

Exploring Effects of AAC Intervention on Child Behavior, Family Interactions, and Parental Acceptance among Children with Autism in Nablus-Palestine

Hala Jarrar

An-Najah National University

Lana Malhis

malhislana@gmail.com

An-Najah National University

Alaa Munawer

An-Najah National University

Moamen Omareya

An-Najah National University

Nagham Deek

An-Najah National University

Razan Abutair

An-Najah National University

Saja Dodeen

An-Najah National University

Sara Majed Khadeje

An-Najah National University

Zaynab Abu-Shamat

An-Najah National University

Research Article

Keywords: Augmentative and Alternative Communication (AAC), autism, parental perceptions, family interactions

Posted Date: February 27th, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-8901365/v1>

License: © ⓘ This work is licensed under a Creative Commons Attribution 4.0 International License.
[Read Full License](#)

Additional Declarations: No competing interests reported.

Version of Record: A version of this preprint was published at BMC Pediatrics on June 16th, 2026. See the published version at <https://doi.org/10.1186/s12887-026-07161-2>.

Abstract

Background

Autism spectrum disorder patients face multiple challenges on a daily life basis; communication is one of the most important. Multiple interventions are available to improve both verbal and nonverbal communication, including speech and language therapy, music, art, and play interventions. Augmentative and Alternative Communication (AAC) is one of the supportive interventions to improve communication that does not force speech by itself but supports communication using pictures, gestures, symbols, etc., while at the same time supporting speech. This study examines the parental experiences during AAC system use as well as effects of AAC interventions on child behavior, family interactions, and parental acceptance among children with autism in Nablus, Palestine.

Methods

A cross-sectional design was used in this study. Data were collected from 75 families recruited via convenience sampling to examine parental perceptions and experiences with AAC system interventions using a 3-section questionnaire.

Results

Results indicate strong parental support for AAC's ability to enhance communication (97.3%) and improve interactions at home (86.7%), consistent with current literature. However, significant discrepancies were found regarding AAC's perceived appropriateness for all children (31.1%) and awareness of the availability of alternative systems (33.3%). Statistical analysis revealed a non-significant correlation (Spearman's rho = 0.167, $p = 0.171$) between parental perceptions and experiences with AAC.

Conclusion

Multiple significant effects of AAC interventions were found. These findings underscore the importance of tailored interventions to address awareness gaps and enhance AAC effectiveness in diverse cultural and resource-limited settings like Palestine.

Introduction

Effective communication is essential for early child development, particularly in social/cognitive and language domains. It has significant importance involving education, academic performance, social interactions, and overall well-being(1). Unfortunately, communication can be challenging for certain populations including Individuals with intellectual disabilities, Fragile X syndrome, Angelman syndrome, Down syndrome, Rett syndrome, brain injuries, and autism spectrum disorder (ASD), all of which require Complex Communication Needs (CCN) (2). ASD is defined as any one of a group of disorders that usually start in preschool and are characterized by a variety of distinct but frequently noticeable and long-lasting

deficiencies in social interaction and communication, including issues with social-emotional reciprocity, nonverbal communication behaviors, and social relationships, as well as limited and repetitive patterns of interests, behaviors, and/or activities.(3) There are increasing cases of diagnosed ASD recently; according to the CDC, about 1 in 31 children aged 8 years has been identified with ASD, compared to 1 in 59 in 2014 CDC statistics (4, 5). This can be partially attributed to factors, such as increased awareness, greater diagnostic efforts, and changed definition of ASD throughout the years .(6) Nevertheless, this upgoing prevalence highlights the growing public health importance of early detection and intervention. Between 25% and 30% of kids with ASD are either barely verbal (using fewer than 30 words) or unable to speak verbally.(7) Several interventions are available to improve communication skills in ASD patients including behavioral interventions ,music and art mediated approaches, parent or caregiver based interventions, Developmental and Social Pragmatic Approaches ,speech and language therapy, and Augmentative and Alternative Communication interventions.

