

Original Research Article

Using sign language in children with autistic spectrum disorders: special education teachers' attitudes and experience

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ABSTRACT

Background: There is evidence that sign language can help autistic children communicate more effectively. The present study aimed to assess the attitude and experience of special education school teachers toward sign language use in autistic spectrum disorder (ASD) and to explore the associated variables that influence positive attitudes.

Methods: A cross-sectional study includes fifty-three teachers working with special education children. A conventional online survey was distributed to uncover the primary ideals of teachers' attitudes toward using sign language by ASD children. The scores in the attitude domain were typically distributed and expressed as mean, then were categorized as poor (<50%), fair (50-69%), and good (≥70%).

Results: More than 50 percent of the survey respondents have a level of education after graduation and 37% work in special needs education. Seventy-three percent of respondents had experience teaching ASD children, and more than half had less than five years of experience. However, about 73% received training courses in teaching ASD children, and only 37.7% had a good experience using sign language with ASD children. The overall percentage of good attitudes was 53%, which significantly correlates to gender and the number of students in the school.

Conclusions: Even though sign language is a widely used form of communication for children with ASD, Sudan's unique-education teachers still need support and training to instruct autistic students and caregivers how to use it. The teachers' positive attitudes were significantly related to the teacher's gender and the number of students per school.

Keywords: Autistic spectrum disorder, Sign language, Special education, Teachers

INTRODUCTION

Autistic spectrum disorder (ASD) affected children usually have difficulties developing communication skills. They have specifically pervasive deficiencies in social communication with limited and repetitive behaviors. Patterns of language usage and conduct frequently found in children with ASD varied between a repetitious or rigid language like echolalia, inability to use gestures, poor eye contact, or even selective.^{1,2}

Sign language is any communication through physical movements, especially of the hands and arms, and is used

when the expressed communication is unattainable or difficult. For example, it may be represented by well-known body language such as frowns, shrugs, or points, or it might use a subtle combination of hand-coded signals enhanced by facial expressions and possibly handwritten words.³ Children with speech disorders have many options for communicating through usable communication methods that range from simple techniques such as photographs, gestures, and pointing to complex techniques such as computer technology. Behavior modification approaches to speech and sign language training are two primary methods crucial in managing communication defects in ASD.⁴ Many trials use sign language as a good communication option in

ASD children.⁵⁻⁷ Innovative devices like talking hands that translate gestures and sign language to voice in ASD people were tried with good outcomes despite some limitations to be used daily.⁸

Special education school teachers' perception of ASD and the way of communication that they use with the affected children is crucial. In general, successful teaching of children with disabilities, particularly those with autism spectrum disorder, is closely related to the teacher's positive perceptions toward the use of sign language.⁹ Therefore, the present study aimed to assess the attitude and experience of special education school teachers toward sign language usage in children with autistic spectrum disorder and to explore the associated variables that influence positive attitudes.

METHODS

A descriptive cross-sectional study was done between 2021 and 2022 in Khartoum state, the capital of Sudan, and includes fifty-three teachers in special education schools. The inclusion criterion of working with special education needs children in regular or private special education schools was met to make up the study cohort. The participants who did not match the inclusion criteria, refused to participate in the study, or not completing the questionnaire were excluded. The participant sample size was restricted to teachers associated with the few private centers offering special education to ASD children in Khartoum. Even regular school teachers who took part in the study were selected from Khartoum, where ASD children had lately been incorporated into the schools. As a result, 53 participants volunteered to take part in this study.

The researchers prepared the study questionnaire using an anonymous online survey instrument (Google form) and distributed it through a link to the participants. The design, assessment, and statistical analysis of a conventionally created questionnaire served as the foundation for this applied study, which sought to uncover the primary ideals of teachers' attitudes toward the use of sign language by ASD children. It contains the informed written consent part and the demographic data part; there are questions about the experience and training regarding the use of sign language in ASD children. Twenty questions measure how teachers perceive several concepts that the literature has shown could affect and modulate communication through sign language in ASD children. This questionnaire assessed teachers' attitudes toward communicating with children with ASD by some items. First, there are items related to using sign language in ASD children, such as dealing with phonology and addressing pronunciation difficulties. It also helps clarify words, strengthens the verbal communication of the ASD child, makes him understand and comprehend faster, and increases visual communication. Finally, some Items explore the expected emotional response of using sign language in children with ASD as helping reduce the internal pressures of the autistic child and helping reduce fear.

In comparison, other items assess the teachers' perception of sign language in improving the social skills of ASD children, like developing social relationships, focusing strongly on the environment around them and adapting to life situations. Finally, there are Items to evaluate the teachers' perceptions of the possibility of teaching children sign language at an early age, whether Sign language can be molded according to the needs of the ASD the child without any restriction to the agreed-upon global language, and if the verbal language of the ASD child can be replaced by sign language. Three psychology professors reviewed the questionnaire to ensure its validity and suggest any additions before approving it.

