Original Article

Cross-Disciplinary Appraisal of Knowledge and Beliefs Regarding the Diagnosis of Autism Spectrum Disorders in India: A Cross-Sectional Survey

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ABSTRACT

Background: Many healthcare professionals, including pediatricians, psychiatrists, Clinical Psychologists (CPs), Occupational Therapists (OTs), and Speech-Language Pathologists (SLPs), are involved in the identification and intervention of Autism Spectrum Disorders (ASD) in children. Distinctive training backgrounds and professional exposure can result in contrasting ideas regarding the assessment, diagnosis, and treatment of ASD. Only a few studies have addressed the cross-disciplinary perspective of knowledge, belief, and awareness about diagnostic criteria required for diagnosing ASD. **Materials and Methods:** A total of 154 allied healthcare professionals (98 SLPs, 33 CPs, and 23 OTs) participated in the study. The survey tool used for this study was adapted from a previously available survey on the assessment of knowledge and belief about ASD and self-efficacy. **Results:** The overall knowledge and belief of allied healthcare professionals regarding ASD differed significantly across the groups. However, the knowledge of Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM-5) diagnostic criteria for ASD did not differ significantly between the groups. **Conclusion:** Our findings have salient clinical implications and advocates for the continued education of healthcare professionals in India regarding recent diagnostic criteria for ASD.

Key words: *Allied healthcare professionals, autism, India*
Key Message: *While knowledge and belief of professionals regarding autism differed, the knowledge about ASD diagnostic features did not differ significantly between the groups (SLPs, OTs, and CPs). Continued education of healthcare professionals is needed regarding recent diagnostic criteria for ASD.*

Autism spectrum disorder (ASD) is a group of neurodevelopmental disorders characterized by difficulty in social communication skills and the presence

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of restricted interests and repetitive behaviors.[1] ASD is indeed a spectrum of conditions, with considerable variability across individuals in cognitive function, language ability, and psychiatric and neurological comorbidities.

Kanner[2] stated that three primary characteristics are necessary to identify autism. They are difficulty in social interaction, qualitative impairments in communications, and restricted, repetitive, and stereotyped behavior, interests, and activities. One of the following characteristics should be observed before the age of 3 years. Children with autism show marked social difficulties like lack of awareness of feelings towards others, preferences for being alone, unable to comprehend social rules and conventions, a failure to take help from others during distress, difficulty to imitate the actions of others, and a lack of social and creative play. Nevertheless, symptoms of ASD, like repetitive and stereotypic behavior patterns and social deficits, might not be identified until a child is not able to meet educational, occupational, social, or other demands that are important for life. Limitations in functional abilities may vary among persons with ASD and might develop over time.[3]

Autism is often identified and diagnosed in various clinical settings. The diagnosis of autism is carried out by numerous healthcare professionals, including psychiatrists, pediatricians, medical practitioners, clinical psychologists (CPs) and school psychologists. Subsequently, children with ASD are seen by speech-language pathologists (SLPs) and occupational therapists (OTs) for speech, language delay, and developmental concerns. Since the identification and diagnosis of children with ASD are performed in numerous settings, the process of diagnosis and treatment is frequently not easy and smooth.[4] Hence, the procedure is usually lengthy and confounded by diagnostic confusion, which can increase the time taken for proper diagnosis and duration of management.[5] Furthermore, an obsolete and incorrect belief about prognosis and management of ASD can affect the counseling which the professionals are likely to provide the parents of children with ASD. Therefore, continued training in recent research is essential for accurate diagnosis and treatment of ASD. While various studies have been done to evaluate the nature and treatment of ASD, only limited studies have been conducted to examine the cross-disciplinary comparison of knowledge and belief about ASD that can affect the diagnostic decisions across the settings.

Thus, the present study aimed to investigate and compare the knowledge and belief of allied healthcare professionals (SLPs, OTs, and CPs) involved in the rehabilitation of children with ASD in India.

