ORIGINAL ARTICLE

MEDICAL STUDENTS' KNOWLEDGE AND SOCIETAL ATTITUDES TOWARDS AUTISM SPECTRUM DISORDER: A CROSS-SECTIONAL STUDY

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ABSTRACT

Objectives: This study focuses on assessing autism knowledge and societal attitude among medical students in Karachi, who represent the future of healthcare.

Methods: A cross-sectional study was conducted in July, 2022. The targeted population was Medical students of Dow Medical College, Karachi. A survey was conducted to obtain information related to demographics, ASD related information, ASD knowledge and societal attitude on ASD symptoms through a questionnaire. Independent sample t-test was used to compare the mean ASD Knowledge and societal attitude score with groups by using SPSS. Level of significance was set on 5% for this study.

Results: A total of 431students were invited to participate in this voluntary survey carried out to investigate their knowledge and societal attitude regarding ASD. Among the participants, 68.7% (296) were female, while 31.3% (135) were male. According to our results 425 out of 431 respondents were of the view that both the general public and medical students should be provided with basic knowledge regarding the symptoms and features of ASD. The study results revealed moderate to high awareness regarding autism spectrum disorder (ASD) among participants, with 64.3% recognizing it as a developmental disorder (mean = 3.62 ± 1.09). A majority correctly identified key characteristics, including poor social skills (73.3%), resistance to routine changes (70.3%), and the importance of special education (72.4%). Mean societal attitude score differed significantly ($p < 0.001$), with those who had an autistic family member 3.91±0.44 and also showed a significant difference ($p = 0.005$), with those who had attended ASD sessions, were higher mean scores (4.01±0.43) than those who had not (3.83±0.49).

Conclusion: The findings of this study strongly support the need for mandatory training and awareness programs on autism spectrum disorder (ASD) in medical colleges to improve the ability of future practitioners to identify and manage ASD in clinical practice.

Keywords: Autism Spectrum Disorder, Knowledge, Societal attitude, Medical Students, Pakistan.

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INTRODUCTION

Autism Spectrum disorder (ASD) is a heterogeneous complex multifactorial neurodevelopmental disorder characterized by challenge in social communication and interactions [1]. These patients also exhibit repetitive or restrictive activities and behavioral patterns such as following specific daily routine, rigidity in behavior, repetitive movements and atypical response to sensory stimuli [2]. Autism Spectrum Disorder (ASD) is highly diverse in its presentation. This spectrum ranges from individuals with significant developmental delays and impairments to those with exceptional intellectual or artistic talents, making it a highly individualized disorder. The exact etiology of ASD remains unclear but involves both genetic and environmental factors [3–4]. Increased risk is associated with having a sibling with ASD, older parental age, genetic conditions such as Down syndrome or Fragile X syndrome [5–6], and very low birth weight [7].

Epidemiological studies have documented a steady rise in the prevalence of Autism Spectrum Disorder (ASD) over the past 30 years [8]. This increase could be due to factors such as improved awareness, better diagnostic tools, and broader diagnostic criteria. However, the exact reasons for this trend remain a topic of ongoing research. The estimated average worldwide prevalence of ASD is 1% [9]. Though, the reported prevalence of Autism Spectrum Disorder (ASD) varies substantially, many studies have reported higher rates in certain populations or regions. Some studies have reported autism prevalence rates as high as 3.9% in parts of Asia, [10]. highlighting regional differences in diagnosis and awareness of the condition. The Pakistan Autism Society estimates that approximately 350,000 children in Pakistan are affected by Autism Spectrum Disorder [11]. ASD is a lifelong condition that typically becomes noticeable in early childhood, often as early as 18 months or even sooner [12]. It presents with a wide range of symptoms that vary from person to person. The severity and combination of these symptoms can differ greatly among individuals [13]. At present, there is no known cure for Autism Spectrum Disorder (ASD). However, research shows that early therapeutic and behavioral interventions can lead to better outcomes and an enhanced quality of life for children with ASD [14]. Though, majority of recent guidelines specify that ASD can be reliably diagnosed in children at 18 months, while certain early signs can be evident by 13-14 months [15]. However, the actual average age at which ASD is diagnosed is 60.48 months; highlighting a significant delay in the time it takes for children to access specialized services for early intervention [16-17]. This gap suggests a critical need for earlier identification and streamlined pathways to diagnosis.

