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The level of understanding of alzheimer's disease among medical and physiotherapy students in Türkiye

Abstract

Aim: Alzheimer's disease (AD) is a progressive, age-related neurodegenerative disorder characterized by significant memory loss and cognitive decline. Early medical education plays a critical role in equipping future healthcare professionals with the necessary knowledge to diagnose and manage such disorders. This study examines and compares the knowledge and attitudes toward Alzheimer's disease among first- and second-year medical and physiotherapy students. Identifying knowledge gaps within these groups can help shape targeted educational interventions and better prepare future healthcare professionals to manage AD effectively.

Materials and Methods: A quantitative, descriptive study was conducted involving 149 students from the medicine and physiotherapy departments. The Alzheimer's Disease Knowledge Scale (ADKS) and Dementia Attitude Scale (DAS) were used to assess participants' knowledge and attitudes toward Alzheimer's disease. Participants, aged 18–22, completed a structured questionnaire, and data were analyzed using GraphPad Prism 9, with statistical significance set at $p < 0.05$.

Results: Medical students scored significantly higher than physiotherapy students on both the ADKS and the DAS, indicating a greater understanding and more positive attitudes toward Alzheimer's disease. The mean ADKS score was 14/22 for medical students and 12/22 for physiotherapy students, while the mean DAS scores were 14.22 and 13.14, respectively. A statistically significant difference was observed between the two groups ($p < 0.05$).

Conclusion: This study highlights the need for enhanced educational interventions in physiotherapy programs to bridge the knowledge gap in dementia care. Strengthening dementia-related training is essential for all healthcare students to ensure they are adequately prepared to manage Alzheimer's disease in their future practice.

Keywords: Alzheimer's disease, Alzheimer's Disease Knowledge Scale, Dementia Attitude Scale, knowledge assessment, physiotherapy students, medical students

INTRODUCTION

Alzheimer's disease (AD) is a progressive neurodegenerative disorder associated with age-related brain changes that lead to memory loss and cognitive decline. By the time AD is diagnosed, significant neuronal loss and structural abnormalities have already affected multiple brain regions (1).

In the modern job market, a bachelor's degree is often a prerequisite for careers in the medical field. Consequently, the number of young individuals enrolling in medical programs has increased. However, some students may enter the medical

profession with limited knowledge of prevalent neurological disorders, such as AD. This knowledge gap may hinder their ability to understand, diagnose, and manage these conditions effectively in clinical practice.

Examining populations commonly found in the healthcare sector, such as medical and physiotherapy students, serves two essential purposes. First, it helps identify knowledge gaps in specific areas that may require additional focus, such as social sciences. Second, the data collected can be used to enhance curriculum design, leading to a more structured and effective educational experience for medical students (2,3).

Supporting medical students' socialization in academic settings is crucial for fostering a strong professional foundation, ensuring their success both during their studies and in clinical practice (3). Similarly, for physiotherapy students, the goal is to expand their medical knowledge in diagnosis, evaluation, and treatment while also equipping them with strategies to prevent diseases through lifestyle modifications (4).

Most healthcare professionals, including doctors, physicians, and other medical staff, possess a fundamental understanding of AD (5). However, research suggests that healthcare teams may lack a comprehensive grasp of the condition. While findings vary, studies indicate that insufficient training and expertise, limited clinical experience, and inadequate healthcare resources are the primary factors contributing to gaps in knowledge regarding Alzheimer's dementia and the care of affected patients (6-8).

It is important to acknowledge that the Alzheimer's Disease Knowledge Scale (ADKS) is not a comprehensive assessment tool for evaluating AD-related knowledge. Instead, it comprises a set of representative elements that, when considered collectively, provide insight into an individual's overall understanding of the disease. Consequently, the scale may have limitations when used with highly knowledgeable groups, potentially resulting in ceiling effects. To address this, developing additional ADKS modules tailored for specific populations, such as dementia caregivers or specialized clinicians, could enhance its applicability. Furthermore, if the ADKS proves to be an effective tool, expanding the normative sample to include diverse factors—such as age, profession, and assessment setting—will be essential for improving its validity and generalizability (9).

