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Knowledge and attitudes of clinical physicians towards Alzheimer's disease and related dementias: an observational cross-sectional study from Palestine

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Abstract

Background Dementia is a common global health concern with mortality and morbidity concerns with no cure, making clinical physicians' knowledge and attitude essential for patient care. Therefore, this study aimed to assess the level of knowledge and attitude among clinical physicians toward Alzheimer's disease and related dementias.

Methods A questionnaire was used in this cross-sectional study. 479 clinical physicians in Palestinian hospitals were surveyed. In addition to physicians' demographic variables, the questionnaire assessed knowledge and attitudes toward dementia and related disorders using the Alzheimer's Disease Knowledge Scale (ADKS) and the Dementia Attitude Scale (DAS).

Results Among participating physicians, the mean age was 28.57 years (SD=7.39), and 263 (54.9%) were male. By professional category, the participants included interns (46.3%), board-certified Specialists (20.7%), general Practitioners (19.8%), and residents (13.2%). The mean Alzheimer's Disease Knowledge Scale (ADKS) score was 19.64 (± 3.33) out of 30, representing 65.46% of the total score, indicating a moderate level of knowledge of Alzheimer's disease among practicing physicians. No significant differences in the mean ADKS scores between the different levels of practicing physicians (p -value=0.422). Female physicians had higher ADKS scores than male physicians (p -value=0.008). Regarding attitude, the mean Dementia Attitude Scale (DAS) score was 89.64 (± 12.26) out of 140, representing 64% of the maximum score, indicating a neutral attitude among practicing physicians toward dementia. A weak positive correlation was observed between the ADKS and DAS scores of practicing physicians ($p=0.186$, 95% CI: 0.096–0.274, $p<0.001$).

Conclusion Palestinian physicians have moderate knowledge and a neutral attitude towards dementia and related disorders, highlighting training shortcomings. Programmed educational interventions, combined with clinical updates, may help improve physicians' knowledge of dementia and foster a more positive attitude toward patients with dementia, thereby enhancing competencies in dementia care.

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Trial registration Not Applicable.

Keywords Alzheimer's disease, Attitude, Dementia, Knowledge, Physicians, Practice

Introduction

Dementia is defined as any disorder with a significant decline from one's previous level of cognition that causes interference in occupational, domestic, or social functioning [1]. Dementia is considered to be an acquired syndrome with multifactorial etiology and complex pathogenesis. Many aspects of the etiology and pathogenesis are unknown, and thus, there is currently no curative treatment for dementia. Symptomatic supportive treatments are the only interventions offered to patients [2]. There are several known types of dementia; the most common one is Alzheimer's disease, followed by vascular dementia [3].

Dementia is a common global cause of morbidity and mortality worldwide. In 2018, it was estimated that around 47 million people worldwide had dementia, and by 2050, the number is projected to triple to 131 million [4]. It is estimated that the number of people with dementia among the elderly (65 years or above) will double from 35 million in 2007 to 70 million in 2030 in the United States [5]. In the Middle Eastern region, the prevalence of dementia is expected to increase by 125% by 2050 [6]. The annual per-person costs for dementia include direct medical costs, direct social sector costs, and costs of informal care provided to persons with dementia. This cost is about four times higher than the costs of the same care provided to similarly aged persons without the disease [7]. In 2019, the annual global societal costs of dementia were estimated at US\$1,313.4 billion [8].

In the light of the current absence of curative management for dementia, supportive treatment and healthcare for patients and families remain the only strategy to adopt [9]. A sufficient level of awareness among physicians of the early signs and symptoms of dementia is essential, as they are the primary point of contact for appropriate management [10]. It is noteworthy that a recent study from Saudi Arabia found a lack of knowledge among primary care physicians regarding dementia. This study emphasized the crucial importance of physician education in this area [11]. Another study found that physicians in Hong Kong held positive attitudes toward early detection of dementia; however, they exhibited variable confidence and ability to make early diagnoses [12].

In Palestine, the prevalence of dementia among individuals aged 60 and older is approximately 4.01% [6]. A recent study on Palestinian medical students as prospective physicians found an insufficient level of knowledge about dementia associated with a low level of positive attitudes. Importantly, this study correlated students'

knowledge levels with positive attitudes towards dementia [13]. No prior study has addressed this topic among physicians; therefore, it remains unknown how practicing physicians in Palestine possess foundational knowledge and opinions regarding dementia. To address this knowledge gap, the current study aims to assess the level of knowledge and attitudes among Palestinian practicing physicians regarding dementia. We hypothesize that practicing physicians in Palestine have moderate knowledge and positive attitudes toward dementia, with higher levels of knowledge and more positive attitudes in experienced physicians.

Methodology

Study design and setting

The study employed a descriptive cross-sectional design, and the STROBE checklist was used to guide reporting. The primary objective was to assess the knowledge and attitudes of practicing physicians in the West Bank, Palestine, regarding Alzheimer's disease and related dementia. The study was conducted across various healthcare facilities, including major hospitals and specialized centers. These facilities provided diverse healthcare services, including An-Najah National Hospital, Rafidia Surgical Hospital, Thabet Thabet Government Hospital, Al-Watani Government Hospital, Salfit Government Hospital, Ibn Sina Specialized Hospital, Al-Maqased Hospital, and Al-Mutala' Hospital. This selection of settings ensured comprehensive coverage across different regions and specialties within the healthcare system, enhancing the representativeness of the sample. The study participants were recruited between November 05, 2024, and January 21, 2025.

