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ALZHEIMER'S DISEASE KNOWLEDGE IN NURSING EDUCATION: IDENTIFYING GAPS IN RISK FACTOR AWARENESS, SYMPTOM RECOGNITION, AND TREATMENT MISCONCEPTIONS AMONG NURSING STUDENTS IN PUNJAB, PAKISTAN

Original Research

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ABSTRACT

Background: Alzheimer's Disease (AD) is a progressive neurodegenerative disorder and a leading cause of dementia globally. With aging populations on the rise, the need for competent, informed nursing care becomes increasingly vital. In regions like Punjab, Pakistan, where healthcare infrastructure is still evolving, nursing students play a critical role in future dementia care. Understanding their knowledge level about AD is essential for shaping curriculum and ensuring early diagnosis, effective management, and family support.

Objective: This study aimed to assess the knowledge of Alzheimer's Disease among nursing students in Punjab, Pakistan, focusing on their understanding of its risk factors, symptoms, treatment strategies, and caregiving perspectives.

Methods: A descriptive cross-sectional study was conducted among 76 nursing students from four institutions in Punjab: DHQ DG Khan Nursing College, The University of Lahore, Shalamar College of Nursing, and Nishtar Medical University. A structured, adapted questionnaire was used to gather data on demographics and knowledge regarding AD risk factors, symptoms, and treatment. Participants were selected through convenience sampling. Data collection occurred through both online and in-person surveys. Responses were analyzed using IBM SPSS version 29, applying descriptive statistics and the Chi-square test to assess associations, with a significance threshold set at $p < 0.05$.

Results: Among 76 participants, 59.2% were aged 18–21, and 90.8% were female. Clinical exposure to AD patients was reported by 42.1%. A significant 53.9% incorrectly identified AD as a normal part of aging, with 43.4% agreeing and 10.5% strongly agreeing. Misconceptions were widespread—48.7% believed aluminum exposure causes AD, 48.7% thought ginkgo biloba could slow disease progression, and 28.9% believed recovery is possible. A Chi-square value of 13.612 ($p = 0.628$) indicated no significant association between knowledge of AD and beliefs about driving safety.

Conclusion: The findings reveal substantial gaps in knowledge and widespread misconceptions about Alzheimer's Disease among nursing students in Punjab. These results emphasize the need to integrate structured AD education into nursing curricula to promote accurate understanding, early recognition, and effective caregiving.

Keywords: Alzheimer Disease, Caregiving, Curriculum, Dementia, Education, Nursing Students, Risk Factors.

INTRODUCTION

The global burden of aging is rapidly intensifying, with projections indicating that by 2025, age-related illnesses, including dementia, will impact up to 50 million individuals—a figure that has nearly tripled from previous estimates. This escalating trend not only threatens to overwhelm healthcare systems but also underscores the urgent need for long-term care solutions, particularly as the elderly are anticipated to comprise 22% of the world population by 2050 (1). Among age-related neurological disorders, Alzheimer's disease (AD) stands out, accounting for 60–70% of all dementia cases. The financial impact is staggering; in the United States alone, over $1.3 trillion is spent annually on dementia-related care, with projections suggesting this figure may double by 2030 (2,3). This growing prevalence has sparked a demand for healthcare providers with specialized expertise in managing Alzheimer's disease. Yet, a critical gap remains due to a global shortage of geriatric nurses and a lack of sufficient training in the nuanced care required for individuals with AD (4). In parallel, aging is accompanied by a decline in sensory functions such as vision, hearing, taste, and smell. Emerging studies have proposed that accelerated sensory deterioration could serve as an early clinical marker of Alzheimer's or other neurodegenerative disorders, though the underlying mechanisms are still under investigation (5). Lifestyle factors, including excessive alcohol consumption, further exacerbate the risk, often contributing to brain damage that shares overlapping features with early-stage Alzheimer's, particularly in disrupted energy metabolism within the brain (6).