The major barrier to early screening, identification and referral of ASD lies in the limited knowledge, awareness, and specialized training among healthcare professionals [18-19]. ASD is diagnosed through clinical observation and detailed family history, as no definitive lab test exists [20–21]. Physicians must carefully assess behavior and reported symptoms. Over 80% of individuals with ASD have co-occurring conditions, including intellectual disabilities, epilepsy, ADHD, anxiety, and physical health issues like diabetes and cardiovascular disease [22–24].

It has been evidenced from researches that individuals with autism spectrum disorder (ASD) have up to 10 time greater mortality rate compared to the general population [25-26]. Many autistic individuals struggle to acquire quality care due to physicians' limited autism-specific training, low confidence, and time constraints [27]. Various studies from the U.S., Palestine, and others report poor provider self-efficacy and knowledge in managing ASD [28–29], largely due to inadequate autism-focused curricula in medical education. Child psychiatry, including autism, remains a significantly underdeveloped and overlooked area within Pakistan's healthcare system. Limited resources and inadequate training hinder physicians' ability to accurately diagnose and manage autism. The purpose of this specific study is to examine the extent of autism knowledge and awareness among the medical students in Karachi, as medical students represent the future of our healthcare system. Globally, healthcare providers often lack the skills and knowledge to effectively care for autistic children and adolescents, with over half of primary care providers reporting no prior autism-specific training [30]. There is a significant gap in research addressing autism-specific challenges within the Pakistan. The aim of this study focuses on assessing autism knowledge and societal attitude among medical students.

METHODOLOGY

This cross-sectional study, conducted in July 2022, aimed to evaluate the knowledge and societal attitudes of medical students toward Autism Spectrum Disorder (ASD). Convenience sampling was utilized by randomly distributing questionnaire forms among students attending lectures across all five academic years at Dow Medical College, a public sector institution in Karachi that offered a five-year undergraduate program in medicine. The sample size was calculated by World Health Organization (WHO) software Sample Size Determination in Health Studies version 2.0, with estimation of population mean formula: $n = (Z^2 \times ó^2) / d^2$**.** Taking 95% confidence level, *ó* is the standard deviation (0.54) with 0.05 absolute precision. The respondents reported an aggregated mean and standard deviation 3.44±0.54 score for societal attitude toward ASD. The calculated sample size was 449. Using a non-probability, Purposive sampling method, 449 students from the MBBS program were invited to take part in the study from which 431 accepted to participate in the study. Prior to beginning the research students were guaranteed complete anonymity and written informed consent was obtained from each participant.

Study Tool: A survey was conducted to obtain information related to knowledge and societal attitude on ASD. The survey tool was divided into three sections. Part A gathered demographic and ASD related details of participants. ASD related questions covered areas such as whether they had attended ASD-related courses, and had relatives with ASD in Yes/No format.

Part B assessed participants' knowledge of ASD symptoms through a 20-item questionnaire designed to measure their understanding and awareness of ASD. The questionnaire was developed by modifying and updating the survey created by Stone (1987) and later adapted by other researchers [31]. while part C focused on societal attitudes toward ASD, using a 16-item questionnaire covering rights, functionality, and presence of individuals with ASD, developed by Flood et al. (2013), used in a Malaysian study by Low HM, in that study a five-point Likert scale (ranging from Strong Disagree, Disagree, Neither Disagree nor Agree, Agree, to Strongly Agree) was used instead of 4 point, to assess societal attitude among Malaysian students [30]. Part B comprised of 9 true statements (e.g. Are you aware that autism is a developmental disorder?) and 11 false statements (e.g. Do you think autism is completely curable). Part C including 3 positive statements (e.g. People with ASD should have the opportunity to go to college) and 13 negative statements (e.g. People with ASD should not engage in romantic relationships). The higher mean scores consistently reflected higher knowledge toward ASD. The scoring criteria remained the same for societal attitudes towards ASD. These sections employed a five-point Likert scale statements that were false, the scoring was reversed (e.g., strongly agree received a score of 1, and strongly disagree received a score of 5) to accurately calculate participants' overall scores before data analysis. Data was gathered through printed questionnaires, which were non-randomly distributed among medical students at Dow Medical College.