Study population, inclusion and exclusion criteria

The study population consisted of practicing physicians and interns working in hospitals, medical centers, and clinics throughout the West Bank, Palestine. This group was selected for their direct involvement in patient care and diagnosis, and for potential interactions with patients with dementia, making them a relevant population for understanding knowledge and attitudes towards dementia. Physicians were eligible for inclusion if they were currently engaged in direct patient care at the time of data collection. Exclusion criteria included healthcare personnel in non-clinical roles (e.g., administrative, research-only, laboratory, or policy positions) who do not routinely interact with patients, as well as physicians who were retired or on extended leave from clinical practice. Physicians whose primary roles were educational

or managerial and did not involve direct patient contact were also excluded, as their knowledge and attitudes may not directly reflect clinical practice. No restrictions were applied on the basis of specialty, years of experience, or workplace setting. Participation was voluntary, and informed consent was obtained from all participants prior to data collection. Respondents who did not provide informed consent or who submitted incomplete questionnaires were excluded from the final analysis.

Sample size and sampling techniques

The minimal required sample size was calculated based on the largest number of physicians in the West Bank of Palestine. The sample was calculated from a population of approximately 8000 physicians. Using a 95% confidence interval, a response distribution of 50%, and accepting a margin of error of 5%, the sample size was 367 physicians. A convenience sampling technique was employed to recruit physicians from different medical centers and hospitals. This approach was used to facilitate access to the target population, given the wide geographic distribution of health care facilities and existing movement restrictions.

Variable definitions

Dependent variables included two main variables. First, the knowledge of Alzheimer's disease and related dementia is defined as the total score on the knowledge assessment section. Secondly, attitudes toward dementia were measured using responses to the attitude assessment scale. Summed scores from the Likert-scale items reflect each participant's attitude, with higher scores indicating a more positive or supportive stance toward dementia care. Independent variables will include age, gender, years of experience, specialty, and prior experience with patients with dementia. These factors may affect both knowledge and attitudes, enabling exploration of demographic influences on the primary outcomes.

Study tool, validity, and reliability

An anonymous structured questionnaire was administered in both printed and electronic formats using Google Forms to collect relevant data on dementia and Alzheimer's disease among practicing physicians in Palestine. The study tool used was adapted from previous studies [13–15]. It served as the data collection instrument, designed with three primary sections. The demographics section collected information on participants' age, gender, specialty, years in practice, and prior experience working with patients diagnosed with Alzheimer's disease or other dementias. The knowledge assessment section, which included knowledge-related questions, covered Alzheimer's disease etiology, risk factors, diagnostic criteria, and management options. This section

included true/false items adapted from validated instruments, such as the Alzheimer's Disease Knowledge Scale (ADKS), thereby ensuring a standardized approach to assessing knowledge [14]. The attitude assessment section included Likert-scale items (e.g., 1–5, from “strongly disagree” to “strongly agree”) from the Dementia Attitude Scale (DAS), to evaluate physicians' attitudes toward dementia care, their perceived competence in managing patients with dementia, and their openness to receiving further training. Higher scores indicated a more favorable attitude toward dementia care and a greater willingness to engage with patients with dementia [15]. Reliability of the two instruments was assessed using Cronbach's alpha, a measure of internal consistency. Results demonstrated an acceptable internal consistency for the ADKS (0.725) and the DAS (0.763). Because a convenience sampling approach was used, the precise response rate could not be determined.

Bias

Given the questionnaire's self-report nature, the findings may be affected by self-reporting and social desirability bias. Moreover, the use of non-random sampling may have introduced selection bias; however, this is partially mitigated by recruiting a geographically diverse sample that exceeds the minimally required sample size. Moreover, there is a risk of sampling bias, given that most study participants were medical interns. Therefore, the results of this study should be interpreted accordingly.

Statistical analysis

Data were collected, entered, and cleaned using Google Spreadsheets. Data analysis was carried out using the SPSS software. Descriptive analysis of the demographic, knowledge-related, and attitude-related variables was conducted, and the results were summarized as frequencies, rates, means, and standard deviations. The Kolmogorov-Smirnov (K-S) test revealed p -values < 0.05 for the ADKS scores and DAS scores. Inferential statistics using the Mann-Whitney U test and the Kruskal-Wallis test were conducted to compare the knowledge and attitude between the study groups (based on sex and physicians' level). Spearman's correlation test was used to evaluate the association between the knowledge and attitude. Significance level was set at 5%.

Results

Sociodemographic characteristics of the practicing physicians

A total of 479 practicing physicians participated in this study, with a mean age of 28.57 (SD $\pm$ 7.39) years, reflecting a higher rate of participation among the younger practicing physicians. The study included nearly equal gender representation, with females at 45.1% (216) and