Among all, Augmentative and Alternative Communication (AAC) is particularly special in terms of empathy with the patient; as it does not necessarily force speech, yet it allows improved both verbal and nonverbal communication. It encompasses two primary approaches: augmentative, which supplements natural speech or writing, and alternative, which substitutes for it entirely. The International Society for Augmentative and Alternative Communication defines AAC as encompassing various modes of communication—speech, gestures, signs, symbols, and devices—aimed at ensuring comprehension when natural communication is compromised(8). According to the American Speech-Language-Hearing Association, AAC plays a crucial role in clinical and educational settings by enhancing communication for individuals with severe speech/language disorders, either for temporary or permanent impairments. (9). This includes both unaided methods, like gestures and signs, and aided methods ranging from low-tech communication boards to high-tech solutions such as speech-generating devices and mobile apps (9). Through a variety of techniques, AAC not only improves communication but also lessens the psychological strain brought on by verbal communication issues. Importantly, research has found no evidence that AAC disrupts language development in autistic children(10), conversely, several studies showed improved verbalization and speech production among AAC users (11). Through this, AAC gives those who are unable to speak a voice.

Despite increasing recognition of AAC role and potential benefits, there still lack of evidence in literature regarding its effects on child behavior, family interactions and dynamics, as well as parental awareness and acceptance of it. This becomes especially true in low- and middle-income countries where children do not usually receive early detection or intervention, and have limited access to specialized services. Researching interventions locally aids in adapting appropriate for environments with limited resources. Additionally, by conducting research locally, a sustainable infrastructure for ASD care is created and clinicians, educators, and families are better trained.

Our study aims to investigate AAC parental experience, and the effects of Augmentative and Alternative Communication (AAC) interventions on child behavior, family interactions, and parental acceptance among children with autism in Nablus, Palestine.

Methodology

Study Design, setting and population

This study employed a descriptive research cross-sectional design to investigate the effects of Augmentative and Alternative Communication (AAC) interventions on child behavior, family interactions, and parental acceptance among children with autism in Nablus, Palestine. It included 75 parents of children with autism who were using AAC devices. Participants were selected utilizing a convenience sampling technique, which selects participants according to their availability and desire to take part. This approach was selected because it is practical to collect data within the time and resources available.

Sample size

There is no formal registry regarding prevalence data of autism for Nablus. However, an estimate from university autistic center suggest approximately 103 autistic children in Nablus city .(12) However there is no data of number of children who used AAC interventions. The sample size was calculated using the Raosoft sample size calculator (13) Using a 95% confidence level and 5% margin of error with an assumption of a 50% response rate, and using population size of 80 which is the approximate number of patients who were using AAC from the 103 patients, the minimum effective sample size required was 67. The final sample size was raised to 75 to improve the study population's representativeness.

Inclusion and exclusion criteria

Parents or primary caregivers of children who, at the time of data collection, were actively using or undergoing structured training in Augmentative and Alternative Communication (AAC) systems and had a confirmed diagnosis of autism spectrum disorder (ASD) based on medical or educational records were included in the study. To guarantee equal access to services and follow-up support, eligible participants had to live in Nablus city and its environs. In addition to being able to comprehend and finish the study questionnaire, parents required to be actively involved in the child's everyday care and communication routines.

If the child had not yet started using or training AAC, or if AAC had been stopped before the study period, the family was omitted.

Residence outside the study area, incapacity to give informed consent, and insufficient questionnaire replies that would jeopardize the validity of the data were further exclusion factors.

Data collection

A structured questionnaire that involved three sections was used. It was designed by referring to educational literature and previous research on the topic(10, 14–16) .The instrument was revised and

modified with input from a group of experts to ensure its validity. The questionnaire was distributed both on paper and online. First section assessed sociodemographic characteristics, second section evaluated the impact of AAC interventions on children's behavior, interactions with family members, and parental acceptance. And finally, third and last section assessed families' experience regarding the support received during the process of AAC implementation. The final version of the questionnaires is available at the end of the study. (Appendix 1)

validity and reliability

Ten patients participated in pilot research to evaluate the questionnaire's readability and dependability. In particular, the results of the pilot evaluation were not taken into account in the final data analysis. The survey instrument was improved using the data received during the pilot review procedure.