The objectives of the study were to evaluate and compare the knowledge and belief of allied healthcare professionals on ASD and to evaluate and compare the knowledge of allied healthcare professionals regarding the diagnostic criteria for ASD.

METHOD

Study design
A time-bound cross-sectional research design was used. Purposive sampling was adopted for data collection.

Participants
All the participants in the study were qualified and practicing SLPs, OTs, and CPs in India. Professionals who had completed their undergraduate degree and were working and/or doing their graduation in the fields of SLP and OT and M Phil Clinical Psychology trainees were included. Professionals who had studied in India but are working abroad or vice-versa were excluded.

Assessments
The survey tool (questionnaire) used for this study was adapted (with permission for use in the Indian context) from the survey used by Ben-Sasson and Atun-Einy in their study on the assessment of knowledge and belief about ASD and self-efficacy.[6] The original questionnaire consists of three sections, wherein an additional section on demographic details was added for use in the present study. Section III of the original survey (on self-efficacy) was not included in the current study, as many participants were not comfortable with this section, particularly the self-competence questions. Finally, our questionnaire consisted of the following three sections:

Section I comprised of nine questions collecting the participant's background details such as name, age, gender, qualification (undergraduate, graduate, M. Phil, Doctorate), professional background (OTs, SLPs, or CPs), duration of clinical experience, the experience of handling cases with ASD, the total number of cases seen, and the nature of the workplace.

Section II consisted of 43 statements assessing knowledge and beliefs related to ASD. The rating scale used was a 6-point Likert scale and a column of "I don't have specific knowledge about the topic". Obtained responses on the 7-point rating scale were coded as follows: 1 was coded as *fully disagree*, 2 as *mostly disagree*, 3 as *somewhat disagree*, 4 as *somewhat agree*, 5 as *mostly agree,* and 6 as *fully agree*. The response "I don't have specific knowledge about this topic" was coded as 0.

Section III consisted of 26 items related to knowledge about autism features for diagnostic purposes based on

the DSM-5 criteria. Respondents were asked to rate each of the 26 features related to autism as "obligatory," "comorbid/helpful but not necessary," "not relevant" for the diagnosis. This section also included two open-ended questions on early signs and on who are at increased risk for ASD.

The final study protocol was approved by the Institutional Research Committee and the Institutional Ethics Committee.

Validation of the survey tool
Before the commencement of the study, the content validation of the questionnaire was carried out by an experienced professional from each of the three professional groups under study. They were asked to provide their agreement/disagreement against each statement/question for all sections of the questionnaire. Further, comments were elicited on how individual statements/questions might be modified for better understanding.

Procedure
In the preliminary stages, the contact details of the practicing professionals from each of the disciplines were collected from the institutional websites, their corresponding national association sites, and alumni sites. Information about the study was mailed to them, and informed consent was taken through email.

A web link, prepared using Google forms, was sent to all the participants who consented to participate, with detailed instructions about filling in the questionnaire. The survey link was open for participants for about 4 months. Reminders were sent at regular intervals (nine reminders in total were given at an interval of 15 days).

Scoring and analysis
All obtained responses were tabulated and numerically coded in an Excel datasheet. Responses obtained in Section I of the questionnaire (participants' background details) are presented using descriptive statistics (frequency and percentages). Responses for Section II (knowledge and belief between allied healthcare professionals), using a Likert scale, were numerically coded (as described above in the material section) and computed. One-way Analysis of Variance (ANOVA) was used to compare the responses across the groups. Section III responses (knowledge of DSM-5 diagnostic criteria for autism) were scored as one for each correct response and zero for an incorrect response. Further, one-way ANOVA was performed to compare the scores between the groups. The responses obtained from the two open-ended questions regarding the DSM-5 diagnostic criteria were analyzed by listing all answers and identifying common answers/

themes with respective frequencies. The responses received in this section were then compared with the DSM-5 criteria for the correctness and are discussed accordingly.