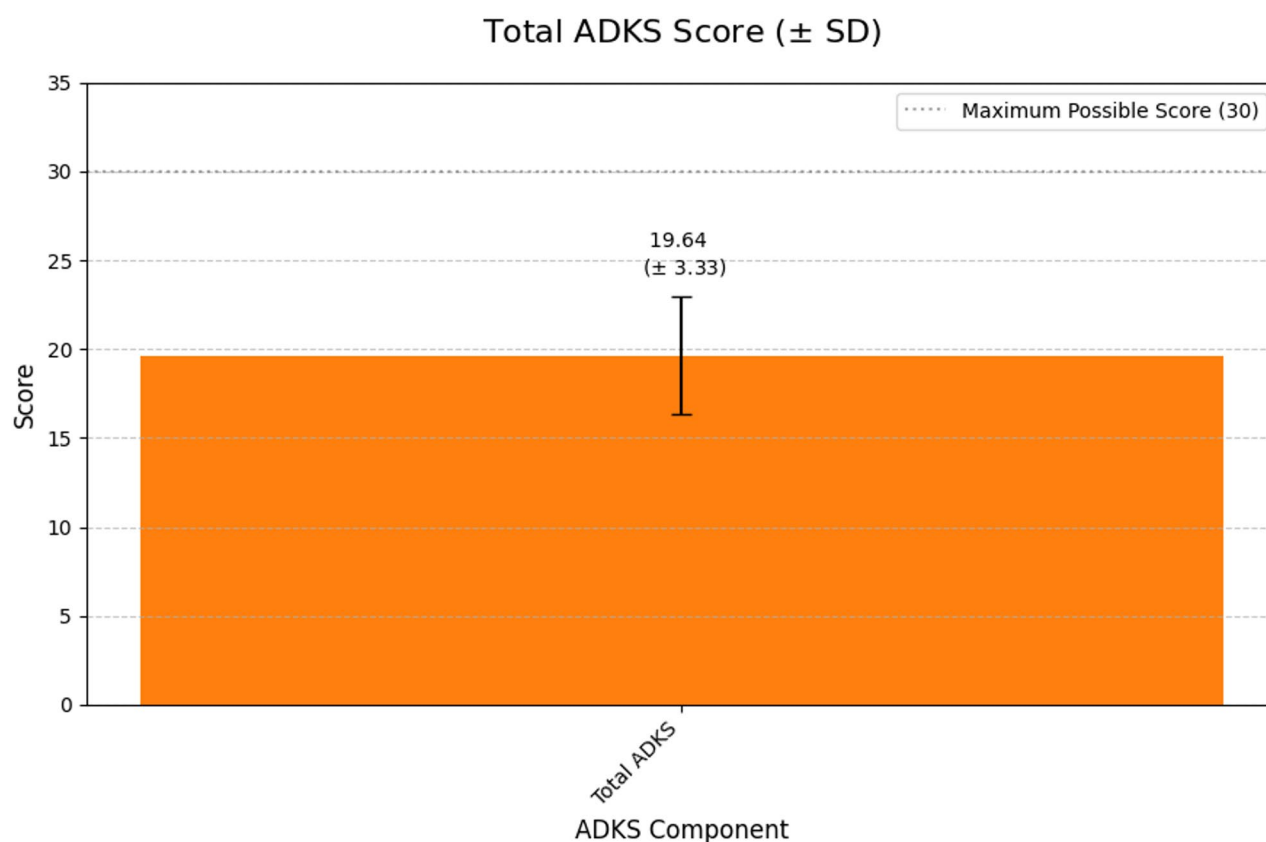
Table 1 Sociodemographic characteristics of the practicing physicians

Variable	Mean	SD
Age:	28.57	± 7.39
Variable	Frequency	Percentage (%)
Age Groups:		
23–30	377	78.7%
31–40	62	12.9%
41–50	26	5.4%
51–60	12	2.5%
61–70	2	0.4%
Sex:		
Male	263	54.9%
Female	216	45.1%
Physician Level:		
Specialists	99	20.7%
Residents	63	13.2%
General Practitioners	95	19.8%
Intern Doctors	222	46.3%
Residence type:		
City	336	70.1%
Village	130	27.1%
Camp	13	2.7%
Experience with dementia diagnosis or treatment:		
Yes	170	35.5%
No	309	64.5%
Total	479	100%

males at 54.9% (263). The majority of the participants were intern physicians ($n=222$, 46.3%), followed by board-certified specialists ($n=99$, 20.7%), general practitioners ($n=95$, 19.8%), and residents in training ($n=63$, 13.2%). Only 170 (35.5%) practicing physicians reported having prior experience diagnosing and managing patients with dementia. The sociodemographic characteristics of the practicing physicians are summarized in Table 1.

Knowledge of Alzheimer's disease among practicing physicians

The mean Alzheimer's Disease Knowledge Scale (ADKS) score was 19.64 (± 3.33) out of 30, representing 65.46% of the total score, indicating a moderate level of knowledge of Alzheimer's disease among practicing physicians, as shown in Fig. 1. The mean correct answer rate varied across the domains of the ADKS score, ranging from 52.16% to 84%. The items in the risk factors domain had the lowest mean correct rate, whereas those in the assessment and diagnosis domain had the highest. No significant differences in the mean ADKS scores between the different levels of practicing physicians (p -value = 0.422). Female physicians had higher ADKS scores than male physicians ($U=24400$, $Z=2.669$, p -value = 0.008).


Fig. 1 The mean Alzheimer's disease knowledge score (ADKS) among practising physicians

Surprisingly, physicians who reported experience diagnosing and managing patients with dementia had lower ADKS scores than those who reported no such experience ($U = 21792.5$, $Z = 3.100$, $p\text{-value} = 0.002$). Moreover, female physicians had higher scores than male physicians in the following domains of the ADKS: symptoms ($p\text{-value} = 0.044$), life impact ($p\text{-value} = 0.042$), and treatment ($p\text{-value} = 0.014$). Similarly, physicians who reported no experience diagnosing and managing patients with dementia had higher scores than those who reported no experience in the following domains of the ADKS: risk factors ($p\text{-value} < 0.001$) and assessment & diagnosis ($p\text{-value} = 0.013$). No significant differences in ADKS domain scores were found across levels of practicing physicians. The mean scores of the ADKS and its domains, with comparisons across variables, are summarized in Table 2 and Fig. 2.

Supplementary Table 1 presents the 30-item statements of the ADKS divided into the 7 domains, along with the corresponding correct answers. The most correctly answered items of the ADKS were “*Alzheimer’s disease is one type of dementia*” from the assessment and diagnosis category, and “*People with Alzheimer’s disease are particularly prone to depression*” from the life impact category, where about 90.8% of the practicing physicians answered correctly. On the other hand, the least correctly answered item in the ADKS was “*When people with Alzheimer’s disease begin to have difficulty taking care of themselves, caregivers should take over right away*,” from the caregiving category, for which only 20.3% of practicing physicians answered correctly. Multiple statistically significant differences in the rates of correct answers across various items of the ADKS were observed between the studied groups, summarized in Supplementary Table 1.