Ethical approval

An-Najah National University's Institutional Review Board (IRB) received the study (IRB Reference: HSP. Dec.2023/8). There were no clinical trial interventions used in this observational study. The Declaration of Helsinki was followed when conducting the study. Prior to their involvement, the participants were made aware of the study's objectives and provided signed consent. Throughout the trial, patient privacy and confidentiality were upheld, and only the research team had access to patient data. To guarantee participant comfort and confidentiality, data collection was done in private settings.

Statistical Analysis

The Statistical Package for the Social Sciences (SPSS) version 26 was used to analyze the data. The study variables were summarized using descriptive statistics. Frequencies and percentages were used to report categorical variables. Medians and interquartile ranges (IQR) were used to summarize ordinal and non-normally distributed continuous variables.

The Kolmogorov-Smirnov and Shapiro-Wilk tests were used to determine the normality of continuous variables, and the results showed that none of them were normally distributed ($p < 0.05$).

Ordinal variables between two independent groups were compared using the Mann-Whitney U test, and ordinal variables between three or more groups were compared using the Kruskal-Wallis test. The connections between ordinal and non-normally distributed continuous variables as well as between pairs of ordinal variables were evaluated using Spearman's correlation. Statistical significance was defined as a p-value of less than 0.05.

Results

Sociodemographic characteristics

About 75 parents participated in the study. Age was categorized into three categories, about half of children (51.4%) aged between 6 to 12 years old. Nearly 70% were male. When asked about fathers' education, the results revealed that more than half (54.7%) had a bachelor's education, similarly, about 60% of mothers had the same level of education. When asked if the child suffers from any other disorders or problems in addition to autism spectrum disorder, parents reported that 72.6% had no other disorders; among those who did, cognitive disorders were the most common disorders in children. The median of number of children per family was 3 (IQR 2-4). The median length of time the child spent training in this system was 24 (12-24) months. All other related information is shown in Table 1, 2.

Table 1: Characteristics of participants and their children (n = 75).

Variable	Frequency	Percent (%)
Age		
Less than 3 Years Old	6	8.1
4-5 Years old	30	40.5
6-12 Years old	38	51.4
Gender		
Male	51	69.9
Female	22	30.1
Father Education Level		
Secondary Education	23	30.7
Diploma	1	1.3
Bachelor	41	54.7
Master	8	10.7
PhD or higher	2	2.7
Mother Education Level		
Secondary Education	19	25.3
Diploma	2	2.7
Bachelor	45	60.0
Master	7	9.3
PhD or higher	2	2.7
Does your child suffer from any other disorders or problems in addition to autism spectrum disorder?		
No	53	72.6
Cognitive	13	17.8
Auditory	3	4.1
Others	4	5.5

Table 2: Distribution of continuous variables among participants (n=75)

Variable	Median	Interquartile Range (Q1–Q3)	Unit
Age of children	6	4–12	years
Number of children in family	3	2–4	—
Length of AAC training	24	12–24	months

Perceptions of children's families about the use of Augmentative and Alternative Communication (AAC) systems.

Detailed parental responses to perception items shown in table 3 showed that the highest agreed perception was that using augmentative or alternative communication (AAC) devices increases the child's communication opportunities (97.3%), followed by Augmentative or alternative communication (AAC) systems helped change my child's behavior and interaction for the better inside the home (86.7%). The lowest score was Augmentative or alternative communication (AAC) systems suitable for all children (31.1%) followed by having knowledge about other systems that can be used in addition to those used by my child (33.3%). When categorizing the perception using 10 Yes/No items with each Yes response scored as 1 and each no scored as 0, it was found that 48% of parents had low perception (0-3). While 17.3% were moderate (4-6), and 34.7% had high perception (7-10).

