DISSERTATION

University of Wales
Trinity Saint David
BIRMINGHAM

Sefydliad Dysgu Canol Dinas / Institute of Inner-City Learning

MSc Public Health and Social Care in Practice

Title: Awareness of Alzheimer's disease and Dementia among young adults: A Systematic Literature Review

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LCHS7004_BIRM

Dissertation submitted as part of the requirements for the award MSc Public Health and Social Care in Practice

January 10th 2024,

DECLARATION

This work has not previously been accepted in substance for any degree and is not being concurrently submitted in candidature for any degree.

Signed: Shana Rankin Date: 30th September 2023

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This dissertation is being submitted in partial fulfilment of the requirements for the degree of MSc.

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ACKNOWLEDGEMENTS

I want to thank my supervisor, Dr. Aishat Bakre, for offering valuable insights and knowledge that have substantially contributed to my dissertation. Additionally, I acknowledge Ms. Doreen, the library assistant, for conducting a personalised session to assist me in obtaining the necessary information to complete my dissertation. Furthermore, Ms. Doreen provided a comprehensive overview of database search techniques and effectively demonstrated the utilisation of the tools provided by UWTSD. The resource has been crucial in informing my research and enhancing my comprehension of the subject matter. Dr. Aishat has been instrumental in establishing a solid groundwork for my research and has significantly contributed to expanding my understanding of the field. I am so thankful for my supervisor, who took the time out and commitment and proficiency herself for me to complete my existing systematic review.

Thank you,

ABSTRACT

Background: Alzheimer's disease and dementia are both classified as severe brain disorders (AD), which pose substantial challenges to public health. A synthesis of research findings has examined the degree of cognisance among young adults worldwide. This literature review aimed to identify and synthesise existing research to identify any overarching trends among young adults in Asia, the United Kingdom, Canada, and various other countries.

Methods overview material: An electronic database search of PubMed, Google Scholar and ProQuest from 2018 to 2021 was conducted using the Population, Intervention (Issue), Comparison (Context), Outcome (PICO) framework through September 2023. Disease search terms included awareness, Alzheimer's disease, Dementia and young adults. 13 quantitative studies by the Coughlan, Cronin, and Ryan Framework, which measures awareness with descriptive statistics using surveys, experiments, and questionnaires, were evaluated using quality, research credibility, and practice relevance. Thematic analysis is used to identify themes in young adult Alzheimer's disease research articles.

Results: In these 8 Canadian studies,44% had high Alzheimer's disease awareness. Two studies found self-knowledge that 49% of young adults in the US and 44% of non-North Americans perceived self-knowledge. This rate is far lower than literature's 62%. The comprehensive literature evaluation identified existing research and combined data to identify regional adolescent patterns. In Canada, the UK, and the US, most young adults know of Alzheimer's disease and believe it has no treatment. Whites are more aware of education, information, family history, and cognitive activity protection than blacks. Families significantly affect Alzheimer's diagnosis and therapy. The report recommends concentrated education, support networks, and research and studies to raise young people's understanding of Alzheimer's and public health.

Conclusions: The prevalence of awareness of Alzheimer's disease and dementia among young adults was conducted worldwide and revealed an alarming lack of information and understanding of these disorders. These findings highlight the need to enhance awareness and understanding of these diseases and impact public health policy, education, and research. Young people may not have had Alzheimer's or dementia; thus, knowledge is crucial. The study highlights the need for more significant research on factors affecting young people's comprehension and knowledge of these illnesses.

Keywords: Systematic Literature Review, Alzheimer's disease, Dementia, Young adults, Awareness

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ABBREVIATIONS

AD: Alzheimer's Disease

CAT: Critical appraisal tools

DEM: Dementia

DLB: Dementia with Lewy bodies

FTD: Frontotemporal dementia

GDP: Gross domestic products

LDL: Late onset dementia

MD: Mixed dementia

NFT: Neuronal degeneration

NIH: National Institute on Aging

PICO: Population, Intervention (issue), Comparison (context) and Outcome

PRISMA: Preferred reporting items for systematic review-meta-analyse.

SLR: Systematic literature review

TIA: Transient ischemic attack

VD: Vascular dementia

WHO: World Health Organization

YA: Young Adult

YLDS: Lived with disability.

YOD: Young-onset dementia

UK: United Kingdom

US: United States of America

BPSD: Behavioural and Psychological symptoms of Dementia

CHAPTER 1: INTRODUCTION AND BACKGROUND

1.0 Introduction to the topic

This chapter is a comprehensive introduction to the research, providing valuable insights into the current awareness of Alzheimer's disease and dementia among young adults globally. It emphasises educating young adults about these disorders, their risks, symptoms, and prevention techniques. Young adults can take proactive measures to reduce their chance of developing these debilitating conditions and seek timely medical assistance if necessary. The objective of the chapter is to reduce the negative impact of Alzheimer's disease and dementia on individuals and their families by increasing awareness and early diagnosis, thereby improving their health outcomes and quality of life.

1.1 Overview of the Research

Dementia is one of the significant public health problems affecting over 55 million people worldwide World Health Organization, (2021). It causes memory loss and cognitive impairment, impacting the daily lives of individuals (Morley, 2018). Although often linked to older adults, it can also affect younger individuals (Barreto et al., 2021). Unfortunately, young adults lack awareness of Alzheimer's disease and dementia, leading to delayed diagnosis and treatment Novek and Menec, (2021).

The symptoms of Alzheimer's disease and dementia can vary from person to person, as stated by Joe and Ringman (2019), but some common symptoms include:

- Memory loss
- Difficulty with problem-solving or planning
- Difficulty with familiar tasks
- Confusion about time or place
- Changes in mood or personality
- Difficulty communicating
- Withdrawal from social activities

Alzheimer's disease, a subtype of dementia, is a devastating brain disorder that affect memory, thinking, and behaviour (Fymat et al., 2019). According to the National Institute on Aging (2023), Alzheimer's disease accounts for 60-80% of the leading causes of dementia cases worldwide (Alzheimer's disease fact sheet, 2023). Furthermore, young-onset dementia, which

is not uncommon, affects approximately 119.0 per 100,000 people aged 30 to 64 globally (Hendriks et al., 2021). The aetiology of dementia is unknown, and there is no known cure. As a result, urgent and practical initiatives to decrease or avoid the burden of these diseases through risk reduction and increased awareness are required (Gopalakrishnan and Ganeshkumar, 2019).

Due to stigma, young adults often need more awareness of these conditions, leading to delayed diagnosis and care (Sims et al., 2021). The aim to improve and understand Alzheimer's disease and dementia is to educate young adults about the risks, symptoms, and prevention strategies of these conditions (Rosenberg et al., 2020). By increasing their knowledge and understanding, young adults can take proactive steps to reduce their risk of developing these conditions and seek timely medical attention if needed (McGorry et al., 2022). While there is no cure for these conditions, there are steps that people can take to reduce the risk of developing them (Herrup, 2023). These include:

- Staying physically active
- Eating a healthy diet
- Engaging in cognitive activities, such as reading or puzzles
- Managing chronic conditions, such as high blood pressure or diabetes
- Avoiding smoking and excessive alcohol consumption

Educating young adults and conducting systematic literature reviews can identify and address the factors affecting cognition, such as education, socioeconomic status, and culture (McGorry et al., 2022). Ultimately, promoting awareness and early diagnosis can minimise the negative impact of Alzheimer's disease and dementia on individuals and their families (Bacsu et al., 2020). Early detection is also essential in managing Alzheimer's disease and dementia. People who experience symptoms should seek medical attention; early diagnosis can lead to earlier treatment and better management of symptoms (Rasmussen and Langerman, 2019).

Overall, it is essential to understand the severity of Alzheimer's disease and dementia and their impact on individuals and society. By promoting awareness, early diagnosis, and management, researchers can minimise the adverse effects of these conditions on individuals and their families. Educating young adults and conducting systematic literature reviews will identify and address the barriers to care and help those affected by Alzheimer's disease and dementia.

1.2 Background and Current Context

A progressive decline in cognitive skills, such as memory, reasoning ability, and behavioural patterns, characterises the neurological disorder known as Alzheimer's disease and

dementia (Piguet et al., 2017). This ailment has gained significant attention and awareness among young adults in its historical context and present-day understanding (Mladenov and Dimitrova, 2023). The challenges associated with early detection arise from the increased awareness and comprehension among healthcare practitioners and the general populace.

Therefore, effective management of Alzheimer's disease is imperative to mitigate (Logsdon et al ., 2007) symptoms and improve the overall quality of life for persons affected by this condition. In 2015, the projected global expenditure on dementia was estimated to reach US$ 818 billion, representing around 1.09% of the global gross domestic product (GDP) Prince et al., (2015). Based on recent data, the current worldwide expenditure on dementia has surpassed an annual amount of US$ 1.3 trillion (Bruck et al., 2023). According to projections, this figure is anticipated to increase to US$ 2.8 trillion by 2030 (Bruck et al., 2023).

Alzheimer's disease and dementia are traditionally associated with ageing populations (Babulal et al., 2019); however, recent studies have highlighted the increasing incidence of these disorders among younger adults. However, this has led to a surge of scholarly inquiry to improve awareness and understanding of these conditions among individuals in their early adulthood (Babulal et al., 2019). In this context, a systematic review is a valuable tool for gathering and analysing existing research on this topic (Vasileiou et al., 2018). Such a review will provide a comprehensive understanding of the current information and perspectives regarding the impacts of Alzheimer's disease and dementia on young adults (Breijyeh and Karaman, 2020).

By examining a wide range of scholarly investigations, researchers can gain valuable insights into the unique requirements of this particular demographic (Onwuegbuzie et al., 2009). The insights from such a systematic review can be crucial in creating customised support systems and resources to effectively address the specific needs of young adults with Alzheimer's disease and dementia (Onwuegbuzie et al., 2009).

Dineen-Griffin et al. (2019) state that this is a crucial field of inquiry, and researchers' efforts are commendable. The increasing incidence of Alzheimer's disease and dementia among young adults has led to a surge of scholarly inquiry to improve awareness and understanding of these conditions (Dineen-Griffin et al., 2019).

A gradual deterioration in cognitive abilities characterises Alzheimer's disease and dementia (Morris, 2005). These neurological illnesses impact individuals across different age groups, including the elderly and young adults (Prieto et al., 1996). Over time, these conditions have

garnered considerable attention and awareness among young adults within their historical background and contemporary comprehension (Vu et al., 2018). Nevertheless, the difficulties related to early detection stem from the heightened awareness and understanding among healthcare professionals and the general public (Rosenstock, 2005). Hence, it is crucial to implement efficient management strategies for Alzheimer's disease to alleviate its symptoms and enhance the general well-being of individuals impacted by it (Clare and Woods, 2004).

The issue pertains to the need for recognition and accurate diagnosis among young adults, leading to substantial delays in obtaining essential treatment. Non-communicable diseases, such as Alzheimer's and dementia, do not possess the ability to be transmitted directly from one individual to another Ogoina and Onyemelukwe (2009). Nevertheless, managing these chronic illnesses presents a considerable challenge, resulting in adverse health outcomes and escalated healthcare expenditures (WHO, 2002;WHO 2018).

The diseases mentioned above pose a substantial public health issue, and due to their incurable nature, timely identification and effective treatment are of utmost importance (Annear et al., 2015). Regrettably, the available data from researchers does not encompass the entire range of young adults, thereby failing to indicate any significant increase or decrease in the proportion of young adults within the community (Wittchen et al ., 2011). However, there is projected to be a substantial increase in the prevalence of these disorders (Wittchen et al ., 2011).

1.3 Rationale for Research or Problem Statement

The topic of awareness of Alzheimer's disease and dementia among young adults was chosen because it is an important issue affecting a growing number of people worldwide. The purpose of researching this topic area is to understand better how young adults perceive and understand these diseases and to identify ways to improve awareness and education around them. The systematic literature review (SLR) is an essential step in the research as it provides a comprehensive analysis of the current state of awareness of Alzheimer's disease and dementia among young adults. By conducting an SLR, researchers can identify awareness in the existing literature and gain insights into the effectiveness of previous awareness campaigns. Moreover, this will help researchers develop practical recommendations for improving awareness of Alzheimer's disease and dementia among young adults, ultimately leading to better health outcomes for individuals and society.

1.4 Research question

- What is the level of awareness/knowledge of Alzheimer's disease and dementia among young adults?

- What sources of information do young adults rely on to learn about Alzheimer's disease?