This study aims to compare dementia-related knowledge between first- and second-year medical and physiotherapy students at a Turkish university. We hypothesize that medical students will demonstrate significantly higher knowledge and more positive attitudes towards Alzheimer's disease than physiotherapy students. Specifically, this study seeks to (1) assess the level of Alzheimer's disease knowledge among first- and second-year medical and physiotherapy students using the ADKS, (2) evaluate the attitudes towards dementia among these students using the Dementia Attitude Scale (DAS), (3) compare the ADKS and DAS scores between medical and physiotherapy students to determine if there are significant differences, and (4) identify potential areas for improvement in dementia-related education within the physiotherapy curriculum. By achieving these objectives, this study will contribute to a more comprehensive understanding of the knowledge and attitude landscape surrounding Alzheimer's disease among Turkish healthcare students, thereby informing the development of effective educational interventions to bridge existing gaps and enhance the quality of dementia care.

MATERIALS AND METHODS

This study employed a descriptive study design to assess the level of knowledge medical professionals have regarding AD (10). No experimental methods were used. To achieve this objective, a questionnaire was administered, incorporating true/false questions from the ADKS to evaluate participants' comprehension of AD (9).

The survey consisted of two parts:

1. **ADKS** – A true/false questionnaire designed to measure participants' knowledge of AD. The ADKS covered seven key domains related to dementia: signs and symptoms, risk factors, disease progression, diagnosis, caregiving, effects on daily living, and management.
2. **DAS** – Aimed at assessing students' attitudes toward dementia. The DAS included two subscales: "Heartfelt" and "Heartsink", each comprising four items.

Students from the medicine and physiotherapy programs completed a 30-question survey divided into two sections: one section evaluated their attitudes toward AD patients, while the other assessed their knowledge of AD, with points awarded for correct answers.

The survey included three types of questions: Brief open-ended questions, True/false questions, and Graded Likert-scale questions (ranging from 1 to 5).

Inclusion Criteria:

- Individuals who identify as either female or male.
- Individuals aged 18 to 22 years.
- Individuals enrolled as students at BAU.
- Individuals studying Medicine or Physiotherapy.

Exclusion Criteria:

- Individuals younger than 18 or older than 22.
- Individuals not enrolled as students at BAU.
- Individuals not studying Medicine or Physiotherapy.

Sample Size Calculation:

The sample size for this study was determined using SurveyMonkey by Wacławski (11). This tool employs power survey analysis to estimate the population size, margin of error, and confidence level. Based on this analysis, a representative sample of 68 medical students and 81 physiotherapy students was calculated.

Ethical Considerations

This study was evaluated and approved by the Ethical Board of the Faculty of Medicine at BAU University (Approval Date: 10.11.2022; Issue Number: E-22481095-020-1962). Participants were fully informed about the study's purpose, benefits, potential risks, and their role before providing consent. To ensure

comprehension, the survey questions were written in clear, simple English.

The dignity and well-being of participants were prioritized to prevent any discomfort or embarrassment. Participants were also given the right to withdraw from the study at any time without consequences. To maintain data integrity and confidentiality, all collected information was securely stored.

Data Collection Instruments

A structured questionnaire was used to collect quantitative data relevant to the research objectives, providing numerical data necessary for statistical analysis. Each participant received 27 questionnaire items via a Google Form, which was selected for its flexibility in response options, as noted by Wright (2016) (12).

Participant email addresses were obtained from the Medicine and Physiotherapy departments, and the survey was distributed via email. The estimated completion time for the survey was approximately 10 minutes.

Data Analysis Procedure

The paired sample t-test was used to analyze the ratio-level data collected in the study. To minimize errors and enhance reliability, data analysis was conducted using GraphPad Prism 9. The mean value was calculated to determine the central tendency of the data, as recommended by Akoglu (13).