Data Analysis: Statistical analysis calculations were performed using SPSS 25.0. The mean± standard deviation and frequencies with percentage were reported for demographic and ASD related variables. All the false and negative statements were reversing coded prior to the analysis of the mean scores. Knowledge and societal attitudes item-mean scores, and frequencies (percentage) were calculated. First check the normality of the overall knowledge and societal attitude mean scores regarding ASD by using Kolmogorov-Smirnov test. The independent t-test was used to compare mean scores. A p-value of less than 0.05 was considered as significant.

RESULTS

In this study, the mean knowledge and societal attitude scores of Autism Spectrum Disorder (ASD) were compared among medical students. A total of 449 participants were invited and response rate of study participants was 95.99%. The participants' ages ranged from 19 to 23 years, with an average age of 21.58±1.4. Among the participants, 296(68.7%) were female, while 135(31.3%) were male. An overwhelming 398(92%) of participants expressed that Autism Spectrum Disorder (ASD) should be formally incorporated into the medical training curriculum, also, there was high level of agreement as 425(98%) were in favor of allowing general public to attend educational sessions on ASD, as summarized in Table 1.

Table 1: Demographic and Autism Spectrum Disorder (ASD) related information of study participants (n=431)

Characteristics	Frequency (n)
Age (years)	21.58±1.40*
Gender	
Male	135(31.3%)
Female	296(68.7%)
Year of study	
First	72(16.7%)
Second	75(17.4%)
Third	88(20.4%)
Fourth	178(41.3%)
Fifth	18(4.20%)
Family member with autism	
Yes	56(13.0%)
Gender of family member with autism	
Female	12(2.8%)
Male	44(10.2%)
Not applicable	375(87.0%)
Have you attained any session about ASD	
Yes	69(16.0%)
Should ASD be taught in medical programs?	
Yes	398(92.3%)
Should general public be allowed to attend sessions on ASD?	
Yes	425(98.6%)

*Mean± Std. Deviation

Table2 discussed the knowledge of participant regarding ASD, across various statements, with responses rated on a five-point Likert scale from "Strongly Disagree" to "Strongly Agree. A majority of participants 277(64.3%) agreed or strongly agreed that autism is a developmental disorder, with a mean score 3.62 ± 1.09, indicating moderate to high awareness of this fact. However, notable misconceptions were also identified, as 66.4% believed that vaccines increase autism risk (mean = 3.81 ± 1.02). There were mixed responses on the existence of a cure and effectiveness of universal interventions. While participants showed moderate awareness concerning genetic links with 43.6% agreeing, Nearly half of the participants acknowledged that autism can be diagnosed as early as 18 months of age (48.3%) and is more prevalent in males (45.7%).

A large majority 334(77.5%) recognized that autism affects people from all races, ethnicities, and socioeconomic backgrounds also a higher awareness was also observed in participants concerning core characteristics of autistic children, with 73.3% recognizing poor social and communication skills and 70.3% acknowledging resistance to changes in routine. Majority 312(72.4%) agreed about the importance of special education for these children. Mixed responses were observed on statement regarding diagnosis of ASD via blood and genetic test and on whether autism can be fatal over time. Participant also show mixed responses to whether one intervention is effective for all individuals.