- What are the Alzheimer's disease and dementia factors affecting awareness and the gaps or development needed?

- What recommendations are required to improve awareness of Alzheimer's disease among young adults?

1.5 Research Aim

This systematic review aims to investigate the awareness of Alzheimer's disease and dementia among young adults from existing evidence.

1.6 Research Objectives

- To determine the level of knowledge of Alzheimer's disease and dementia among young adults.
- To identify the sources of information that young adults rely on to learn about Alzheimer's disease.
- To identify Alzheimer's disease and dementia factors affecting awareness and highlight gaps or development needs.
- To provide recommendations to improve awareness of Alzheimer's disease among young adults.

1.7 Chapter Summary

The chapter provides an overview of the current understanding of dementia among young adults and highlights the gaps in knowledge that need to be addressed. The next chapter describes the literature review for this systematic review research.

CHAPTER 2: Literature Review

2.1 Introduction to Literature Review Chapter

This chapter presents a review of existing literature on the research topic. This chapter starts with an overview of dementia epidemiology and examines the epidemiological aspects of Alzheimer's disease and dementia in young adults by analysing the existing evidence.

2.2.1 Definition and Clinical Symptoms of AD

Dementia (DEM) is a broad term for various brain-related degenerative conditions that cause considerable cognitive decline World Health Organisation (WHO, 2023). Dementia is a neurological illness that impairs memory and executive function National Institute on Aging (NIH, 2023). Dementia affects older adults predominantly but can also occur in younger individuals (Qiu et al.,2022).

This disorder is distinguished by the co-occurrence of several cognitive dysfunctions, including amnesia, which is a form of memory loss, and one or more of the cognitive impairments listed below: aphasia (language), apraxia (tasks), agnosia (pattern recognition), and executive function (decision-making and planning) (Beydoun et al., 2014). There are numerous subcategories of this syndrome, one of which is Alzheimer's disease (AD), which accounts for 50–70% of all types of dementia; among those aged 85, the prevalence of AD increases by 1%. WHO (2019); Qiu et al. (2009); Beydoun et al. (2014). Alzheimer's disease (AD) is a multifaceted disorder characterised by three discernible neuropathological characteristics (Reitz et al., 2011): the presence of amyloid plaques, which are extracellular plaques composed of β-amyloid protein and encircled by dystrophic neurites; the development of neurofibrillary tangles (NFTs); and the neuronal degeneration (Reitz et al., 2011; Alzheimer's Association, 2016).

All of this causes the brain to gradually develop and degrade, resulting in the loss of neurons owing to the brain's regions shrinking. However, this leads to cognitive impairments and, ultimately, dementia (Jack et al., 2010; Jack et al., 2013; Alzheimer's Association, 2016). Other types of dementia include vascular dementia (VD), which is another form of dementia that commonly occurs after a stroke or transient ischemic event (TIA). This subtype of dementia is the second most prevalent, making up around 15-25% of all dementia cases. Dementia with Lewy bodies (DLB) is characterised by symptoms such as Parkinsonism, visual hallucinations, and impairments in concentration and cognitive functions. Frontotemporal dementia (FTD) manifests with symptoms of executive dysfunction, disinhibition, and apathy; lastly, mixed

dementia (MD) is diagnosed when there is evidence of multiple causes of dementia, and these classifications have been examined in studies by (Jiang et al., 2013; Foltyn, 2015; Alzheimer's Association Report, 2016).

According to Bagga and Kumar (2023), Alzheimer's disease is a neurological condition characterised by a gradual decline in memory, cognitive abilities, problem-solving skills, language impairments, confusion, disorientation, and alterations in behaviour and personality. The manifestation of dementia symptoms exhibits considerable variation among individuals. However, this gradually deteriorates the affected person's cognitive and functioning abilities. The aetiology and specific brain damage influence cognitive functions such as learning abilities, memory, thinking, comprehending, orientation, judgement, and verbal communication. However, the individual's awareness remains unaffected (WHO, 2019). During the initial phases of the illness, the hippocampus and temporal lobe of the brain undergo impairment in short-term memory.

The manifests as mild forgetfulness and becomes apparent when the brain degeneration proceeds due to severe brain atrophy caused by nerve cell (neuron) loss (Alzheimer's Association, 2016). This preliminary stage is also accompanied by difficulty with reminiscences, making the proper decision, carrying out every day domestic activities, needing some disorientation, and needing more motivation. As the condition develops, the brain regions involved in logical reasoning, skilful movements, and recognition are compromised (Morrison and Lykestos, 2005). However, this eventually leads to an inability to perform personal hygiene autonomously, leaving them utterly reliant on others. As the condition progresses into the latter stages, mood swings and behavioural disturbances such as wandering may occur (Morrison and Lykestos, 2005). In the advanced stages of the disease, the affected individual loses their talking and language abilities and needs ongoing assistance with everyday tasks, such as personal hygiene and nutrition (Alzheimer's Association, 2016; WHO, 2019).

The need to thoroughly comprehend these clinical symptoms is emphasised in the review, which includes difficulties in executing familiar tasks, struggles with spatial awareness, impaired judgement, and retreat from social activities (Fick et al., 2002). The progression of the disease is characterised by a gradual deterioration, leading to a decline in daily functioning and autonomy (Mclaughlin et al., 2010).

Timely identification and intervention are of utmost importance in effectively managing the symptoms and enhancing the overall well-being of individuals diagnosed with Alzheimer's (AD)

(Borson et al., 2013). It is essential to establish a pragmatic framework for diagnosing, treating, and providing support to individuals affected by Alzheimer's Disease (Fick et al., 2002).

2.2.2 prevalence and incidence of dementia

It is estimated that around 35.6 million people worldwide are currently living with dementia. This number is expected to almost quadruple every 20 years, reaching 65.7 million in 2030 and a staggering 115.4 million in 2050 World Health Organisation (WHO, 2023). It is a concerning trend highlighting the need for increased research, funding, and support for those affected by this condition (Dementia Statistics Hub, 2023).

According to the comprehensive literature analysis conducted by Mattap et al. (2022), it was shown that there is a global prevalence of dementia affecting around 55 million individuals, with over 60% of these cases being concentrated in low- and middle-income nations. According to Prince et al. (2015), an estimated annual incidence of around 10 million cases of dementia can be attributed to a range of diseases and brain traumas.

In addition, Prince et al. (2013) study revealed a global age-standardised prevalence rate of 119.0 per 100,000 individuals aged 30 to 64 years. Furthermore, this corresponds to an estimated 3.9 million people globally living with Young-onset dementia (YOD) within this age range (Hendriks et al., 2021).

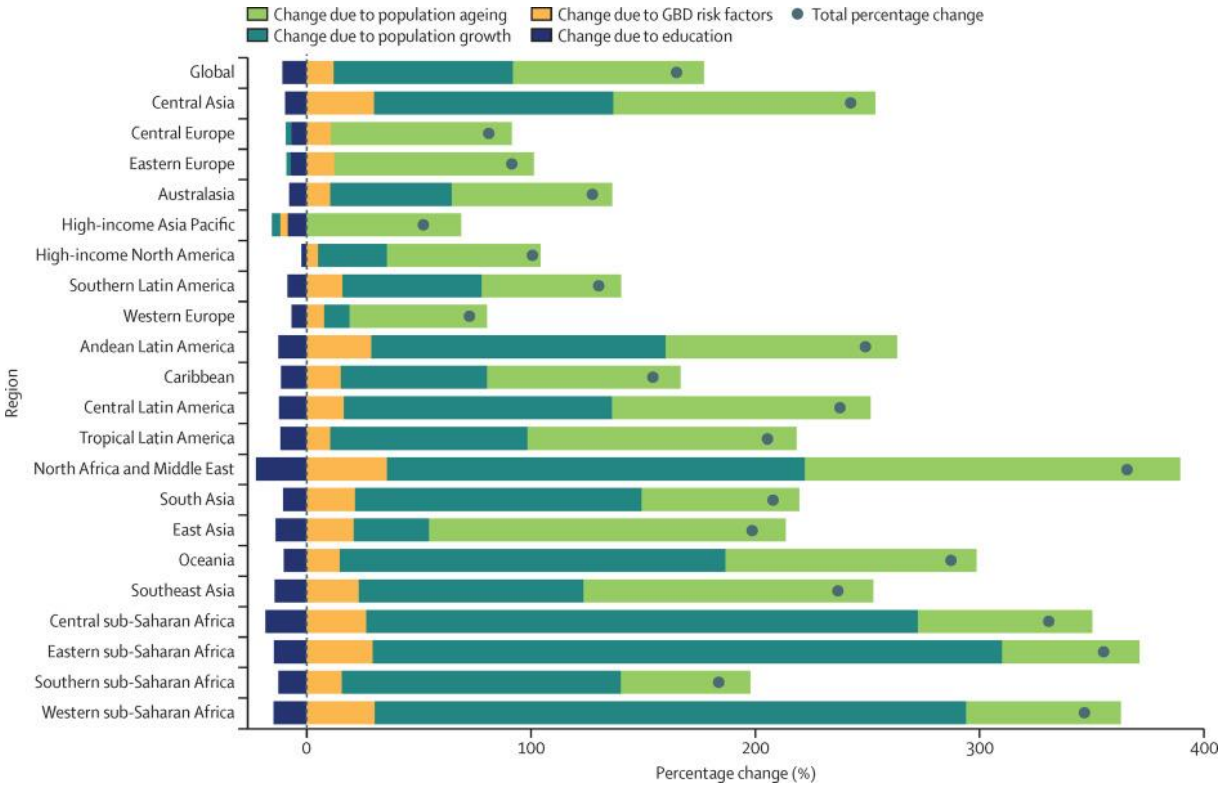
Prevalence estimates range from 0 to 5% in the general population and from 0 to 30.5% in all dementia cases, depending on case criteria (Zaccai et al., 2005; Zaccai et al., 2006). According to Martínez-Nicolás et al. (2021), the global prevalence of dementia is expected to rise from 57.4 million cases in 2019 to 152.8 million by 2050 (with a 95% uncertainty interval of 130.8-175.9 million).

Although the expected dementia population has increased, the age-standardised prevalence among both sexes has remained relatively constant from 2019 to 2050, with a global percentage change of 0.1% (ranging from -7.5% to 10.8%) (Sosa-Ortiz et al. 2012). The global female-to-male dementia ratio was 1.69 (95% confidence interval: 1.64-1.73) in 2019 (Nicolás et al., 2021). Researchers expect this trend to continue until 2050, with a female-to-male ratio of 1.67 (95% CI: 1.52-1.85) (Sosa-Ortiz et al., 2012).

The number of projected cases increased slightly (Foreman et al. 2018) in high-income Asia Pacific (53% [41–67]) and Western Europe (74% [58–90]) but significantly more in North Africa and the Middle East (367% [329–403]) and eastern sub-Saharan Africa (Foreman et al.,

2018). The population growth and demographic shift towards older people will likely increase cases. Nevertheless, these elements were essential in different parts of the world (Cruz and Ahmed, 2018) in particular, population growth drove rises in sub-Saharan Africa, while population ageing increased in East Asia (Temple et al. 2022).

Figure 1: Dementia cases between 2019 and 2050 globally and by world region (Martínez-Nicolás et al., 2021).



2.2.3 Risk factors for dementia

Dementia is a condition caused by various risk factors that can influence its development (Kalaria et al., 2008). These risk factors include non-modifiable (e.g., age, genetics, cardiovascular health) and lifestyle (e.g., smoking, alcohol consumption, and lack of exercise) that are modifiable (Sacco, 2001). While certain factors are more established than others, it is crucial to note that determining causation can be challenging, and the level of individual risk can differ (Kraemer et al., 2001).

Several risk factors identified in Sommer et al. (2017) systematic review can affect a person's likelihood of developing dementia, some of which can be modified. Age is a significant risk factor, with the risk increasing as a person ages (Johnson et al., 2020). The studies supported by (Song et al., 2018 ; Sancho et al., 2018 ; Liu et al., 2018 ; Williamson et al., 2018 ; Nomikos et al., 2018; Campbell et al., 2018) a systematic review have all supported the notion that risk factors such as genetics, family history, smoking, alcohol use, atherosclerosis, high LDL

cholesterol, plasma homocysteine levels, and mild cognitive impairment can increase the risk of developing dementia and Alzheimer's disease. Specifically, specific genes have been found to increase the risk of Alzheimer's disease, while smoking and alcohol use can lead to dementia and atherosclerosis can interfere with blood flow to the brain and cause stroke, which is a significant risk factor for vascular dementia. High LDL cholesterol and plasma homocysteine levels have also been linked to an increased risk of dementia.

