A Cross-Sectional Study on Dementia Awareness and Depression among Medical Students at Fazaia Ruth Pfau Medical College, Pakistan

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Abstract

Background: Dementia awareness among medical students is often limited, and many of them face mental health challenges, particularly depression. These factors can influence their ability to provide quality care and impact their well-being during and after medical school.

Objective: This study aimed to assess how much medical students know about dementia, understand how many of them experience depression, and explore whether these two factors are connected.

Methods: A cross-sectional survey was conducted at Fazaia Ruth Pfau Medical College, Karachi, between January and March 2023. A total of 256 students participated by completing an online questionnaire, which covered demographics, their knowledge of dementia (using the Dementia Knowledge Assessment Scale - DKAS), and their mental health status (using the Patient Health Questionnaire-9). The data was analyzed statistically to identify trends and relationships.

Results: Nearly half of the students (42.5%) had insufficient knowledge about dementia, scoring an average of 28.7 ($\pm$6.2) on the DKAS. Depression was another major concern, with 33.1% of participants reporting moderate-to-severe symptoms. Interestingly, students who were more aware of dementia tended to report fewer depressive symptoms (p = 0.002). Female students and those in the early years of medical school were more likely to struggle with both depression and limited dementia awareness.

Conclusion: The findings reveal a need for better dementia education and stronger mental health support for medical students. Improving their knowledge and providing resources to manage stress could benefit both their future clinical practice and their personal well-being.

1. INTRODUCTION

Stress can be defined as a state of psychological or emotional tension caused by various factors, while it can also refer to the body's natural responses aimed at self-protection [1]. Furthermore, stress occurs when an individual perceives incongruence between environmental demands (stressors) and their capacity to handle them [2].

Young-onset dementia (YOD), defined as dementia occurring before 65 years of age, presents distinct diagnostic and therapeutic challenges. Unlike late-onset dementia, YOD affects individuals in their most productive years, leading to profound personal, social, and economic consequences. The causes of YOD are diverse, ranging from neurodegenerative disorders, vascular diseases, and metabolic disorders to autoimmune diseases, with α-synuclein pathologies,

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chronic traumatic encephalopathy, and Fahr's disease also contributing in some cases [2]. While treatments for YOD primarily address symptoms, certain causes, such as vascular dementia, benefit from targeting modifiable risk factors. Non-pharmacological approaches are equally important to ensure patient safety and quality of life.

Research into the epidemiology of early-onset dementia (EOD) highlights its distinctiveness from senile dementia. EOD prevalence varies widely, ranging from 0 to 700 per 100,000 individuals aged 25-64, with neurodegenerative diseases being the most common cause. The increasing incidence of EOD with age underscores the importance of further epidemiological studies to explore environmental risk factors and improve healthcare strategies for affected individuals [3]. Presenile dementia is recognized as a complex disorder associated with significant ethical, legal, financial, and social challenges for patients and their families. It is linked to various conditions, including Alzheimer's disease, vascular dementia, frontotemporal lobar degeneration, and Huntington's disease, underscoring the importance of early detection and comprehensive management [4].

Inflammatory markers have been implicated in the pathogenesis of dementia. Elevated levels of IL-6 and MIP-1α were observed in Down syndrome (DS) patients with Alzheimer-like processes, with a significant correlation between cognitive decline and these chemokines. These findings suggest that inflammatory markers may contribute to neurodegenerative processes and warrant further research into their role in disease progression [5, 6].

Educational gaps in dementia-related training among healthcare professionals remain a pressing issue. Limited coverage of dementia education in medical training programs has been reported, particularly in topics such as young-onset dementia, cultural diversity, and physical healthcare. Lifestyle factors, including low education, smoking, diabetes, physical inactivity, and depression, have been identified as significant contributors to cognitive decline and dementia risk in older adults. Addressing these gaps and risk factors is essential for improving the competency of healthcare professionals and optimizing dementia care [7-9].

