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Preschool and primary school teachers' attitude towards inclusive education for students with autism spectrum disorders in Ethiopian public schools: multicenter cross-sectional study

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Abstract

Background Autism spectrum disorder (ASD) is a neurodevelopmental disorder primarily impacting social communication and behavior. The prevalence of ASD has been rapidly increasing, leading to a corresponding rise in the number of children with ASD attending mainstream schools. Preschool and primary school teachers have a vital role in identifying and supporting these children. However, the extent of teachers' Attitudes towards including children with ASD in their classrooms remains uncertain.

Objective The aim of this study was to evaluate the attitude towards including children with autism spectrum disorders in their classrooms, and the associated factors among preschool and primary school teachers in public schools in Addis Ababa.

Methods and materials Data from preschool and primary school teachers were collected using a self-administered questionnaire between September 2023 and December 2023. The collected data were analyzed utilizing SPSS version 27. Descriptive statistics and thematic analysis were employed to summarize the findings, while bivariate binary logistic regression was utilized to examine associations between variables.

Results The study findings revealed that from a total sample of 416 teachers, only 35.5% of teachers had adequate knowledge, and the mean attitude score was 3.4, indicating a slight positive inclination towards inclusive education. Furthermore, teachers who have previous experience with students with special needs are six times more likely to have a positive attitude towards inclusive education (AOR = 6, 95% CI = 1.05–40.7). Teachers with a positive attitude towards including students in regular classes were 72% more likely to have adequate knowledge (AOR = 0.28, 95% CI = 0.1–0.6). Teachers with a positive attitude towards including students in regular classes were 72% more likely to have adequate knowledge (AOR = 0.28, 95% CI = 0.1–0.6). Conversely, teachers who identify behavioral and emotional

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problems of autistic children as a challenge are 94% less likely to have a positive attitude towards inclusive education (AOR = 0.06, 95% CI = 0.05–0.7).

Conclusion and recommendation The findings of this study indicate that teachers displayed a generally positive attitude towards ASD. This highlights the need for increased emphasis on educational interventions aimed at enhancing attitudes towards ASD further.

Keywords Autism spectrum disorder, Attitude, Preschool teacher, Inclusive education

Introduction

Autism spectrum disorder (ASD) is a diverse neurodevelopmental disorder characterized by impairments in social communication, social interaction, and the presence of restricted and repetitive behavior patterns. The severity of ASD can vary greatly, ranging from severe forms that necessitate extensive lifelong support for significant social and behavioral challenges to milder forms where individuals can lead relatively normal lives with learned coping strategies. The classification of ASD may also consider the presence of associated disorders, such as intellectual disability and language impairment [1].

ASD is a significant public health concern. Studies have shown a rapid increase in its prevalence in recent years. According to a comprehensive systematic review and meta-analysis, the global prevalence of ASD was found to be 0.6% [2]. The Centers for Disease Control in the USA indicates that ASD affects 1 in 36 children at the age of 8 years [3]. Data are scarce on the prevalence of ASD in Africa compared to other regions of the world. However, four studies conducted in African communities (Uganda, Nigeria, Somalia, and Libya) were assessed, revealing an overall prevalence rate of 1% [2]. In Uganda a prevalence of 0.68% was recorded [4]. In a population-based survey of autistic traits in Kenyan adolescents and young adults 0.63% were estimated as having high autistic traits while 14.9% had borderline autism traits [5]. The prevalence of ASD in Ethiopia, as in many developing nations, lacks official documentation. Nonetheless, it appears ASD is an unaddressed problem given the overcrowding and lengthy waiting lists at existing autism centers in Addis Ababa [6].

ASD poses a significant global financial burden due to various factors, including healthcare services, therapeutic interventions, educational expenses, as well as the costs associated with the loss of productivity among caregivers and adults with ASD. The combined impact of these costs contributes to the economic challenges faced by individuals, families, and societies affected by ASD [7].

The core characteristics of ASD contribute to the academic challenges in students with this disorder [8]. The recent significant increase in its prevalence has meant a parallel increase in the number of children with this disorder in mainstream preschools [9]. Global policy as well as Ethiopian policies, give great importance to the inclusion of children with special needs within regular classrooms [10]. Inclusive education has many benefits: it minimizes stigma, provides academic resources and social learning opportunities. In addition, students with autism who are in inclusive classes demonstrate better cognitive and adaptive characteristics [11]. Moreover, awareness among teachers about ASD helps children with this disorder obtain better access to the early screening and identification process [12]. However, it may also cause multiple challenges for students with ASD and their teachers [13].