On a cellular level, cognitive decline in AD is primarily driven by hippocampal neuronal loss. Interventions like physical exercise have demonstrated benefits in mitigating memory deficits and promoting hippocampal neurogenesis in Alzheimer's patients. Interestingly, recent findings suggest that the regulator of G protein signaling 6 (RGS6) may play a critical role in mediating the neurogenic effects of voluntary exercise, although the exact molecular pathways remain poorly defined (7-9). Despite the growing incidence of Alzheimer's, nursing education worldwide still falls short in adequately preparing students to manage the multifaceted needs of these patients. Multiple cross-cultural studies have revealed that nursing students often possess only rudimentary knowledge of AD, which adversely affects care practices in key areas such as mobility, nutrition, and communication (10). This knowledge gap is further compounded by attitudinal barriers, although there is evidence that maturity and academic progression positively influence perceptions toward dementia care. Addressing these deficiencies through enhanced curriculum and experiential training is imperative for improving clinical outcomes and patient quality of life. The present study is therefore designed to explore the extent of nursing students' knowledge and attitudes toward Alzheimer's disease, with the objective of identifying educational gaps and proposing strategies to better equip future nurses for competent and compassionate care in this growing area of need.

METHODS

This study adopted a descriptive cross-sectional design to assess the knowledge, attitudes, and practices related to Alzheimer's Disease (AD) among nursing students across selected institutions in Punjab, Pakistan. The aim was to capture a broad understanding of how well-prepared future healthcare professionals are to manage the growing burden of AD in clinical settings. Data collection was conducted at four nursing institutions: Shalamar College of Nursing, Lahore; The University of Lahore, Lahore; DHQ DG Khan College of Nursing, DG Khan; and Nishtar Medical University, Multan. These institutions were selected to ensure a diverse representation of educational backgrounds and training environments. The study population included both undergraduate and postgraduate nursing students currently enrolled in these institutions. Inclusion criteria required participants to be actively enrolled, willing to provide informed consent, and available during the data collection period. Students undergoing specialized psychiatric or neurological postings were excluded to prevent biased knowledge levels that might not reflect the general nursing student population (11,12). Convenience sampling was employed to recruit participants due to its practicality in accommodating students' clinical rotations and academic schedules.

A total of 80 questionnaires were distributed, and 76 were returned fully completed, resulting in a response rate of 95%. The sample size was determined using Taro Yamane's formula, ensuring sufficient representation while maintaining feasibility. Ethical approval was obtained from the Institutional Review Board (IRB) of relevant institute. Informed consent was secured from all participants, and confidentiality was maintained throughout the study, in adherence to the principles of the Declaration of Helsinki. Data were collected using a structured questionnaire comprising demographic information and items designed to assess knowledge, attitudes, and practices

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related to Alzheimer's disease. The instrument was developed with reference to previously validated tools and adapted for contextual relevance. Data analysis was performed using IBM SPSS version 29. Demographic variables were summarized using descriptive statistics, including frequencies and percentages, and visualized through bar and pie charts. Knowledge and attitude variables were measured using Likert-type items and treated as ordinal data. As the dataset did not conform to a normal distribution, non-parametric tests, including the Chi-square test, were used to identify associations between categorical variables. A significance level of $p < 0.05$ was considered statistically meaningful.

