A Study of Assessment of Knowledge of Childhood Autism among Medical Students in Mumbai

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Abstract

Aims: This study is to study the knowledge and awareness on autism among medical students and the factors which impact their knowledge on autism. **Settings and Design:** For the study, a multicenter cross-sectional research has been carried out among medical students in seven medical colleges in Mumbai. **Subjects and Methods:** A total of 201 final-year medical students from seven medical colleges in Mumbai completed the knowledge on childhood autism among healthcare workers (KCAHW) survey and a semi-structured pro forma. Of the 201 students, 152 are from the public medical colleges and 37 from the private medical colleges. **Statistical Analysis Used:** Data collected have been represented in the form of frequency and percentage. SPSS 20.0 is used to analyze the mean distribution of KCAHW scores. A value of $P < 0.05$ is regarded as statistically significant. **Results:** The total mean score in the KCAHW questionnaire is 11.85 ± 3.15 out of 19. This is considered as poor knowledge. Our study reveals that students' knowledge on autism is limited. Knowledge gaps identified in certain autism spectrum disorder (ASD) symptoms are associated with the obsessive and compulsive repetitive pattern of behavior and that autism is associated with epilepsies. **Conclusions:** It is thus important that these children displaying ASD symptoms are diagnosed correctly and at the earliest. To enable this, doctors in all fields must be able to accurately identify the diagnostic features of autism both within and outside the four walls of the hospital.

Keywords: Autism, knowledge about childhood autism among health workers, medical student

INTRODUCTION

Autism is a neurodevelopmental disorder with a genetic basis. It is characterized by marked impairment in social interaction, verbal and nonverbal communication, repetitive behavior, and intellectual disabilities. Some children with autism reach their developmental milestones only to gradually regress later into autism.[1] Typically, the onset occurs before 2½ years and usually persists throughout life.

The global prevalence of autism spectrum disorder (ASD) is estimated at 62/10,000 during 2012.[2] The Centers for Disease Control (CDC) estimates that about one in 68 children aged 8 years have been identified with ASD in a survey across the United States during 2012.[3] Doctors in India have conventionally considered autism a disease of the West doubting its prevalence in India. In reality, it is highly prevalent and rising. This prevalence increase has also been thought to be attributable to increased knowledge among health workers in India and global media.

The research, however, about this condition is limited in developing countries. In South Asian developing countries, the exact prevalence of autism is unknown. There are only few articles supporting the prevalence of autism in India. One such study was carried out to estimate the prevalence of autism in Northwestern states in India surveying 11,000 (children in the age group 1–10 years) participants. An overall prevalence of 0.9/10,000 was calculated, which is lower than the global prevalence but still alarming.[4]

It must be noted that autism requires early detection and intervention to allow child to grow as normally as possible and to help with activities of daily living.[5] However, diagnosis of autism relies heavily on clinical signs as per the Diagnostic and Statistical Manual of Mental Disorder-5 and the variability in symptoms and severity makes diagnosis difficult,[6] and most children are not even diagnosed until after age 4 years as per CDC 2014.[7] Physicians do play an important role in early recognition of ASD because they are usually the first point of contact for parents.

There are tools to assess variation in knowledge on autism among all health workers including medical students over different geographical regions. One such tool developed by Bakare *et al.*[8] in 2008 examines the knowledge of autism among health-care workers using the knowledge about childhood autism among health workers (KCAHW) questionnaire.

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Coming back to medical students, they will be the future of our health care. Hence, it is crucial to assess their knowledge on autism. This in turn will help in the early recognition and intervention for childhood autism. Unfortunately, there is a gap in research about the knowledge on autism among medical students in India.

The objective of this study was to test this baseline knowledge of autism among medical students in Mumbai using the KCAHW tool. Final-year medical students are included our study as they are exposed to clinical wards and are likely to have exposure to such children. The advantage of this cross-sectional study is that we are able to assess the knowledge of autism among final-year medical students, to compare them with similar studies conducted across other countries, and to identify specific questions wherein there is a knowledge deficit.

Review of literature
A study in Lahore claimed that nonphysicians (psychologists and speech therapists) were more likely to correctly identify diagnostic features of autism when compared with physicians (psychiatrists, pediatricians, neurologists, and family physicians).[9] The research showed that people had outdated views such as autism existed only in childhood and social withdrawal was a product of parental bonding and child attachment difficulty.