Table 2: Knowledge Toward Autism Spectrum Disorder (ASD) Responses Distribution n (%) and Mean ± SD Scores

Knowledge Regarding ASD	SD	D	N	A	SA	Mean± SD
Q1	23(5.3)	51(11.8)	80(18.6)	190(44.1)	87(20.2)	3.62±1.09
Q2	11(2.6)	37(8.6)	97(22.5)	162(37.6)	124(28.8)	3.81±1.02
Q3	26(6.0)	88(20.4)	168(39.0)	103(23.9)	46(10.7)	3.13±1.04
Q4	20(4.6)	72(16.7)	151(35.0)	154(35.7)	34(7.9)	3.26±0.98
Q5	8(1.9)	64(14.8)	151(35.0)	164(38.1)	44(10.2)	3.40±0.92
Q6	9(2.1)	48(11.1)	177(41.1)	152(35.3)	45(10.4)	3.41±0.89
Q7	40(9.3)	154(35.7)	149(34.6)	62(14.4)	26(6.0)	2.72±1.01
Q8	16(3.7)	641(4.8)	97(22.5)	188(43.6)	66(15.3)	3.52±1.03
Q9	19(4.4)	92(21.3)	150(34.8)	119(27.6)	51(11.8)	3.21±1.04
Q10	13(3.0)	73(16.9)	88(20.4)	180(41.8)	77(17.9)	3.55±1.06
Q11	3(0.7)	28(6.5)	88(20.4)	214(49.7)	98(22.7)	3.87±0.86
Q12	58(13.5)	170(39.4)	123(28.5)	62(14.4	18(4.2)	2.56±1.02
Q13	3(.7)	29(6.7)	831(9.3)	231(53.6)	85(19.7)	3.85±0.83
Q14	2(.5)	33(7.7)	93(21.6)	204(47.3)	99(23.0)	3.85±0.87
Q15	20(4.6)	87(20.2)	110(25.5)	150(34.8)	64(14.8)	3.35±1.10
Q16	6(1.4)	19(4.4)	72(16.7)	201(46.6)	133(30.9)	4.01±0.88
Q17	38(8.8)	91(21.1)	149(34.6)	119(27.6)	34(7.9)	3.05±1.07
Q18	29(6.7)	90(20.9)	137(31.8)	127(29.5)	48(11.1)	3.17±1.09
Q19	51(11.8)	132(30.6)	135(31.3)	88(20.4)	25(5.8)	2.78±1.08
Q20	14(3.2)	46(10.7)	147(34.1)	169(39.2)	55(12.8)	3.48±0.95

Q1. Are you aware that autism is a developmental disorder? (T): Q2.Do you think vaccines are causing an increase in autism? (F): Q3. Do you think autism is completely curable (F): Q4. Do autism runs in families (T): Q5. Can autism be diagnosed at earlier developmental stages as early as 18 months? (T): Q6. Do you think autism is more frequently observed in males than in females? (T): Q7. Do you believe changing a child's diet will lessen the severity of autism symptoms? (F): Q8. Do you think that all children with autism show poor eye contact? (F): Q9. Do you believe that same interventional approach can work for all children with autism? (F): Q10. Do you think children with autism can grow up to lead an independent life? (T): Q11. Do you believe that all children with autism must receive special educational services? (T): Q12. Do you think that with if the proper treatment is provided, most children with autism will eventually outgrow it? (F): Q13. Do you think that children with autism have poor social and communication skills? (T): Q14. Do you believe children with autism exhibit resistance to changes in daily routines? (T): Q15. Do you believe that unstable upbringing with lack of proper care is one of the causes of autism? (F): Q16. Do you believe that autism can affect people from every race, ethnic group and socioeconomic background? (T): Q17. Do you think autism can be diagnosed through blood and genetic testing? (F): Q18. Do you think autism can be fatal over time? (F): Q19. Do you believe autistic children can see or hear things that do not exist? (F): Q20. Do you believe that majority of children with autism have intelligence, average or above average? (F)

SD, strongly disagree; D, disagree; N, Neutral; A, agree; SA, strongly agree;