RESULTS

The questionnaire was checked for content validation by professionals each in SLPs, OTs, and CPs team. All three professionals provided a 100% agreement for all the sections of the questionnaire, thereby making a 100% Kappa score. A test of Cronbach's alpha was performed to check for the internal consistency of the questionnaire. Cronbach's alpha for 43 knowledge and belief statements was found to be acceptable ($\alpha = 0.795$). However, Cronbach's alpha for 26 items in diagnostic features was found to be slightly low ($\alpha = 0.538$).

The web-based survey was sent out to 938 participants, and responses were obtained from 154, showing a response rate of nearly 17%. The 154 participants comprised of 98 SLPs (64%), 33 CPs (21%), and 23 OTs (15%). This included 133 (86%) females and 21 (14%) males. All the 154 participants had managed children with ASD; the majority have seen 30 + cases (37%; $n = 57$), followed by 11–20 cases (29%; $n = 44$), 1–10 cases (25%; $n = 38$), and 21–30 cases (8%; $n = 15$). Sixty-three (41%) participants had a clinical experience of 1–5 years, 49 (32%) more than 5 years, and 42 (27%) less than 1 year. Participants worked in a variety of clinical settings such as a combination of various settings (38%; $n = 58$), followed by institutional (32%; $n = 49$), hospital (18%; $n = 27$), private clinic (11%; $n = 17$), and school (2%; $n = 3$).

One-way ANOVA revealed a statistically significant difference between groups [$F (2, 151) = 5.206$, $P = 0.007$] on the comparison of total scores obtained on knowledge and belief among allied healthcare professionals (SLPs, CPs, and OTs). A Bonferroni post-hoc test revealed significant differences in knowledge and belief scores between the SLPs and OTs ($P = 0.028$), and between OTs and CPs ($P = 0.006$). However, there was no statistically significant difference between the knowledge and belief scores of SLPs and CPs ($P = 0.654$).

Further, the results of one-way ANOVA for comparison of total scores on the knowledge of DSM-5 diagnostic features of ASD across professionals did not reach a significance, $F (2, 151) = 1.164$, $P = 0.315$. Table 1 presents participants' total scores on knowledge, belief, and knowledge of the DSM-5 diagnostic features of ASD.

The responses obtained on the two open-ended questions, "What early signs in a baby under your care raise your concern for ASD?" and "In your opinion, which babies are at increased risk for ASD?" were tabulated and grouped and the respective frequencies were obtained for each of the participant groups. Participants' responses on the two open-ended questions are presented in Tables 2 and 3, respectively.

DISCUSSION

A multidisciplinary approach, including mental health professionals and allied healthcare professionals, is preferred for the treatment of developmental disorders like ASD.[7] Therefore, professionals need to update their knowledge in this field.

The results of the study revealed an overall significant difference regarding knowledge and beliefs but particularly not for the knowledge of diagnostic features regarding the assessment of ASD among allied healthcare professionals in India. Further, the analysis of knowledge of diagnostic criteria used for evaluation of ASD showed a range of responses, thereby indicating the extent of knowledge in the allied healthcare professionals working in India. These findings are discussed in the following sections.

Comparison of knowledge and belief related to ASD
The results for the comparison of knowledge and belief related to ASD showed that the overall knowledge of participants differed between professions. Differences were revealed in the comparisons of knowledge and belief of SLPs and OTs, and OTs and CPs but not between SLPs and CPs. Similarly, the SLPs and OTs were more likely to endorse the old view that the cause of ASD was a parental bonding, and child attachment difficulty. The etiological credit, once assigned to aloof, rejecting parenting has been now shown to be irrelevant by researchers in the field. Researchers, since the 1960s, have acknowledged that parental factors and pathogenesis are not causal in ASD.[8] When compared to CPs, the majority of SLPs and OTs believed that children with ASD find difficulty in making eye contact with others. Literature suggests that early interventions can help to improve deficits such as children's communication skills, attention, and social interaction skills, and hence early intervention is crucial.[9] Two of the professional groups (i.e., SLPs and OTs) in the study were likely to endorse that, ASD has a firm genetic basis, thereby supporting the views from research that the behaviors associated with autism are likely attributed to the etiological factors, such as underlying neural and genetic factors.[10] A large percentage of SLPs and OTs (in comparison to CPs), reported not knowing the suitability of the Developmental, Individual difference,

