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ORIGINAL ARTICLE

Exploring factors affecting memory loss in young adults in Jeddah, Saudi Arabia

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ABSTRACT

Objectives: This study aimed to assess the awareness of Alzheimer's disease (AD) and memory factors among young adults in Jeddah, Saudi Arabia, and identify associated demographic variables and gaps in knowledge.

Methods: This cross-sectional descriptive survey included 310 young adults residing in Jeddah, Saudi Arabia. Data were collected via an online self-administered questionnaire distributed through social media networks. Descriptive statistics summarized demographic characteristics, levels of awareness, knowledge about AD, and lifestyle practices related to memory enhancement.

Results: Out of 310 participants, 44.2% were unsure if memory loss is hereditary, and 64.5% believed that stress affects memory. Significant associations were found between age and knowledge about actions to strengthen memory (p-value = 0.002) and between gender and awareness of stress' impact on memory (p-value = 0.019). The majority of participants (71.3%) understood that AD impacts memory, thinking, and behavior, yet misconceptions persisted, particularly regarding the exclusive impact of AD on the elderly.

Conclusion: The study highlighted moderate awareness levels of AD among young adults in Jeddah, with notable gaps and misconceptions. Tailored educational interventions, including age-specific and gender-sensitive programs, are recommended to improve understanding. Collaborating with healthcare professionals and caregivers and leveraging digital platforms can enhance the effectiveness of these initiatives. Future research should explore the longitudinal impacts of educational efforts to sustain improvements in AD awareness.

Keywords: Alzheimer's disease, awareness, young adults, Jeddah, educational interventions, public health

Introduction

Alzheimer's disease (AD) is a degenerative neurological condition that deteriorates considerably as time passes. It sets itself apart due to the development of senile plaques and neurofibrillary tangles. These changes affect the normal processes of the cells in the brain, disrupting neural transmission, the death of nerve cells, and the death of brain tissue. These pathological changes include the build-up of amyloid protein and the accumulation of the tau protein [1–3]. For instance, the APOE4 allele is responsible for the generation of the disease; this is why genetic factors are significant [3]. A decrease in the synaptic elements leads to a deterioration of the cognitive status of a patient suffering from AD [4].

AD is characterized by alterations in memory, language, and cognitive abilities due to several pathological changes. Cognitive impairment in AD is mainly due to the presence of amyloid-beta (Aβ) and neurofibrillary tangles (NFTs) in the hippocampus and cortical areas of the brain. The Aβ peptide of the extracellular matrix, one of the components of senile plaques and deposits, triggers a sequence of processes that affect the structural and functional characteristics of neurons and, consequently, cognitive function [5].

This is accompanied by the destruction of the synapses as well as the neurons, a factor that is equivalent to slow thinking capacity and memory loss, such as in AD. Besides, because the NFTs, made of tau proteins, are present in the cells of the brain, transportation in neurons is also impaired. This, in turn, leads to cell death and intensification of the deterioration of higher brain functions such as memory and language [6]. AD can be associated with other pathological

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changes, such as cerebrovascular disease and Lewy body disease, which augment and exacerbate cognitive deficits [6]. Also, hypertension, which is common in older people and often precedes or coexists with AD, affects the blood vessels in the brain and the body and plays a role in cognitive decline. This might lead to a decrease in cerebral blood flow and, thus, a further compromise of cognitive abilities [7].

Currently, from a global perspective, the level of dementia is rapidly rising at an alarming rate. The World Health Organization estimates that 47 million people had dementia in 2019, and this figure is projected to reach 131 million by 2050. This number is predicted to increase to 132 million by 2050 [8]. Asia and Latin America, especially developing countries, are forecasted to record the steepest increase in dementia cases. This is mainly due to a rise in their population and a high incidence of vascular risk factors in these regions [9–12].

These regions are also experiencing a shift in the types of dementia, with AD being more frequent than vascular dementia [9, 11]. This makes dementia worse, particularly because low educational achievement and other socioeconomic factors are associated with the chances of obesity, physical inactivity, diabetes, high blood pressure, abnormal lipid levels, and metabolic syndrome [11].

