other chronic diseases risk markers*

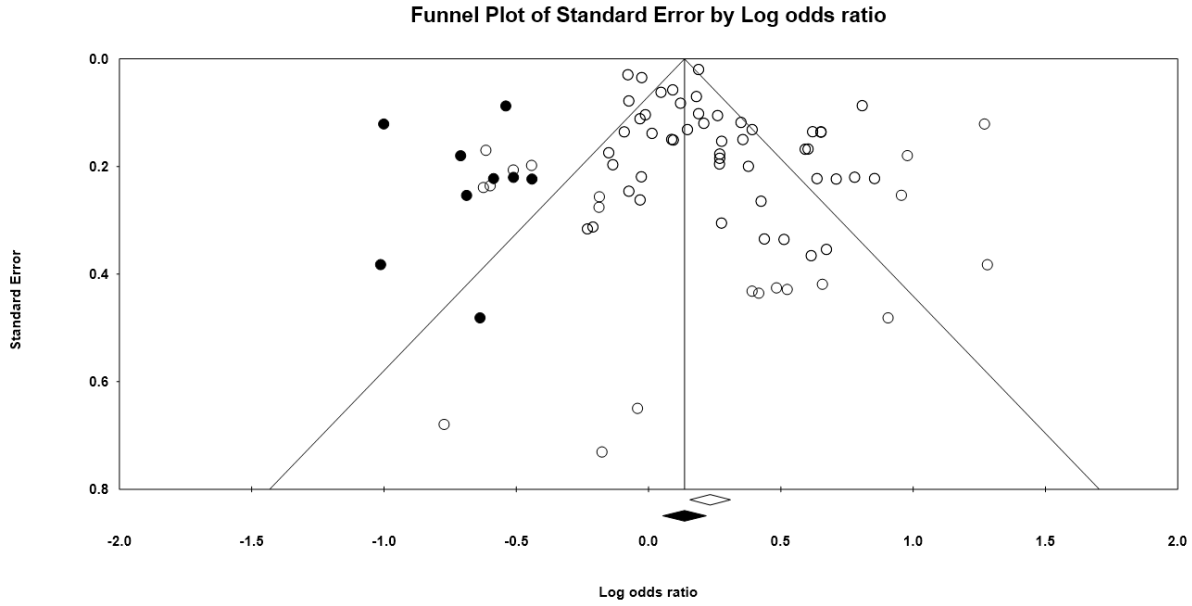

**Figure 6**

*Codesheet for article data coding*

This is the official (cross-coded & corrected) codesheet: NO ☐ YES ☐

Coding discrepancies on these items_____

**Total number if coding discrepancies_____**

DRAFT #10

**Elder Abuse/Neglect Meta-Analysis**

Code-Sheet

**Coder**

**01) Coder ID Initials_ _____**

**02) Date Coded __/__/__ (mm/dd/yy)**

**Study**

**03) Study ID Number _____**

**Source Characteristics**

**04) Last names of Author(s) _____**

_____

**05) Gender of first author? _____(#)**

**0. Unknown**
**1. Male**
**2. Female**

**Page#**

**06) Year of printed Publication _____**

**07) Article/Chapter Title _____**

**Page#**

_____

**08) Name of Journal/Book_____**

**Page#**

_____

**09) Type of Publication ___ (#)**

**1. Journal Article**
**2. Book Chapter**
**3. Dissertation/Thesis**
**4. Conference Presentation**
**5. Other _____**

**Page#**

**10) Was the data collection process funded? _____ (0 = No/Unknown, 1 = Yes)**

| | |
|---|---|
| | **11) If funded, what was the source of funding? _____**<br>**0. Unknown/Not Applicable**<br>**1. Internal funding**<br>**2. External funding**<br>**3. Internal & External funding sources** |
| **Page#** | **12) List source(s) of external funding:**<br>_____ |
| | **<u>Sample Characteristics</u>** |
| **Page#** | **13) From where were the participants recruited (<u>clearly</u> circle all that apply)?**<br>**0. Unknown**<br>**1. Military**<br>**2. National**<br>**3. University/Academic setting (non-clinical)** |
| **Page#** | **4. Social services**<br>**5. Hospital setting and Emergency Care**<br>**6. Emergency Care**<br>**7. Obstetrics/Gynecology clinic**<br>**8. Retirement center/Assisted Living Facility**<br>**9. Psychiatrist/Psychologist /Outpatient Mental Health/Clinic**<br>**10. Religious organization**<br>**11. Community**<br>*12. (blank)*<br>*13. (blank)*<br>*14. (blank)*<br>**15. Other_____** |
| | **14) List all #'s of <u>*Additional*</u> Type of Recruitment _____** |
| | **15) What is the "Name" of data set (or <u>if unavailable</u>, brief description of data set)?**<br>_____ |
| | **16) What was the combined sample size for <u>*this* particular study</u>? N = _____** |
| **Page#** | **17) What is the N (or the % of the N) for each gender & ethnic group in the study?**<br>**Males_____ Females_____** |
| **Page#** | **18) White/Caucasian_____ Black/African American_____ Latino/Hispanic_____**<br>**Asian _____ Native American_____ Other_____** |
| **Page#** | **19) Average Age of Participants:** Females_____ Males_____ Combined _____ |