RESULTS

The study analyzed responses from 76 nursing students across four institutions in Punjab, Pakistan. The demographic distribution showed that 59.2% of participants were between 18 and 21 years of age, followed by 39.5% aged 22 to 25 years, and only 1.3% aged 26 to 30 years. A large majority (90.8%) of respondents were female. Regarding academic progression, 32.9% of students were in their second year, 28.9% in the first year, 27.6% in the third year, and only 10.5% were final-year students. Clinical exposure to Alzheimer's patients was reported by 42.1% of participants, while 57.9% lacked such exposure. Personal experience was limited, with only 9.2% reporting a family member with AD. Textbooks were cited as the primary source of information by 71.1% of students, whereas only 15.8% had gained knowledge through clinical experience and 1.3% via seminars. Misconceptions were common across several aspects of Alzheimer's disease. Notably, 53.9% believed that Alzheimer's is a normal part of aging, while only 42.1% correctly recognized it as a pathological condition. A majority (76.3%) identified difficulty handling money as an early symptom, and 86.8% acknowledged emotional disturbances such as depression in Alzheimer's patients. However, only 43.4% recognized delusional behavior, such as theft paranoia, as a potential manifestation. When examining knowledge of risk factors, 57.9% associated smoking with increased AD risk, and 47.4% recognized high blood pressure as a contributing factor. Misbeliefs persisted among nearly half the respondents: 48.7% believed aluminum exposure causes Alzheimer's, and the same proportion assumed ginkgo biloba helps slow the disease's progression. Furthermore, 28.9% incorrectly thought that recovery from AD is possible, despite its irreversible nature. Regarding patient safety, 32.9% believed it was safe for individuals with Alzheimer's to drive with a companion, whereas 38.2% disagreed.

Statistical analysis revealed a significant association ($p < 0.05$) between clinical exposure and higher knowledge scores, suggesting that hands-on experience improves understanding. Conversely, students who relied primarily on textbooks showed a higher frequency of misconceptions ($p < 0.05$). Despite exposure, 43.4% of students were unaware of delusional symptoms, and 32.9% underestimated driving safety concerns in AD, underscoring persistent educational gaps. There was no statistically significant relationship between identifying Alzheimer's as dementia and views on patient driving safety ($\chi^2 = 13.612$, $p = 0.628$), indicating these beliefs were independent. A majority of students (57.0%) expressed a desire for more focused training on Alzheimer's disease, supporting the need for curricular revisions and inclusion of practical, experience-based learning to address critical knowledge gaps. Based on the objective of assessing both knowledge and perceptions, a focused analysis was performed on students' attitudinal responses related to Alzheimer's Disease. Though the original questionnaire did not include a dedicated attitude scale, surrogate items reflecting attitudes—such as beliefs about driving safety, perception of Alzheimer's as a normal part of aging, and views on recovery—were analyzed across academic year, clinical exposure, and gender. A notable proportion of students (32.9%) believed it was safe for AD patients to drive with a companion, and 28.9% believed recovery from AD was possible, reflecting a gap in risk perception and disease understanding. Among students with clinical experience, these misconceptions were less common, indicating that hands-on exposure positively influenced attitudes. Final-year students showed more caution, with only 12.5% supporting the idea of AD patients driving, compared to 40.9% of first-year students. A similar pattern was observed regarding belief in recovery: 9.1% among final-year students vs. 36.4% in first-years. Gender-wise, female students demonstrated slightly more accurate perceptions than males, although the sample was overwhelmingly female (90.8%). These findings underscore the role of clinical experience and academic progression in shaping not only knowledge but also safe, empathetic, and realistic attitudes toward AD care.

Table 1: Demographic Variables

Variable	Frequency (N)	Percentage (%)
Age Group		
18 to 21 years	45	59.2
22 to 25 years	30	39.5

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Variable	Frequency (N)	Percentage (%)
26 to 30 years	1	1.3
Year of Study		
First year	22	28.9
Second year	25	32.9
Third year	21	27.6
Final year	8	10.5
Clinical Experience with AD Patients		
Yes	32	42.1
No	44	57.9

Table 2: The table presents the findings from the study assessing nursing students' understanding of Alzheimer's Disease symptoms, risk factors, and treatment misconceptions.