A number of general education teachers' practices and interventions have been found to be successful in improving academic outcomes across individuals with ASD [14]. Social, behavioral, and academic teaching strategies can be implemented to improve the educational experiences of students with ASD [15].

A positive attitude toward the disorder is essential since pedagogical activity carried out by teachers can facilitate inclusive practice despite the challenge of teaching students with these disorders [12]. Research shows successful inclusionary practices depend on teachers' beliefs regarding disability and their roles in supporting students with special needs. Those educators who accept these responsibilities are more likely to apply effective strategies that positively impact all learners. Furthermore, these beliefs are connected to wider attitudes about ability and knowledge, referred to as epistemological beliefs [16]. A study done in another part of Ethiopia found that knowledge and attitude about inclusive education together explain 11.8% of the variance in inclusive education practices. Both knowledge about inclusive education, and attitude towards inclusive education were correlated positively with inclusive education practices [17].

This limited understanding can result in behaviors associated with autism being misinterpreted as intentional misbehavior or a reflection of a disordered personality, rather than being recognized as manifestations of the condition. Moreover, this lack of awareness hinders the recognition and understanding of autism among teachers [18, 19].

In a systematic review examining teachers' attitudes towards inclusive education for children with ASD, four studies (conducted in the USA, Indonesia, and Australia)

reported that teachers held a positive attitude towards inclusive education. On the other hand, six studies (conducted in Malaysia, Greece, Turkey, and China) showed a neutral attitude, while only one study conducted in Ireland reported a negative attitude out of the total of 11 studies [12]. In Africa, a study conducted in Nigeria demonstrated a positive attitude among teachers [20].

There is a significant lack of attitude about ASD in Ethiopia among the general public, and educational and social sectors, including teachers, health professionals, and government officials [21]. School system support for children with ASD is also very underdeveloped at both government and public facilities [6]. According to a previous study on the lived experiences of parents with children with autism, one of the most significant challenges they faced was accessing schools that could provide professional services for their children. These parents expressed constant worry about the limited availability of facilities such as schools, autism centers, and therapeutic centers, particularly those that offered speech therapy. The lack of resources, services, and trained professionals posed obstacles to parents in supporting their children's academic and social progress effectively. Moreover, the mainstream schools that were accessible to them were ill-equipped to meet the specific needs of children with special needs. These schools lacked proper equipment, professional staff, and adherence to ethical standards. As a result, parents had to navigate through inadequate school systems that had unfair admission rules and where their children received unprofessional treatment from staff members [22].

In Ethiopia, inclusive education is a current goal of educational reforms. Preschool and primary school teachers play a crucial role in identifying children with ASD. The research conducted provides valuable insights into the level of understanding among preschool and primary school teachers in Addis Ababa regarding ASD, including its characteristics and signs, as well as their familiarity with effective intervention strategies. Additionally, the study explores the attitudes of preschool and primary school teachers towards children with ASD, including their level of acceptance, inclusiveness, and willingness to accommodate their specific needs. Furthermore, the research investigates various factors that may influence preschool teachers' attitudes towards ASD, such as their educational background, access to training opportunities, and prior experience working with children with ASD.

Methods and materials

Study design, area and period

An institutional-based cross-sectional study was conducted. The study was conducted in Addis Ababa, the capital and largest city of Ethiopia, which is divided into 11 sub-cities. The focus was on preschools and primary schools within the public school system. Of the 903 preschools in Addis Ababa, 227 are public schools. The study took place from September 2023 to December 2023, covering a four-month period. The target population consisted of teachers working in public primary schools with preschools in Addis Ababa, totaling 12,019 teachers.

Population, inclusion and exclusion criteria

The source population consisted of all public preschool and primary school teachers in Addis Ababa. The study population was randomly selected from preschool and primary school teachers working in selected public schools during the study period who were willing to participate. The inclusion criterion was that participants had to be preschool and primary school teachers in public schools in Addis Ababa who were providing services at the time of the study. Those who were on sick leave or maternity leave during the data collection period were excluded.

Sample size determination

The sample size in this cross-sectional study was determined using a single population Proportion formula.

Considering the following assumptions:

Formula: $n = \frac{\left(\frac{Z\alpha}{2}\right)^2 \times p(1-p)}{d^2}$

Where, n = the required sample size,

($Z\alpha/2 = 1.96$ = (standard score corresponding to 95% confidence interval).