Studies have also been conducted among medical students. The results in a Nigerian study showed that undergraduate medical students and nursing who spent 4 weeks in psychiatry postings were more likely to recognize symptoms and signs of autism compared to psychology students who spent only 1 week there.[10] Not surprisingly, the total score on the KCAHW questionnaire showed a positive correlation with the number of weeks of postings.

A study in Karachi also showed that students in public medical facilities scored higher on the KCAHW questionnaire as compared to those in private medical facilities.[11] This could be because the longer exposure and readily available patients in public institutes will give medical students a chance to interact with patients and enhance their clinical knowledge. However, the total mean score in this study was low (12.24 ± 3.24) and this reflected deficit in the knowledge on autism among all medical students, as similar to the findings of the Nigerian study.

To the best of our knowledge, there has not been any similar study in India assessing the knowledge on autism among medical students. This may be because, in a developing country like India, most of research is focused on infectious diseases and stress-related noncommunicable diseases. Furthermore, psychiatric illness and neurodevelopment disorders such as autism are not given much weightage in the curriculum despite its rising prevalence. Going forward, it is important for India to address this gap in knowledge on autism for the future of robust all-round health care.

Aims
- To study the knowledge on autism among medical students.

Objectives
- To study the knowledge and awareness on autism among medical students
- To study factors which impact their knowledge on autism (media, attending psychiatry posting, having family members/friends suffering from autism).

Subjects and Methods
Study design
A multicenter cross-sectional study has been carried out over a period of 2 months among medical students in seven medical colleges in Mumbai. The medical colleges included in this study are Topiwala National Medical College, Seth GS medical college, Lokmanya Tilak Municipal Medical College, Grant Medical College, Rajiv Gandhi Medical College, and two private colleges, viz., KJ Somaiya Medical College and DY Patil Medical College.

Sample size and technique
A total of 201 final-year undergraduate medical students have completed the survey. To calculate the sample size, a similar study in Karachi, Pakistan, on final-year medical students[11] was referenced. In this study, sample size was calculated based on a study that reported that less than half of middle school students (46.1%) have heard of autism.[12] Keeping confidence interval 95%, approximated proportion of medical student's awareness about autism is taken as 46%,[12] and assuming a precision of ± 10%, our minimum sample size was calculated as 149.

Inclusion criteria
Participants are final-year undergraduate medical students who have given consent to the study.

Exclusion criteria
Students who did not give consent were excluded.

Data collections
Before data collection, we obtained permission from the Dean. Next, the proposal was sent to The Ethics Committee of Topiwala National Medical College, and we were granted permission to conduct the survey. We created the surveys on SurveyMonkey and shared via WhatsApp to all the final-year students of the medical colleges we had identified for the study. From each medical college, a student was contacted and was asked to share the link to their WhatsApp groups consisting of final-year medical students from their respective colleges. By this way, a maximum number of students could be reached.

It may be noted that this exercise has been conducted outside the college premises and after college hours. The students filled informed consent and the survey which consisted of a semi-structured pro forma containing demographic information

and questions, such as where they have heard about autism and if they have any family member suffering from autism followed by a standard KCAHW survey.

Tools
Semi-structured pro forma

This consists of questions regarding demographic variables and factors such as college name, where they have heard about autism, attended psychiatry postings or not, and if they have any family member suffering from autism.

Knowledge on childhood autism among health workers

This is a self-administered questionnaire that contains a total of 19-item questions that are divided further into four domains. It is similar to the KCAHW tool designed by Bakare *et al.*, which is an open-access article distributed under the terms of Creative Commons Attribution License permitting unrestricted use, distribution, and reproduction in any medium provided the original work is properly cited.

The four domains of KCAHW too are social interaction, impairment in communication, obsessive and repetitive behavior, and characteristics of autism as a disorder and its comorbidities.

The validity of KCAHW questionnaire has been assessed by Bakare *et al.*[8] The test–retest reliability was assessed when the mean domain and total scores at first-time and second-time administration were compared with paired *t*-test statistical analysis. The correlation of coefficient of the mean total score was 0.99. The internal consistency was assessed by correlating the mean interdomain scores during the first- and second-time administration of the questionnaire with the mean total scores and Cronbach's alpha and was calculated as 0.97.