Early-onset dementia is an under-recognized condition that significantly impacts individuals during their most productive years. This study aims to investigate medical students' knowledge of dementia and its association with depressive symptoms, hypothesizing that limited awareness of dementia may correlate with higher depressive symptoms. By identifying gaps in dementia education among medical students, this research seeks to enhance early detection, management, and care for patients with EOD.

2. METHODOLOGY

A cross-sectional survey was conducted between January and March 2023 at Fazaia Ruth Pfau Medical College, Pakistan, to assess dementia knowledge among medical students. A non-probability convenience sampling method was employed to recruit participants. The study focused on medical students aged 18-30 enrolled in medical programs, who provided their informed consent. Students who had received prior formal training related to dementia were excluded to minimize bias. Ethical approval for the study was granted by the Institutional Review Board of Fazaia Ruth Pfau Medical College (FRPMC-IRB-2023-20), and confidentiality was maintained throughout the study.

An online questionnaire was distributed to the participants, and interviews were also conducted. The questionnaire consisted of three parts:

1. Socio-Demographic Data: Age, sex, year of study, and prior dementia-related coursework.

2. Dementia Knowledge Assessment Scale (DKAS): to measure participants' awareness of dementia, where higher scores indicate greater familiarity with the topic.

3. Patient Health Questionnaire-9 (PHQ-9): used to assess depressive symptoms and their relationship with dementia knowledge.

To minimize selection bias, recruitment was conducted at varied times and locations to encourage participation. Out of 400 students, 256 provided complete responses, which were included in the analysis. Incomplete forms were excluded from the study.

Descriptive statistics were used to summarize participant profiles, including means, standard deviations, and frequencies. Pearson's Chi-square test was used to examine associations between categorical variables, and independent t-tests were applied to assess differences in DKAS and PHQ-9 scores across demographic groups. Multivariate logistic regression analysis identified factors associated with depression, controlling for potential confounders such as sex and year of study. A p-value < 0.05 was considered statistically significant.

3. RESULTS

A total of 400 students were invited to participate in the study, with 256 complete responses included in the analysis, yielding a 64% response rate. Most participants

were female (58.4%), and 62.8% were clinical-year students (years 3 to 5).

The study found that 42.5% of participants had inadequate dementia awareness, with a mean Dementia Knowledge Assessment Scale (DKAS) score of 28.7 (±6.2). Moderate to severe depression, defined as a PHQ-9 score ≥10, was reported by 33.1% of students. Female students exhibited significantly higher depressive symptoms compared to males ($p < 0.05$). Furthermore, higher dementia awareness was associated with lower depression levels ($p = 0.002$).

Multivariate analysis revealed that clinical-year students were 2.3 times more likely to be aware of dementia than pre-clinical-year students (95% CI: 1.5–3.4, $p < 0.01$). Female students had 1.8 times higher odds of moderate-to-severe depression compared to male students (95% CI: 1.1–3.1, $p = 0.03$). Missing data accounted for 4.7% (12/256).

Table **1** summarizes the sociodemographic characteristics of participants. Gender distribution was 41.4% male and 58.6% female. The distribution of students by academic year was 37.2% pre-clinical and 62.8% clinical-year students. The mean age of respondents was 21.09 ±1.48 years for males and 21.07 ±1.43 years for females.

The average mean score for all dementia-related questions was 3.32 (±1.82), indicating moderate agreement among participants. Emotional disturbances, such as increased irritability (mean: 3.86) and mood changes (mean: 4.22), were the most frequently reported symptoms. Difficulty adapting to changes in routine (mean: 3.84) and verbal expression challenges (mean: 3.84) were also prominent. In contrast, symptoms such as forgetting to shut doors (mean: 2.53) and turning off lights or water supply (mean: 2.55) were less common.

The highest variability was observed in inactivity or disengagement from college (SD: 2.00), verbal expression challenges (SD: 1.97), and recalling recent conversations (SD: 1.94).

Conversely, consistent responses were observed for forgetting to shut doors (SD: 1.72) and difficulty using laboratory instruments (SD: 1.65).

The 33-item Likert scale used for evaluating dementia-related symptoms demonstrated high reliability, with a Cronbach's Alpha of 0.959 (Table **3**, Fig. **1**).