$P = 80\%$ taken from a South African study done on knowledge and associated factors for knowledge of ASD [23]. However, the researcher could not find a similar study on attitude and associated factors for attitude.

d = 5% (maximum margin of error the researcher is willing to allow).

Therefore,

$n = (1.96)^2 (0.5 \times 0.5)/ (0.05)^2 = 384$ for attitude.

$n = (1.96)^2 (0.5 \times 0.5)/ (0.05)^2 = 384$ for associated factors for attitude.

384 was taken because it is the highest possible sample size. Then, considering a 10% of non-respondent rate, the final desired sample size was calculated as 384 + 38 (10% non-response rate).

- Then, the final sample size was 423.

Sampling techniques and procedures for record reviews

The study was conducted in Addis Ababa public schools that have kindergartens. Three sub-cities of Addis Ababa will be selected randomly. For each sub-city, the sample size will be allocated by using the proportional-to-size allocation formula. Schools will be selected from each sub-city based on the sample size. All preschool teachers from each school were included in the study.

Data collection and instrument

A validated self-administered questionnaire was chosen as the appropriate method for data collection in this study due to its advantages in terms of standardization and efficiency. The Autism Stigma and Knowledge Questionnaire (ASK-Q) was chosen as it is a validated tool with robust psychometric support and cross-cultural applicability in measuring knowledge. The ASK-Q draws upon published research conducted in 11 countries, including the US, UK, Iran, India, Saudi Arabia, Malaysia, Tanzania, Senegal, Cape Verde, Zambia, and Burkina Faso. The questionnaire includes four domains that assess different aspects of knowledge. The first domain focuses on symptoms and diagnosis of ASD. The second domain explores the etiology and nature of the disorder. The third domain examines knowledge about the treatment of ASD. Lastly, the fourth domain delves into the topic of stigma associated with ASD. To assess the reliability of the ASK-Q, a test-retest method using a reliability metric developed for Dichotomous Classification Models (DCMs) was employed. The findings revealed high-reliability coefficients for the classifications of the four subscales, namely 0.982, 0.954, 0.984, and 0.933. Additionally, the ASK-Q exhibited strong internal consistency, as indicated by a Cronbach's Alpha coefficient of 0.88 [24]. For this study, a total of 19 items were selected from the original 49 items of the ASK-Q, representing all four subscales. Proportional cut-off values were calculated to determine inadequate knowledge.

The Autism Attitudes Scale for Teachers (AAST) is used in this study. It is a Likert-type scale used to measure school teachers' attitudes towards children with ASD. It consists of two alternate forms, each containing seven items, and offers five response options: strongly disagree, disagree, uncertain, agree, and strongly agree. The correlation between Forms A and B is reported to be 0.84. The reliability coefficients for Forms A and B are 0.85 and 0.78, respectively. The combined 14-item scale has an alpha reliability coefficient of 0.91. Accordingly, attitude scores are obtained by summing the scores of individual items. Notably, Questions 1, 2, 4, 6, 7, 8, 9, 11, 13, and 14 are reverse graded. A higher total score on the scale indicates a more positive attitude towards children with ASD [25]. Both form was used in this study.

In addition to the above questionnaire, an open-ended question was added to the survey, asking what challenges did you face when teaching children with autism in your classroom.

Variables

Attitude of preschool and primary school teachers toward teaching students with ASD in regular classrooms was the dependent variable. Socio-demographic factors, years of experience, training on autism spectrum disorder, previous exposure to a child with ASD, source of knowledge about ASD, training on early childhood development, teaching Children with special needs in the classroom, previous experience with children with special needs, level of knowledge of teachers about ASD and the challenges teachers face, while they teach children with ASD, were independent variables.

Data quality control

Before data collection, to ensure the quality of the data, the questionnaire underwent a translation process to Amharic by experts, and then it was retranslated back to English to identify any discrepancies. To ensure the suitability and clarity of the questionnaire, a pretest was conducted at Yeka Terar Preschool and Primary School, located in Yeka Sub-city. A sample size of 42 participants, which represents 10% of the total sample size, was used for the pretest. Based on the feedback received during the pretest, minor modifications were made to improve the wording and clarity of the questionnaire. These adjustments were made prior to deploying the final version of the questionnaire for the actual study. It's important to note that the data collected during the pretest is not included in the final analysis of the study. A two-day training session was conducted for both data collectors and supervisors. The training covered various aspects, including the objective and relevance of the study, the importance of maintaining the confidentiality of information, the rights of the respondents, obtaining informed consent, and the methods of data collection. Following the training, data collection was started. At the end of each day, the supervisors and principal investigator reviewed and examined the collected questionnaires for completeness and relevance. Feedback and guidance were provided to the data collectors as necessary, ensuring the quality and accuracy of the data collection process.