(F), were presented false statements; (T) were presented True statements

Table 3 revealed the participants responses toward the presence and rights of individuals with Autism Spectrum Disorder (ASD). Most of the participants 374(86.8%) and 384(89%) expressed that they were not afraid to be around someone with ASD and felt comfortable with an individual with ASD in their class respectively. A significant portion of participants 415(96.3%) were neutral or supportive of an ASD facility opening in their neighborhood, with a mean score 3.60 ± 0.69, While a substantial majority 324(75.2%) agreed that children with ASD should be fully integrated into mainstream classes with a mean score 4.02 ± 0.85. Responses were more reserved, as only 44.6% agree or strongly agree to show physical affection such as hugging towards ASD individual. A large number of respondents 234(54.3%) agree to the statement that ASD individual should go to college. A strong majority 364(84.5%) were agreed with the idea that individuals with ASD should engage in romantic relationships with a mean score 4.20 ± 0.75, and 334(77.5%) agreed they should marry individuals without ASD with mean score 4.10 ± 0.85. Among participants 332(77%), with a mean score of 4.07 ± 0.87 agreed that people with ASD can form relationships and express affection.

Table 3: Societal Attitude Toward Autism Spectrum Disorder (ASD) Responses Distribution n (%) and Mean ± SD Scores

Societal Attitude	SD	D	N	A	SA	Mean± SD
Q1.	2(0.5)	9(2.1)	46(10.7)	184(42.7)	190(44.1)	4.28±0.77
Q2.	-	16(3.7)	177(41.1)	201(46.6)	37(8.6)	3.60±0.69
Q3.*	-	10(2.3)	37(8.6)	191(44.3)	193(44.8)	4.32±0.72
Q4.	38(8.8)	57(13.2)	144(33.4)	180(41.8)	12(2.8)	3.16±0.99
Q5.*	4(0.9)	29(6.7)	164(38.1)	234(54.3)	4(0.9)	4.46±0.66
Q6.	4(0.9)	35(8.1)	89(20.6)	150(34.8)	153(35.5)	3.96±0.98
Q7.	4(0.9)	-	63(14.6)	203(47.1)	161(37.4)	4.20±0.75
Q8.	1(0.2)	18(4.2)	78(18.1)	172(39.9)	162(37.6)	4.10±0.85
Q9.	-	26(6.0)	73(16.9)	176(40.8)	156(36.2)	4.07±0.87
Q10.*	-	23(5.3)	84(19.5)	186(43.2)	138(32.0)	4.02±0.85
Q11.	15(3.5)	62(14.4)	111(25.8)	160(37.1)	83(19.3)	3.54±1.06
Q12.	7(1.6)	75(17.4)	102(23.7)	145(33.6)	102(23.7)	3.60±1.07
Q13.	4(0.9)	49(11.4)	120(27.8)	167(38.7)	91(21.1)	3.68±0.96
Q14.	2(0.5)	47(10.9)	111(25.8)	142(32.9)	129(29.9)	3.81±1.00
Q15.	31(7.2)	68(15.8)	110(25.5)	127(29.5)	95(22.0)	3.43±1.19
Q16.	21(4.9)	42(9.7)	126(29.2)	157(36.4)	85(19.7)	3.56±1.06

Q1. Do you feel afraid to be around a person with ASD?: Q2. Would you feel comfortable living in a neighborhood where an Autism Spectrum Disorder (ASD) facility is located?: Q3.* Do you feel comfortable having a person with ASD as your classmate?: Q4. Do you feel comfortable to hug a person with ASD?: Q5.* Do you think individuals with ASD should go to college?: Q6. Do you believe it is acceptable for individuals with Autism Spectrum Disorder (ASD) to have children?: Q7. Do you believe it is acceptable for individuals with Autism Spectrum Disorder (ASD) to engage in romantic relationships?: Q8. Do you believe it is acceptable for individuals with Autism Spectrum Disorder (ASD) to marry individuals without ASD?: Q9. Do you believe individuals with Autism Spectrum Disorder (ASD) can form relationships and express affection?: Q10.* Should children with Autism Spectrum Disorder (ASD) be fully integrated into mainstream classrooms?: Q11. Do you believe that individuals with Autism Spectrum Disorder (ASD) are capable of living independently?: Q12. Do you believe autistic individuals can understand other people's feelings?: Q13. Do you agree that a person with Autism Spectrum Disorder (ASD) is not a financial burden to their family?: Q14. Do you agree that students with ASD attending mainstream regular classrooms are not a distraction to students without ASD in that classroom?: Q15. Do you think individual with ASD is not an emotional burden to his/her family?: Q16. Do you agree that people with Autism Spectrum Disorder (ASD) should not be institutionalized for their safety and the safety of others?