For interval and ordinal variables, mean and standard deviation were computed, while frequency and mode were used for nominal data. The p-value was set at <0.05, and the confidence interval was established at 95%, following the recommendations of Altman (14).

Reliability and Validity

To ensure early and accurate diagnosis, various cognitive assessment tests have been developed based on country-specific and sociocultural factors. However, these tests have limitations depending on the population they assess.

In Australia, the DAS was developed in 2004 to address the challenges of diagnosing cognitive impairment in diverse

sociocultural populations. Given Türkiye's diverse demographic composition, identifying a reliable and culturally appropriate cognitive evaluation tool is essential. The DAS may serve as a valuable instrument for assessing populations with different cultural and linguistic backgrounds.

This study examines the Turkish version of the DAS to evaluate its validity and reliability as a screening tool for severe neurocognitive disorders (15).

Limitations

This study had several limitations. Participants were selected randomly and voluntarily, which may have introduced selection bias. Additionally, self-reported data were collected through an online survey to assess participants' understanding of AD across different medical disciplines. This method may have resulted in response bias, including random or socially desirable answers, potentially affecting data accuracy. More objective evaluation methods would have been preferable for assessing the constructs examined in this study.

Furthermore, all participants were medical or physiotherapy students from a single institution, limiting the generalizability of the findings. Therefore, caution should be exercised when applying these results to university students in different locations or broader populations.

RESULTS

The first section of the survey contained three questions aimed at collecting participants' demographic information, including age, department, and year of study. A total of 149 individuals who met the eligibility criteria were recruited. The DAS and ADKS were used to assess participants' attitudes and knowledge regarding AD.

Table 1 presents the demographic data, including department affiliation and year of study. The study enrolled participants from the Physiotherapy (PTR) and Medicine departments, focusing on first- and second-year students from both disciplines. The physiotherapy group had the largest representation, consisting of 81 participants, followed by the medicine group, which included 68 participants.

Table 1. Demographic characteristics of participants

Department	N (%)	Year 1 N (%)	Year 2 N (%)	Female N (%)	Male N (%)	Age (Mean±SD)
Physiotherapy	81 (54.3)	10 (12.3)	71 (87.6)	48 (59.3)	33 (40.7)	21.09±2.34
Medicine	68 (45.6)	23 (33.8)	45 (66.2)	37 (54.4)	31 (45.6)	20.30±1.47

N: number of participants, SD: standard deviation

Regarding gender distribution, the physiotherapy faculty had 48 female and 33 male participants, while the medicine faculty had 37 female and 31 male participants.

In terms of age, the mean age of participants in the physiotherapy group was 21.09±2.34 years, while the mean age of participants in the medicine group was 20.30±1.47 years.

The table above presents the mean and standard deviation (SD) values for participants from the Physiotherapy and Medicine departments on the ADKS and DAS scales. Additionally, it provides the p-values for comparisons between the two groups for each scale.

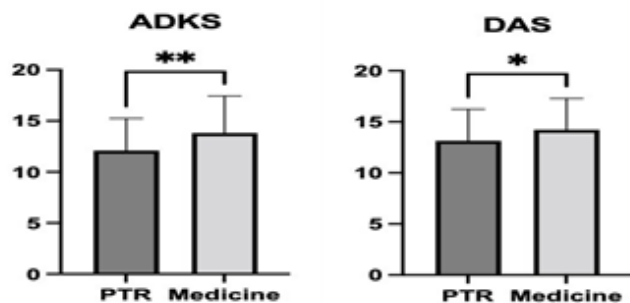
All statistical analyses were performed using GraphPad Prism 9. The data in the graphs are expressed as mean $\pm$ SD. An unpaired t-test was used to assess statistical differences between groups. A significance threshold of $p < 0.05$ was set for all tests, with p-values below this threshold indicating statistical significance.