Statistical Package for Social Sciences software, version 23.0 (IBM SPSS Inc., Chicago, IL), was used to analyse data. Initially, all data was gathered via a questionnaire and coded into variables. The normality of data was experimented with using the Kolmogorov-Smirnov and Shapiro-Wilk tests. Reliability analysis was done using Cronbach's alpha test for data validation; attitude = 0.968=96.8%. Kaiser-Meyer-Olkin measure of sampling adequacy= 0.882=88.2%, Bartlett's test of sphericity was statistically significant, and internal consistency was tested using a rotated component matrix with the Varimax rotation method. Both descriptive and inferential statistics involving one way ANOVA (analysis of variances) test and binary logistic regression were used to present the results. A p value less than 0.05 was assumed statistically significant.

Score

Although the questionnaire for assessing attitude consisted of 20-questions, a Likert scale was used: strongly agree=5, agree=4, neutral=3, disagree=2, and strongly disagree=1, then transformed to percentages using this formula $(Average-1)*25$. The scores in the attitude domain were typically distributed and expressed as mean, then were categorized as poor (<50%), fair (50-69%), and good ($\geq 70\%$). A poor and fair attitude was considered a negative one, and a good one was considered a positive one.

RESULTS

This study's overall number of responses was 53, with 72 percent female participants compared to 28 percent male. Over half of the survey participants had a postgraduate education level, and about 38 percent were 20-30 years old. Table 1 demonstrates that 37% of the participants work in special need education, with 30% in the private sector. Seventy-three percent of the participants had experience teaching ASD children, with more than half having less than five years of experience compared to only 7.7% with more than ten years of experience. About 73% of the participants received training courses in teaching ASD children, and only 37.7% had a good experience using sign language with ASD children. About 32% of teachers were working in busy schools with more than 200 students per school.

Table 1: Demographic characteristics of the participants.

| Demographic characteristics | Number | Percentage |
|--|--------|------------|
| Age groups (years) | | |
| 20-30 | 20 | 37.7 |
| 31-40 | 18 | 34 |
| 41-50 | 10 | 18.9 |
| More than 50 | 5 | 9.4 |
| Gender | | |
| Male | 15 | 28.3 |
| Female | 38 | 71.7 |
| Level of education | | |
| University | 19 | 35.8 |
| Postgraduate | 34 | 64.2 |
| Type of school | | |
| Special education (public) | 4 | 7.5 |
| The regular school (public) | 11 | 20.8 |
| Special education (private) | 16 | 30.2 |
| The regular school (private) | 22 | 41.5 |
| Number of students per school | | |
| less than 50 students | 22 | 41.5 |
| 50-99 students | 9 | 17 |
| 100-199 students | 5 | 9.4 |
| 200 students and more | 17 | 32.1 |
| Experience in teaching autistic children | | |
| Yes | 39 | 73.6 |
| No | 14 | 26.4 |
| Year of experience in teaching autistic children (n=39) | | |
| less than five years | 22 | 56.4 |
| 5-10 years | 14 | 35.9 |
| More than ten years | 3 | 7.7 |
| Training courses in teaching autistic children | | |
| Yes | 39 | 73.6 |
| No | 14 | 26.4 |
| Number of training courses in teaching autistic children (n=39) | | |
| One | 10 | 26.3 |
| Two | 5 | 13.2 |
| Three | 6 | 15.8 |
| More than three | 17 | 44.7 |
| Experience in using sign language in autistic children (n=53) | | |
| Yes | 20 | 37.7 |
| No | 33 | 62.3 |

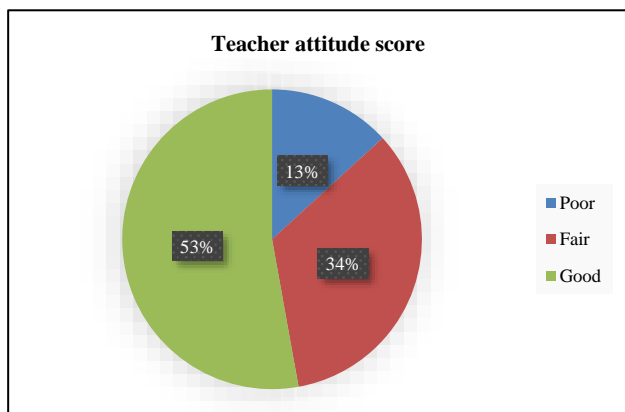


Figure 1: Diagram demonstrates the teachers' attitude score.