2.2.4 Outcomes and cost of dementia

Young onset dementia (YOD) is a type of dementia that affects people under the age of 65 (Baptista et al.,2016). This condition has significant financial implications worldwide as it can lead to lost productivity and increased healthcare costs during the prime working years of an individual (Day et al., 2022). Moreover, the long-term care required for individuals with YOD dementia can be financially burdensome for families and healthcare systems (Hutchinson et al.,2016). This condition can severely impact the quality of life of the affected individuals, making it essential to raise awareness and allocate resources to provide support for those suffering from YOD dementia (Hutchinson et al., 2016).

Recent research has shed light on the outcome of dementia on young adults, particularly concerning the associated costs. Kandiah et al. (2016) found that Young Onset Dementia (YOD) patients typically experience symptoms at a much younger age than those with Late Onset Dementia (LOD). The study also revealed that the median annual cost for YOD patients is nearly double that of LOD patients, with YOD patients incurring an average cost of USD 15,815 versus USD 8,396 for LOD patients (Kandiah et al., 2016). Even when grouped by dementia aetiology, the cost for YOD patients was higher than that of their elderly counterparts, with YOD patients with Alzheimer's disease, frontotemporal dementia (FTD), and vascular dementia, experiencing the highest costs, as reported by Lourida et al. (2013). Notably, YOD patients with FTD had the highest cost (Atee et al., 2017).

Furthermore, 43.2% of YOD patients reported losing their jobs due to dementia, a significantly higher figure than the 2.4% reported by LOD patients (Ruiz-Adame, 2022). These findings emphasise the need for more significant support for YOD patients and their families, as well as the importance of early detection and intervention to minimise the financial and emotional impact of the disease.

2.2.5 Knowledge of Alzheimer's Disease among Young Adults

Researchers reported the findings of the relevant meta-analysis studies on the knowledge of Alzheimer's disease among young adults across the globe. This review will aim to identify

existing literature and synthesise the data to observe if there are any overarching trends among young adults in various locations supported by (Chow et al., 2018). Research has revealed a correlation between the knowledge of Alzheimer's disease and dementia among young adults (Cahill et al.(2015).

Nevertheless, the underlying mechanism remains elusive (Seto et al.,2021). Numerous studies have been conducted to investigate the association between adolescents and young adults and the risk of developing Alzheimer's disease and dementia (Sacco,2001; Cahill et al.,2015; Seto et al., 2021; Martínez-Nicolás et al., 2021; Chow et al., 2018; Hutchinson et al.,2016; Baptista et al.,2016; Bruscoli and Lovestone, 2004; Johnson et al., 2020; Day et al., 2022; Atee et al., 2017; Sommer et al., 2017; 2015; Kalaria et al., 2008). However, the findings regarding the influence of confounding factors on this relationship remain inconclusive (Lennon et al., 2019; Prickett et al ., 2015; Lourida et al., 2013).

2.6 Chapter Summary

This chapter provides the definition and clinical symptoms of Alzheimer's disease and dementia, the prevalence and incidence of dementia, risk factors for dementia, and the outcome and cost of dementia. Also, it explores existing research on dementia awareness among young adults. The following chapter describes the methodology for this systematic review research.

CHAPTER 3: METHODOLOGY

3.1 - Introduction to Chapter

The chapter outlines the methodology to investigate the awareness of Alzheimer's disease and dementia among young adults. It provides an overview of a systematic review and highlights its validity and usefulness. This chapter also describes the search strategy, the PICO framework, and the databases searched to retrieve relevant articles using the Boolean operator. Finally, this chapter presents the PRISMA flowchart and study selection, including the inclusion and exclusion criteria and the ethical considerations.

3.2 Systematic Literature Review (SLR)

A systematic literature review (SLR) is an independent academic technique that aims to identify, evaluate and synthesise all the pertinent literature on a topic to answer the research question (Uman, 2011). Seven steps are required to achieve an excellent systematic literature review (Uman, 2011). These include formulating a research question, identifying inclusion/exclusion criteria, developing a search strategy using keywords, Boolean operators, and variations of search terms to find relevant studies in a database search, selecting relevant studies, extracting the data, critically evaluating studies, analysing and interpreting the findings (Bramer et al., 2018; Xuani et al., 2020; Khurshid et al., 2021). These stages ensure a complete, reliable, informative literature evaluation (Whiting et al., 2016).

3.3 Search Strategy

The search strategy systematically amalgamates keywords, phrases, subject headers, and limiters to extract pertinent items from a database to address a specific research question (Research Medical Library, 2022). This technique is crucial in achieving a good systematic review. Therefore, to achieve a comprehensive search for the systematic review of the awareness of Alzheimer's disease and dementia among young adults, the PICO (Population, Intervention, Comparison, Outcome) framework was used (Eriksen et al., 2018; Richardson et al., 1995).

The PICO framework is vital as it helps the systematic review process by structuring the research question and guiding the search for relevant studies. Pollock and Berge (2018) explained that the PICO helps to maintain clarity and consistency throughout the review, making the findings more reliable and actionable. Therefore, this systematic review will use the PICO framework extensively (Eriksen et al., 2018; Richardson, 1995). The articles included in this systematic review were searched from the earliest date of each database to 2023.

3.4 Search terms

A search term in research is a specific word or phrase included in the search strategy and placed into a search engine or database to obtain relevant material on a given research topic (Gupta and Lehal, 2009). However, this helps to thoroughly investigate young adults' knowledge of dementia and Alzheimer's disease in multiple databases (Walden University, 2023).

Nashruddin and Mustaqimah (2020) highlighted that choosing the correct search terms is critical for performing a thorough literature search and locating the most relevant and trustworthy sources for the research. In order to effectively gather a diverse array of pertinent information while minimising extraneous results, it is imperative to utilise a combination of specific and broader search phrases and synonyms of search terms (Nashruddin and Mustaqimah, 2020). To achieve a comprehensive search for this systematic review, the PICO (Population, Intervention, Comparison, Outcome) framework was used (Eriksen et al., 2018; Richardson et al., 1995) (See below **Table 1**). These include.

Table 1: PICO/PEO Framework

Population/ Problem	Young adults
Intervention/ issue	Alzheimer’s disease (AD) and Dementia
Context	Worldwide
Outcome	Awareness

Using the above PICO framework, the research question for this SLR is,

What is the worldwide (C) level of awareness/knowledge (O) of Alzheimer's disease and dementia (I) among young adults (P)?

The following are the database search strategy that was used to retrieved relevant articles using the Boolean operators “OR” and “AND” to combine the search terms/synonyms.

- Search 1 (P): Young population or young adults or adolescent

- Search 2 (I): Alzheimer's disease or neurodegenerative disorder or dementia or cognitive decline.

- Search 3 (C): Worldwide or global or international
- Search 4 (O): Awareness or consciousness or comprehension
- Search 5: Search 1 AND Search 2 AND Search 3 AND Search

Using EBSCO as one of the research databases, incorporating Boolean operators (AND, OR NOT) to combine search terms effectively, and employing the PICO (Population, Issue, Context, Outcome) framework (Toronto and Remington, 2020), the researcher can achieve comprehensive results in researching the level of awareness/knowledge of Alzheimer's disease and dementia among young adults. Grindell et al. (2022) state that this approach would aid in conducting a systematic literature review, gathering pertinent research studies, and analysing the data to acquire insights into young adults' awareness and knowledge concerning Alzheimer's disease and dementia. The search terms for this SLR include Alzheimer's, dementia, awareness, and young adults.

3.5 Key Words

Keywords are distinct words or phrases that indicate a study's main concepts or topics of interest (Cahill et al., 2015). These keywords assist researchers in locating relevant articles, books, or other sources of information on the research topic (Bharucha et al., 2009). Similarly, researchers can focus the search and identify the most relevant and specialised information for the study by utilising well-chosen keywords (Bharucha et al., 2009). This research's main keywords include consciousness, perception, Alzheimer's disease, neurodegenerative disorders, dementia, cognitive decline, adolescent and young adult.

3.6 Databases

Databases are essential for finding reliable and credible sources for academic purposes and searching relevant sources (Gusenbauer and Haddaway, 2019). It provides access to scholarly articles, journals and research papers (Albert, 2006). Databases are crucial because they provide specialised information and research studies (Bramer et al., 2017a).

They contain many scholarly articles and academic resources that are not easily found through general search engines. Several databases are necessary for a comprehensive search because each covers various sources. Using multiple databases helps ensure a wide variety of relevant articles and research studies. Casting a wider net increases the likelihood of finding comprehensive and diverse evidence to support the argument. So, exploring different databases is crucial for a thorough and well-rounded research approach.

The databases used to achieve this systematic review include PubMed, Google Scholar, and ProQuest. These databases are excellent resources for finding research studies and articles on healthcare themes, including Alzheimer's disease, dementia and young adults. In addition to the database search, Chandna et al. (2019) recommended scanning grey literature and reference lists for related studies. According to Yousaf et al. (2019), the goal is to review all relevant material on young adult Alzheimer's disease and dementia awareness.

3.7 Inclusion/Exclusion Criteria

In research, inclusion and exclusion criteria are the characteristics that determine whether a particular study will be included or excluded from the research (Garg, 2016). Studies must meet inclusion requirements to be included in the research. On the other hand, exclusion criteria disqualify studies from being included in the research (Cahill et al., 2015; Anaesth et al., 2019). These criteria help researchers select studies that satisfy research questions/objectives and meet age, gender, health condition, and other relevant aspects (Nikolopoulou, 2022; NIH, 2023). Researchers can use these factors to select suitable studies, thereby contributing to the study's validity and reliability (Patino and Ferreira, 2018).

3.7.1 Inclusion Criteria

The inclusion criteria for this research study include:

- Studies that focused on young adults as the target population.
- Research articles that specifically examine awareness or knowledge of Alzheimer’s disease and dementia among young adults.
- Studies conducted in various settings such as community, educational institutions, or healthcare facilities.
- Studies conducted worldwide.
- Articles published in peer-reviewed journals to ensure quality and credibility.
- Articles that used quantitative and qualitative research methods
- Articles published in English language.

3.7.2 Exclusion Criteria

The exclusion criteria for this research study include:

- Studies that do not specifically focus on the awareness or knowledge of Alzheimer’s disease and dementia among young adults.
- Research articles that do not involve young adults as target population.

- Non-peer-reviewed sources, such as conference abstracts or unpublished dissertation
- Studies that are not conducted in community, educational, or healthcare settings.
- Articles that are not published in English language.

3.8 Search Results

The PRISMA flowchart visually presents the selection process of relevant studies for a systematic review (Clay et al., 2020). It helps researchers eliminate irrelevant studies through a systematic screening process and assess each study's relevance to their research question (Page et al., 2021). The chart visually represents the flow of search results from the initial identification of studies to the final inclusion of relevant ones (Page et al., 2021). Researchers can use the PRISMA chart to ensure their research methodology is thorough and accurate.