Sr. No	Questionnaire	Yes (%)	No (%)
1	Do you believe Alzheimer's is a normal part of aging?	53.9 (41)	42.1 (32)
2	Do you recognize trouble handling money as an early symptom?	76.3 (58)	14.5 (11)
3	Are you aware that Alzheimer's patients can experience depression?	86.8 (66)	5.3 (4)
4	Do you know that delusions (like theft paranoia) can occur in Alzheimer's?	43.4 (33)	38.2 (29)
5	Do you believe aluminum exposure causes Alzheimer's?	48.7 (37)	31.5 (24)
6	Do you think ginkgo biloba can slow Alzheimer's progression?	48.7 (37)	19.8 (15)
7	Do you know Alzheimer's currently has no cure?	52.6 (40)	28.9 (22)
8	Do you believe it's safe for Alzheimer's patients to drive with a companion?	38.2 (29)	46.1 (35)
9	Are you aware that fall risk increases as Alzheimer's progresses?	71.1 (54)	17.1 (13)
10	Do you recognize high blood pressure as a risk factor for Alzheimer's?	47.4 (36)	26.3 (20)

Note: Percentages are rounded to one decimal place. The numbers in parentheses represent the actual count of respondents

Table 3: Key Findings

Variable	Key Findings	Statistical Significance
Knowledge	53.9% believed AD is normal aging, 48.7% thought aluminum causes AD, 48.7% believed in ginkgo biloba's efficacy. Students with clinical exposure showed better knowledge.	Clinical exposure associated with better knowledge ($p<0.05$)
Misconceptions	32.9% believed AD patients can drive safely, 28.9% thought recovery is possible, 43.4% unaware of delusional symptoms. Textbook-learners showed more misconceptions.	Significant knowledge gaps identified ($p<0.05$)
Education Gaps	71.1% relied on textbooks, only 15.8% learned from clinical experience. Students wanting more training: 57.0%.	Need for curriculum enhancement ($p<0.05$)

Table 4: Attitudinal Indicators by Academic Year and Clinical Exposure

Attitudinal Statement	Academic Year	% Agree (n)	Clinical Experience	% Agree (n)
"AD patients can drive with a companion"	First Year	40.9% (9)	Yes	21.9% (7)
	Second Year	36.0% (9)	No	50.0% (22)
	Third Year	33.3% (7)		
	Final Year	12.5% (1)		
"AD recovery is possible"	First Year	36.4% (8)	Yes	18.8% (6)
	Second Year	32.0% (8)	No	38.6% (17)
	Third Year	28.6% (6)		
	Final Year	12.5% (1)		

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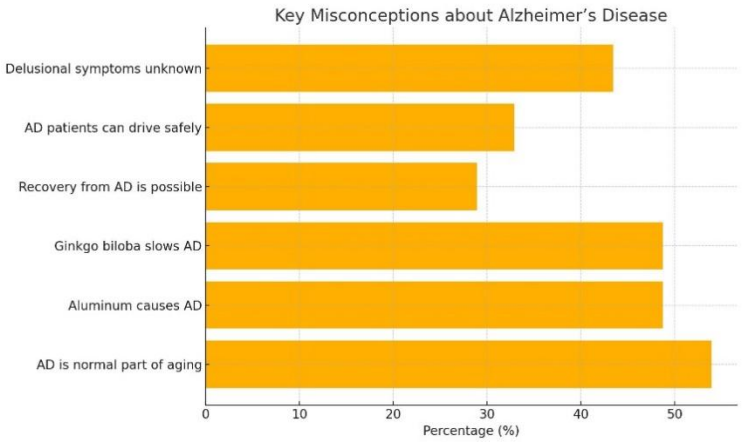