Each question we asked has three options to choose from with only one being correct. The correct option on each question attracts a score of 1 while the incorrect options attract a score of 0.

- Domain 1 contains eight questions that address the impairments in social interaction usually found in childhood autism. A maximum and minimum score of 8 and 0, respectively, are possible in this domain.
- Domain 2 contains only one question that addresses impairment in communication and language development. A maximum and minimum score of 1 and 0, respectively, are possible in this domain.
- Domain 3 contains four questions that address obsessive and compulsive patterns of behavior found in childhood autism, which has been described as restricted, repetitive, and stereotyped. A maximum and minimum score of 4 and 0, respectively, are possible in this domain.
- Domain 4 contains six questions that address information on what type of disorder is childhood autism, possible comorbid conditions, and onset of childhood autism. A maximum and minimum score of 6 and 0, respectively, are possible in this domain.

Therefore, a maximum and minimum total score of 19 and 0, respectively, are possible when the four domain scores are added together.

Statistical analysis

The qualitative data are represented in the form of frequency and percentage. Data have been analyzed for mean distribution of KCAHW scores. A value of $P < 0.05$ is regarded as statistically significant. SPSS version 20.0 (IBM SPSS Statistics 20) is used for statistical analysis.

RESULTS

We received a total of 201 questionnaires that were filled and had written consent of the students. Within the sample, public medical students have a representation of 152 (75.62%) and those from private medical colleges are 37 (18.4%).

Overall, the gender breakup is fairly even with 108 (53.73%) being male students and 93 (46.26%) being female students. Further, a total of 139 (69.15%) students have attended psychiatry postings of 2-week duration: 28 (13.93%) are from private medical colleges and 111 (55.22%) from the government medical colleges.

Total Scores and subscales

Out of 201 students, the total mean score is 11.85 ± 3.15 out of a total of 19 possible.

The mean score in Domain 1 is 5.56 ± 1.79 out of a total of 8. The mean score in Domain 2 is 0.64 ± 0.48. Domain 3 yields a mean score of 2.06 ± 1.23 out of 4. Domain 4 records a mean score of 3.59 ± 1.37 out of 6 [Table 1].

Knowledge gaps in autism

When assessing the knowledge in each domain, Domain 2 and 3 show that < 70% students have ≥ 50% of their answers right. This shows a deficit of knowledge in the language aspect (Domain 2) and regarding the motor skills (Domain 3) of autistic children. However, in social aspects (Domain 1) and etiology and textbook information (Domain 4), >70% of the students have ≥ 50% of their answers right [Table 2].

Proportion of final-year medical students recognizing particular symptoms of ASD in the KCAHW questionnaire are as follows:

- Our study presumes that when < 70% of final-year medical students recognize a particular symptom of ASD, it falls short of acceptable knowledge.[13]

The following revealed knowledge deficiency among the final-year medical students uses this criterion:
- Less than 50% of the assessed population recognizes that ASD symptoms could include abnormal eating habit and that autism is associated with epilepsies.
- Less than 60% of the assessed population recognizes that ASD symptoms could include staring into open space, loss of interest in the environment and surroundings, absence

of social smile, persistent preoccupation with objects, and love for regiment activities.

- Less than 70% of the assessed population recognizes that ASD symptoms could include lack of emotional reciprocity and interest in other people, developmental delay in language skills and that autism is associated with mental retardation.

Quite alarmingly, only around 60% of the students have correctly answered the question that autism is not childhood schizophrenia and the question regarding onset of autism.

Factors influencing knowledge about childhood autism among final-year undergraduate medical students
Correlation of knowledge about childhood autism among health workers score and gender
Out of the 201 students assessed, 93 (46.26%) are male and 108 (53.73%) are female. There is not any significant difference between the total scores of male (11.70) and female (11.99) students. In Domain 1, female students score significantly higher with a score of 5.81 compared to male students (5.28) while Domain 4 has a significant higher score among the male students (3.80) [Table 3].

Correlation of knowledge about childhood autism among health workers scores with attending psychiatry postings
The total score and Domain 1 score are significantly higher with those 139 students who attended 2 weeks of psychiatry postings [Table 4].