It remains a critical public health problem in Saudi Arabia because people have very little information about the disease [13]. Therefore, there is a need to increase knowledge of the public on AD alongside calling for responsible advertising and consumption.

Challenges regarding the diagnosis and treatment of AD in Saudi Arabia are numerous. These requirements include the need to improve the infrastructure and resources that will support the use of disease-modifying agents such as aducanumab and lecanemab [14]. Additionally, physicians lack adequate knowledge and perception of risk reduction therapy for atherosclerotic disease [15]. The country has a big problem because diabetes is common in the population, and it is a risk factor for both AD and cardiovascular disease [16]. Furthermore, the link between depression and chronic autoimmune diseases, which are common in Saudi Arabia, adds complexity to the diagnosis and management of AD [17].

Young adults should have a clear understanding of A since advertising influences the buying process [18]. Furthermore, online banner advertisements can also elicit major reactions among young adults in the digital age [19]. However, more studies are needed to evaluate the effectiveness of interventions to raise advertising literacy [18]. A survey conducted in 2023 showed that education and employment can enhance the understanding of certain conditions like ADHD [20]. This showed that targeted publicity attempts can be effective in creating awareness. Therefore, it is necessary to define the socialization media in schools about AD among teenagers [21].

The purpose of this research was to determine what young adults in Jeddah, KSA, knew about memory and other matters related to it, including AD. The research objectives of the study were to contribute to the fight against the deficiency in awareness in the area of Public Health and Education Campaigning by establishing the current level of awareness and indeed identifying the cause of the deficiency. The evidence generated from this study would help in raising awareness and visibility of the careers of people with AD.

Subjects and Methods

This study was carried out among young adults in Jeddah, Saudi Arabia, employing a cross-sectional descriptive survey design to determine their level of awareness about AD and the causes of memory deterioration. This research was carried out in KSA among healthy young adults who reside in Jeddah, one of the biggest cities in the nation.

As for the sampling technique that has been used in the study, it was convenience sampling since the sample size was 310 participants. Convenience sampling was used, and questionnaires were completed through social media.

The questionnaire consisted of questions that gathered data in terms of demography, AD awareness, and behaviors that might affect memory. It was a series of questions, and it was designed to capture participants' knowledge about AD. These questions were concerning memory and AD, and some of the questions asked were whether memory loss is inherited, how exercise enhances memory, whether women are at higher risk of memory loss, and the effects of stress and diet on memory. The participants were also asked about their awareness of AD, its association with only older people, cognition, and early diagnosis.

Data entry and statistical analysis were done with the help of the Statistical Package for Social Science version 29. To present the data in tabular and graphic form, descriptive statistics were calculated. Qualitative variables were analyzed using the chi-square test, and a significance level of $p < 0.05$ was considered statistically significant.

Results

The study sample consisted of 310 participants, with females comprising 188 (60.6%) participants (Table 1).

Regarding the knowledge and awareness of memory and AD, 137 (44.2%) responded "Maybe" when asked if memory loss is considered a hereditary disease. Most participants (62.3%) believed that exercise could affect memory. When asked if women are more susceptible to memory loss, 125 (40.3%) did not know about it. A majority (72.9%) believed that memory loss is not limited to the elderly. Most participants (64.5%) believed that stress affects memory. A large proportion (69.4%) believed that there are diseases that affect memory.

***Table 1**. Participant demographic information.*

	Frequency (*n*)	Percentage (%)
Gender		
Female	188	60.6
Male	122	39.4
Age (Years)		
Less than 20	30	9.7
From 20 to 30	227	73.2
From 30 to 40	26	8.4
From 40 to 50	7	2.3
50 and more	20	6.5

Regarding lifestyle practices and memory enhancement, 212 (68.4%) believed that there are actions to strengthen memory. When asked if there are foods that affect memory, 131 (42.3%) said "Yes." Only 49 (15.8%) considered their lifestyle to be healthy. A majority (78.1%) believed that reading and memory games help strengthen memory.

Concerning perceptions and impacts of AD, 13.5% consider experiencing momentary memory loss an indication of AD. Furthermore, 71.3% said that AD impacts memory, thinking, and behavior in the brain. Moreover, 34.2% knew anyone who was diagnosed with AD and 12.9% said that AD exclusively affects older adults (Table 2).