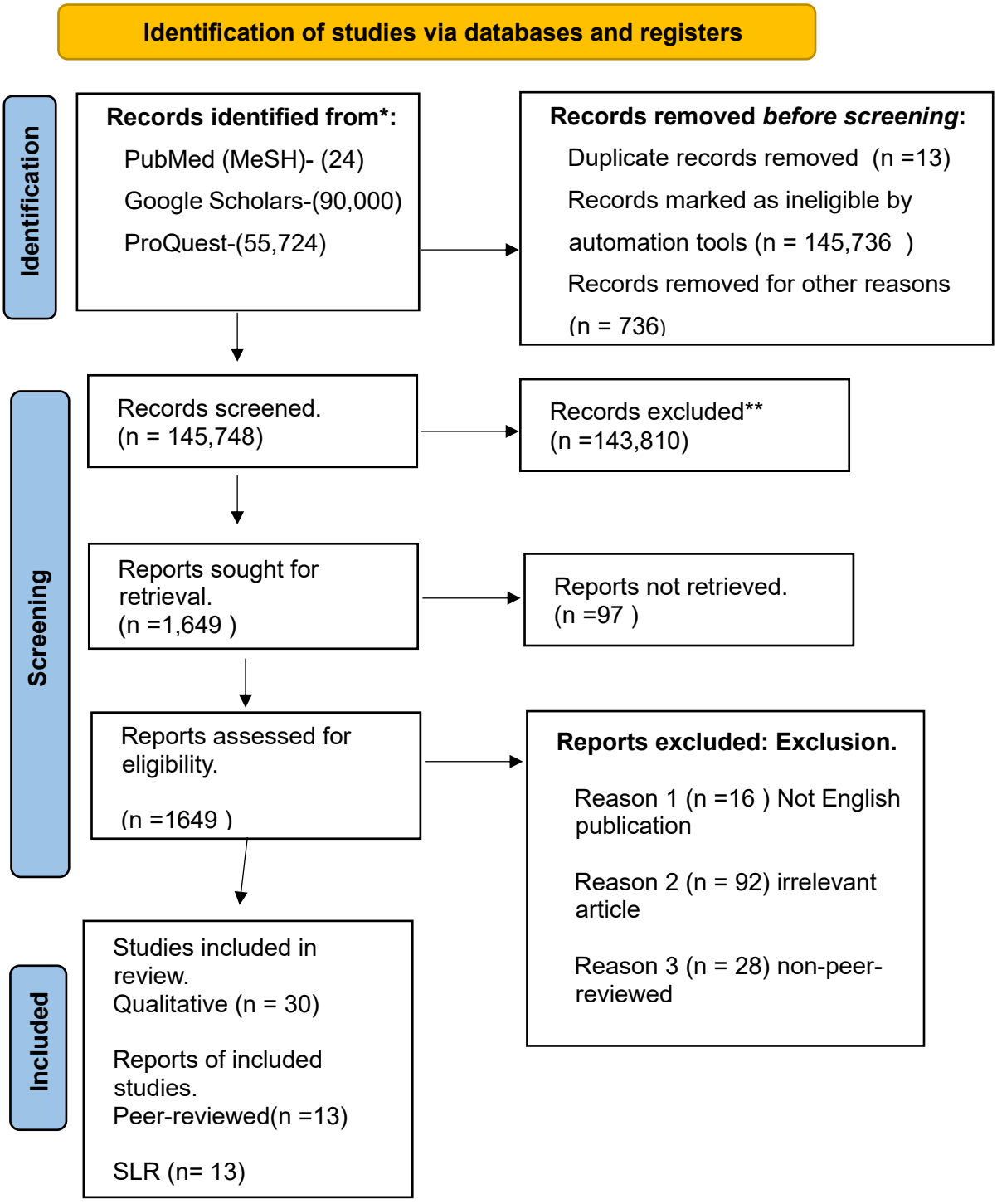
The PRISMA flow chart shows a thorough evaluation of 13 cross-sectional studies. A systematic approach was utilised to ensure methodological accuracy to exclude publications irrelevant to the study issue. A systematic approach was used to exclude papers irrelevant to the research question.

A comprehensive search across PubMed, Google Scholar, and ProQuest databases yielded 145,748 records, from which 13 duplicates were removed upon careful examination. Subsequently, the remaining records were screened, and 145,736 of the articles were found ineligible, excluding 1,042 documents from further screening. Researchers attempted to retrieve 1,649 records and could not recover a subset of 97 items successfully. To determine eligibility for inclusion in the study, we evaluated 1,649 papers. Of these, 16 articles were eliminated because they were not published in English, while 92 were deemed irrelevant to the research topic.

Additionally, 28 papers were found to be non-peer-reviewed studies. Ultimately, our review comprised 13 peer-reviewed studies. Figure 1: PRISMA chart visually represents the study selection process.

Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow chart, a 27-item checklist used to improve transparency and completeness in reporting, can serve as a valuable resource when conducting systematic reviews, including the Coughlan, Cronin, and Ryan critical appraisal (Parums et al., 2021).

Figure 2: PRISMA flow chart (Adapted from Page et al., 2021)



3.9 Ethical Considerations

Researchers should deeply understand the ethical aspects of research that involve safeguarding the participants' rights, dignity, and welfare World Health Organisation (WHO, 2011; Connelly, 2014). For this review, all the published articles have been carefully selected based on their consideration of ethical considerations and approval by a Review Board or University, ensuring that this study does not pose any ethical issues.

3.10 Chapter Summary

This chapter explains the methodology used to conduct the systematic literature review study, including the definition and significance. It examines the search technique, search terms, keywords, databases, and selection criteria used in systematic reviews and their importance. The search results were presented using the PRISMA chart, and the chosen articles' ethical dimensions were examined in this chapter. In Chapter 4, researchers will elucidate the critical appraisal tool and quality assessment of the chosen articles.

CHAPTER 4: DATA EXTRACTION AND EVALUATION

4.1 Introduction to Chapter

This data extraction and evaluation chapter provides a thorough information extraction and critical appraisal of the relevant studies for the systematic review of the awareness of Alzheimer's disease and dementia among young adults. The quality and validity of the relevant research studies were assessed during the critical appraisal evaluation of the quantitative study utilising the Coughlan, Cronin, and Ryan Framework tool.

4.2 Data Extraction

According to Noyes et al. (2019), data extraction is gathering pertinent information from the studies evaluated for review eligibility and organising the material to aid in study synthesis and conclusion drawing. Each publication was individually assessed using a pre-made data extraction form to collect the necessary data from the 13 relevant studies. A baseline measure of the frequency of awareness of AD among young adults, the study duration, participant characteristics, recruitment strategy, sample size, sample size at follow-up (16.1% of baseline sample), publication year of the first author, study type, study name, study location, sample size, data analysis method, and findings are among the data extracted.

4.3 Brief introduction to critical appraisal and paper quality assessment

Critical appraisal is a method that involves systematic examination of research studies to assess their relevance, validity, and reliability (Mhaskar et al., 2009). It involves evaluating the methods used in a study, the quality of the data collected, and the conclusions drawn from the results (Powell, 2006). The objective of critical appraisal is to determine whether a study provides reliable evidence that can be used to inform clinical decision-making or policy development (Cook et al., 1997).

It is crucial to appraise research papers because not all studies are of equal quality. Al-Jundi and Sakka (2017) state that some studies may need to improve their design or execution, which can lead to biased or unreliable results. Critical appraisal helps to identify these limitations and assess the overall quality of a study (Al-Jundi and Sakka, 2017). By critically appraising research papers, researchers can ensure that the evidence used is of the highest quality and that their decisions are based on reliable information (Munn et al., 2018).

4.4 Critical Appraisal Tools (CAT)

Critical appraisal tools (CAT) help to assess the quality and validity of research papers ((Soliman et al., 2017). It is vital to select the appropriate CAT because different CATs may emphasise various aspects of research quality (Cseh et al., 2019). Choosing the right critical appraisal tool is essential to evaluate the research study comprehensively and unbiasedly (Waddington et al., 2023). Different types of appraisal tools are developed to assess different types of research methods and study designs. These include the Coughlan, Cronin, and Ryan (2007) framework, Critical appraisal skills programme (CASP), Jonna Briggs Institute(JBI), Mixed method appraisal (MMAT), Cochrane risk of bias (RoB), and Newcastle-Ottawa Scale (NOS) (O'Brien et al., 2014). However, there needs to be more evidence concerning the appropriate items for each critical appraisal tool. Overall, all quality assessment tools are expected to evaluate the research process documented in all relevant studies found for a systematic literature review (Pollock et al., 2016).

4.5 Evaluation of Quantitative Studies using an appropriate tool

The relevant quantitative studies for this SLR were evaluated using the Coughlan, Cronin, and Ryan (2007) framework. This widely used framework can help assess the quality and rigour of a quantitative research study (Coughlan et al., 2007). The Coughlan, Cronin, and Ryan (2007) framework provides a structured approach to evaluating research articles, and it is expected to appraise various aspects of quantitative research papers (Cronin et al., 2014). In addition, it provides a systematic and structured approach to reviewing and synthesising existing literature (Lewis et al., 2003; Coughlan et al., 2013). Its applicability may be limited to certain quantitative research studies due to the distinct nature of research questions, methodologies and contextual factors inherent to each study (Ormston et al., 2014). The Coughlan, Cronin, and Ryan (2007) framework comprises 19 questions organised into three categories: methodological quality, research credibility, and relevance to practice (Munn et al., 2018).

Methodological quality refers to the soundness of the research design, including the sampling method, data collection techniques, and statistical analysis (Zeng et al., 2015). Research credibility assesses the strength of the evidence and the conclusions drawn from it (Ryan et al., 2007). Relevance to practice evaluates the applicability of the study findings to clinical practice and their potential impact on young adults' outcomes (Valderas et al., 2008).

In this study, the researcher evaluated the 13 relevant quantitative articles (Chow et al., 2018a; Viehweger et al., 2018; Chow et al., 2018b; Borean et al., 2018; Anapalagan et al., 2018; Hollenberg et al., 2018; Rzepka et al., 2018; Viehweger et al., 2018b; Borean et al., 2018b;

Viehweger et al., 2018c; Chow et al., 2018c; Chow et al., 2018d; Kafadar et al., 2021) identified for the awareness of Alzheimer's disease and dementia among young adults.

Quantitative methodology study focuses on numerical data collection and analysis (Ahmad et al., 2019). This research strategy uses statistics to generate findings from surveys, questionnaires, trials, or observations (Ahmad et al., 2019). The quantitative methodology used in the relevant studies was appropriate for each of the article's research questions and objectives.

The study designs of each study were also evaluated during the critical appraisal process (MacDermid et al., 2009). Of the 13 studies (Chow et al., 2018a; Viehweger et al., 2018; Chow et al., 2018b; Borean et al., 2018; Anapalagan et al., 2018; Hollenberg et al., 2018; Rzepka et al., 2018; Viehweger et al., 2018b; Borean et al., 2018b; Viehweger et al., 2018c; Chow et al., 2018c; Chow et al., 2018d; Kafadar et al., 2021), all used an observational cross-sectional study design.

The cross-sectional quantitative studies were designed to measure the prevalence of Alzheimer's disease and dementia awareness among young adults at a specific time (van Vliet et al., 2013). The researchers provide valuable insights into the prevalence of a disease or condition, identify knowledge gaps and educational needs, and inform public health policies and interventions.

Quantitative methodology mainly uses instruments, experiments, and questionnaires for data collection (Ahamad et al., 2019). All 13 studies employed self-reported questionnaires and surveys due to their ease of calculation and ability to examine different domains (Steward et al., 2019). 8 studies (Chow et al.,2018; Viehweger et al., 2018; Chow et al., 2018; Anpalagan et al., 2018; Chow et al., 2018; Hollenberg et al., 2018; Rzepka et al., 2018; Chow et al., 2018; Viehweger et al.,2018) used surveys, 3 studies (Borean et al.,2018; Viehweger et al., 2018; Chow et al., 2018) used Fisher-exact statistical test and 1 study (Borean et al., 2018) used both survey and 5 quiz questions to assess the awareness of Alzheimer's disease to analyse the knowledge and the level of awareness and understanding of Alzheimer's disease among young adults. One study by Kafadar et al. (2021) measured Alzheimer's Disease (AD) knowledge using various methods, including post hoc comparison Games-Howell, univariate ANOVA test compare ethnic groups, ANOCOVA test three different ethnic groups, and MANOVA multiple variables dependent for domain scores. The Alzheimer's Disease Knowledge Scale (ADKS) comprises 30 items and 7-topic domains. The scale was used to assess the participants' levels of knowledge about AD (Kafadar et al. 2021).

13 studies (Chow et al., 2018a; Viehweger et al., 2018; Chow et al., 2018b; Borean et al., 2018; Anapalagan et al., 2018; Hollenberg et al., 2018; Rzepka et al., 2018; Viehweger et al., 2018b; Borean et al., 2018b; Viehweger et al., 2018c; Chow et al., 2018c; Chow et al.,2018d; Kafadar et al.,2021) used descriptive statistics to understand the awareness of Alzheimer's disease among young adults by summarising and analysing data related to their knowledge, attitudes and behaviours. 2 studies (Chow et al., 2018a; Viehweger et al., 2018a; Chow et al., 2018b; Borean et al., 2018; Anapalagan et al., 2018; Hollenberg et al., 2018; Rzepka et al., 2018; Viehweger et al., 2018b; Borean et al., 2018b; Viehweger et al., 2018c; Chow et al., 2018c; Chow et al., 2018d) used Fisher-exact tests to analyse whether there was a difference in awareness between the different groups because this was solely developed to analyse contingency tables with small sample sizes (Aslam and Alamri 2023). A p-value of less than 0.05 was considered to be statistically significant. All the statistical analyses of the 12 studies were done using the Statistical Analysis Software (SAS Version 9.4 for Windows).