Operational definition

Preschool teachers teachers who are teaching students in kindergarten class at the time of the study.

Autism spectrum disorder disorder which meets the ASD criteria of DSM-5TR.

Adequate knowledge Respondents who scored above or equal to the cut-off score of knowledge-related questions [24].

Inadequate knowledge Respondents who scored below the cut-off score of knowledge-related questions [24].

Positive attitude Respondents who scored the mean score and above of attitude-related Questions [26].

Table 1 Socio-demographic characteristics among preschool and primary school teachers ($n=413$)

		Frequency	Percentage (%)
Age	20–25 years	65	16.1
	26–30 years	124	30.7
	31–40 years	166	41.1
	Above 40 years	49	12.1
Sex	Female	214	51.8
	Male	197	47.7
Marital statues	Married	236	57.7
	Single	155	37.5
	Divorced	14	3.4
	Widowed	7	1.7
Level of education	Certificate	10	2.4
	Diploma	158	38.3
	Degree	228	55.2
	Masters	17	4.1
Work Experience	< 1 year	17	4.1
	1–5 years	92	22
	5–10 years	124	30
	10–20 years	104	25.2
	20–30 years	27	6.5
	30–40 years	9	2.2
Level of classroom teachers teach	Preschool	65	15.7
	1st– 6th Grade	204	49.4
	7th– 8th Grade	130	31.5
Sub-city of school teachers teaches	Arada	90	21.7
	Addis Ketema	175	42.3
	Gulelea	148	35.8

Negative attitude Respondents who scored below the mean score of attitude-related questions [26].

Methods data analysis and interpretation

Data collection was carried out using the Kobo Tool software. Subsequently, the collected data underwent a cleaning process and was exported to SPSS Version 27 software for analysis. Descriptive analyses were conducted for all variables after ensuring the data's distribution, and any outliers, missing values, or inconsistencies were identified and addressed. Continuous variables were reported as mean ± standard deviation, while categorical variables were presented as numbers (percentages). Adequate knowledge was coded as "1" and inadequate knowledge as "0" for the knowledge outcome. Similarly, a positive attitude was coded as "1" and a negative attitude as "0" for the attitude outcome.

For the open-ended question, thematic analysis was conducted. Bivariate and multivariate regression analyses were conducted to examine the association between dependent and independent variables. Statistical significance was determined at a 95% confidence interval, with a p-value threshold of less than 0.05. The study's results were presented using text, tables, and pie charts to enhance comprehension.

Table 2 Participant responses to questions regarding previous training, formal education and experience related to ASD ($n=413$)

Variable	Response	Frequency	%
Have you heard about autism before	Yes	392	97.8
	No	6	1.5
Have you come across autistic child during your work experience as teacher?	Yes	236	57.1
	No	175	42.4
Have you had any form of formal Education about autism?	Yes	121	29.3
	No	291	70.5
Do you know a close person with autism?	Yes	224	54.2
	No	187	45.3
If the answer to the above question is yes how frequently do you meet this child	Daily	71	17.2
	Weekly	28	6.8
	Monthly	17	4.1
	Sometimes	97	23.5
	Never	12	2.9
Have you had Training on early childhood development?	Yes	145	35.1
	No	265	64.2
Are you teaching in inclusive school	Yes	334	80.9
	No	50	12.1
	I don't know	27	6.5
Have had teaching experience in a special need or inclusive classroom?	Yes	261	63.2
	No	147	35.6
Have you had Previous experience of children with special need?	Yes	178	43.1
	No	230	55.7

Result

Socio-demographic characteristics of study participants

In this study, a total of 416 teachers participated, resulting in a response rate of 98.3%. However, data from 3 participants had missing values exceeding 50%, so the final sample size used for analysis was 413. The mean age of the participants was 32.5 years, with a standard deviation of 7.3. Of the participants, 52% (214) were female and 48% (197) were male. The majority of teachers had work experience ranging from 5 to 10 years, accounting for 30% of the sample. Regarding monthly income, the mean was reported as 7795 birrs, with a range of 2799 to 19,030 birr (Table 1).