Figure 1 Key Misconceptions about Alzheimer's Disease

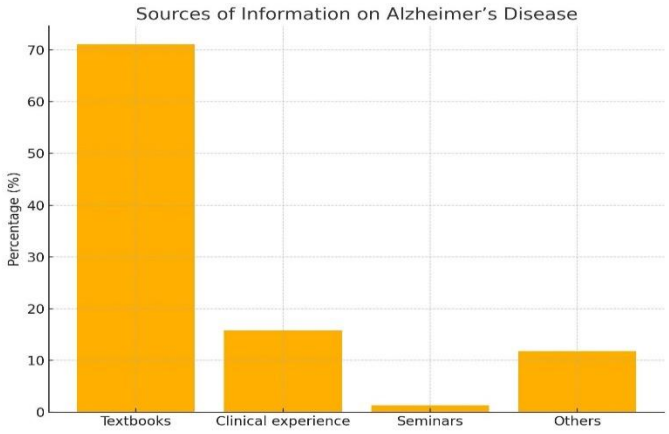

Figure 2 Source of Information on Alzheimer's Disease

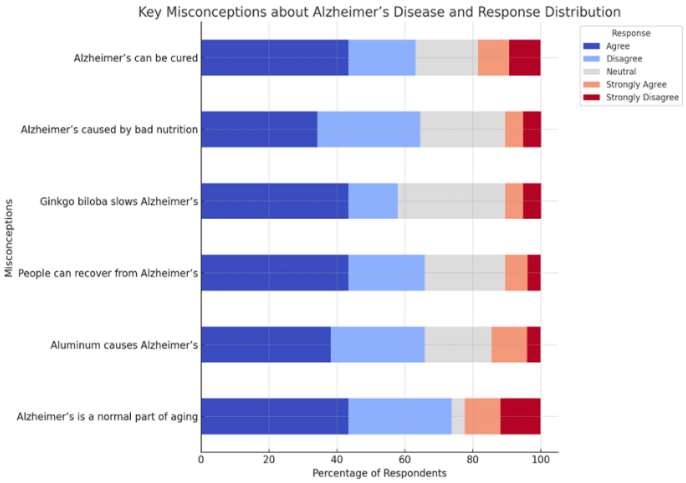

Figure 3 Key Misconceptions about Alzheimer's Disease and Response Distribution

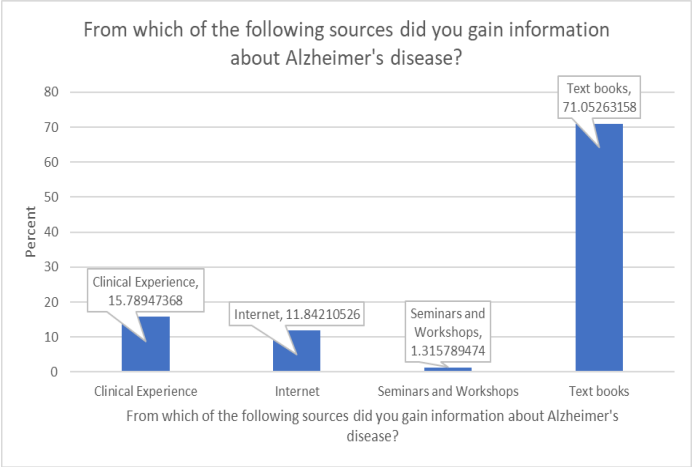

Figure 4 From Which of the Following Sources did you gain Information about Alzheimer's Disease

DISCUSSION

This study provided valuable insights into the knowledge, misconceptions, and attitudes of nursing students in Punjab, Pakistan, toward Alzheimer's Disease (AD), revealing several critical gaps that warrant curricular attention. The most prevalent and concerning misconception was the belief among more than half of the respondents that AD is a normal part of aging. This misperception aligns with existing research highlighting the widespread tendency among healthcare students to conflate normal cognitive aging with pathological neurodegeneration (13,14). Such misunderstandings can lead to delays in diagnosis, missed opportunities for early intervention, and a general lack of urgency in implementing preventative strategies. If future nurses regard Alzheimer's as an unavoidable consequence of aging, they may inadvertently contribute to passive or suboptimal care practices. The study also demonstrated variable understanding of Alzheimer's symptomatology. While cognitive symptoms such as difficulty with financial tasks were widely recognized, awareness of neuropsychiatric manifestations—including paranoia and delusional behavior—was comparatively low. This pattern has been echoed in earlier cross-national research, which found that nursing students consistently demonstrate greater familiarity with cognitive deficits than with behavioral symptoms of dementia (15-17). Such gaps are problematic, as neuropsychiatric symptoms often pose the greatest challenges to caregivers and significantly affect patients' quality of life. An underemphasis on these symptoms during training may leave

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future nurses ill-equipped to manage behavioral disturbances effectively. Integrating dementia-specific modules and simulation-based learning into nursing education may help address these deficiencies by fostering more holistic and empathetic care approaches (18,19).