Table 1: Comparison of participants' total scores on knowledge and belief section of the survey

Allied healthcare professional group (s)		*n*	Mean (SD)	95% CI for mean	
				Lower Bound	Upper Bound
Knowledge and Belief total scores	SLP	98	157.20 (19.37)	153.32	161.09
	OT	23	168.26 (17.15)	160.84	175.68
	CP	33	152.70 (14.34)	147.61	157.78
Knowledge of DSM-5 criteria	SLP	98	14.90 (2.54)	14.39	15.41
	OT	23	15.83 (2.58)	14.71	16.95
	CP	33	15.24 (3.13)	14.13	16.35

SLP: Speech-Language Pathologist; OT: Occupational Therapist; CP: Clinical Psychologist; *n*: sample size; SD: Standard Deviation; CI: Confidence Interval

Table 2: Participants' response to the open-ended question "What early signs in a baby under your care raise your concern for autism?"

Response(s)	SLPs	OTs	CPs
Core features			
Social interaction deficits	102	31	41
Communication deficits	14	3	7
Stereotypic behaviors	20	2	14
Developmental features			
Sensory	5	6	1
Motor	10	5	3
Communication	49	6	11
Cognitive	20	4	2
Behavioral	13	4	4
Emotional	1		
Total	234	61	83

SLPs: Speech-Language Pathologists; OTs: Occupational Therapists; CPs: Clinical Psychologists

Table 3: Participants' response to the open-ended question "In your opinion which babies are at increased risk for autism?"

Response(s)	SLPs	OTs	CPs
Biological factors			
Genetic	43	5	20
Birth-related	30	7	20
Neurological	7	2	4
Parental	7	3	6
Environmental factors	54	26	6
Familial	4	3	1
Social	2	3	-
Others	3	1	-
Nil	9	1	1
Total	159	51	58

SLPs: Speech-Language Pathologists; OTs: Occupational Therapists; CPs: Clinical Psychologists

Relationship-based (DIR) model[11] for children with high functioning autism. Many of the OTs, followed by SLPs and CPs, continue to hold the belief that, children with ASD can outgrow the disorder with proper treatment. The literature shows that the effects of treatment vary according to the severity of impairment,

where the prognosis for children falling in the more profound/severe end of the spectrum, typically requiring a supervised living placement throughout adulthood. Children falling in mild end of the continuum are often able to achieve adequate functioning in language and social behavior but are still likely to retain some persistent speech and behavioral peculiarities.[12] In the present study, the differences exhibited by the allied healthcare professionals on knowledge of the treatment of ASD could be attributed to relatively less literature available in the Indian scenario, and a lack of understanding of the disorder.

When compared to SLPs, a large percentage of CPs, followed by OTs, continue to hold an outdated belief that most children with ASD are mentally disabled. At the same time, the allied healthcare professionals agreed that children with ASD are more intelligent than appropriate testing indicates, a finding consistent with the existing literature.[13] There is a significant shift in the understanding regarding the cognitive aspect and intellectual functioning of ASD. Initially, Kanner[2] believed that children with ASD have average intellectual potential. This view was derived from Kanner's observation of peak cognitive skills in his samples. Many studies have consistently reported that the majority (nearly 70%) of children with ASD function within the mentally retarded range.[14] The very first cross-disciplinary study by Stone[5] found ASD specialists' responses also supported this fact.[14]

SLPs and OTs were more likely to endorse a higher prevalence of ASD in the higher socioeconomic groups/educational levels. However, recent epidemiological research suggests that ASD occurs across socio-economic status.[6] This result mainly demonstrates the tendency to hold on to outdated beliefs as initially presented by Kanner.[2] Thus, the finding of this study is consistent with previous studies displaying differences and misperceptions about various aspects of ASD across disciplines.