As demonstrated in Figure 1, the total percentage of good attitudes was 53% compared to 13% of poor attitudes. According to the analysis of variance (ANOVA), gender and the number of students per school significantly impacted the teacher's attitude. Additional variables, such as the teaching experience, training, or sign language usage with ASD children, did not affect the attitude score, as Table 2 shows. Female participants contributed more to having negative attitude AOR: 5.224 (1.010-27.028) time statistically significant with p value 0.049<0.05. Further, an increase in the number of students per school contributed to negative attitude AOR: 2.182 (1.126-4.227) time statistically significant with p value 0.021<0.05. All other predictors had a contribution but were statistically insignificant, with p values >0.05, which is demonstrated in Table 3.

Table 2: Associations between various variables and teachers' attitude scores in One way ANOVA test.

| One way ANOVA-test | | | | | | |
|--|------------------------------|--------|----------------------------|--------|------------|---------|
| Variables | | Number | Teacher attitude score (%) | | | P value |
| | | | Mean | SD | Std. error | |
| Age groups (years) | 20-30 | 20 | 67.9 | 20.624 | 4.612 | 0.707* |
| | 31-40 | 18 | 66.28 | 18.071 | 4.259 | |
| | 41-50 | 10 | 71 | 21.359 | 6.754 | |
| | More than 50 | 5 | 77.4 | 19.126 | 8.553 | |
| Gender | Male | 15 | 79.47 | 21.411 | 5.528 | 0.011** |
| | Female | 38 | 64.63 | 17.216 | 2.793 | |
| Level of education | University | 19 | 69.89 | 16.516 | 3.789 | 0.769* |
| | Postgraduate | 34 | 68.24 | 21.183 | 3.633 | |
| Type of school | The regular school (public) | 11 | 76.73 | 19.744 | 5.953 | 0.183* |
| | Special education (public) | 4 | 81.25 | 5.679 | 2.839 | |
| | The regular school (private) | 22 | 64.27 | 14.996 | 3.197 | |
| | Special education (private) | 16 | 66.56 | 24.755 | 6.189 | |
| Number of students per school | less than 50 students | 22 | 76.09 | 18.184 | 3.877 | 0.033** |
| | 50-99 students | 9 | 68.11 | 23.369 | 7.79 | |
| | 100-199 students | 5 | 49.6 | 12.219 | 5.464 | |
| | 200 students and more | 17 | 65.47 | 17.022 | 4.129 | |
| Experience in teaching autistic children | Yes | 39 | 69.26 | 21.14 | 3.385 | 0.793* |
| | No | 14 | 67.64 | 14.526 | 3.882 | |
| Years of experience in teaching autistic children | less than five years | 22 | 72.32 | 17.659 | 3.765 | 0.136* |
| | 5-10 years | 14 | 69.36 | 24.522 | 6.554 | |
| | More than ten years | 3 | 46.33 | 20.404 | 11.78 | |
| Training courses in teaching autistic children | Yes | 39 | 70.28 | 20.688 | 3.313 | 0.370* |
| | No | 14 | 64.79 | 15.631 | 4.178 | |
| Number of training courses in teaching autistic children | One | 10 | 72.4 | 13.962 | 4.415 | 0.081* |
| | Two | 5 | 90.4 | 13.975 | 6.25 | |
| | Three | 6 | 68.33 | 21.63 | 8.831 | |
| | More than three | 17 | 63.47 | 23.017 | 5.582 | |
| Experience in using sign language in autistic children | Yes | 20 | 75.5 | 21.461 | 4.799 | 0.051* |
| | No | 33 | 64.79 | 17.295 | 3.011 | |

Table 3: Associations between various variables and negative teachers' attitudes in binary logistic regression analyses.

| Negative teacher attitude score | | | | | | | | |
|---|--------|-------|-------|----|-------|--------|-------------------|--------|
| Variables in the equation | B | S.E. | Wald | df | Sig. | Exp(B) | 95% CI for exp(B) | |
| | | | | | | | Lower | Upper |
| Age groups (decrease) | -0.555 | 0.396 | 1.966 | 1 | 0.161 | 0.574 | 0.264 | 1.247 |
| Gender (females) | 1.653 | 0.839 | 3.886 | 1 | 0.049 | 5.224 | 1.010 | 27.028 |
| Level of education (university) | 0.912 | 0.772 | 1.395 | 1 | 0.238 | 2.489 | 0.548 | 11.307 |
| Type of school (regular) | 0.043 | 0.948 | 0.002 | 1 | 0.964 | 1.044 | 0.163 | 6.697 |
| Number of students per school (increase) | 0.78 | 0.337 | 5.349 | 1 | 0.021 | 2.182 | 1.126 | 4.227 |
| Experience in teaching autistic children (no) | -0.11 | 1.048 | 0.011 | 1 | 0.916 | 0.896 | 0.115 | 6.990 |
| Training courses in teaching autistic children (no) | -0.686 | 0.919 | 0.557 | 1 | 0.455 | 0.503 | 0.083 | 3.051 |
| Experience in using sign language in autistic children (no) | 1.272 | 0.915 | 1.933 | 1 | 0.164 | 3.568 | 0.594 | 21.439 |
| Constant | -5.106 | 2.557 | 3.988 | 1 | 0.046 | 0.006 | | |