| | |
|---|---|
| Page# | **20) From where (geographically) was the sample collected? ____(#)**<br>**1. International**<br>**2. United States**<br>**3. Both** |
| | **21) From which international country was the sample collected? _____** |
| Page# | **22) From which region within the United States was the study conducted? ____(#)**<br>**0. Not Applicable**<br>**1. Northeast**<br>**2. South**<br>**3. Midwest**<br>**4. West**<br>**5. Various regions**<br>**6. Nationwide**<br>**7. Unknown** |
| Page# | **23) How was the data collected?___(#)**<br>**0. Unknown**<br>**1. Paper & Pencil Survey &/or face-to-face interview (Elder participant/proxy)**<br>**2. Internet survey (Elder participant/proxy)**<br>**3. Telephone interview (Elder participant/proxy)**<br>**4. Paper & Pencil Survey &/or face-to-face interview (Clinician/Caregiver)**<br>**5. Internet survey (Clinician/Caregiver)**<br>**6. Telephone interview (Clinician/Caregiver)**<br>**7. Two or more of the above → (which #'s?_____)** |
| Page# | **24) How did the authors draw the sample? __ (#)**<br>**0. Unknown**<br>**1. Convenience**<br>**2. "Representative" (National or "Other type" of representative_____)**<br>**3. Random**<br>**4. Other_____** |
| Page# | **25) What was the nature of study conducted? ____(#)**<br>**0. Unknown**<br>**1. Cross-sectional**<br>**2. Longitudinal**<br>**3. Longitudinal (but <u>only</u> cross-sectional data reported)** |
| Page# | **26) Were sample participants rewarded for their participation?___(#)**<br>**0. No/Unknown**<br>**1. Yes** |
| Page # | **27) Who reported the data?_____(#)**<br>**1. Female Elders *(and proxy)***<br>**2. Male Elders *(and proxy)***<br>**3. Male and Female Elders *(and proxy)***<br>**4. Clinicians/Caregivers (*regardless of gender*)** |

Page #

**28) This Elder Abuse/Neglect data reflects:_____(#)**

| | |
|---|---|
| **Single Gender Data** | **1. Female Elder victimization**<br>**2. Male Elder victimization** |
| **Mixed Gender Data** | **3. "Combined" male & female elder victimization**<br>**4. Both males and females were included, but data represents "Males" and "Females" separately.** |
| **Couples Data (IPV: Intimate Partner Violence)** | **5. Male perpetration and female victimization**<br>**6. Female perpetration and male victimization**<br>**7. Both male and female perpetration and victimization (bi-lateral IPV)** |

Page#

**28A) Perpetrator's relationship to elder victim: ___ (#)**

**0. Unknown/Undifferentiated**
**1. Stranger**
**2. Caregiver (Hired/"Trained")**
**3. Friend**
**4. Intimate partner (current or ex)**
**5. Child(ren)**
**6. Grandchild(ren)**

Page#

**7. Sibling(s)**
**8. "Undifferentiated Family" or Other Family Member(s) _____**

Page#

**28B) Was the perpetrator a caregiver? ____ (#)**

**0. Unknown**
**1. Yes**
**2. No**

Page#

**29) Were established instruments used to measure the occurrence or severity of the *elder ABUSE*? _____(0 = No, 1 = Yes, 2 = Both)**

**30) What are the names of the established/standardized instrument(s) used to measure *elder ABUSE*?_____**

**31) Were established instruments used to measure the occurrence or severity of the *elder NEGLECT*? _____(0 = No, 1 = Yes, 2 = Both)**