Attitudes of practicing physicians towards dementia

The mean Dementia Attitude Scale (DAS) score was $89.64 (\pm 12.26)$ out of 140, representing 64% of the maximum score, indicating a neutral attitude among practicing physicians toward dementia, as shown in Fig. 3. The mean social comfort score was $40.90 (\pm 4.95)$ out of 70, with a 58.43% mean rate, indicating a negative attitude toward social comfort in the DAS. The mean dementia knowledge score was $48.74 (\pm 10.42)$ out of 70, with a 69.63% mean rate, indicating a neutral attitude toward the knowledge domain of the DAS (Fig. 4). No statistically significant differences in DAS scores were found among the study groups by sex, physician level, or experience with dementia diagnosis or management. Moreover, physicians who reported experience diagnosing and managing patients with dementia had lower DAS Knowledge scores than those who reported no experience ($U = 20672$, $Z = 3.868$, $p\text{-value} < 0.001$). The remaining differences in DAS domain scores (comfort and knowledge)

Table 2 The mean correct answers of content domains on Alzheimer’s disease knowledge scale ($n = 479$)

Domain	Range of Scores	Mean $\pm$ SD	Mean Correct Rate (%)	Sex		Experience with Dementia diagnosis or management				Physician Level			
				Males, Mean rank	Females, Mean rank	U	Z	p-value α	Yes, Mean Rank	No, Mean Rank	U	Z	p-value α
Symptoms	0–4	2.56 ± 0.90	64	229.09	253.29	25533.5	2.013	0.044*	234.13	243.23	25267	0.727	0.467
Risk Factors	0–6	3.13 ± 1.29	52.16	237.81	242.66	27828.5	0.393	0.694	212.55	255.1	21598.5	3.313	< 0.001*
Assessment & Diagnosis	0–4	3.36 ± 0.82	84	241.88	237.71	27909	0.365	0.715	220.88	250.52	23014	2.494	0.013*
Course	0–4	2.95 ± 0.90	73.75	232.96	248.57	26552	1.305	0.192	239.25	240.41	26137.5	0.093	0.926
Life Impact	0–3	2.05 ± 0.70	68.33	229.51	252.77	25645	2.037	0.042*	229.73	245.65	24519.5	1.340	0.180
Caregiving	0–5	2.71 ± 1.04	54.2	230.91	251.07	26013.5	1.659	0.097	224.52	248.51	23634	1.899	0.058
Treatment	0–4	2.88 ± 0.85	72	226.73	256.16	24914.5	2.468	0.014*	237.49	241.38	25837.5	0.314	0.753
Total ADKS	0–30	19.64 ± 3.33	65.46	224.78	258.54	24400	2.669	0.008*	213.69	254.47	21792.5	3.100	0.002*

α Mann-Whitney U-test, β Kruskal-Wallis test

*Significant < 0.05

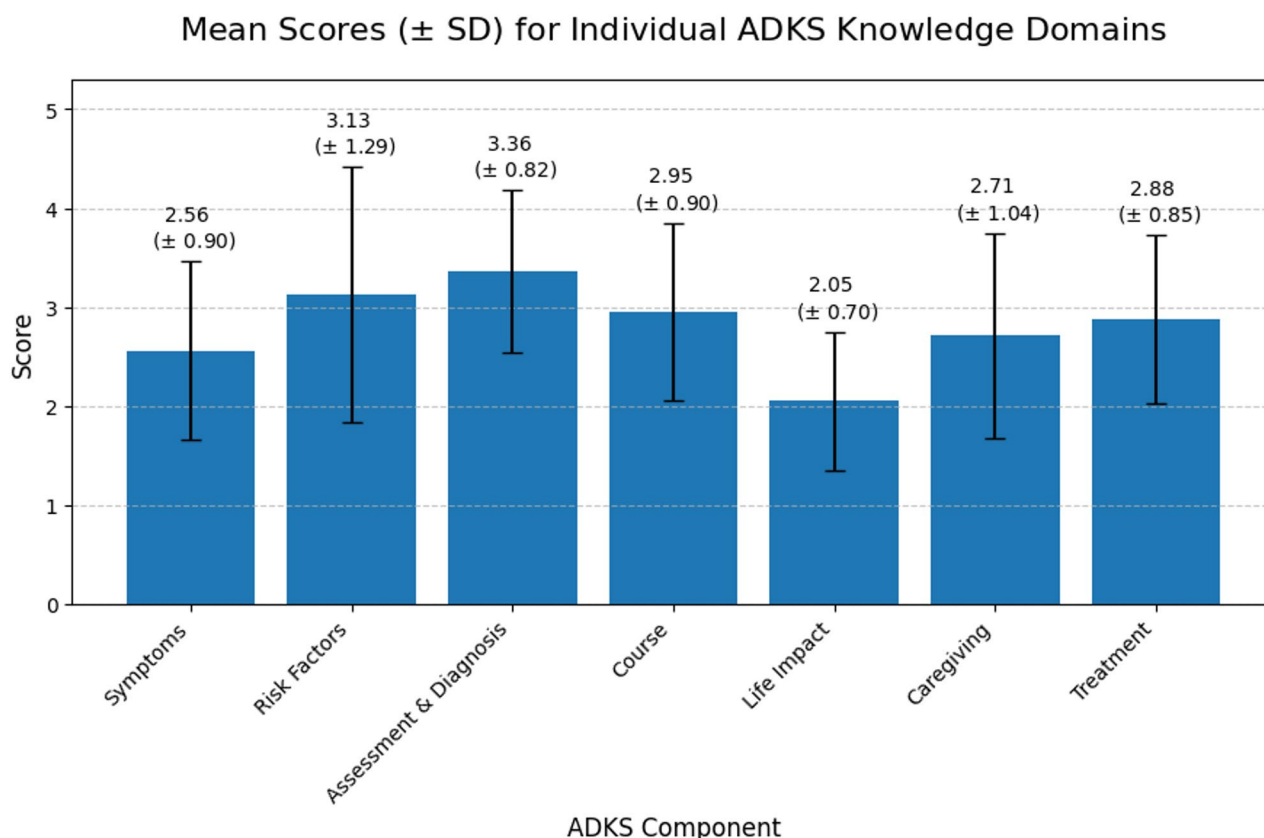


Fig. 2 Mean scores for the Alzheimer's disease knowledge score (ADKS) domains

among the study groups were not statistically significant. Detailed scores for the DAS domains and a comparative analysis of the study groups, stratified by sex, physician level, and experience with dementia diagnosis or management, are presented in Table 3.