Comparison of knowledge about childhood autism among health workers scores among private and government medical colleges
The total mean score for government medical colleges (12.10 ± 3) is significantly higher than that of the private medical colleges (10.7 ± 3.5). The mean scores in Domains 1 and 4 are also significantly higher among the government medical students [Table 5].

Respondents have gained previous knowledge mostly from books, journals, and newspaper (65.17%) followed by clinics or ward rounds (55.22%) and social media (50.24%) [Figure 1].

DISCUSSION

The aim of our study is to assess the knowledge on autism among medical students and the factors that impact their knowledge. In our study, we have assessed knowledge of 4th-year medical students from private and public medical universities. Our results show a mean score of 11.85/19 on the KCAHW questionnaire among all those who took part in the study. This is considered as poor knowledge, while the score of 12 and above is taken as acceptable knowledge on autism. While studies in Nigeria[10] and Karachi[11] among final-year medical students, the total mean score on the KCAHW questionnaire was 12.24 and 12.30, respectively. This shows that the students in Nigeria and Karachi have more knowledge on childhood autism than final-year students in Mumbai.

Table 1: Pattern of distribution of Knowledge on Childhood Autism among Healthcare workers scores among medical students

	Mean±SD
Domain 1 score	5.56±1.79
Domain 2 score	0.64±0.48
Domain 3 score	2.06±1.23
Domain 4 score	3.59±1.37
Composite score	11.85±3.15

SD=Standard deviation

Table 2: Knowledge gaps in autism

	Total number of questions	Number of students ≥50% answers right	Frequency (%)
Domain 1	8	167	83.08
Domain 2	1	128	63.6
Domain 3	4	132	65.6
Domain 4	6	153	76.11

Table 3: Correlation of Knowledge on Childhood Autism among Healthcare workers score and gender

	Mean±SD		P
	Female (*n*=108)	Male (*n*=93)	
Domain 1 score	5.81±1.63	5.28±1.92	0.037
Domain 2 score	0.65±0.48	0.62±0.49	0.72
Domain 3 score	2.12±1.13	1.99±1.33	0.452
Domain 4	3.42±1.39	3.80±1.33	0.051
Composite score	11.99±2.74	11.70±3.57	0.51

SD=Standard deviation

Table 4: Correlation of Knowledge on Childhood Autism among Healthcare workers scores with attending psychiatry postings

	Mean±SD		P
	No (*n*=62)	Yes (*n*=139)	
Domain 1 score	4.85±1.86	5.88±1.66	<0.001
Domain 2 score	0.61±0.49	0.65±0.48	0.64
Domain 3 score	1.85±1.21	2.15±1.23	0.113
Domain 4	3.37±1.48	3.69±1.31	0.127
Composite score	10.69±3.32	12.37±2.93	<0.001

SD=Standard deviation

Table 5: Comparison of Knowledge on Childhood Autism among Healthcare workers scores among private and government medical colleges

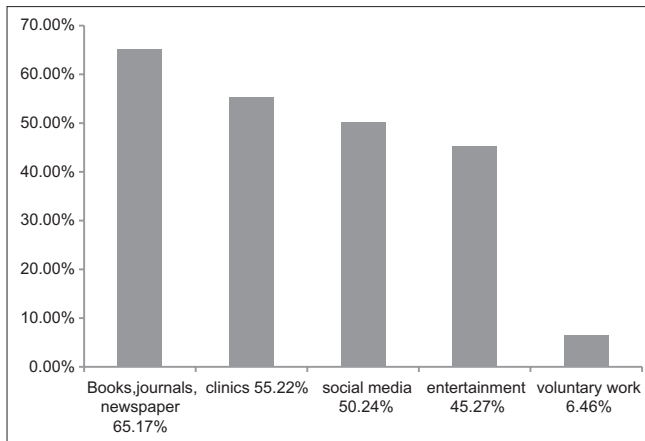|	Mean±SD		P
	Government	Private	
Domain 1 score	5.7±1.7	4.9±1.8	0.009
Domain 2 score	0.6±0.5	0.6±0.5	0.758
Domain 3 score	2.1±1.2	2.0±1.2	0.847
Domain 4 score	3.7±1.3	3.1±1.6	0.018
Total score	12.1±3.0	10.7±3.5	0.008