For the DAS scale, statistical significance is denoted as follows: $p < 0.05$ is indicated by (*), $p < 0.005$ is indicated by (**) (Table 2 and Graph 1).

Table 2. Mean scores of ADKS and DAS by department

Scale	Medicine (Mean $\pm$ SD)	Physiotherapy (Mean $\pm$ SD)	p-value
ADKS	14/22 (± 3.63)	12/22 (± 3.17)	<0.001
DAS	14.22 (± 3.05)	13.14 (± 3.11)	0.03

ADKS: Alzheimer's Disease Knowledge Scale; DAS: Dementia Attitude Scale, SD: standard deviation



Graph 1. Illustrates the discrepancy in P values for ADKS and DAS scores between participants from the Physiotherapy (PTR) and Medicine groups; ADKS: Alzheimer's Disease Knowledge Scale, DAS: Dementia Attitude Scale, PTR: physiotherapy; **: $p < 0.005$, *: $p < 0.05$

Based on the ADKS results, there was no statistically significant difference in the mean scores between participants from the Physiotherapy and Medicine departments. The scores were relatively similar, with only a slight variation, indicating that Medicine students had marginally higher scores than Physiotherapy students (Graph 2).

Similarly, the DAS results showed either no significant difference or only a slight variation between the mean scores of participants from both fields (Graph 2). However, Medicine students had a slightly higher average score compared to Physiotherapy students.



Graph 2: Presents the variation in Mean ($\pm$ SD) values for ADKS and DAS scores between participants from Physiotherapy (PTR) and Medicine; ADKS: Alzheimer's Disease Knowledge Scale, DAS: Dementia Attitude Scale, PTR: physiotherapy, SD: standard deviation

DISCUSSION

This study aimed to test the hypothesis that male and female first- and second-year students from the Medicine and Physiotherapy faculties have different levels of knowledge about AD which could be relevant to their future professional practice.

To assess knowledge and attitudes toward AD, two standardized scales were used: the ADKS and the DAS. The results indicated a significant relationship between ADKS scores and the participants' field of study, with Medicine students scoring higher than Physiotherapy students ($p < 0.001$). Similarly, a statistically significant difference was observed in DAS scores, with Medicine students again scoring higher than Physiotherapy students.

These findings support the hypothesis that Medicine students possess greater knowledge and understanding of Alzheimer's disease compared to Physiotherapy students, suggesting that their curriculum may provide more extensive exposure to dementia-related topics.

El-Masry (2018) conducted a study using the Arabic version of the ADKS to assess middle-aged and elderly Egyptian doctors (16). The results revealed several misconceptions about Alzheimer's disease in Egypt, including the belief that patients experience suffering primarily due to their caregivers' and families' lack of understanding of disease management. These findings emphasize the importance of establishing a strong foundation in Alzheimer's disease management early in medical education.

The study suggests that healthcare students generally possess a reasonable level of knowledge about AD (17,18). However, research from various countries, including the United States, has identified common knowledge gaps among medical students. Conversely, a comparative study of Asian countries found that final-year healthcare students demonstrated a higher level of understanding of AD compared to their junior counterparts (19).

This study underscores the importance of learning styles in understanding AD. It examines how the Spanish population, including unpaid caregivers of AD patients and the general public, perceives the disease. The findings indicate that this sample has a good overall understanding of AD, which may be attributed to the increased awareness driven by an aging population.

However, significant disparities exist in the level of knowledge among different demographic groups, with certain populations exhibiting notable gaps in their understanding of the disease (20).

Lacrampe's (2021) study found that the concept of legal incapacity was not well understood (21). Only 50% of participants demonstrated sufficient knowledge on the topic, with similar levels of understanding among both the general public and informal caregivers. Despite limited improvement as they advanced in their studies, medical students exhibited a better understanding than these groups, as expected. This suggests that education on legal incapacity remains inadequate in other disciplines, particularly during hospital internships, aside from the legal medicine module. Conversely, healthcare professionals, particularly social workers, displayed a much greater awareness of legal incapacity issues.