Supplementary Table 2 presents the results for the DAS items. Approximately one quarter of the practicing physicians agree with the statement that they feel afraid of people with Alzheimer's Disease and Related Dementias (ADRD). Only one-third of the practicing physicians agreed with the statement that they feel uncomfortable around people with ADRD. Surprisingly, around 43% of the practicing physicians reported that they cannot imagine taking care of someone with ADRD. On the other hand, around 38% of the practicing physicians reported being confident around people with ADRD. Moreover, approximately 69.5% of practicing physicians agreed that they can do a lot to improve the lives of people with ADRD.

Relationship between Alzheimer's disease and related dementias knowledge and the attitudes of practicing physicians toward dementia

As displayed in Table 4, a weak positive but statistically significant correlation was found between the ADKS

and DAS scores of the practicing physicians ($\rho=0.186$, 95% CI: 0.096–0.274, p -value<0.001). Similarly, multiple weak positive correlations were found between the various domains of the ADKS and DAS. The ADKS was positively associated with the knowledge domain of the DAS ($\rho=0.193$, 95% CI: 0.103–0.280, p -value<0.001). On the other hand, the DAS was positively associated with several domains of the ADKS; the assessment & diagnosis domain ($\rho=0.225$, 95% CI: 0.187–0.358, p -value<0.001), the course domain ($\rho=0.106$, 95% CI: 0.014–0.197, p -value=0.020), and the caregiving domain ($\rho=0.139$, 95% CI: 0.048–0.229, p -value=0.002). The exact domains of the ADKS were also positively correlated with the DAS Knowledge score.

Relationship between socio-demographic characteristics, knowledge, and attitude of practicing physicians towards people with dementia

The results of the Kruskal-Wallis test showed no statistically significant differences in ADKS and DAS scores across age groups among practicing physicians. Similarly, no statistically significant differences in ADKS and DAS scores were observed among practicing physicians residing in urban, rural, or refugee camp settings. Table 5 summarizes the relationships between age, residence

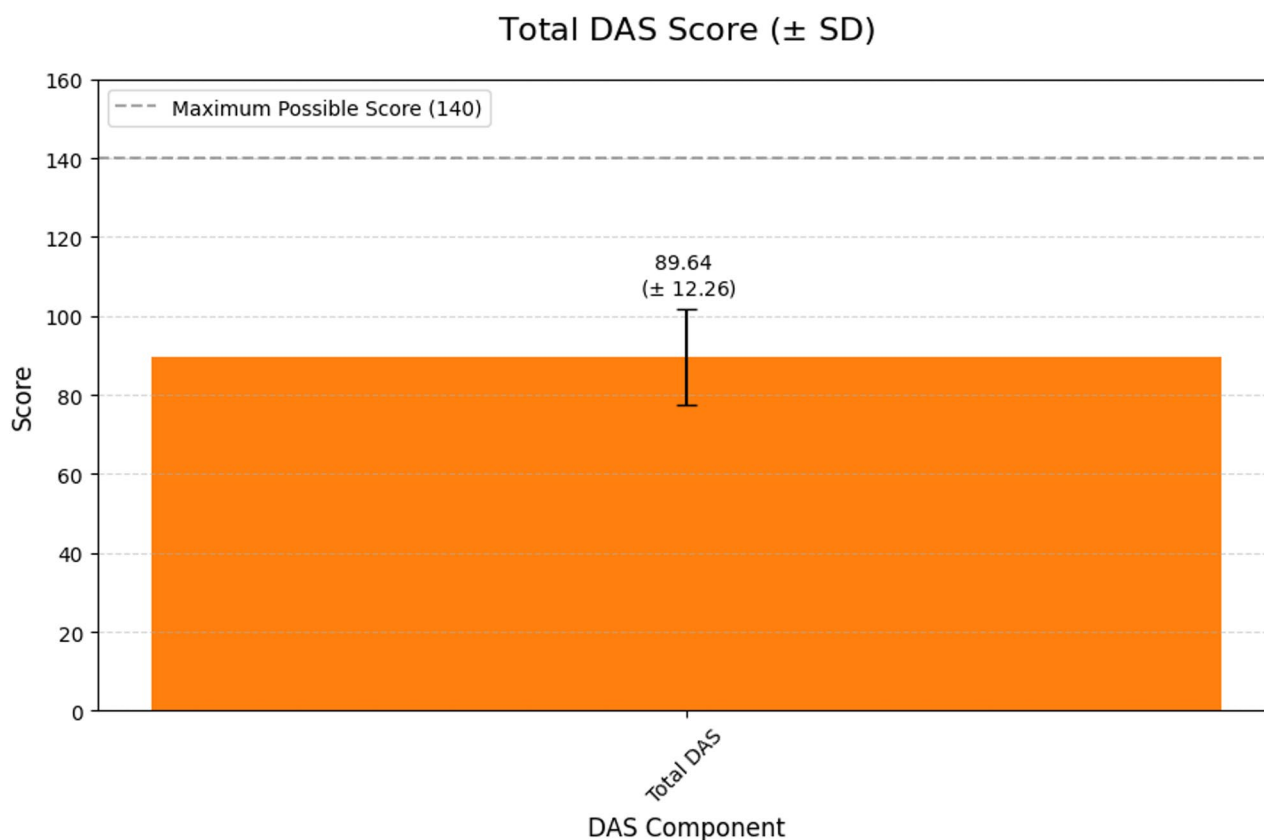


Fig. 3 The mean Dementia Attitude Scale (DAS) among practising physicians

type, knowledge, and attitudes of practicing physicians toward people with dementia.

Discussion

This study aimed to assess the knowledge and attitudes of practicing physicians in Palestine regarding Alzheimer's disease and related dementias (ADRD). Additionally, this study explored the possible association of the physician's sex, level, and experience with diagnosing and managing patients with dementia, and their knowledge and attitudes toward people with dementia. The findings of this study revealed that practicing physicians have a moderate level of knowledge and neutral attitudes toward Alzheimer's disease and related dementias, with noticeable gaps in understanding ADRD and comfort in managing patients with ADRD. This is particularly important, as these findings may inform future educational interventions to enhance practicing physicians' knowledge and attitudes toward ADRD in Palestine.