Another recurring theme was the presence of outdated and unscientific beliefs regarding AD risk factors. A notable percentage of students attributed the disease to aluminum exposure—a theory long discredited in scientific literature. While lifestyle-related risk factors such as smoking and hypertension were better recognized, the coexistence of accurate and inaccurate beliefs highlights a deeper issue: insufficient emphasis on evidence-based learning. This concern has been observed in other healthcare education settings, where students often rely on unvetted online resources and anecdotal information rather than peer-reviewed literature or institutional guidelines (20,21). Curricula need to emphasize critical appraisal skills and the importance of sourcing credible, research-backed information to combat the spread of misinformation within clinical practice. Equally significant was the finding that nearly one-third of respondents believed recovery from Alzheimer's is possible, despite the disease's well-documented irreversible progression. This misconception could influence future nurses' communication with patients and caregivers, potentially fostering false hope or hindering realistic care planning. These results suggest a pressing need to strengthen instruction on the natural history of AD and set accurate expectations regarding its prognosis (22). Additionally, the attitudinal data indicated that many students underestimated safety risks—such as allowing AD patients to drive with a companion—highlighting a limited appreciation for the cognitive and functional impairments involved in the disease.

The study's strength lies in its multi-institutional approach, providing data from diverse academic and clinical environments across Punjab, thus improving the generalizability of its findings within the region. The use of structured and pretested tools also enhanced the consistency and reliability of data collection. However, the study is not without limitations. The cross-sectional design restricted causal interpretations, and the use of convenience sampling may have introduced selection bias. The sample size, while adequate for exploratory analysis, limited the ability to detect subtler associations across subgroups such as gender or academic year. Additionally, attitudinal analysis was based on indirect indicators rather than validated attitude scales, which may have affected the depth and specificity of attitudinal insights. Future research should incorporate larger and more diverse samples, use validated attitude measurement instruments, and explore longitudinal designs to assess the impact of educational interventions on Alzheimer's-related knowledge and attitudes over time. Moreover, exploring the role of experiential learning, such as clinical placements in geriatric and neurology units, may provide further clarity on the factors influencing student preparedness. Ultimately, this study underscores the urgent need for curricular reform in nursing education to improve understanding of Alzheimer's disease, dismantle persistent myths, and prepare students to deliver informed, compassionate, and effective care to a growing population of affected individuals.

CONCLUSION

This study concludes that nursing students in Punjab, Pakistan, possess limited and often inaccurate knowledge about Alzheimer's disease, particularly in distinguishing it from normal aging, recognizing non-cognitive symptoms, understanding risk factors, and accurately perceiving its prognosis and treatment. These misconceptions underscore the urgent need to strengthen nursing curricula through evidence-based, contextually relevant, and practically oriented education. By addressing these knowledge and perception gaps, nursing programs can play a pivotal role in preparing a future healthcare workforce that is not only clinically competent but also empathetic and culturally attuned to the complex needs of individuals living with Alzheimer's disease.

AUTHOR CONTRIBUTION

Author	Contribution
Aneela Jamil*	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published
Yasra Azhar	Substantial Contribution to study design, acquisition and interpretation of Data Critical Review and Manuscript Writing Has given Final Approval of the version to be published
Maimoona Shahid	Substantial Contribution to acquisition and interpretation of Data Has given Final Approval of the version to be published
Sharmeen Edwin	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published
Maham Shakeel	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published

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