Across all 13 cross-sectional studies, it was observed that the research problem and aims were concisely and coherently identified. Furthermore, the literature review in all the quantitative studies was meticulously organised and included articles from the past five years that were particularly applicable to the studies. It was evident that all quantitative articles exhibited a clear and logical structure, enhancing the overall quality of the research.

Tables 4, 5 and 6 in Appendices 8.5, 8.6 and 8.7 document the quality assessment of the quantitative studies where the weighted averages for the extracted endpoints are presented. These endpoints provide valuable insights into young adults' awareness level concerning Alzheimer's disease, which can inform decision-making in this field (Goldsack et al.,2021).

4.6 Chapter Summary

This chapter delved into assessing the quality of the research studies found for the systematic literature review. In addition, the importance of utilising Coughlan, Cronin, and Ryan's (2007) critical appraisal tool to evaluate the studies' credibility, accuracy, and relevance was emphasised. In the next chapter, the researcher will explore the intricacies of data analysis and synthesis, covering the process of extracting information from selected studies, synthesising it, and presenting the findings comprehensively and informally.

CHAPTER 5: DATA ANALYSIS AND SYNTHESIS

5.1 Introduction to Chapter

Data analysis is indeed a critical aspect of interpreting research findings. This chapter explores Alzheimer's disease among young adults, employing data analysis and synthesis approaches such as thematic analysis to find common traits and emergent themes in carefully identified research articles.

5.2 Thematic Analysis

Thematic analysis is used to identify patterns and themes within textual data (Herzog et al., 2019). It involves identifying recurring patterns of meaning across a dataset and then grouping these patterns into themes (Lochmiller, 2021). Thematic analysis is commonly used to analyse primary qualitative data. However, in the context of a systematic literature review, it is called thematic synthesis, which involves analysing and synthesising secondary data from multiple studies (Salm et al., 2021). Thematic analysis can also be used for quantitative research to help identify patterns and themes within numerical data, such as surveys, questionnaire responses or experimental results (Robert et al., 2019).

5.3 Data analysis tool

This study used the thematic analysis framework proposed by Braun and Clarke (2006) to analyse and synthesise the relevant studies. This framework involves three steps: line-by-line coding of text, development of descriptive themes, and analytical themes (Braun and Clarke, 2006). The framework helps preserve the link between the conclusion and text of primary research, which is an essential aspect of systematic review (Braun and Clarke, 2006). This framework allowed for a comprehensive and rigorous qualitative and quantitative data analysis, ensuring that themes from the data are grounded in the data extraction table (Braun and Clarke, 2006).

5.4 Characteristics of the identified studies

Of the 13 relevant studies found for this review, all were published between 2018 and 2021. 8 studies were from Canada (Chow et al., 2018a; Viehweger et al., 2018; Chow et al., 2018b; Borean et al., 2018; Anapalagan et al., 2018; Hollenberg et al., 2018; Rzepka et al., 2018; Viehweger et al., 2018b), 2 studies were from United States (Borean et al., 2018b; Chow et al., 2018c), 1 study was from Asia (Viehweger et al., 2018),1 study was from Dublin (Chow et al., 2018d), and 1 study was found in United Kingdom (Kafadar et al., 2021). The sample size

varied from 13 to 186 participants, and the baseline age of the study participants varied from 18 to 40 years. See Appendix 8.4 for the data extraction Table 3.

5.5 Emerging Themes from Included Studies.

This systematic literature review aimed to ascertain extant scholarly works and integrate the gathered data to discern any overarching themes and patterns among young adults' awareness of AD across different geographic regions.

Following the thematic analysis stages, 11 significant themes were identified from the 13 relevant studies. These are presented in Table 2 below.

Table 2 : Themes

Themes	**Articles where it was extracted**
Perception and Knowledge	Borean et al., 2018; Kafadar et al., 2021; Chow et al., 2018; Chow et al., 2018b; Chow et at., 2018c; Rzepka et al., 2018; Hollenberg et al., 2018; Viehweger et al ., 2018; Viehweger et al., 2018b; Chow et al., 2018d; Viehweger et al., 2018c; Borean et al., 2018b.
Family Members	Borean et al., 2018; Kafadar et al., 2021 ;Chow et al ., 2018; Chow et al., 2018b; Chow et at., 2018c; Rzepka et al., 2018; Hollenberg et al., 2018; Viehweger et al ., 2018; Viehweger et al., 2018b; Chow et al., 2018d; Viehweger et al., 2018c; Borean et al., 2018b.
Self-Belief of AD	Borean et al., 2018; Chow et al ., 2018;Chow et al., 2018; Chow et at., 2018b; Rzepka et al., 2018; Hollenberg et al., 2018; Viehweger et al ., 2018; Viehweger et al.,2018b; Chow et al., 2018c; Viehweger et al., 2018c; Borean et al., 2018b.

Leading Cause of death	Borean et al., 2018 ; Chow et al ., 2018;Chow et al., 2018b ; Chow et at., 2018c; Rzepka et al., 2018 ; Hollenberg et al., 2018 ; Viehweger et al ., 2018 ; Viehweger et al., 2018b; Chow et al., 2018d ; Viehweger et al., 2018c ; Borean et al., 2018b. Except for Kafadar et al., 2021
Education and AD Awareness	Rzepka et al ., 2018 ; Viehweger et al ., 2018 ; Kafadar et al ., 2020
AD is a subtype of dementia	Borean et al., 2018 ; Chow et al ., 2018 ;Chow et al., 2018b; Chow et at., 2018c ; Rzepka et al., 2018 ; Hollenberg et al., 2018; Viehweger et al ., 2018; Viehweger et al., 2018b; Chow et al., 2018d; Viehweger et al., 2018c; Borean et al., 2018b. Except for Kafadar et al., 2021
AD is normal with respect to aging	Borean et al., 2018; Chow et al., 2018; Rzepka et al., 2018 Hollenberg et al., 2018 ; Viehweger et al., 2018, Except for Kafadar et al., 2021
No cure to AD	Borean et al., 2018; Kafadar et al., 2021;Chow et al ., 2018;Chow et al., 2018b; Chow et at., 2018c; Rzepka et al., 2018; Hollenberg et al., 2018; Viehweger et al ., 2018; Viehweger et al., 2018b; Chow et al., 2018d; Viehweger et al., 2018c; Borean et al., 2018b.
Ethnicity	Borean et al., 2018;Kafadar et al., 2021;Chow et al ., 2018;Chow et al., 2018b; Chow et at., 2018c; Rzepka et al., 2018; Hollenberg et al., 2018; Viehweger et al ., 2018; Viehweger et al., 2018b; Chow et al., 2018d; Viehweger et al., 2018c; Borean et al., 2018b.

AD protective factors awareness in young adults	Kafadar et al., 2021
Family function	Kafadar et al., 2021

5.5.1 Perception and Knowledge

Among the included studies, it was found that 44% of the 8 Canadian studies acknowledged a high level of awareness (Chow et al., 2018; Viehweger et al., 2018; Chow et al., 2018; Borean et al., 2018; Anapalagan et al., 2018; Hollenberg et al., 2018; Rzepka et al., 2018; Viehweger et al., 2018). In 2 studies, 49% of young adults in the United States of America (Borean et al., 2018; Chow et al., 2018) and 44% of those outside North America similarly recognised a perception of self-knowledge among young adults (Viehweger et al., 2018).

This rate is notably lower than the rate of 62% documented in other literature (Borean et al., 2018; Chow et al., 2018; Chow et al., 2018; Chow et al., 2018; Rzepka et al., 2018; Hollenberg et al., 2018; Viehweger et al., 2018; Viehweger et al., 2018; Chow et al., 2018; Viehweger et al., 2018; Borean et al., 2018). A recent study by Kafadar et al. (2021) stated that the literature supported 45.0% of knowledge levels and attitudes among persons aged 18 to 49 from various ethnic backgrounds in the United Kingdom.

According to the survey and questionnaires, only 59% of American young adults were informed about Alzheimer's disease (Chow et al., 2018; Borean et al., 2018), while knowledge levels were higher in Canada (Chow et al., 2018; Rzepka et al., 2018; Hollenberg et al., 2018; Viehweger et al., 2018; Chow et al., 2018; Anapalagan et al., 2018; Viehweger et al., 2018; Borean et al., 2018) and non-North American regions (Chow et al., 2018; Viehweger et al., 2018). The studies suggest that 62% of the young adult population is aware of Alzheimer's disease, and these findings are supported by relevant articles on awareness of Alzheimer's disease among young adults (Chow et al.,2018; Viehweger et al., 2018; Chow et al.,2018; Borean et al., 2018; Anpalagan et al., 2018; Borean et al., 2018; Viehweger et al., 2018; Hollenberg et al., 2018; Rzepka et al., 2018; Viehweger et al., 2018; Chow et al.,2018; Kafadar et al., 2021).

5.5.2 Family Members

Several studies have shown that young adults with family members tend to feel more knowledgeable about Alzheimer's disease than those without familial ties. Only 22% of those without familial ties considered themselves knowledgeable about the disease compared to those with family members ($p = 0.0023$), as supported by Borean et al. (2018). Chow et al.

(2018) reported that family members affected by Alzheimer's disease seem more confident in their awareness, with 70% of those affected considering themselves knowledgeable compared to 33% unaffected (p = 0.665).

Additionally, a study by Chow et al. (2018) found that 31% of young adults knew a relative affected by Alzheimer's disease. Meanwhile, a study conducted in Dublin, Ireland, revealed that 60% of family members affected by the disease and 85% of those not affected received a score deemed knowledgeable (p = 0.2066) (Chow et al., 2018). Rzepka et al. (2018) found that 71% of family members affected by the disease believed they knew about it, while 41% did not (p = 0.1700). Among family members with the disease, 40% believed they were knowledgeable, and 60% were well aware.

A family member with the disease, 40% believed they were knowledgeable, and 60% were aware of it (Hollenberg et al., 2018; Viehweger et al.,2018; Chow et al., 2018; Anpalagan et al., 2018; Borean et al., 2018). Furthermore, in Ottawa and Saskatoon, Canada, 46% of family members had Alzheimer's disease, and 69% and 85% believed they were knowledgeable, respectively (Viehweger et al., 2018; Viehweger et al., 2018). Overall, these studies suggest that family members affected by Alzheimer's disease tend to feel more knowledgeable and confident about the disease than those without familial ties. This observation underscores the crucial role of family members in raising awareness and providing support for individuals living with Alzheimer's. Furthermore, the impact of Alzheimer's disease and dementia on family dynamics cannot be overstated, as it can significantly affect the relationships and interactions between family members.

The results of the critically appraised studies provide valuable insights into the level of awareness of Alzheimer's disease and dementia among young adults (Clare, 2004). Young adults understand Alzheimer's disease and dementia, awareness and misconception about the condition.

5.5.3 Education and AD Awareness

Based on the research conducted by Rzepka et al. (2018) stated that females exhibit a greater level of understanding and knowledge about Alzheimer's disease when compared to their male counterparts. This discrepancy could be attributed to their level of involvement in Alzheimer's education and their participation in family treatment. The findings presented here confirm the general trend previously highlighted in published literature. However, Viehweger et al. (2018) have pointed out that the trend observed in this study differs slightly from that observed in previous studies. This variation could be attributed to differences in geographical regions and

levels of education awareness. Furthermore, Kafadar et al. (2021) have demonstrated that education level positively correlates with an individual's knowledge of Alzheimer's disease. In other words, individuals with higher levels of education tend to possess a greater understanding of Alzheimer's disease.

5.5.4 Self-belief of AD

The research revealed that several studies state that Canadian young adults had a profound understanding of Alzheimer's disease, as 44% of them were self-aware of the condition (Chow et al., 2017c). Furthermore, 43%, 31%, and 53% of young adults, respectively, self-believed they had a good understanding of Alzheimer's disease (Borean et al.,2018; Chow et al .,2018; Chow et al., 2018b; Chow et at., 2018c; Rzepka et al.,2018; Hollenberg et al.,2018; Viehweger et al ., 2018; Viehweger et al.,2018b; Chow et al., 2018d; Viehweger et al., 2018c; Borean et al., 2018b)

5.5.5 Leading Cause of Death

The 12 relevant articles reveal that the leading cause of death for individuals aged 20 years and above is similar. Among the participants, 38% correctly agreed with this statement, 32% incorrectly disagreed, and 30% were unsure. The studies conducted by Borean et al., 2018 Chow et al., 2018 Rzepka et al., 2018 Hollenberg et al., 2018 and Viehweger et al., 2018, with a p-value of 0.9999, indicate that Alzheimer's disease is the leading cause of death. However, the study by Kafadar et al. (2021) did not support this statement. *Alzheimer's disease* is a debilitating neurological disorder that affects millions of people worldwide and is currently the sixth leading cause of death globally (Thakur et al., 2018). The findings of these studies highlight the importance of understanding the leading causes of death and their impact on public health and the need for further research in this area.