ADRD knowledge among Palestinian physicians

Generally, practicing physicians in Palestine displayed a moderate level of knowledge regarding Alzheimer's disease and related dementias (ADRD), as assessed by the

ADKS. This finding is consistent with findings from previous studies conducted among general practitioners (GPs), primary care physicians, family medicine residents, and other healthcare professionals in China [16, 17], Turkey [18, 19], Saudi Arabia [11], Ireland [20], and Brazil [21], showed that these physicians have a low to moderate level of knowledge about dementia. Similarly, a previous study demonstrated that undergraduate medical students in Palestine have insufficient knowledge of ADRD, suggesting inadequate curriculum coverage [13]. Overall, the understanding of ADRD appears to be a national challenge on multiple levels, necessitating educational interventions to enhance the quality of care for patients with dementia.

Notably, three factors can explain the low-to-moderate level of knowledge about ADRD. First, it may stem from potential defects in medical schools' dementia training curricula and the need for comprehensive coverage of dementia training [8]. Secondly, practicing physicians may view the care and management of patients with ADRD as primarily the domain of specialists in this field, rather than general practice [16, 21]. Finally, it may stem from a potential lack of interest in learning about ADRD, as the majority of our sample work primarily in general

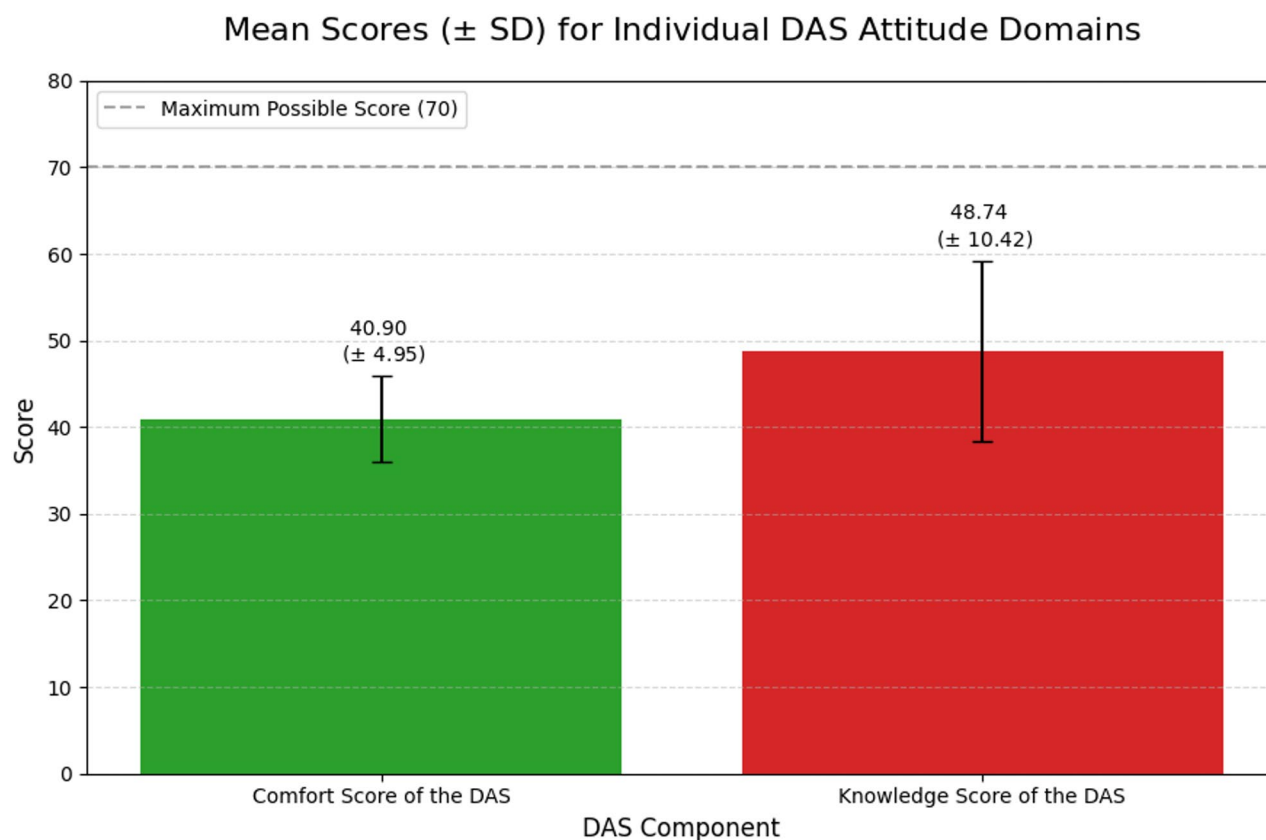


Fig. 4 The mean score for practising physicians' DAS attitude domains

practice and in specialties other than neurology and geriatrics, and two-thirds of the sample have no experience in dementia diagnosis and management.

Although sex was not associated with greater knowledge of ADRD among undergraduate medical students in Palestine [13], female physicians have higher levels of knowledge than their male counterparts. In fact, female physicians displayed a better understanding of dementia symptoms, treatment, and life impact. This link between the sex of the physician and their knowledge of dementia has not been discussed in the literature, underscoring the need for further studies to explore this relationship. Moreover, studies have shown that prior experience with dementia, including direct patient care, clinical encounters, or targeted education, is consistently associated with greater physician knowledge [18, 19, 22]. Surprisingly, in our cohort, physicians with prior experience in dementia diagnosis or management demonstrated a lower knowledge of ADRD. This finding may have resulted from self-report bias; therefore, it should be interpreted cautiously. We hypothesize that participants' self-reported experiences may have been brief and observational rather than hands-on. Such exposure may not translate into a robust or updated understanding of ADRD, particularly regarding diagnostic criteria or contemporary management

guidelines. Furthermore, depending on outdated concepts, inconsistencies in the quality of clinical training, or overconfidence arising from informal experience may lead to unsatisfactory performance on standardized knowledge assessments. These findings indicate that clinical experience alone may be insufficient and emphasize the need for structured, hands-on, competency-based education in dementia care to translate clinical exposure into enhanced knowledge.