SD=Standard deviation

Figure 1: Sources of autism

Our study reveals that students' knowledge on autism is restricted to impairment in language development (Domain 2) and obsessive and compulsive behavior (Domain 3). Knowledge in autism is limited to social impairment of autism (Domain 1) and textbook information (Domain 4). Knowledge gaps are identified in certain ASD symptoms such as whether abnormal eating habit and that autism are associated with epilepsies. When cross-comparing the studies, the Nigerian study showed that final-year medical students were not familiar with "abnormal eating habit" as well. They also could not identify that "absence of social smile," "nonspecific gaze focus," and "love for regimented routine activities" are the possible symptoms of ASD.[10]

It is important for medical students to realize that autism is not just a disease of social impairment and to address impairment in language and abnormal repeated movements as diagnostic features of autism.

There is also confusion among medical students in our study regarding the onset of autism. 117 (58.21%) students correctly identify that the onset of autism is in infancy (till 2 years of age) while 75 (37.31%) students think that the onset is in childhood (3–8 years of age). Clarity and knowledge regarding the onset are crucial as early intervention is vital for the development of the child.

On the other hand, 181 students out of 201 in our study correctly identify that there is marked impairment in nonverbal behaviors such as eye to eye contact, facial expression, body postures, and gestures during social interaction, one of the most characteristic features of autism in children.

When comparing the KCAHW scores and the factors that impact knowledge on autism, female students in our study know more regarding the impairment of social interactions among autistic children (Domain 1). Probably females being a more empathetic gender they are more likely to correctly identify the impaired social behavior among autistic children.

Students in our study who attend psychiatry postings scored >12 (acceptable knowledge) whereas those who did not

attend scored <12 (poor knowledge). This shows that along with textbook learning, clinical exposure is important. Hence, medical students should be encouraged to attend postings of adequate duration and interact with and observe such children and their behavior. This is similar to the Nigerian study which showed that the duration of psychiatry postings is proportionate to the scores on KCAHW.[11]

Final-year students from government colleges in our study have scored more in the total scores (>12, acceptable) in comparison to private college students (<12, poor). Clearly, government colleges give the medical students a greater exposure both in terms of number of children observed and different levels of autism. Since autism has a broad spectrum, it is important to observe as many cases as possible for better understanding. This helps enhance overall clinical knowledge. Like our Mumbai study, the Karachi study[11] also has students from government colleges with scores that significantly higher in Domain 1 and Domain 4. Domain 1 is based on the impairments in social interaction found in childhood autism, which can only be appreciated when one observes and interacts with an autistic child.

Our study shows that most students attain their knowledge through textbook learning rather than clinical exposure. It is important to change this as clinical exposure is key to diagnosing autism and other such neurodevelopmental disorders.

Autistic children are a part of society and have the right to enjoy all available resources to its optimum. Inclusiveness is the key factor which has to be practiced at all levels right from schools to public spaces and social settings. It is thus important that these children are diagnosed correctly and at the earliest. This would ensure early intervention which would help them live a more enriched life. To enable this, doctors in all fields must be able to accurately identify the diagnostic features of autism both within and outside the four walls of the hospital. The past studies have shown a deficit in knowledge on autism among health-care professionals in developing countries, and this must be changed at the root level. In this study, we have shown that there is a deficit of knowledge among medical students in Mumbai. It is important for medical students to realize that autism is a development disorder which has a broad spectrum and enhanced clinical exposure is required to for autism diagnosis.

Although the small sample size is small, it is important to note that it has covered final-year medical students from prestigious medical colleges of Mumbai.

The use of WhatsApp to target a number of medical students across a cross-section of medical colleges for the research is a limitation of the study as it can allow the students to use the internet for answers and give skewed results toward higher knowledge. However, our results have shown lower awareness on autism than previous studies. It is unlikely that the students in our study have relied on the internet on such an extent that it would have affected the results.

We believe that the salient findings of this study and the conclusions resulting from the findings are germane and could be extended to the general awareness of autism among medical students across India. It is important that a doctor has a baseline awareness of symptoms of autism to alert and guide the family, thereby enabling early intervention.

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Conflicts of interest

There are no conflicts of interest.

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