5.5.6 AD is a subtype of dementia

The 12 studies indicating that Alzheimer's disease is a sub-type of dementia, with a significant (p-value of 07.894), reveal a trend of 91% of females correctly identifying Alzheimer's disease as an abnormal condition, compared to 64% of males who recognised it as a disorder. Moreover, the USA study demonstrated that young adults were less likely to recognise Alzheimer's as a subtype of dementia, with only 67% identifying it as such (Chow et al., 2018; Borean et al., 2018). This figure is notably lower than the percentages reported for young adults in Canada (77%) and those outside North America (76%) (Borean et al.,2018; Chow et al .,2018; Chow et al., 2018b; Chow et at., 2018c; Rzepka et al.,2018; Hollenberg et al.,2018; Viehweger et al ., 2018; Viehweger et al.,2018b; Chow et al., 2018c; Viehweger et al., 2018d; Borean et al., 2018b; except for Kafadar et al., 2021). The articles offer valuable insights into

the awareness levels of different groups regarding Alzheimer's disease and dementia and the recognition of Alzheimer's disease as a specific type of dementia, differentiating between Alzheimer's and other forms of dementia.

5.5.7 AD is normal with respect to ageing

According to 5 of the relevant studies, young adults have a 76% accuracy rate when answering questions about Alzheimer's disease (Borean et al., 2018; Chow et al., 2018; Rzepka et al., 2018; Hollenberg et al., 2018; Viehweger et al., 2018). The studies found that most young adults understood that Alzheimer's is not a normal part of ageing and that it worsens over time. Interestingly, individuals from Canada, the United Kingdom, and the US demonstrated a significantly higher awareness level, with 93% of young adults answering the questions correctly (Hollenberg et al., 2018). However, the study also found that individuals from other study regions had a lower awareness level. The findings of Kafadar et al. (2021) did not align with the findings of the previous studies. Perception of Alzheimer's disease as a normal part of a

geing can be changed by educating young adults about the distinction between normal age-related memory decline and Alzheimer's disease.

5.5.8 No cure for AD

The results of 13 articles conducted on Alzheimer's disease awareness among young adults from different regions revealed that a significant proportion of respondents believed that there is no cure for the disease. The highest percentage of respondents who held this belief were from Canada, with a frequency of 92%, followed by those outside North America at 90%, the United States of America at 84%, and the United Kingdom at 61.8% (Borean et al.,2018; Kafadar et al.,2021; Chow et al .,2018; Chow et al., 2018b; Chow et at., 2018c; Rzepka et al.,2018; Hollenberg et al.,2018; Viehweger et al ., 2018; Viehweger et al.,2018b; Chow et al., 2018d; Viehweger et al., 2018c; Borean et al., 2018b). These findings highlight the need for increased education and awareness about Alzheimer's disease and its management. Awareness of the current lack of cure for Alzheimer's disease; focus on managing symptoms and improving quality of life for individuals with the condition.

5.5.9 Ethnicity

The analysis identified notable disparities in variables according to ethnicity and geographic locations ($F (2, 177) = 5.363$, $p = 0.005$, partial $\eta 2 = 0.057$) (Kafadar et al., 2021). The findings indicated that White individuals exhibited superior scores to Black persons ($p = 0.026$) (Kafadar et al., 2021). However, no correlation was observed between other demographic factors and the evaluation and diagnosis score. The study aimed to assess the level of awareness of

Alzheimer's disease among young adults, regardless of their age, gender, and background. This finding was supported by several studies conducted by (Borean et al.,2018; Kafadar et al.,2021; Chow et al., 2018; Rzepka et al.,2018; Hollenberg et al., 2018; Viehweger et al.,2018). There are disparities in awareness, diagnosis, and access to resources for Alzheimer's disease and dementia among different ethnic groups.

5.5.10 AD protective factors awareness in young adults

The reviewed studies have shown that there exists a negative correlation between young adults' awareness of Alzheimer's disease and its protective factors. These protective factors include education associated with a lower risk of Alzheimer's disease, and pursuing lifelong learning can positively impact their brain health, access to information, familial history, and participation in cognitive activities can stimulate their thinking abilities (Kafadar et al., 2021). Additionally, (Kafadar et al., 2021) stated that maintaining a healthy lifestyle contributes to reducing the risk of Alzheimer's disease, with regular exercise, managing stress, and a balanced diet may also decrease the chances of developing Alzheimer's disease and dementia (Kafadar et al., 2021).

5.5.11 Family Function

The research by Kafadar et al. (2021) highlights the critical role of family function in shaping the association between awareness of Alzheimer's disease in young adults and its link to medication effect. The study reveals that family function has a substantial impact on understanding Alzheimer's disease, which ultimately affects the prevalence of the disease in the UK (Kafadar et al., 2021). Thus, family support and dynamics shape young adults' awareness and comprehension of Alzheimer's disease and its risks. The investigations reveal the characteristics that can influence the understanding and treatment of Alzheimer's disease (Kafadar et al., 2021).

The results of the study indicate that there is a pressing need for increased awareness and accurate knowledge among young adults regarding Alzheimer's disease and dementia (Chow et al., 2018). The findings suggest that family members can be crucial in supporting individuals affected by these conditions (Grabher, 2018). The significance of early detection is highlighted, as well as the need for more research and resources due to the significant impact of Alzheimer's disease on public health (Rasmussen and Langerman, 2019).

5.6 Chapter Summary

In this chapter, the awareness of Alzheimer's disease and dementia among young adults was analysed and synthesised using a thematic synthesis framework to identify various themes.

The overarching themes that were identified include perception and knowledge, family members, self-belief AD, the leading cause of death, education and AD awareness, AD is a subtype of dementia, AD is normal with respect to ageing, no cure for AD, ethnicity, AD protective factors, awareness in young adults and family function. Overall, the chapter's findings provide valuable insights into the current awareness among young adults and suggest potential strategies to improve it.

CHAPTER 6: DISCUSSION

6.1 Overview of findings

To the best of our knowledge, this study is the first to identify the existing studies on awareness of Alzheimer's disease and dementia among young adults. The discussion revolves around the findings categorised into various themes and synthesising the published data from literature about awareness levels in different geographic regions worldwide.

This review allows for those studies with small sample sizes, whose trends were previously overlooked due to low statistical power, to be conglomerated with other studies and examined for overarching trends (Mack et al., 2023). These themes include perception and knowledge, family members' understanding of Alzheimer's disease, self-belief regarding Alzheimer's disease, the leading cause of death, the relationship between Alzheimer's disease and dementia, the normalcy of Alzheimer's disease concerning ageing, the absence of a cure for Alzheimer's disease, the impact of ethnicity on awareness of Alzheimer's disease, and the level of understanding of Alzheimer's disease among young adults.

To summarise, the review emphasises the necessity for heightened awareness and education on Alzheimer's disease and dementia among young adults. The results indicate a deficiency in knowledge and comprehension regarding certain illnesses, particularly within specific ethnic groups (Wong et al., 2020). Moreover, the analysis underscores the significance of family members in fostering awareness and aiding individuals impacted by Alzheimer's disease and dementia (Khan et al., 2023).

The systematic review on the awareness of Alzheimer's disease (AD) and dementia among young adults has identified multiple themes that influence the perception of this disease. The review's discussion has been structured based on the identified themes.

6.2 Discussion of Key Findings

Regarding perception and knowledge, the review found that young adults have a limited understanding of AD and dementia was, supported by *(*Farina et al., 2020). Their knowledge of the early symptoms and signs of the disease needs to be improved, leading to delayed diagnosis and treatment. Franssen et al. (2020) found that older adults (aged 19 to 65) need more understanding and knowledge of symptoms, therapy, and supportive care options. This

lack of awareness acts as a barrier to improving the accessibility and advancement of therapies and support organisations for individuals with Alzheimer's disease (Tahami et al., 2022). Furthermore, the study found that family members are essential in shaping young adults' perceptions and knowledge of AD, supported by Nguyen and Li (2020). However, the review found that family members need more awareness and knowledge of the disease, which can hinder proper management. The literature indicates that several demographic characteristics, including age, gender, marital status, education level, language disparities, and ethnicity, have been found to influence individuals' understanding and perception of AD (Franssen et al., 2020).

The review also found that many young adults have a self-belief. Only 29% of the population had a family member affected by Alzheimer's disease, which is lower than both the self-belief examined by elderly adults' rate and the actual awareness rate that they will not develop AD (Mimura, 2008), leading to a lack of concern and prevention measures (Wang et al., 2022).

Furthermore, the review highlighted that many young adults are unaware that AD is a subtype of dementia and that it is a natural process concerning ageing. This finding was supported and declared by O'Malley et al. (2021), who stated that research has shown that the behavioural and psychopathological disturbances caused by dementia are universal, regardless of the subtype. However, this can lead to a lack of urgency in seeking diagnosis and treatment.

Additionally, the review found that there is no cure for AD, which can lead to a lack of hope and motivation for patients and their families. Moreover, this is consistent with the previous finding of van der Schaar et al. (2022), where the importance of providing emotional and psychological support to patients and their caregivers to improve their quality of life and well-being conclusion that the lack of a cure for AD can significantly impact patients and their families, underscoring the need for better awareness and understanding of the disease.

Regarding ethnicity, the review found that awareness and knowledge of AD vary among different ethnic groups (Gilmore-Bykovskyi et al., 2019). Moreover, this can lead to disparities in diagnosis, treatment, and management of the disease (Babulal et al., 2019). For example, one study found that young adults who had a family member with Alzheimer's disease or dementia had a higher level of awareness of these conditions than those who did not have a family member with these conditions (Borean et al., 2018). A study found that young adults who had received education about Alzheimer's disease and dementia had a higher level of awareness than those who had not received education about these conditions (Hollenberg et al., 2018).

The study also highlights the significance of engaging with individuals who have dementia, as the disease is strongly associated with multiple ADKS domains(Kafadar et al.,2021). However, the study's cross-sectional design makes it difficult to establish a causal relationship between the independent variables and the AD knowledge score (Wang and Cheng,2020). The text further mentions that some studies had limitations, whereas one study had a few limitations as the sample size had good quality and quantity. Still, it only led to detecting trends rather than significant differences at other points. A larger sample size would have mitigated the issues (Wang and Cheng,2020).

It is encouraging to note that the proportion of people who had a family member affected by Alzheimer's disease was lower than the disease's awareness level and some of its implications *(*Fernández-Calle et al.,2022). Family members can help more by educating themselves about the illness and its implications *(*Fernández-Calle et al.,2022). Overall, the study significantly contributes to understanding Alzheimer's disease knowledge and viewpoints among individuals globally (Mielke et al.,2022). The study's findings emphasise the need for more disease awareness and the importance of using diverse and thoroughly characterised samples in future research (Mielke et al.,2022).

The findings imply that there is a requirement for focused educational and awareness initiatives to enhance the knowledge and comprehension of Alzheimer's disease and dementia among young adults (Paul et al.,2023). The analysis also proposes that healthcare practitioners adopt a more proactive approach to enlighten patients and their families regarding these conditions (Paul et al.,2023).

In terms of critique, the review could have benefited from a more diverse sample, as it primarily focused on studies conducted in developed countries (Abdelnour et al.,2022). Additionally, the review could have provided more information on the methodologies used by the included studies to ensure their validity and reliability (Sürücü and Maslakci,2020).

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6.3 Strengths and Limitations

The decision to employ only a cross-sectional study and not a mixed method, evidence-based pyramid, case-control study, longitudinal study for this research and relevant papers may have been due to various reasons such as availability of resources, time constraints, or the specific research question (Pollock et al., 2016).