Gaps in physicians' knowledge Of ADRD

The domain-specific analysis of ADKS scores provides important insight into the strengths and weaknesses of physicians' understanding of ADRD. Physicians demonstrated adequate knowledge in the following domains: assessment and diagnosis, disease course, and treatment. This finding suggests a reasonable familiarity with the clinical approach to evaluating cognitive impairment, the general progression of dementia, and the therapeutic principles guiding management. These areas often receive more focus in medical training and are encountered more frequently in clinical practice, which may account for the comparatively stronger performance.

On the other hand, the mean scores for the remaining domains were unsatisfactory, indicating knowledge gaps,

Table 3 Scores of the content domains of dementia attitude scale towards dementia ($n=479$)

Domain	Range of total Scores	Mean $\pm$ SD	Percentage of Maximum score (%)	Sex	Experience with Dementia diagnosis or management						Physician Level									
					Males, Mean Rank		Fe- males, Mean Rank	U	Z	p- value α	Yes, Mean Rank	No, Mean Rank	Specialist, Mean rank	Resi- dents, Mean rank	General Practitio- ners, Mean rank	In- terms, Mean rank	H	df	p- val- ue β	
					Mean Rank	Rank														
Comfort Score of the DAS	10–70	40.90 $\pm$ 4.95	58.43%	234.07	247.22	26844.5	1.035	0.301	246.37	236.49	25181.5	0.748	0.455	239.48	223.79	258.60	236.87	2.70	3	0.441
	10–70	48.74 $\pm$ 10.42	69.63%	241.27	238.45	28069.5	0.222	0.824	242.9	272.9	20,672	3.868	<0.001*	252.93	244.30	245.06	230.84	2.03	3	0.565
Total DAS	20–140	89.64 $\pm$ 12.26	64.03%	231.86	249.92	26,262	1.422	0.155	244.22	232.34	24962.5	0.899	0.369	232.51	225.58	259.59	239.05	2.890	3	0.409

Mann-Whitney U-test, β Kruskal-Wallis test

 α Mann-Whitney U-test, β Kruskal-Wallis test

*Significant < 0.05

particularly in the symptoms, risk factors, and caregiving. Limited understanding of the diverse and often early neuropsychiatric or behavioral symptoms of ADRD may hinder early recognition and timely referral. Similarly, insufficient knowledge of modifiable and non-modifiable risk factors may reflect an underappreciation of dementia prevention strategies, an area that has evolved in recent years. The caregiving domain, which received the lowest score, highlights a broader challenge: physicians may have limited exposure to the psychosocial, functional, and caregiver-related aspects of dementia care, although these are central to the well-being of patients and their families. This gap highlights the need for educational initiatives that go beyond biomedical aspects to include holistic, person-centered, and caregiver-focused training, ensuring that physicians can address the full range of challenges associated with ADRD.

Palestinian physicians' attitudes toward dementia

The evaluation of physicians' attitudes toward dementia, conducted using the Dementia Attitude Scale (DAS), showed an overall neutral attitude. This indicates that while physicians do not have overtly negative views about dementia, they also do not exhibit strongly positive or supportive attitudes. In contrast, physicians in China and Saudi Arabia demonstrated a positive attitude toward dementia [11, 16]. This finding is significant because physician attitudes play a crucial role in influencing diagnostic behavior, communication, and the overall quality of care.

Domain-specific analysis uncovered notable differences between the two components of the DAS. The social comfort domain, which reflects ease and confidence in interacting with individuals living with dementia, demonstrated the lowest relative scores (58.43%). This finding suggests comparatively lower levels of comfort in direct interactions with patients with dementia among participating physicians. Such patterns may be related to limited exposure to dementia care, inadequate training in communication strategies for patients with cognitive impairments, or insufficient experience in managing behavioral symptoms. We hypothesize that these factors may be potential barriers to optimal engagement in providing comprehensive care and support to patients with dementia. In contrast, the knowledge domain showed a relatively higher mean score, indicating a neutral cognitive attitude toward dementia. This suggests that while physicians possess a foundational understanding of dementia-related principles, this knowledge may not fully translate into higher levels of comfort or confidence in clinical interactions with patients living with dementia.

Importantly, no statistically significant differences in overall DAS scores were observed across sex, physician level, or prior experience categories, indicating that

Table 4 Relationship between ADKS and DAS scores of the practicing physicians

Alzheimer's Disease Knowledge Score	Dementia Attitude Score					
	Overall		Comfort Score		Knowledge Score	
	Correlation Coefficient (95% CI)	p-value	Correlation Coefficient (95% CI)	p-value	Correlation Coefficient (95% CI)	p-value
Overall score	0.186 (0.096–0.274)	< 0.001*	0.007 (-0.085-0.099)	0.878	0.193 (0.103–0.280)	< 0.001*
Symptoms	0.089 (0.003–0.180)	0.051	0.031 (-0.062-0.123)	0.501	0.075 (-0.017-0.166)	0.101
Risk Factors	0.007 (0.085-0.10)	0.87	− 0.048 (-0.140-0.044)	0.29	0.031 (-0.062-0.123)	0.503
Assessment & Diagnosis	0.225 (0.187–0.358)	< 0.001*	0.080 (-0.012-0.171)	0.078	0.280 (0.193–0.363)	< 0.001*
Course	0.106 (0.014–0.197)	0.020*	0.049 (-0.044-0.140)	0.287	0.092 (0.0-0.183)	0.044*
Life Impact	0.065 (-0.037-0.147)	0.225	-0.131 (-0.123-0.061)	0.498	0.061 (-0.031-0.153)	0.181
Caregiving	0.139 (0.048–0.229)	0.002*	0.012 (-0.080-0.104)	0.788	0.153 (0.062–0.242)	< 0.001*
Treatment	0.084 (-0.008-0.175)	0.065	0.003 (-0.090-0.095)	0.954	0.078 (-0.014-0.169)	0.088