Significant associations were found between age group and certain knowledge/awareness questions, such as actions that can help strengthen memory (p-value = 0.002), whether memory loss is limited to the elderly (p-value = 0.041), whether AD exclusively affects older adults (p-value = 0.012), and the effects of AD on individuals who suffer from it (p-value = 0.004).

Similarly, significant associations were observed between gender and some knowledge/awareness questions, including whether memory loss is limited to the elderly (p-value = 0.018), whether stress affects memory (p-value = 0.019), knowing someone diagnosed with AD (p-value = 0.012), whether AD exclusively affects older adults (p-value = 0.016), and the effects of AD on individuals who suffer from it (p-value = 0.003).

***Table 2.** Perceptions and impacts of AD.*

Questions	Frequency (*n*)	Percentage (%)
Is experiencing momentary memory loss an indication of AD?		
Yes	42	13.5
Maybe	111	35.8
I don't know	81	26.1
No	76	24.5
Does AD impact memory, thinking, and behavior in the brain?		
Yes	221	71.3
Maybe	40	12.9
I don't know	32	10.3
No	17	5.5
Do you know anyone who has been diagnosed with AD?		
Yes	106	34.2
No	204	65.8
Does AD exclusively affect older adults?		
Yes	40	12.9
Maybe	77	24.8
I don't know	38	12.3
No	155	50.0
What are the effects of AD on individuals who suffer from it?		
It affects their body	1	0.3
It affects their memory	51	16.5
It affects their psyche	9	2.9
All of the above	249	80.3
Are there benefits to diagnosing AD early?		
Yes	197	63.5
Maybe	65	21.0
I don't know	38	12.3
No	10	3.2
Is there a relationship between depression and AD?		
Yes	99	31.9
Maybe	125	40.3
I don't know	50	16.1
No	36	11.6

Discussion

The study aimed to assess the awareness of AD and memory factors among young adults in Jeddah, Saudi Arabia. This study was therefore able to establish a moderate level of awareness on AD, with gaps and misconceptions evident. Concerning the knowledge and awareness variables, age and gender differences were found to be highly significant, which warrants further informative campaigns in these areas.

The awareness levels found in the community of Jeddah are parallel to the levels found in other studies conducted in other areas. According to studies, the misconceptions and lack of knowledge were a bit higher in Saudi Arabia than in other countries [13], while another study conducted in Saudi Arabia showed moderate healthcare

professionals' (HCPs) knowledge [14]. For instance, in the present research, 44.2% of participants were unaware that memory loss could be hereditary, while 27.7% believed that it was not and only 16.1% thought it was hereditary. These similes indicate a global gap that requires increased educational campaigns about AD in different parts of the world.

Other education interventions have been proven effective in enhancing knowledge about AD considerably. According to a study, awareness can be achieved with the help of structured educational programs and multimedia resources [22]. This supports the recommendation of developing specific educational campaigns to increase awareness among the target group of young adults in Jeddah. These findings emphasize the impact of diet, exercise, and stress on cognition, as well as the role of age and sex. A study indicated that a healthy diet helps in enhancing cognitive performance [23]. For instance, 62.3% of the current study participants believed that exercise affects memory, and 64.5% of participants had a firm belief that stress would affect memory. These findings support the results of the study and emphasize the necessity of healthy lifestyle information and real-life educational programs in improving memory and cognitive abilities in young people.

A knowledge deficit in the public was also observed for AD, including perceived risk factors and myths. A study observed that knowledge was significantly different across various groups, with higher levels of understanding in the people who had first-hand experience [24]. For instance, 69.4% of participants believed that diseases affect memory, but only 42.3% believed that only certain foods affect memory. This proves that there is a need to embark on proper education campaigns that seek to bridge these gaps, especially in areas that are still in their infancy in terms of awareness, such as Jeddah.

Current awareness campaigns in Saudi Arabia are inadequate regarding the misconceptions people have about AD. There is a lack of understanding of the disease and stigmatization, as established in some studies [25, 26]. For example, 80.3% of participants were certain that AD is directly related to memory, body, and psyche, but 50% believed that it does not exclusively affect older adults. This suggested that there is still a lack of adequate awareness campaigns in the public domain to increase awareness and thus reduce prejudice against AD.