The association of dementia-related symptoms with gender and age showed no significant differences. Gender had a p-value of 0.619, while age had a p-value of 0.631, indicating uniform experiences across these variables in Table **4**.

Table 1: Socio-demographic characteristics of study participants.

Variables (MBBS Students)	Respondents		Gender			
	n	Percentage (%)	Male	Mean Age	Female	Mean Age
1st year	77	30.08%	39 (50.65%)	19.59 ± 1.04	38 (49.35%)	19.39 ± 0.82
2nd year	48	18.75%	22 (45.83%)	20.95 ± 0.72	26 (54.17%)	20.58 ± 0.81
3rd year	49	19.14%	18 (36.73%)	22.06 ± 1.16	31 (63.27%)	21.71 ± 0.59
4th-year	82	32.03%	38 (46.34%)	22.24 ± 0.82	44 (53.66%)	22.36 ± 0.87
Total	256	100.00%	117 (45.70%)	21.09 ± 1.48	139 (54.30%)	21.07 ± 1.43

Table 2: Statistical representation of dementia-related questions with mean responses (± standard deviation) and their significance (p-values).

S. No	Questions	Mean ± SD	p-value
1.	Forgetting locations	3.14 ± 1.97	**0.022***
2.	Neglecting utilities (lights/water)	2.55 ± 1.78	**0.046***
3.	Forgetting to close doors	2.53 ± 1.72	0.194
4.	Difficulty recalling recent events	3.48 ± 1.94	0.709
5.	Forgetting one task when multitasking	3.47 ± 1.75	0.991
6.	Taking longer to complete tasks	3.77 ± 1.81	0.867
7.	Difficulty in planning	3.49 ± 1.87	0.717
8.	Difficulty understanding challenging topics	3.57 ± 1.76	0.441
9.	Reduced interest in daily college attendance	4.10 ± 2.00	0.556
10.	Increased anger	3.86 ± 1.92	**0.047***
11.	General memory issues	3.28 ± 1.86	0.254
12.	Increased memory loss over time	3.19 ± 1.88	0.184
13.	Repeated statements/stories in a day	3.05 ± 1.83	0.834
14.	Forgetting or difficulty tracking events/appointments	3.04 ± 1.72	0.765
15.	Suspecting others of hiding or stealing items	2.95 ± 1.77	0.113
16.	Frequently checking day/date/month/time	3.39 ± 1.85	0.595
17.	Disorientation in strange places	3.50 ± 1.79	0.531
18.	Confusion during travel	3.45 ± 1.75	**0.034***
19.	Difficulty calculating change	3.38 ± 1.93	0.704
20.	Difficulty managing finances	3.30 ± 1.89	0.44
21.	Difficulty using lab instruments	2.86 ± 1.65	0.448
22.	Failing sense of direction	2.84 ± 1.62	0.983
23.	Difficulty finding words other than names	3.04 ± 1.68	0.883
24.	Forgetting names of colleagues	3.09 ± 1.80	0.209
25.	Trouble recognizing familiar faces/objects	2.72 ± 1.73	0.64
26.	Difficulty following instructions	2.96 ± 1.75	0.67
27.	Frequently misplacing items like keys/glasses	3.55 ± 1.95	0.653
28.	Difficulty learning new tasks	3.41 ± 1.79	0.308
29.	Difficulty expressing verbally	3.84 ± 1.97	0.108
30.	Changes in mood or increased irritability	4.22 ± 1.96	**0.042***
31.	Difficulty adapting to routine changes	3.84 ± 1.88	**0.024***
32.	Difficulty recalling recent conversations/events	3.38 ± 1.88	0.723
Average		3.32±1.82	-

* Significant p-value

The results reveal considerable variability in dementia-related symptoms among healthcare students. Emotional disturbances, withdrawal from college, and difficulty adapting to changes emerged as the most prevalent concerns. The findings emphasize the necessity of tailored interventions to address these issues and enhance dementia awareness, particularly among pre-clinical-year students and female participants.