SD, strongly disagree; D, disagree; N, Neutral; A, agree; SA, strongly agree;

*were presented positive statements

The mean knowledge and societal attitude scores of ASD did not significantly differ between male and female participants. The t-tests yielded p-values of (p=0.88 & p=0.33), respectively. Participants with a family member diagnosed with autism had slightly higher mean knowledge scores (3.43 ± 0.19) compared to those without (3.37 ± 0.20); however, this difference was not statistically significant (p = 0.080). In contrast, societal attitude scores showed a significant difference (p < 0.001), with participants who had a family member with autism reporting higher mean scores (3.91 ± 0.44).However, there wasn't any significant difference observed in knowledge or societal attitude mean score between participants with male versus female family members with autism p-values (p=0.78 & p=0.85), respectively. There was no significant difference were assessed in knowledge scores noted based on attendance at an educational session on ASD (p = 0.56). However, societal attitude of ASD showed a significant difference (p = 0.005), with those who had attended ASD sessions scores were higher mean score 4.01±0.4 than those who had not mean score 3.83±0.49 (Table 4).

Table 4: Comparing the Mean Knowledge and Societal Attitude Scores Between Demographic and Autism Spectrum Disorder (ASD) Related Factors

Autism Spectrum Disorder (ASD)	**Knowledge**		**Societal Attitude**	
Demographic and ASD factors	**Mean± SD**	P-value	**Mean±SD**	P-value
Gender				
Female	3.37±0.26	0.88	3.87±0.49	0.33
Male	3.38±0.23		3.82±0.48	
Family member with autism				
No	3.37±0.26	0.08	3.51±0.62	<0.001
Yes	3.43±0.19		3.91±0.44	
Gender of family member with autism (n=56)				
Female	3.45±0.19	0.78	3.48±0.68	0.85
Male	3.43±0.19		3.52±0.61	
Have you attained any session about ASD				
No	3.38±0.26	0.56	3.83±0.49	0.005
Yes	3.36±0.24		4.01±0.43	
Should ASD be taught in medical programs?				
No	3.29±0.23	0.08	3.73±0.38	0.13
Yes	3.38±0.25		3.87±0.49	

DISCUSSION

The present study assessed knowledge and societal attitudes toward Autism Spectrum Disorder (ASD) among medical students in Karachi, Pakistan. Overall, the data suggest a moderate level of knowledge that was not significantly influenced by demographic factors such as gender or exposure-related variables like knowing someone with ASD or attending related sessions. Although students with a family member with autism exhibited slightly higher knowledge scores, this difference was not statistically significant.

Notably, many participants were unaware that autism can be diagnosed as early as 18 months. Knowledge of genetic links and the higher

prevalence among males was moderate. However, most students correctly identified key symptoms such as limited eye contact, social and communication difficulties, and resistance to changes in routine. A significant proportion also recognized the importance of special education services for children with autism. These findings suggest that while students possess functional knowledge of behavioral traits and support needs, there is a gap in understanding autism's broader cognitive and sensory dimensions. Curriculum enhancements could help bridge this gap.

The findings of this study resonate with those from other research conducted internationally and regionally, highlighting both similarities and distinctions in autism knowledge among medical students. The results from study conducted in Pakistan to evaluate the knowledge and awareness of childhood autism among healthcare professionals evidenced that among all respondents' medical students exhibited comprehensive knowledge regarding male predominance, etiology, method of diagnosis and available treatment options for autism [32]. In another cross-sectional study among fourth year medical students from public and private medical universities of Karachi, researchers found that mean knowledge score was 12.30±4.71 out of 25, indicating a moderate understanding of ASD [33]. Similarly the study conducted in Mumbai revealed insufficient knowledge among final-year medical students, particularly regarding the age of onset and certain diagnostic traits, such as staring into space, lack of interest in surroundings, fixation on routines, and atypical eating habits. Despite these gaps, students in the Mumbai study demonstrated awareness of key features like impaired language development, poor eye contact, and challenges in social interaction, which align with the strengths observed in the current study. The overall score was 11.85 out of 19 in the Mumbai study, participants in this research demonstrated basic awareness but still showed room for improvement in understanding more nuanced diagnostic features and early detection [32]. The multicenter study among medical students of Palestine [29] showed insufficient knowledge about autism, particularly concerning its symptoms, diagnostic characteristics, and treatment options. This was reflected in the students' low median familiarity scores on the subject. This contrasts with findings from the United States, where third-year medical students demonstrated significantly higher knowledge than the general population ($p < 0.001$)