Spearman Correlation by ranks

*Significant < 0.05

attitudes toward dementia are broadly similar across demographic and professional subgroups in this cohort. However, one notable exception emerged: physicians who reported prior experience diagnosing or managing dementia scored significantly lower in the knowledge domain compared to those without such experience. This counterintuitive finding aligns with similar patterns observed in the ADKS results and may reflect the unstructured, inconsistent, or outdated nature of dementia-related experiences in the local clinical context. This pattern suggests that unstructured practical exposure alone is not necessarily associated with higher dementia knowledge or more positive attitudes, unless reinforced by structured training. However, this result should be interpreted cautiously, given the risk of potential reporting bias.

The relationship between physicians' knowledge of Alzheimer's disease and related dementias (ADRD) and their attitudes toward dementia revealed a pattern of weak but statistically significant positive correlations. This indicates that higher levels of knowledge are modestly associated with more positive or informed attitudes, although the strength of these associations remains limited. The overall correlation between the ADKS and DAS scores suggests that while knowledge may influence attitudes, it accounts for only a small proportion of attitudinal variance, underscoring the multifactorial nature of physicians' perceptions of dementia.

Recommendations and directions for future research

The findings of this study highlight a pressing need for targeted educational interventions that not only improve physicians' knowledge of dementia but also enhance comfort, confidence, and attitudes toward caring for individuals with cognitive impairment. Strengthening both domains is essential to facilitating earlier recognition, empathetic communication, and comprehensive dementia care. Based on these findings, we recommend

designing hands-on continuing medical education courses or workshops, aiming to improve the knowledge and perspectives of Palestinian Physicians regarding dementia. The use of case-based discussions and the inclusion of the communicative and caregiving aspects of dementia care would greatly enhance the outcomes of such training programs. Such educational interventions should aim to develop not only competent but also empathetic and confident physicians in the management of ADRD. Future studies can be directed to explore the relationship between the physician's sex and their knowledge of ADRD. Moreover, assessing the impact of future educational interventions on physicians' knowledge and attitudes toward dementia, as well as on the quality of care, remains essential.

Strengths and limitations

This is the first report to explore the knowledge and attitudes toward dementia among practicing physicians in Palestine. It provided a comprehensive assessment of physicians' preparedness to provide care for patients with dementia. The use of validated tools, such as the ADKS and DAS, enables comparability of findings. Furthermore, the inclusion of physicians from multiple health-care settings across regions ensured broad coverage. On the other hand, the use of a convenient sampling strategy limits the generalizability of the findings and may have introduced selection bias. Moreover, the study sample includes a relatively high proportion of young physicians and interns, which may not fully reflect the knowledge and attitudes of more experienced practitioners. Therefore, this may limit the generalizability of the findings to older physicians and largely represent the next generation of physicians rather than the whole workforce. Additionally, the use of a self-reported questionnaire may have introduced social desirability bias, impacting the quality of our findings. However, using an anonymous survey for data collection might have significantly minimized

Table 5 Relationship between socio-demographic characteristics, knowledge, and Attitude of practicing physicians towards people with dementia (n=479)

Variable	Age Group		(31–40),		(41–50),		(51–60),		(61–70),		H		df		p-value α		Residence Type		Refugee Camp,		H		df		p-value α	
	(23–30),	Mean Rank	(31–40),	Mean Rank	(41–50),	Mean Rank	(51–60),	Mean Rank	(61–70),	Mean Rank							City, Mean		Village,		Mean rank					
ADKS Score	237.56		250.27	249.88	249.88	228.54	228.54	321	1.37	4	0.849	244.42	226.82	257.65	1.75	2	0.417									
DAS Score	238.91		225.88	271.83	289.75	289.75	171.75	4.083	4	0.395	246.76	222.38	241.35	2.91	2	0.233										

α Kruskal-Wallis test
*Significant <0.05

this effect. Overall, the results of this study should be interpreted cautiously, and a more structured, objective assessment of physicians’ knowledge and competencies remains essential.

Conclusions

Palestinian physicians demonstrated a moderate level of knowledge regarding Alzheimer’s disease and related dementias (ADRD) and an overall neutral attitude toward dementia. Poor knowledge was demonstrated in domains such as symptoms, risk factors, and caregiving of patients with dementia. A predominantly negative attitude was observed in the comfort domain. These findings underscore the pressing need to design and implement continuing medical education interventions with hands-on training and case-based discussions. The weakly positive association between the physicians’ knowledge and attitude toward dementia indicates that the desired change should be comprehensive, focusing on improving the physicians’ communicative and caregiving competencies. Future studies may be directed to evaluate the effects of educational interventions on physicians’ knowledge and attitudes toward dementia, as well as the quality of care provided.

Abbreviations

- ADRD Alzheimer’s disease and related dementias
- ADKS Alzheimer’s Disease Knowledge Scale
- DAS Dementia Attitude Scale

Supplementary Information

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Supplementary Material 1.

Supplementary Material 2.

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Authors’ contributions

M.A. A.R. and M.G: Conceptualization, Methodology, data analysis, writing original-draft and editing, and supervision. M.AL, M.D, S.AL: Writing original draft and editing. A.A, A.S, A.K and F.H: Data collection and writing original-draft.

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Data availability

The corresponding author will provide any information about this study upon reasonable request.

Declarations

Ethics approval and consent to participate

The study was approved by the Institutional Review Board of An-Najah National University (IRB ref: BioMed. Nov.2024/15). The clinical physicians provided informed consent before they could qualify to participate in the study. All methods were carried out in accordance with the Declaration of Helsinki.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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