Laura's (2022) study found that healthcare students generally have a satisfactory and adequate understanding of AD, aligning with the findings of previous research (22-24). However, these results contrast with a 2019 study (25) that reported poor or insufficient knowledge among students. Both studies utilized the Dementia Knowledge Attitude Scale (DKAS) and the ADKS to assess students' knowledge of AD.

According to Strøm et al., many caregivers agreed that dementia patients are prone to depression, though some believed that severe depressive symptoms could be mistaken for dementia (26). Additionally, some caregivers held misconceptions about the expected lifespan of a dementia patient, with some estimating it to be 6–12 years after symptom onset. While most respondents acknowledged that dementia is incurable, some believed that recovery was possible. Overall, working with dementia patients was generally perceived as rewarding. However, only half of the caregivers surveyed reported being highly familiar with dementia and expressed frustration over their lack of knowledge on how to provide adequate support. Despite this, most participants felt comfortable engaging in physical contact with dementia patients.

According to Spector et al. (27), a comprehensive understanding of dementia is essential for healthcare professionals, as it enables them to provide better counseling to patients and their families regarding disease prognosis and its potential psychological effects.

The study found that the level of dementia knowledge among health district employees was moderate, with an average accuracy rate of 79%. As expected, employees with direct patient contact demonstrated higher knowledge levels compared

to administrative, housekeeping, security, and transport staff. However, knowledge gaps were observed in certain key areas, particularly risk factors and disease progression, which were prevalent across nearly all participants. These findings are consistent with those of Carpenter et al. (9).

According to the ADKS, the knowledge level of many health district employees was moderate. As expected, those in medical and nursing professions with direct patient contact demonstrated higher levels of knowledge.

The results also indicated that respondents who rated their own knowledge as good tended to perform better on the test. Additionally, the study found that the majority of participants were male (56%) (6).

Similar findings were reported in studies on medical students in the United States and healthcare workers in Queensland, Australia. Moreover, individuals who self-rated their dementia knowledge higher scored better on the ADKS than those who had attended dementia training sessions (28).

Baral's study on the Nepalese population reported a significant increase in the prevalence of AD. The study also assessed dementia knowledge among male and female students, revealing average performance on the test (29).

Similarly, a study by Alrifi et al. found that educating individuals about dementia can significantly improve their knowledge, particularly among healthcare professionals (30). Several intervention studies have evaluated the effectiveness of various dementia education programs, including informational videos, brochures, and one-hour lectures covering topics such as dementia knowledge, disease physiology, common dementia-related behaviors, and behavioral management strategies.

The findings indicated that these educational programs effectively enhanced participants' understanding of dementia. However, while the study focused on students from a single university, it is important to acknowledge that Saudi Arabia (KSA) has numerous universities, each offering different programs across various regions.

Enhancing the knowledge of medical professionals is essential for delivering high-quality care to individuals with dementia. Educating healthcare students plays a critical role in this effort (23). It is crucial to equip future healthcare professionals with the specialized knowledge and skills required to care for dementia patients effectively.

This study confirmed that undergraduate health professions students had limited knowledge of dementia. Their ADKS assessment scores were lower than those reported in wealthier countries and in a recent Chinese study that employed the same evaluation method (23,24).

Trainees demonstrated insufficient knowledge about Alzheimer's disease symptoms and caregiving, aligning with previous

research on Chinese community health workers, Norwegian psychologists, and Maltese nursing students, as reported by Wang et al. (31) and Scerri et al. (23).

This knowledge gap may be attributed to the fact that 78.5% of students in the sample had no prior experience with dementia patients, and 94.8% had no experience in dementia patient care. Consequently, health professions students may lack the necessary expertise in dementia symptoms and care, potentially impacting their ability to deliver high-quality care services post-graduation (24).