4. DISCUSSION

This study sheds light on the significant gaps in dementia awareness among medical students and the high prevalence of depressive symptoms. Alarmingly, 42.5% of participants showed inadequate knowledge about dementia, and 33.1% reported moderate-to-severe depression. These findings point to the pressing need for tailored educational programs and mental health support in medical schools.

The average DKAS score of 28.7 (±6.2) suggests a moderate understanding of dementia among participants, with clinical-year students demonstrating better awareness compared to their pre-clinical counterparts. This aligns with previous studies, such as those by Tullo *et al*. [10, 11], which highlight the lack of structured dementia education in medical curricula. Similarly, Dong *et al*. [12] found that limited dementia knowledge among Chinese health students stemmed from insufficient curricular emphasis.

Table 3: Reliability statistics.

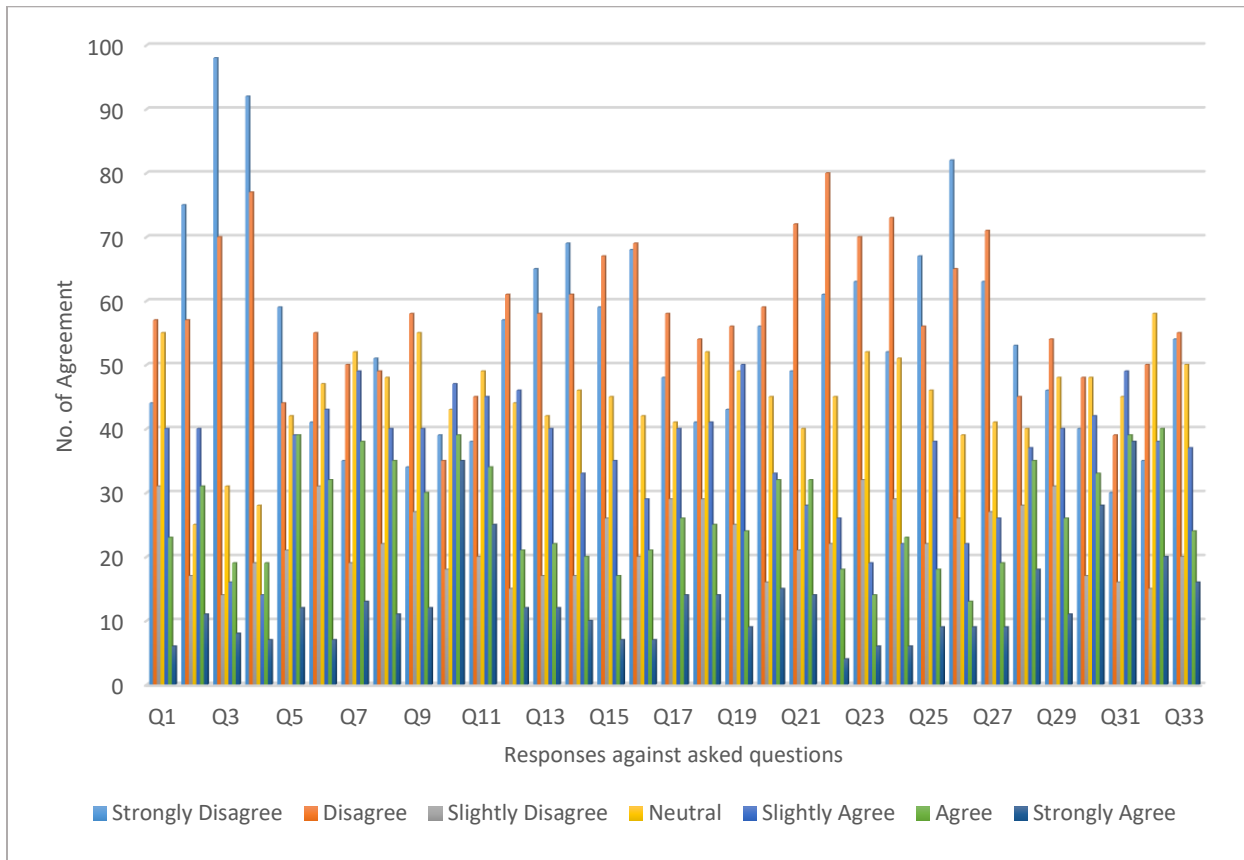| Cronbach's Alpha	No. of Items	Mean	St. Dev
0.959	33	3.32	1.82

Figure 1: Likert Scale – Evaluation of dementia.