Page#

**32) What are the names of the established/standardized instrument(s) used to measure *elder NEGLECT*?_____**

Page#

**33)** Prevalence *Period*: _____ **for COMBINED Elder Abuse/Neglect.**
Prevalence RATES for Females_____ Males_____
Combined (Males and Females) _____ **Caregivers**_____

**34)** Prevalence *Period*: _____ **for Physical Abuse.**
Prevalence RATES for Females_____ Males_____
Combined (Males and Females) _____ **Caregivers**_____

**35)** Prevalence *Period*: _____ **for Psychological/Emotional Abuse.**
Prevalence RATES for Females_____ Males_____
Combined (Males and Females) _____ **Caregivers**_____

**36)** Prevalence *Period*: _____ **for Sexual Abuse.**
Prevalence RATES for Females_____ Males_____
Combined (Males and Females) _____ **Caregivers**_____

**37)** Prevalence *Period*: _____ **for Financial/Fiduciary Abuse.**
Prevalence RATES for Females_____ Males_____
Combined (Males and Females) _____ **Caregivers**_____

**38)** Prevalence *Period*: _____ **for Neglect (generic/combined).**
Prevalence RATES for Females_____ Males_____
Combined (Males and Females) _____ **Caregivers**_____

**39)** Prevalence *Period*: _____ **for Self-Neglect.**
Prevalence RATES for Females_____ Males_____
Combined (Males and Females) _____ **Caregivers**_____

**40)** Prevalence *Period*: _____ **for Physical Neglect.**
Prevalence RATES for Females_____ Males_____
Combined (Males and Females) _____ **Caregivers**_____

**41)** Prevalence *Period*: _____ **for Psych/Emotional Neglect.**
Prevalence RATES for Females_____ Males_____
Combined (Males and Females) _____ **Caregivers**_____

**42)** **What is your subjective quality rating of this article? _____(←Sum values)**
_____a) N > 1,000
_____b) Clear definition of elder abuse/neglect
_____c) Clearly described sampling procedures & sample characteristics
_____d) Authors discussed how they handled missing data &/or attrition
_____e) Established instrument(s) for measuring elder abuse/neglect
_____f) Established instruments for risk markers
_____g) Data reported in a clear, organized manner
_____h) Univariate/Bivariate data reported
_____i) Multivariate data reported

**43)** **Need to contact the author(s) for data/output? YES NO**

*Abuse* **OR** *Neglect* **Type: _____ Risk marker # ____& Name of risk marker _____**

**Author's description of risk marker_____ Page# _____**

Name of Instrument/Scale for Risk marker_____ **[*n* = _____]**

What data will be used for the effect size? ___ (#)

1. Pearson *r* /Correlations
2. *M* & *SD*
3. Hedges' *g* OR Cohen's *d*
4. *o* (odds ratio)
5. *β* (beta)
6. Chi-squared (X^2)
7. Z-score
8. N's & %s
9. Other *Multivariate*

| Who reported: M F U Cl Care | About Whom: M F U Care /// P V |
|---|---|
| *p* < | |

| | |
|---|---|
| *Independent groups* | Group 1 = _____ Mean = _____ SD = _____ *N* = _____<br>Group 2 = _____ Mean = _____ SD = _____ *N* = _____<br>Group 3 = _____ Mean = _____ SD = _____ *N* = _____<br>Group 4 = _____ Mean = _____ SD = _____ *N* = _____ |

*Abuse* **OR** *Neglect* **Type: _____ Risk marker # ____& Name of risk marker _____**

**Author's description of risk marker_____ Page# _____**

Name of Instrument/Scale for Risk marker_____ **[*n* = _____]**

**What data will be used for the effect size?** ___ (#)

1. Pearson *r* /Correlations
2. *M* & *SD*
3. Hedges' *g* OR Cohen's *d*
4. *o* (odds ratio)
5. *β* (beta)
6. Chi-squared (X^2)
7. Z-score
8. N's & %s
9. Other *Multivariate*

| Who reported: M F U Cl Care | About Whom: M F U Care /// P V |
|---|---|
| *p* < | |

| | |
|---|---|
| *Independent groups* | Group 1 = _____ Mean = _____ SD = _____ *N* = _____<br>Group 2 = _____ Mean = _____ SD = _____ *N* = _____<br>Group 3 = _____ Mean = _____ SD = _____ *N* = _____<br>Group 4 = _____ Mean = _____ SD = _____ *N* = _____ |

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