To ensure that health professions students develop the knowledge and caregiving skills necessary for high-quality dementia care, they must be provided with more opportunities to interact with and establish meaningful relationships with dementia patients.

O'Connor et al. (32) emphasize that a deep understanding and compassion for dementia patients are essential for health professions students to deliver optimal dementia care.

In 2014, Eshbaugh E.M. (33) found that nearly half of the responses exceeded the average, with the mean total ADKS score ranging from 8 to 26. The mean ADKS score was 15.45 (SD=2.95), with only 13 out of 385 respondents achieving more than 20 correct answers. A study conducted in Iowa, USA, reported that college students had a higher mean ADKS score of 20.78 (SD=4.24), with individual scores ranging from 2 to 29. Among 200 respondents, 114 scored above 20 on the scale (29). Despite these findings, awareness of AD, along with an understanding of patients' social and healthcare needs, remains low due to a knowledge gap between American and Asian students (34).

In 2015, Kada (35) conducted a study to assess dementia knowledge among undergraduate students pursuing health and social care in Norway. The study concluded that students had an average level of knowledge about AD, aligning with previous research on healthcare workers by Smyth et al. (8) and on Norwegian psychologists by Nordhus et al. (36).

The findings of the current study were higher than those of Carpenter et al., who previously assessed students from non-health professions (9). However, Maltese nursing students scored lower than Norwegian nursing students on the ADKS mean score, as reported by Scerri (23). Additionally, Rust and See (37) found that Canadian professional healthcare providers and undergraduate students performed worse than Norwegian health and social care students on AD knowledge assessments.

In 2016, Garrie conducted a study at Rowan University, utilizing the DAS to assess medical and other healthcare students. As part of the study, a poetry session was held for dementia patients, which led to improvements in quality of life for both the students and patients.

The administration of the DAS, along with post-intervention semi-structured interviews, could be considered a therapeutic intervention, as suggested by Lundquist (2008) (38) and

O'Connor (2010) (32). One medical student who completed the survey reported that the DAS prompted him to confront previously avoided thoughts, allowing him to reflect on his attitude toward working with dementia patients.

Thus, this instructional strategy could be highly beneficial for a broader group of medical and healthcare professional students.

The core objective of these efforts is to develop educational programs aimed at enhancing healthcare systems and strengthening social support for dementia patients. Understanding the level of dementia awareness across different occupational groups is essential.

Previous studies have demonstrated that educational interventions for healthcare professionals significantly improve dementia knowledge, leading to better outcomes in both clinical and community care settings. Additionally, increasing public awareness can help reduce stigma associated with dementia and foster stronger community support (39).

CONCLUSION

The findings of this study indicate that physiotherapy students have a moderate level of knowledge about AD, whereas medical students demonstrate a higher level of understanding.

Educating future physiotherapy and medical practitioners about AD is essential, given its complex medical and caregiving requirements. These results highlight the importance of revising educational curricula to enhance training in dementia care.

By strengthening AD education, future medical and physiotherapy professionals can contribute to better treatment strategies and an improved quality of life for individuals affected by the disease.

Reports emphasize that dementia-specific courses integrating both theoretical and practical components are essential for enhancing students' understanding of the disease and their attitudes toward patients. These courses should address existing knowledge gaps, as identified in previous studies, and include key topics such as the causes, risk factors, and treatments of AD, covering both modifiable and non-modifiable factors.

Additionally, physiotherapy and medical school curricula should place greater emphasis on AD and the broader challenges of geriatric healthcare. Future research should focus on evaluating the effectiveness of dementia and AD education, ensuring that training programs adequately prepare healthcare professionals for clinical practice.

Conflict of Interests

The authors declare that there is no conflict of interest in the study.

Financial Disclosure

The authors declare that they have received no financial support for the study.

Ethical Approval

This study was evaluated and approved by the Ethical Board of the Faculty of Medicine at BAU University (Approval Date: 10.11.2022; Issue Number: E-22481095-020-1962).

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