Response of participants regarding previous training, formal education, and experience related to ASD

In response to questions regarding previous training, formal education, and experience related to ASD, only 6 out of the 413 teachers (1.5%) reported having not heard about autism before. The majority of teachers (80.9%) reported teaching in inclusive schools. Approximately 57.1% of the teachers reported having come across an autistic child in their previous work experience. About 54% of the teachers reported knowing an autistic person closely. When it comes to sources of information about autism, the majority of teachers (63.2%) reported social media as a common source (Table 2).

Knowledge-based characteristics of the study participant on ASD

The overall knowledge of study participants on ASD was measured using the mean value, and the score of the mean value was 9.5 ± 4.2 out of 19. Adequate knowledge was demonstrated by 35.6% of the teachers based on their scores. The knowledge-based characteristics are expressed in the figure below (Fig. 1).

Attitude-based characteristics of study participants on inclusion of student with ASD to regular schools

The overall attitude of study participants towards the inclusion of autistic students in regular schools, based on the mean value score, is 3.34 ± 0.49, indicating a mildly positive attitude. Out of the total participants, 77.5% (320 individuals) had a positive attitude, whereas 22.5% (93 individuals) had a negative attitude towards inclusion. The mean value score for the question, such as "A good teacher can do a lot to help an autistic child" was higher at 3.95 ± 1.1 (Table 3). Conversely, the mean value score for the question "Regular schools are too advanced for autistic children" was lower at 2.66 ± 1.2 (Fig. 2).

Response of teachers to challenges faced when teaching children with ASD

A total of 148 teachers responded to the open-ended question regarding the challenges they encounter while teaching children with ASD. The challenges identified can be categorized into four main themes:

Understanding the subject matter Teachers reported difficulties in ensuring that students with ASD grasp the subject matter. About 26% of respondents highlighted this challenge, with statements like, "They are slow learners," "They don't progress at the same rate as their peers," and "They need more time to learn the lesson for the day."

Communication barriers 17% of teachers noted challenges related to communication. They expressed concerns about "difficulty speaking," "understanding their needs is not possible," and "they can't comprehend instructions."

Behavioral and emotional issues The most significant challenge reported, by 66% of teachers was the behavioral and emotional problems exhibited by students with ASD. Teachers observed that these students often "won't sit in one place," "disturb others," "shout," and may express feelings of fear or resistance to the classroom environment. Additionally, some teachers remarked that disruptive behaviors can affect other children, with comments such as "they make others disturb" and "they attract attention from their peers."

Lack of resources 12% of teachers pointed to a lack of adequate resources as a significant obstacle. This includes insufficient energy, time, training, and appropriate classroom equipment. Teachers expressed frustrations like, "We don't have suitable classrooms or equipment," "There are no resources available for them," and "They require special attention, but there isn't enough time to support them individually."