Cross-sectional studies are essential for evaluating awareness of Alzheimer's disease and dementia among young adults. These studies have numerous advantages, including the ability to collect data from a diverse range of participants and measure awareness levels at a specific

point in time (Wang and Cheng, 2020). By examining various factors that may influence awareness, such as age, education level, and socioeconomic status, cross-sectional studies can help pinpoint gaps in knowledge and understanding among different demographic groups *(*Estevez et al., 2023). This information can be used to identify disparities in awareness levels and develop more effective awareness campaigns (WHO, 2022). Ultimately, cross-sectional studies can help improve Alzheimer's disease and dementia awareness among young adults and reduce the impact of these conditions on individuals, families, and communities (Rosato et al.,2019).

The awareness of Alzheimer's disease and dementia among young adults is a topic of growing interest in the field of public health. Cross-sectional studies have been commonly used to study this topic, but they have some limitations that must be considered when interpreting the findings (Hakami et al., 2023). One of the primary limitations of cross-sectional studies is that they rely on self-reported data, which can be subject to recall bias or social desirability bias (Teh et al.,2023). Recall bias occurs when participants have difficulty recalling past events or experiences accurately (Althubaiti, 2016). For example, if participants are asked about their knowledge of Alzheimer's and dementia, they may overestimate their knowledge to appear more knowledgeable or give socially desirable responses (Althubaiti, 2016).

However, This can lead to inaccurate or biased results, which can affect the study's validity; similarly, social desirability bias occurs when participants respond in a way they believe is socially acceptable rather than expressing their accurate opinions or experiences(Latkin et al., 2017). For example, a participant might report that they are aware of Alzheimer's disease and dementia to avoid appearing uninformed or ignorant; this can lead to overestimating the level of awareness among young adults, affecting the study's accuracy (Latkin et al., 2017).

To overcome these limitations, researchers often use other research methods to gain a more comprehensive understanding of awareness among young adults (Nowell et al., 2017). One method is longitudinal studies, which involve following a group of participants to track changes in awareness of Alzheimer's disease and dementia (Nowell et al., 2017). This approach helps reduce recall bias's impact, as participants' knowledge and awareness can be assessed at multiple time points (Sterne et al., 2019). Another method is qualitative interviews, which involve in-depth interviews with participants to explore their attitudes, beliefs and experiences regarding Alzheimer's and dementia (Sterne et al., 2019).

This approach helps to reduce the impact of social desirability bias, as participants can express their opinions and experiences in a confidential setting without fear of judgment (Meisters et al.,2020). Using a combination of methods, researchers can gain a more comprehensive

understanding of the awareness of Alzheimer's disease and dementia among young adults (Meisters et al.,2020).
Moreover, this helps identify gaps in knowledge and awareness that need to be addressed through education and awareness campaigns and helps inform policy decisions related to preventing and managing these diseases (Vogel et al.,2021). In conclusion, while cross-sectional studies have been commonly used to study the awareness of Alzheimer's disease and dementia among young adults, they have some limitations that need to be considered (Vogel et al.,2021).

In terms of defining the boundaries and limitations of this research, researchers focused on studies that specifically looked at young adults and their knowledge of Alzheimer's disease and dementia (Pugh et al., 2022). They are also limited to reviewing the studies published in English, and a worldwide search was done without any limitation in just 5 years to ensure that the research will be current and relevant. Additionally, the researcher excluded studies that focused solely on clinical aspects of the disease or interventions for those already diagnosed, as our focus is on awareness and education among young adults who may not yet be personally affected by the conditions (Gopal et al., 2020).

The systematic review of extant studies on the awareness of Alzheimer's disease (AD) and dementia among young adults is a noteworthy contribution to the literature in this domain. Nevertheless, it is imperative to recognise the constraints of the study (Allioui and Mourdi, 2023), which could impact the applicability and dependability of its findings: including 13 research in the evaluation conducted in specific geographic places or with specific populations in Canada, Asia, the United States of America, and the United Kingdom introduces the possibility of selection bias. However, this could constrain the findings' relevance to different contexts or groups and impact the generalisability of the results (Delios et al., 2022).

There is a possibility of measurement bias due to the utilisation of varied methodologies in assessing awareness of Alzheimer's disease (AD) and dementia throughout the research (Aditya Shastry and Sanjay, 2023). These outcome discrepancies could compromise the conclusions' dependability (Youssef et al., 2023). Furthermore, the research depended on self-reported measurements, which could be influenced by social desirability bias (Youssef et al., 2023). Consequently, social desirability bias may have influenced the participants' responses, resulting in unreliable findings (Tan et al., 2022).

However, it is essential to note that the study has some limitations:

- It relies solely on existing literature and includes no primary research data. This means that the findings may be limited by the quality and scope of the studies included in the review.
- The study may not fully capture the experiences and perspectives of young adults who have personal or familial experiences with AD and dementia. The awareness of AD and dementia among young adults SLR study is a valuable contribution to the literature on this vital topic. One of the key strengths of this study is that it provides a comprehensive and systematic review of the available literature, which enables a more detailed analysis of the current state of knowledge on the subject (Munson et al., 2022).
- The study highlights the need for further research in this area, which could lead to the development of more effective interventions and better outcomes for those affected by AD and dementia.

Furthermore, although the evaluation acknowledges the existence of knowledge gaps, it fails to offer any direction on how to address these gaps or assess the efficacy of programmes to enhance awareness of AD and dementia among young individuals (Folder et al., 2023). Hence, conducting additional research to tackle these deficiencies and formulate and assess efficacious therapies is imperative (Folder et al., 2023).

6.4 Chapter Summary

This discussion delves into the various themes and findings from a systematic review of existing studies on awareness of Alzheimer's disease (AD) and dementia among young adults and draws comparisons to previous studies. The review highlights a lack of knowledge and comprehension of the disease among specific ethnic groups, indicating the need for more targeted awareness and educational initiatives. The study underscores the importance of family members in fostering awareness and aiding individuals affected by AD and dementia. However, the review's sample could have been more diverse, as it mainly focused on studies conducted in developed countries, and it could have provided more detailed information on the methodologies used in the included studies to ensure their validity and reliability.

CHAPTER 7: RECOMMENDATIONS AND CONCLUSION

7.1 Overview of Research

Young adults who are aware of the early signs and symptoms of Alzheimer's, as well as the risk factors and steps to promote brain health awareness, can play a significant role in advocating for better research, funding, and support services for those living with the disease. The responses collected from these studies can provide researchers with valuable insights into young adults' awareness levels and help identify areas where education and outreach efforts may be needed to raise awareness about Alzheimer's disease.

Alzheimer's disease and dementia are complex conditions that affect people of all ages, including young adults (Manwell et al., 2022). Understanding these conditions requires knowledge and perception, and it is essential to recognise that Alzheimer's disease is a specific subtype of dementia (Porsteinsson et al., 2021). Unfortunately, there is currently no cure for Alzheimer's disease. However, ongoing research is being conducted to find new treatments and therapies. Ethnicity can also play a role in the awareness and impact of Alzheimer's disease, so it is crucial to educate people from all backgrounds about this condition. Raising awareness among young adults is particularly important, as this group may not yet have experience with Alzheimer's disease or dementia. By increasing awareness, education, and support, researchers can improve the lives of those affected by these debilitating conditions.

7.2 Implications of Findings

The systematic review findings on the awareness of Alzheimer's disease and dementia among young adults have several profound implications:

- The lack of knowledge and awareness about these conditions among young adults could have serious consequences (Smith and Lim, 2020). Delayed diagnosis and treatment could lead to poorer outcomes for individuals and an increased burden on healthcare systems (Kokolakis et al., 2020).

- The review highlights the need for education and awareness-raising campaigns for young adults to increase their understanding of Alzheimer's disease and dementia (Phillipson et al., 2019). Furthermore, this could result in earlier detection and intervention, improved quality of life for individuals, and reduced healthcare costs (Rasmussen et al., 2019).

- The study underscores the importance of further research, particularly in understanding the factors influencing awareness and knowledge of these conditions among young adults (Eyre et al., 2023).

Overall, the implications of these findings suggest a pressing need for greater attention and investment in raising awareness and education on Alzheimer's disease and dementia among young adults (Brai et al., *2021).*

7.3 Recommendations for Practice

Alzheimer's Disease and Dementia are two of the most common neurodegenerative disorders that affect the elderly population (Matej et al., 2019). However, recent research has shown that these conditions are not limited to old age and can also affect young adults (Lzquierdo et al., 2021). This systematic review was conducted to raise awareness among young adults about these conditions, recommending certain practices for healthcare professionals and educators.

The review recommended that healthcare professionals should provide education about Alzheimer's Disease and Dementia to young adults during routine health check-ups. Additionally, it suggested that healthcare professionals should involve family members of patients with these conditions in the education process, as they are often the primary caregivers.

The study also recommended that educators integrate information about Alzheimer's Disease and Dementia into the school curriculum, starting as early as middle school. However, this would help young adults understand the risk factors associated with these conditions and how to prevent them. Overall, the review emphasised the importance of raising awareness about Alzheimer's Disease and Dementia among young adults, as early detection and prevention can significantly improve the quality of life for those affected (Culberson et al., 2023).

7.4 Recommendations for Future Research

As Alzheimer's disease and dementia continue to affect an increasing number of individuals, it is crucial to prioritise awareness and education about these conditions, even among young adults. Conducting a systematic review of the existing literature is vital to understand better what has been studied and identify areas for future research. Some potential areas for future research on awareness of Alzheimer's disease and dementia among young adults include:

- Examining the effectiveness of various education and awareness interventions on young adults' knowledge and attitudes towards Alzheimer's and dementia.

- Investigating the effectiveness of non-pharmacological interventions in managing behavioural and psychological symptoms of dementia (BPSD).

- Exploring the potential of biomarkers, such as blood tests and brain imaging, in early detection and diagnosis of Alzheimer's and dementia.

- Examining the impact of lifestyle factors, such as diet and exercise, on the risk and progression of Alzheimer's disease and dementia.

- Investigating the potential of artificial intelligence and machine learning techniques in predicting and managing Alzheimer's disease and dementia.

- Investigating the impact of demographic variables, such as race, ethnicity, and socioeconomic status, on awareness of Alzheimer's disease and dementia among young adults.

- Analysing the role of media and social networks in shaping young adults' perceptions and beliefs about Alzheimer's disease and dementia.

- Assessing the potential of technology-based interventions, such as mobile apps, in educating and raising awareness about Alzheimer's disease and dementia among young adults (Szabó et al.,2020).

By addressing these research gaps, researchers can gain deeper insights into how to improve awareness and education about Alzheimer's disease and dementia among young adults. Ultimately, this can help reduce the burden of these conditions on individuals, families, and society.

7.5 Conclusion

The research topic aimed to explore the level of awareness of Alzheimer's disease and dementia among young adults, which was addressed through the research question, "What is the level of awareness of Alzheimer's disease and dementia among young adults?" The systematic review found that young adults need a greater understanding of these conditions, with many needing more awareness of the symptoms, risk factors, and available treatments.

The significance of these results is that increased awareness and education can lead to better health outcomes, improved quality of life for affected individuals, and reduced burden on

caregivers and healthcare systems. The study identified several gaps in knowledge and experience, including limited exposure to information, lack of education, and misconceptions about the conditions.

In conclusion, the systematic review has highlighted the urgent need for increased education and awareness of Alzheimer's disease and dementia among young adults. The findings have important implications for public health policy, education, and research and underscore the need for continued efforts to raise awareness and understanding of these conditions. With increased awareness and education, we can improve the lives of those affected by Alzheimer's disease and dementia and work towards improving their quality of life and health outcomes.

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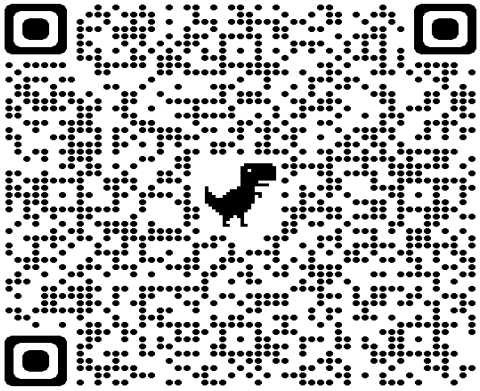
APPENDICES 8

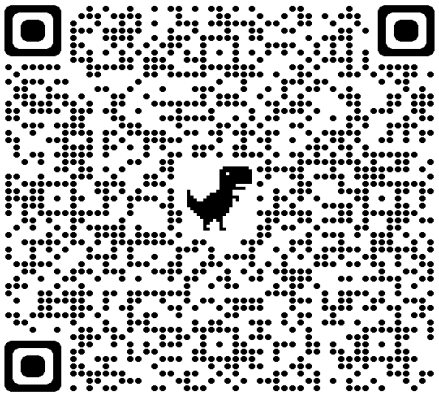
Appendices 8.1

The prevalence and Incidence of dementia



The Global Impact of Dementia

(Prince et al., 2013)



People living with dementia in the United Kingdom (UK)

Appendices 8. 2

Age-Adjusted Prevalence of Dementia in Younger Adults

Though relatively small, the number of adults under age 65 with dementia is likely higher than previously thought.