DISCUSSION

Sign language can bypass the oral-motor constraints of speech since it needs less cognitive processing power and is, therefore, more straightforward to learn than spoken language.⁸ Concerning the ASD children's requirements, some sign languages characteristics such as iconicity, slower pace, minimal redundancy, and reliance on movable body parts are considered. A brief overview of the implementation research has already been done, demonstrating that simultaneous communication emphasizing sign language is a helpful strategy, especially in early training.⁹ Moreover, children with autism spectrum disorder (ASD) have been demonstrated to benefit from augmentation and alternative communication strategies, especially when communicating their preferences for certain things and activities.¹⁰

In this study, about two third of the participants agreed that Sign language is a tool that helps in dealing with phonology and addressing pronunciation difficulties. Also, sign language helps clarify words and meanings for an autistic child. This result is compared to one study that discussed three issues regarding using sign language as a substitute for communication for nonverbal autistic children. First, it concluded that mute toddlers who get simultaneous communication training are unlikely to learn to speak but that simultaneous communication training combined with separate voice training may synergistically affect speech development. In contrast, concurrent communication training improves speech in kids with high verbal imitation skills. Also, data indicate that creative abilities, grammar, and abstract concepts can all be taught. Finally, complex signing skills may benefit from training methods employed in the operant conditioning of speech.¹¹

More than seventy percent of teachers in the current study agreed that sign language helps reduce the internal pressures of the autistic child, such as anxiety and tension, and reduces fear. Moreover, about sixty percent of them believe sign language helps develop social relationships in an autistic child and helps a child with autism focus enormously on the environment around him. Findings are closely compared with the studies that demonstrated that the irritation and anxiety resulting from ineffective attempts at communicating one's needs are lessened when one uses sign language. In addition, imitation training improves language, pretend play, cooperative attention, and other social-communicative behaviors.¹²⁻¹⁴

There is a trend in Sudan to include special education students in regular classes with available supplementary special education services. In the present study, we surveyed the special education teachers' sign language usage in ASD children and explored their experience and attitude toward it. The findings showed that although only 37.7 percent of the teacher had experience using

sign language with ASD children, more than half had a positive attitude about teaching sign language to children with ASD, as shown in Figure 1. However, this positive attitude is significantly affected by teacher gender in favour of females. Also, the number of students per school when increases have an impact on this attitude, as Table 3 shows.

Currently, there are no official statistics on the prevalence of ASD in Sudan; however, one systemic review on autism spectrum disorders in sub-Saharan Africa found only one population-level study that determined the prevalence of ASD and failed to find potential risk variables. In addition, all intervention trials used incredibly small sample sizes. Overall, the available data is insufficient to plan successful intervention methods for ASD children in Africa.¹⁵ Compared to the anticipated number of autism cases, Sudan lacks suitable mental healthcare facilities and staff, and educational and behavioral therapies for children with autism are mostly unavailable. According to information presented in one study with data from the directorate of special needs in the Ministry of Education-Khartoum State, there were only 53 centers.¹⁶ Moreover, the most recent revision of Sudan's mental health policy from 2008 revealed a significant shortage of mental health professionals, with an estimated 0.92 employees working in mental healthcare facilities, including those in the private sector.¹⁷

Teachers working with autistic children are considered the first line of support for those children and their families because they spend the most time with them, understand their needs and requirements, and use all the opportunities available to help and develop them. Therefore, interest in this category should be great, with training chances available. Nevertheless, the results of this study indicated that more than a quarter of the teachers had not received any training in autistic spectrum disorder, so they might fail to communicate and deal with these children.

This study may have some limitations. One limitation of this work is the small sample of teachers represented in these studies. Only fifty-three special education teachers made up our sample, so we may likely have found more statistically significant connections with a larger sample size. Another limitation of this study is that teachers were provided with lists or examples of the attitude rather than generating it themselves, which may have influenced their responses.

CONCLUSION

The use of sign language by children with ASD is currently well-established, with considerable advantages. In light of the outcomes of the present investigation, ASD teachers had positive attitudes toward the use of ASD students' sign language, which is greatly influenced by the teacher's gender and the number of school students.

Evidence generally demonstrates that using sign language in ASD children has many benefits, and most teachers agree. Nevertheless, there is a lack of training programs for ASD; the study emphasizes the necessity for ASD teachers to receive more training and opportunities, especially in communicating with these children, like sign language.

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