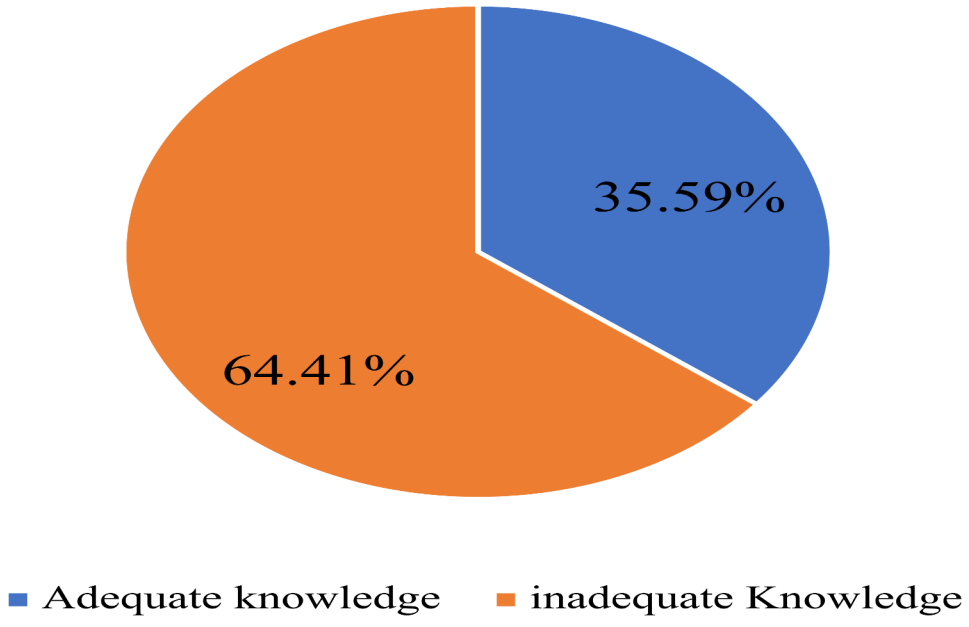

Fig. 1 Knowledge based characteristics of the study participant on ASD

Table 3 The response of participants on attitude based questions

Attitude related questions	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean
Only teachers with extensive special education training can help an autistic child	95(23%)	165 (40%)	41(9.9%)	72(17.4%)	40(9.7%)	3.49 ± 1.2
Mealtime behaviors of autistic children are disruptive and negatively influence the behavior of children around them.	45(10.9%)	125(30.4%)	86(20.9%)	127(30.9%)	28(6.8%)	3.08 ± 1.1
School with both normal and autistic children enhance the learning experience of normal children	9(2.2%)	200(48.5%)	77(18.7%)	99(24%)	27(6.6%)	2.84 ± 1.0
Normal children and autistic children should be taught in separate schools.	77(18.8%)	139(34%)	41(10%)	107(26.2%)	45(11%)	3.23 ± 1.3
Autistic children can learn from a good teacher	29(7.0%)	42(10.2%)	65(15.8%)	188(45.6%)	88(21.4%)	3.64 ± 1.13
Regular school are too advanced for autistic children	44(10.7%)	69(16.8%)	57(13.9%)	184(44.9%)	56(13.7%)	2.66 ± 1.2
I would not want the children in my class to have to put up with autistic school mates	64(15.6%)	115(28.1%)	81(19.8%)	105(25.7%)	44(10.8%)	3.12 ± 1.2
Teachers not specifically trained in special education should not be expected to deal with an autistic child	68(16.5%)	123(29.9%)	58(14.1%)	110(26.7)	53(12.9%)	3.10 ± 1.1
Autistic children are too impaired to benefit from the activities of a normal school.	93(22.6%)	181(44%)	60(14.6%)	58(14.1%)	19(4.6%)	3.66 ± 1.1
School with both normal and autistic children enhance the learning experience of normal children	51(12.3%)	85(20.6%)	70(17.1%)	170(41.5%)	34(8.3%)	3.12 ± 1.2
If I had the choice, I would teach in a school in which there were no autistic children	88(21.3%)	165(40%)	82(19.9%)	48(11.6%)	30 (7.3%)	3.56 ± 1.1
A good teacher can do a lot to help an autistic child	32(7.8%)	14(3.4%)	47(11.4%)	170(41.3%)	149(36.2)	3.95 ± 1.1
Autistic children cannot socialize well enough to profit from contact with normal children	94(22.9%)	187(45.5%)	70(17%)	40(9.7%)	20(4.9%)	3.72 ± 1.0
It is unfair to ask teachers to accept autistic children into their school.	91(22.1%)	163(39.7%)	81(19.7%)	48(11.7%)	28(6.8%)	3.59 ± 1.1

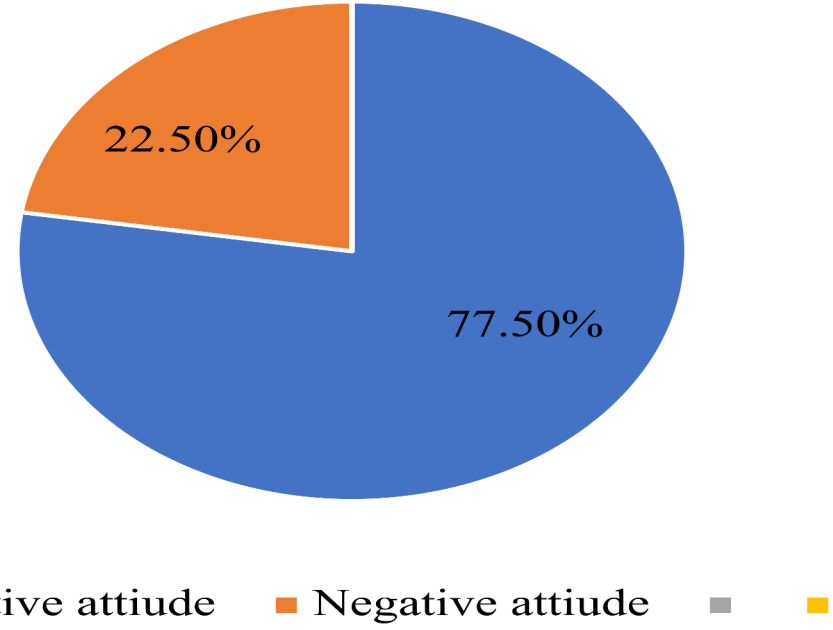

Fig. 2 The overall attitude of study participants on ASD

Determinant of participant's attitude about autism spectrum disorder

The strength of the variables was assessed using a bivariate binary logistic regression model. In the bivariate logistic regression analysis, age, frequency of meeting autistic children, work experience, source of participants' knowledge about autism from surrounding people, previous experience with special need students, knowledge about ASD and the identification of behavioral and emotional problems as challenges in teaching autistic children showed a significant association with attitude toward inclusion at a p-value below the 0.25 level of