Table 4: Association among gender/age and question wise mean score.

Variable		n	Percentage	p-value
Gender	Male	117	45.70%	0.619
	Female	139	54.30%	
Age	17 years	1	0.39%	0.631
	18 years	8	3.13%	
	19 years	33	12.89%	
	20 years	45	17.58%	
	21 years	60	23.44%	
	22 years	65	25.39%	
	23 years	40	15.63%	
	24 years	2	0.78%	
	25 years	2	0.78%	

The link between academic year and dementia awareness—with clinical-year students being 2.3 times more likely to understand dementia—emphasizes the value of hands-on learning experiences. However, as Stojic *et al*. [13] noted, advancing through medical school alone is not enough. Students need direct patient interaction and engaging educational methods like case-based learning and simulations to truly grasp dementia care.

The high rate of depression among participants (33.1%) stands out, especially when compared to studies like Lee *et al*. [14], which reported a 14.9% prevalence among Korean students. This difference could be due to the unique academic pressures and cultural expectations faced by the participants in this study. Similarly, Mao *et al*. [15] found that a third of Chinese medical students experienced depression, underscoring the widespread nature of this issue in medical education.

Female students in this study were 1.8 times more likely to experience depressive symptoms than their male counterparts, mirroring findings from Lee *et al*. [14] and Stewart *et al*. [16]. Factors like body image concerns, difficulty adapting, and limited recreational opportunities likely contribute to this gender disparity [17]. Offering targeted mental health services, peer support networks, and stress management workshops could help address these challenges.

Interestingly, this study found that students with greater dementia awareness were less likely to experience depression (p = 0.002). This aligns with Scott *et al*. [18], who noted that educational initiatives could help reduce stigma and improve attitudes toward dementia. Enhancing dementia education, especially during the early years of medical training, may not only improve knowledge but also build resilience against academic stress.

The findings highlight the need for comprehensive reforms in medical education. Integrating dementia-specific training with mental health education, as suggested by Miller *et al*. [19], could create well-rounded healthcare professionals ready to tackle dementia-related challenges. National guidelines for dementia education, as recommended by Tullo *et al*. [10, 11], could help standardize curricula and ensure consistency across institutions.

5. CONCLUSION

This study highlights critical gaps in dementia awareness and the concerning prevalence of depressive symptoms among medical students. Addressing these issues through tailored educational and mental health programs could better equip future healthcare professionals to manage dementia care while maintaining their own well-being. Collaboration among educational institutions,

policymakers, and mental health experts will be key to achieving these goals.

LIMITATION AND FUTURE DIRECTIONS

This study's reliance on self-reported data and its cross-sectional design may limit the generalizability of its findings. Additionally, the non-random sampling approach poses challenges in applying these results broadly. Future research should adopt longitudinal designs to explore the relationship between dementia knowledge and mental health over time. Qualitative studies could also provide a deeper understanding of students' experiences and challenges.

The study suggests incorporating dementia education in medical curricula, particularly in pre-clinical years, to prepare students for elderly patient care. Establishing mental health services and integrating geriatrics and mental health awareness will improve students' readiness for non-pharmacological interventions.

ETHICAL APPROVAL AND CONSENT TO PARTICIPATE

Ethical approval for this study was obtained from the FRPMC Institutional Review Board (IRB) under reference number FRPMC-IRB-2023-20. Informed consent to participate was obtained from each participant prior to their inclusion in the study.

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AUTHOR CONTRIBUTIONS

MA: led the conception, design, and manuscript preparation.

MM and MF: contributed to literature review and questionnaire formulation, while

TI and NT: handled data collection and analysis.

NT and NS: coordinated SPSS results and project management.

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