The results from the study on the belief that stress has an impact on memory are well-supported by literature. Data from the survey conducted reveal the effects of stress on the human brain [27]. These findings support current study results, stressing the importance of stress management education as a part of cognitive health promotion. In the present research, 64.5% of participants believed that stress affects memory, and 25.5% were uncertain.

The genetic transmission of AD is well understood and supported by research done [28]. There is still some misperception that suggests the need to continue educating the public to demystify the genetic aspects of the disease. In the present research, 44.2% of participants were unaware that memory loss is hereditary, reflecting a significant knowledge gap.

These findings also have important practical implications for public health policy in Saudi Arabia, because of the growing awareness of AD. Other studies further specify that public health education programs are needed to ensure that the general public is knowledgeable and does not hold stigmatized perceptions [25]. This lends credence to current study suggestions for enhanced public enlightenment and campaigns across the nation to increase people's awareness and acceptance of persons with AD. In this study, 71.3% of participants agreed with the statement that AD affects memory, thinking, and behavior, suggesting that participants had a fairly good understanding of the effects of AD.

Adequate support for HCPCs and caregivers is vital to increase public awareness of AD [29]. This study is in support of these studies, indicating that more attention should be given to increasing awareness and support for caregivers in Jeddah. For example, 63.5% of the participants supported the early diagnosis as important, but 21.0% were uncertain. Socioeconomic factors play a large role in awareness and understanding of AD. Research indicates a lower socioeconomic status, less education, and higher prevalence of AD, suggesting that eradicating these inequalities would help increase awareness among young adults in Jeddah [30].

There were several limitations of this study. First, since this study employed a cross-sectional design, it means that it assessed awareness at a given time only as a cross-sectional design does not allow one to make causal inferences or to assess change in awareness over time. Longitudinal research could provide a more dynamic perspective to the questions of awareness and factors affecting memory among young adults. Second, the estimates used in this study were based on the survey responses, and the participants' self-reports can lead to response bias. Some participants might have given their responses in a way that would be most acceptable to others or might not have remembered knowledge that they did possess. The inclusion of objective measurements or the addition of qualitative data could have helped make the results more reliable. Furthermore, the main emphasis was put on AD, without addressing other memory-related disorders or cognitive deficits that can manifest in young people. Expanding the sample to cover a wider range of memory-related conditions might help to give a better picture of awareness levels in the sample group. Finally, although the study revealed a lack of awareness and called for specific education and training, the efficacy of such measures was not assessed. Future research might further investigate the effectiveness of educational interventions aimed at raising awareness and enhancing support for individuals with AD and their families in Jeddah and other comparable sites. Understanding these

limitations could inform future research to increase the effectiveness and applicability of awareness campaigns and related education about AD and other memory-impairing diseases.

Conclusion

This study revealed that there was a moderate level of awareness regarding AD among young adults in Jeddah, Saudi Arabia; however, there were some misconceptions and knowledge gaps. In particular, most participants were uncertain about whether memory loss is hereditary and how stress influences memory, which are issues that might require further awareness-raising efforts. For educational programs to be effective, policymakers should ensure that the distinction between normal forgetfulness and AD is made while acknowledging that the disease is not restricted to the elderly. Age targeting and gender equalization of awareness should also be employed to optimize the effectiveness of the campaigns. The involvement of HCPs and caregivers in the implementation of the educational programs, as well as the ongoing assessments of the educational interventions put in place, would guarantee that the program meets the population's needs. Thus, the findings of the current research suggest the necessity of developing multifaceted public health campaigns to increase public awareness and understanding of AD. Further studies should be done to establish the efficacy of these educational interventions in an endeavor to enhance sustained awareness and support for AD.

List of abbreviations

AD	Alzheimer's disease
NFTs	Neurofibrillary tangles
SPSS	Statistical Package for Social Science

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Conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this article.

Consent for participate

Informed consent was obtained from all the participants.

Ethical approval

The study was approved by the Fakeeh College for Medical Sciences Institutional Review Board via reference number 131/IRB/2020. Dated:

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