significance. However, in the multivariate binary logistic regression analysis, after accounting for other variables, only the odds ratio for previous experience with special needs students and the challenges posed by behavioral and emotional problems in autistic children was found to be significant at a p-value below 0.05.

Accordingly, after adjusting for other covariates, Participants who had negative attitudes toward teaching students with ASD in regular classrooms have a 72% lower chance of having adequate knowledge (AOR = 0.28, 95% CI = 0.1–0.6).

Teachers who have previous experience with students with special needs are six times more likely to have a positive attitude towards inclusive education (AOR = 6, 95% CI = 1.05–40.7).

Conversely, teachers who identify behavioral and emotional problems in autistic children as a challenge are 94% less likely to have a positive attitude towards inclusive education (AOR = 0.06, 95% CI = 0.05–0.7). (Table 4).

Discussion

The overall mean score obtained was 3.34 ± 0.49, indicating a slightly positive attitude among teachers. The majority of teachers (70%) displayed a positive attitude, which is encouraging considering Ethiopia's current Master Plan for Special Needs Education/Inclusive Education [10]. Similar findings were observed in comparable studies conducted in Nigeria and Indonesia [20, 27]. Teachers in Nigeria had scored 74.5% of the total obtainable scores while 71% of the teachers in Indonesia had good attitudes towards autistic students in inclusive primary schools, and 29% had very good attitudes.

The present study found that having a positive attitude towards inclusion was associated with an 72% higher chance of having adequate knowledge. This is consistent with studies conducted in China [28] where the Pearson correlation indicated significant positive relationships between the knowledge and attitude scores ($r = 0.175$). This could be because comprehensive knowledge of ASD enhances teachers' understanding, confidence, experience, skills, and resources in working with students with ASD, leading to a more positive attitude towards them [29]. Teachers with adequate knowledge are likely to be more aware of effective teaching strategies, such as preferring visual inputs over auditory inputs among autistic children. Moreover, they are more inclined to view these children as capable of learning and, consequently, are more comfortable having them integrated into their classrooms.

Like previous studies [12], this study finds significant associations between teachers' previous experience with students with special needs and a positive attitude toward inclusive education. Teachers who are familiar with special needs students may have firsthand experience of the benefits these students gain from inclusion [30].It is essential to implement mentorship programs that enable teachers to gain practical experience with special needs students, fostering positive attitudes towards inclusion.

Teachers who identified behavioral and emotional problems as challenges are less likely to have a positive attitude toward inclusive education. This suggests that teachers may feel frustrated when dealing with challenging behaviors in regular classrooms. Previous studies have indicated that stakeholders recommend preparatory training in special units before inclusion in mainstream classrooms. Such programs can address the primary challenges faced by children with developmental disabilities (DD), potentially reducing stigma and making the integration process smoother [30]. In addition, schools should prioritize the development of targeted training programs that equip teachers with strategies to manage behavioral and emotional challenges effectively, thereby enhancing their confidence in inclusive settings.

Unlike previous studies conducted in Addis Ababa, which found a significant association between special needs education training and positive attitudes toward inclusive education [31], this study did not observe such an association. This discrepancy may be attributed to the quality of the current training. Recent research highlights the limitations of the current curriculum in Ethiopia, which are not specifically designed to meet the needs of teachers supporting children with developmental disabilities. Furthermore, the curriculum lacks a competency-based or practical focus. Additionally, teachers often do not receive ongoing professional development related to developmental disabilities [30]. Therefore, it is essential to enhance the curriculum by incorporating practical, hands-on experiences and evidence-based strategies that directly address behavioral management in inclusive classrooms. Additionally, ongoing professional development should be mandated to reinforce these skills and foster positive attitudes toward inclusion.

At an individual level, teachers must attend training on ASD to improve their knowledge and teaching strategies. Additionally they should use collaborative learning by partnering with special education professionals to share effective practices.