Notably, the U.S. study compared the knowledge levels of medical students with those of the general population and found that medical students had significantly higher knowledge across all surveyed areas ($p < 0.001$). However, despite their stronger knowledge base, the students displayed a low level of confidence in applying this knowledge in practice. The higher than the general knowledge levels observed in the current study, which might reflect differences in curriculum emphasis, exposure to ASD-related content, or cultural and regional variations in autism awareness initiatives [32].

The knowledge levels observed in this study are comparable to findings from other research conducted among medical students at Qasim University in Saudi Arabia reported that 55.5% of participants demonstrated good knowledge regarding ASD and most of them exhibited positive attitude which is slightly higher than the general knowledge levels observed in the current study [33]. Physicians often identify insufficient knowledge and a lack of confidence as major barriers to providing effective care for children with autism. Additionally, studies reveal gaps in medical training: U.S. medical students report inadequate preparation in treating autistic children, while their counterparts in the UK express low confidence in managing the care and referral processes for both children and adults with ASD [28-33].

A major challenge in addressing Autism Spectrum Disorder (ASD) is the issue of delayed diagnosis. Early identification and intervention are crucial, as research consistently shows that intensive, evidence-based early interventions can significantly improve the communication and behavioral challenges faced by young children with ASD. Enhancing knowledge

about autism can lead to earlier recognition and timely interventions, ultimately improving outcomes for children with ASD.

International research involving both medical doctors and medical students highlights a significant gap in medical training related to autism spectrum disorder (ASD), particularly in developing countries. These studies underscore the need for more robust and comprehensive ASD education within medical curricula to equip future healthcare providers with the necessary knowledge and skills. The findings emphasize that while some foundational awareness exists, the lack of specialized training in many regions hampers the ability to address the complexities of ASD diagnosis and management effectively. Strengthening ASD-related education globally is critical to bridging this gap, especially in resource-constrained settings.

Limitations: The study only included medical students from a specific institution, which may limit the generalizability of the findings. The results may not reflect the knowledge or societal attitudes of medical students in other regions of country. In addition, the study relied on self-reported measures to assess knowledge and perceptions of ASD, which may introduce response bias. Students may overestimate their knowledge or provide socially desirable responses rather than an accurate reflection of their true understanding. Furthermore, the study focused on specific aspects of ASD knowledge and societal attitudes, which may not encompass the full range of information necessary for comprehensive understanding, including interventions, support systems, or specific cultural perspectives that are key aspects of ASD.

CONCLUSION

The findings of this study strongly support the need for mandatory training and awareness programs on autism spectrum disorder (ASD) in medical college to improve the ability of future practitioners to identify and manage ASD in clinical practice. Such initiatives are essential for ensuring early and effective intervention. Furthermore, there is a clear need to increase exposure to individuals with ASD during medical training. Providing medical students with more opportunities to interact with ASD patients will not only deepen their understanding but also boost their confidence in managing ASD cases. These findings underscore the importance of integrating ASD-related content and patient interaction into medical curricula to better prepare students for real-world clinical scenarios. The study calls for further research and development of strategies to enhance ASD education and practice.

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Authors' Contribution

BZ: Manuscript writing, interpretation of data and final approval of manuscript

AA: Concept & design, statistical analysis, editing of manuscript, responsible for integrity of research. FJ, TA, ZK, RH, HZ: Data collection and final approval of manuscript.

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