Age	Number of cases
30-34	1.1 per 100K
35-39	1.0 per 100K
40-44	3.8 per 100K
45-49	6.3 per 100K
50-54	10.0 per 100K
55-59	19.2 per 100K
60-64	77.4 per 100K

Source: Stevie Hendriks, M.Sc., et al., *JAMA Neurology,* July 2021

(Zagorski, 2021)

Appendices 8.3

Search Planner

Which database are you using?

PubMed, ProQuest, Google Scholars

What are the key terms from your research question?

Awareness And Alzheimer's disease And Young adults

Fill in your search strategy:

Concept 1	Population	OR	Young population	OR	Youth, adolescents
	AND				
Concept 2	Issue	OR	Alzheimer's disease and Dementia	OR	Cognitive decline, neurodegenerative disorder
	AND				
Concept 3	Context	OR	Worldwide	OR	Global, international
	AND				
Concept 4	Outcome	OR	Awareness	OR	consciousness, knowledge, comprehension,

Appendices 8.4

Table 3 : Data extraction: Awareness of AD among young adults

Authors, year, and country	Aim/ Hypothesis	Study design	Sample	Analysis used for AD	Results
Chow et al., 2018, North Carolina, United States	To evaluate the level of awareness of Alzheimer's disease among young individuals.	Cross-sectional Study	Completed by 38 people. Male & Female	participant age (under 20 years old vs. 20 years old and older), gender (male vs. female), and family history of Alzheimer's disease (affected vs. not affected).	Overall, 58% of the sample population was considered informed, 32% had enough knowledge, and 11% had inadequate knowledge.
Chow et al., 2018 London, Ontario, Canada	To study examined young adults' Alzheimer's disease and knowledge.	Cross-sectional study	A total of 79 people completed. Both men and women	Age (under 20 and 20 and older), sex (male and female), and family history of Alzheimer's disease.	Two age groups agreed that disease was known by 76% of the younger group and 74% of the older group (p=0.9999).
Viehweger et al., 2018 Ottawa Canada	This study examined Ottawa's young adults' Alzheimer's disease awareness.	Cross-sectional study	13 participants, both young adults male and female.	Based on participant ages (under 20 and 20 and older), sex (male and female), and family	7 under 20 and 6 over 20. 71% under 20 and 67% over 20 identified as informed (p = 0.9999). 100% and 57% of the two groups

		.		history of Alzheimer's disease	correctly identified Alzheimer's as dementia (p = 0.3147).
Chow et al., 2018 Kingston, Canada	This study examines young adults' awareness.	Cross - sectional study.	79 young adults completed surveyed. Both male and females	Age (under 20 and 20 and older), sex (male and female), and family history of Alzheimer's disease.	All young adults (p = 0.9999) believe Alzheimer's worsens over time. While 90% of respondents under 20 correctly claimed no cure for Alzheimer's, all respondents over 20 said the same (p = 0.2333).
Borean et al., 2018 Toronto, Canada	This study examined whether Toronto's young adults had similar findings of awareness Alzheimer's disease.	Cross-Sectional Study	156 people; both female and male. .	age (under 20 years old vs. 20 years old and older), gender (male vs. female), and family history of Alzheimer's disease	significant difference between age groups; 37% and 48% of participants aged under 20 years old and aged 20 years old or older, respectively, indicated that they felt knowledgeable about the disease (p = 0.3588).
Anpalagan et al., 2018 Hamilton, Canada	The purpose of this study was to investigate the level of knowledge among young adults' disease,	Cross-sectional study	67 participants completed, both male and female.	Age (under 20 and 20 and older), sex (male and female), and family history of Alzheimer's disease.	Overall, 58% of those 20 and younger and 50% of those over 20 knew the disease well (p = 0.3303).

	regardless of age, gender, or family history of the condition.				
Borean et al., 2018, New York State, United States	This study examined young adults' Alzheimer's disease awareness.	Cross-sectional study	47 people. Both males and females.	Age (under 20 and 20 and older), sex (male and female), and family history of Alzheimer's disease.	The younger and older generations were equally educated about Alzheimer's disease and its ramifications, with 64% and 38% of persons, respectively, being generally knowledgeable (p = 0.3379).
Viehweger et al., 2018 Asia	The objective of this study was to examine the level of awareness among young individuals.	Cross-sectional study .	14 participants completed both males and females.	Age (under 20 years old and 20 years old and older), participant sex (male and female), and family history of Alzheimer's disease.	56% of those 20 and older declined to remark on their awareness, but 100% of those under 20 retracted their judgement (p = 0.3257).
Hollenberg et al., 2018, Waterloo, Canada	The goal of this research was to investigate whether this trend is also present with the awareness of Alzheimer’s disease.	Cross-sectional study. .	100 participants completed .20 years old and older male and females.	ages (under 20 years old, 20 years old and up), sexes (male and female).	Unlike earlier studies, most respondents thought Alzheimer's was the primary cause of mortality (p = 0.8553). Just 49% and 48% disagreed. Younger and older cohorts were 64% and 66% knowledgeable (p = 0.1942).

Rzepka et al., 2018, Montreal, Canada	To further evaluate the overall changes in Alzheimer awareness.	Cross-sectional study	36 responders man and woman younger adults. ,.	Participants were subgrouped by age (under 20 and 20 and older), sex (male and female), and family history of Alzheimer's disease.	42% of the younger cohort believed they knew about the disease, compared to 65% of the older cohort (p = 0.3337).
Viehweger et al., 2018, Saskatoon, Canada	Investigating young adults' knowledge of Alzheimer's disease	Cross-sectional study	37 individuals consented. demographic. .	Age (under 20 and 20 and older), sex (male and female), and family history of Alzheimer's disease.	According to questionnaire replies, 72% of the younger group and 68% of the older group were knowledgeable (p = 0.9999).
Chow et al., 2018, Dublin, Ireland	This study set out to find out how much knowledge young adults know about Alzheimer's disease.	Cross-sectional study	36 people consented and completed.	Ages (under 20 and 20 and older), sex (male and female), and family history of Alzheimer's disease (affected and not affected),	18 were under 20 and 18 were over 20; Self-confidence was similar (p = 0.9999), with 44% of both groups claiming they knew much about Alzheimer's disease Knowledge was similar for 78% of persons under 20 and 78% over 20 (p = 0.9999).
Kafadar et al., 2021, United Kingdom	This study aims to: (1) define AD knowledge and perceptions among UK adults aged	Cross-sectional study	186 participants demographic	A younger individual of three ethnicities and bulk of participants (aged 18-34.	All responders answered AD general knowledge correctly 45.0% of the time. Data contained no missing values.

	18-49; (2) compare knowledge and perceptions among ethnic groups; and (3) evaluate AD knowledge associations with age.				White respondents were more knowledgeable about AD symptoms than Black respondents ($p = 0.026$).

Appendices 8. 5

Table 4 : Critical Appraisal of Quantitative use Coughlan, Cronin, and Ryan (2007) framework.

5 Relevant Cross-Sectional Studies	Chow et al.,2018	Viehweger et al., 2018	Chow et al.,2018	Borean et al., 2018	Anpalagan et al., 2018
Purpose research problem:	Clear identified	Clear Identified	Clear Identified	Clear Identified	Clear Identified
Logical Consistency:	Logically presented clearly	Logically presented clearly	Logically presented clearly	Logically presented clearly	Logically presented clearly
Literature Review:	Identified and clear, reflects the information from 2018 existing studies	Identified and clear, reflects the information from 2018 existing studies	Identified and clear, reflects the information from 2018 existing studies	Identified and clear, reflects the information from 2018 existing studies	Identified and clear, reflects the information from 2018 existing studies
Aims/ Objectives/Hypotheses:	Identified and clear. Reflects the information presented in the literature review	Identified and clear. Reflects the information	Identified and clear. Reflects the information	Identified and clear. Reflects the information	Identified and clear. Reflects the information presented in the literature review

		presented in the literature review	presented in the literature review	presented in the literature review	
Sample:	Clear. Inclusion and exclusion criteria stated	Clear. Inclusion and exclusion criteria stated	Clear. Inclusion and exclusion criteria stated	Clear. Inclusion and exclusion criteria stated	Clear. Inclusion and exclusion criteria stated
Definition:	Clear and present	Clear and present	Clear and present	Clear and present	Clear and present
Methodology:	Research design clearly identified and appropriate. Validity discussed. Results discussed.	Research design clearly identified and appropriate. Validity discussed. Results discussed.	Research design clearly identified and appropriate. Validity and without limitations discussed. Results discussed	Research design clearly identified and appropriate. Validity discussed. Results discussed.	Research design clearly identified and appropriate. Validity discussed. Results discussed.
Data analysis/ results:	Clear and identified.	Clear and identified	Clear and identified	Clear and identified	Clear and identified

Appendices 8.6

Table 5 : Critical Appraisal of Quantitative use the Coughlan, Cronin, and Ryan (2007) framework.

5 Relevant Cross-Sectional Studies	Borean et al., 2018	Viehweger et al., 2018	Hollenberg et al., 2018	Rzepka et al., 2018	Viehweger et al., 2018
Purpose research problem:	Clear identified	Clear identified	Clear identified	Clear identified	Clear identified
Logical Consistency:	Logically presented clearly	Logically presented clearly	Logically presented clearly	Logically presented clearly	Logically presented clearly
Literature Review:	Identified and clear, reflects the information from 2018 existing studies	Identified and clear, reflects the information from 2018 existing studies	Identified and clear, reflects the information from 2018 existing studies	Identified and clear, reflects the information from 2018 existing studies	Identified and clear, reflects the information from 2018 existing studies
Aims/ Objectives/Hypotheses:	Identified and clear. Reflects the information presented in the literature review	Identified and clear. Reflects the information presented in the literature review	Identified and clear. Reflects the information presented in the literature review	Identified and clear. Reflects the information presented in the literature review	Identified and clear. Reflects the information presented in the literature review

Sample:	Clear. Inclusion and exclusion criteria stated	Clear. Inclusion and exclusion criteria stated	Clear. Inclusion and exclusion criteria stated	Clear. Inclusion and exclusion criteria stated	Clear. Inclusion and exclusion criteria stated
Definition:	Clear and present	Clear and present	Clear and present	Clear and present	Clear and present
Methodology:	Research design clearly identified and appropriate. Validity discussed. Results discussed	Research design clearly identified and appropriate. Validity and without limitations discussed. Results discussed	Research design clearly identified and appropriate. Validity and without limitations discussed. Results discussed	Research design clearly identified and appropriate. Validity and without limitations discussed. Results discussed	Research design clearly identified and appropriate. Validity and has its limitations. discussed. Results discussed
Data analysis/ results:	Clear and identified.	Clear and identified.	Clear and identified	Clear and identified	Clear and identified

Appendices 8. 7

Table 6 : Critical Appraisal of Quantitative use the Coughlan, Cronin, and Ryan (2007) Framework.

	Chow et al.,2018	Kafadar et al., 2021	Chow et al.,2018
Purpose research problem:	Clear identified	Clear identified	Clear Identified
Logical Consistency:	Logically presented clearly	Logically presented clearly	Logically presented clearly
Literature Review:	Identified and clear, reflects the information from 2018 existing studies.	Identified and clear, reflects the information from 2021 existing studies	Identified and clear, reflects the information from 2018 existing studies
Aims/ Objectives/Hypotheses:	Identified and clear. Reflects the information presented in the literature review	Identified and clear. Reflects the information presented in the literature review	Identified and clear reflects the information presented in the literature review.
Sample:	Clear. Inclusion and exclusion criteria stated	Clear. Inclusion and exclusion criteria stated	Clear. Inclusion and exclusion criteria stated
Definition:	Clear and present	Clear and present	Clear and present

Methodology:	Research design clearly identified and appropriate. Validity and not without limitations discussed. Results discussed	Research design clearly identified and appropriate. Validity and with limitations discussed. Results discussed	Research design clearly identified and appropriate. Validity and not without limitations discussed. Results discussed.
Data analysis/ results:	Clear and identified.	Clear and identified.	Clear and identified.