Conclusions

The findings of the present study indicate that teachers generally display a positive attitude towards ASD. Having good knowledge and previous experience with students with special needs positively influences teachers' attitudes, while perceptions of behavioral and emotional problems are negatively associated with their attitudes toward inclusive education.

Table 4 Determinate of attitude of teachers towards including student with ASD in the class room

Variables	Attitude		COR (95%CI)	AOR (95%CI)	*P*-value
	Positive Attitude	Negative Attitude			
Age					
20–25	52	13	1	1	
26–30	89	35	0.6(0.3–1.3)	5.0(0.5–50)	0.5
31–40	136	30	1.1(0.5–2.3)	3(0.2–32)	
> 40	36	13	0.6(0.2–1.6)		
How often do you meet an autistic child					
Sometimes	79	18	1	1	0.9
Weekly	24	4	1.3(0.4–4.4)	0.6(0.46-10)	
Daily	51	20	0.5(0.2–1.2)	1.1(0.2-5.0)	
Work experience					
1 to 10 years	160	56	1	1	0.39
11 to 20 years	85	19	1.5(0.8–2.8)	0.2 – 0.04	
21 to 30 years	25	2	4.3(1.0–19)		
Source of knowledge surrounding people					
No	236	53	1	1	0.08
Yes	78	40	0.4(0.2–0.71)	0.2(0.04–1.2)	
Previous experience of children with special need child					
No	171	58	1	1	
Yes	144	35	1.3(0.86–2.2)	6.5(1.05–40.7)	**0.04**
Behavioural and Emotional problem in children ASD					
No	44	6	1	1	
Yes	73	25	0.39(0.1-1.0)	0.06(0.005-0.7)	**0.03**
Knowledge					
Inadequate knowledge	195	71	1	1	
Adequate knowledge	125	22	2(1.2–3.5)	1.0 (0.2–4.2)	**0.98**

Limitations

Sample Size: Increasing the sample size with an appropriate design effect could enhance the strength of the findings.

Questionnaire Design: The wording of the knowledge assessment questionnaire may have led participants to provide responses that aligned with expected correct answers, potentially influencing the results.

Reliability of Attitude Section: The reliability of the attitude section, indicated by a Cronbach's alpha coefficient of 0.659, suggests a moderate level of internal consistency. This coefficient is lower than that of the original questionnaire used [26].

Severity of ASD and student as well as parental perspective as independent variables: The study did not include the severity of ASD and student as well as parental perspective as a variable, which could affect teachers' attitudes.

Comparative Analysis: The lack of comparison between different schools, particularly the exclusion of privately owned schools, limits the understanding of how varying inclusive cultures may influence teachers' knowledge and attitudes towards ASD.

Recommendations for future research

Inclusion of Student Factors: Future studies should incorporate variables related to student factors, including the severity of ASD, performance of student with ASD, number students in the classroom, and parental perspective, to provide a more comprehensive understanding of influences on teacher attitudes.

Comparative Studies: Further research should include a comparative analysis between private and public schools, as most preschools in Addis Ababa are privately owned [32]. This will help in understanding the diverse inclusive cultures that may impact teacher attitudes.

Abbreviations

ASD	Autism spectrum disorders
DSM	Diagnostic and Statistical Manual of Mental Disorders
AAST	Autism Attitude Scale for teachers
ASKQ	Autism stigma and knowledge questionnaire
AOR	Adjusted Odds Ratio
COR	Crudes Odds Ratio
CI	Confidence Interval
OR	Odds Ratio
SPSS	Statistical Package for Social Science
MOH	Ministry of Health
MOE	Ministry of Education
WHO	World Health Organization

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Author contributions

Mizan conceptualized and designed the study; collected, analyzed and interpreted the data; and drafted the manuscript. Fasil, Yohannes and Dires were involved in data analysis, drafting of the manuscript and advising the

entire research paper. They were also involved in the interpretation of the data and contributed to manuscript preparation. All authors have read and approved the final manuscript.

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Data availability
The data and other documents used in this study are available from the corresponding author.

Declarations

Competing interests
The authors declare no competing interests.

Conflict of interest
All authors confirmed that they have no conflict of interest. However, some parts of the paper.

Ethical approval
Before commencing the research, ethical clearance was obtained from the Ethical Committee of SPHMMC (name of the institution) with additional support in the form of a letter from the Pediatrics Department and the City Government of Addis Ababa Education Bureau. Before their involvement in the study, all participating school teachers were provided with a written informed consent document. This document assured them of the confidentiality and anonymity of their responses. It was clearly stated in the consent form that the participants had the right to withdraw from the study at any stage if they wished to do so.

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