Comparison of knowledge about diagnostic features of ASD

This section of the survey was more directly related to the diagnosis of children with ASD. Professionals from different fields employ different criteria for the determination of ASD, though more commonly the DSM criteria. A comparison of the total scores showed no significant difference in the knowledge of diagnostic criteria between allied healthcare professionals. However, their understanding of ASD features differed significantly for five out of a total of 26 behaviors (i.e., hallucinations, sudden unexplained mood changes, attention deficit, lack of coordination between verbal communication messages and nonverbal

communication messages, and difficulty in social responsiveness). This difference could be attributed to the fact that new DSM-5 criteria are not practiced widely in India when compared to western countries. Furthermore, in the Indian context, CPs are mainly involved in the process of diagnosis of autism when compared to other allied professionals. This could have resulted in the CP's knowledge about DSM-5 criteria being better when compared to SLPs and OTs.

As per the DSM-5 diagnostic criteria, the deficit in nonverbal communicative behaviors used for social interaction (poor integrated – verbal and nonverbal communication, poor eye contact and body language, or deficiencies in understanding and use of nonverbal communication) are considered as the core features in the diagnosis of ASD. The results of the study were found to be consistent with the DSM-5 criteria, where, CPs showed better endorsement when compared to OTs and SLPs for item "Lack of coordination between verbal communication messages and nonverbal communication messages." As per diagnostic criteria used for autistic disorder, "hallucinations," "sudden, unexplained mood changes," and "thought disorders" are irrelevant features and as per the results from the present study, CPs showed better knowledge than SLPs and OTs. Furthermore, the only feature "lack of reasoning and solving everyday situations" (an assistive feature as per DSM-5 criteria), was the one where SLPs and OTs presented better knowledge compared to CPs.

Participants' responses on the open-ended questions in the DSM-5 diagnostic criteria for ASD, viz "What early signs in a baby under your care raise your concern for ASD?" revealed many signs as weak social interaction, poor eye contact, inadequate social smile, and so on. Another question, "In your opinion, which babies are at increased risk for ASD?" also showed many factors like inadequate parent-child interaction, preterm babies, genetic predisposition, and so on. The responses obtained from the professionals were mostly consistent with the literature on early signs and risk factors for ASD.[15,16] The responses obtained on the open-ended questions related to early signs and risk factors in the identification of children with ASD also show that the allied healthcare professionals were knowledgeable regarding the diagnostic features and causes.

The findings of the study showed a significant difference regarding the knowledge and beliefs of allied healthcare professionals, though the difference was not significant for knowledge of diagnostic features regarding the assessment of ASD. However, assessment of the participants' knowledge of diagnostic criteria used for evaluation of ASD revealed a range of responses, indicating that allied healthcare professionals are

increasingly aware of the identification of ASD. This could also be attributed to the present-day curriculum of these professionals, where ASD and interventions specific to their field are taught in detail.

One of the drawbacks of the study was that the sample size was uneven across the groups of professionals. It is possible that the results do not reliably reflect the perspectives of the professionals. Furthermore, a few of the participants from various professional groups were students doing their graduate and M Phil studies, which would have influenced the outcome of the study.

Future studies are thus recommended to validate the findings of the present study. The findings of the study have salient clinical implications and advocate for the continued education of healthcare professionals regarding recent diagnostic criteria for ASD in India. Besides, recognition of cross-disciplinary differences may be the step towards transcending these differences.

CONCLUSION

The present study investigated the cross-disciplinary comparison of knowledge and belief in the assessment of children with ASD for the first time in the Indian context. The results provide an essential overview of the knowledge, belief, and diagnostic practices of ASD from a developing country. The study offers support for the contention that perspectives on a single disorder can differ from one discipline to the next. Further, the knowledge about ASD diagnostic features did not differ significantly between the groups (SLPs, OTs, and CPs). While the findings of this study have clinical implications for the education and training of healthcare professionals in India, future studies are recommended to validate our findings.

Conflicts of interest
There are no conflicts of interest.

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