Table 3: Responses related to perceptions of children's families about the use of AAC intervention (n = 75)

No.	Item	Yes n (%)	No n (%)
1	Using augmentative or alternative communication (AAC) devices increases my child's communication opportunities? (Express his\her thoughts and feelings when needed)	73 (97.3)	2 (2.7)
2	Am I having difficulties in integrating augmentative or alternative communication (AAC) devices into my child's daily routine?	53 (70.7)	22 (29.3)
3	Augmentative or alternative communication (AAC) systems helped me understand my child's needs and interact with him?	64 (85.6)	10 (13.3)
4	Augmentative or alternative communication (AAC) systems helped change my child's behavior and interaction for the better inside home?	65 (86.7)	10 (13.3)
5	Augmentative or alternative communication (AAC) systems helped change my child's behavior and interaction for the better outside home?	54 (72)	21 (28)
6	Augmentative or alternative communication (AAC) systems help reduce my child's frustration and behavioral emotions?	60 (80)	15 (20)
7	My child's use of augmentative or alternative communication (AAC) systems helped him to be more independent in his life (such as: making decisions and expressing his wishes)?	61 (81.3)	14 (18.7)
8	It wasn't easy for my child to get one of these helping programs?	51 (68)	24 (32)
9	I have knowledge about other systems that can be used in addition to those used by my child?	25 (33.3)	50 (66.7)
10	Augmentative or alternative communication (AAC) systems suitable for all children?	23 (31.1)	51 (68.9)

Experience of children's families during the use of Augmentative and Alternative Communication (AAC) systems

A nine-item scale with responses ranging from Never, Sometimes, Mostly, and Always was used to gauge parents' experiences with AAC systems. Responses were given the following numerical values for the computation of the overall score: Never = 0, Sometimes = 1, Mostly = 2, and always = 3. A total experience score (range 0–27) was calculated by adding the scores from each item. the total scores were then divided into three experience levels: low, moderate, and high. In total, 32.9% of parents had moderate positive experience scores, 34.3% had high positive experience scores, and 32.9% had low positive experience scores. A moderately favorable experience was indicated by the mean overall score of 17.63 ± 5.18 out of a possible 27. Receiving sufficient direction and support from competent authorities had the highest level of agreement (64.8%), followed by professionals responding to the child's evolving requirements and making necessary modifications (51.4%). The lowest percentage of respondents (18.1%) agreed that they were still having trouble embracing the system even after training had started. (Table 4).

Table 4: Families experience during the intervention of Augmentative and Alternative Communication (AAC) systems (n = 75)

No.	Item	Never n (%)	Sometimes n (%)	Mostly n (%)	Always n (%)
1	I'm getting appropriate guidance and support from the competent authorities (specialists or trainers) in training my child on this system.	1 (1.4)	9 (12.7)	15 (21.1)	46 (64.8)
2	I had difficulty accepting this system for my child at first.	5 (6.9)	10 (13.9)	26 (36.1)	31 (43.1)
3	I still have problems accepting this system for my child even though some time has passed since he started training on it.	10 (13.9)	23 (31.9)	26 (36.1)	13 (18.1)
4	The specialists and trainers on this system are responsive to my child's changing needs and make adjustments in the system in accordance with his needs.	1 (1.4)	10 (13.9)	24 (33.3)	37 (51.4)
5	The specialists and trainers on this system provide continuous assistance and constant follow up to the use of, and understand this system as required.	2 (2.8)	11 (15.3)	24 (33.3)	35 (48.6)
6	I feel confident and able to use these systems effectively to communicate with my child.	2 (2.8)	19 (26.4)	23 (31.9)	28 (38.9)
7	Augmentative or alternative communication (AAC) systems suit the individual needs of my child.	2 (2.8)	11 (15.3)	38 (52.8)	21 (29.2)
8	There is good understanding and effective cooperation between the work team in the application of this system.	-	22 (30.6)	22 (30.6)	28 (38.9)
9	The emotional and psychological needs of my child and family are taken into account when implementing this system.	5 (7)	25 (35.2)	15 (21.1)	26 (36.6)

Sociodemographic Factors related to the perception of parents regarding the use of AAC systems

As indicated in table 5, The Mann-Whitney U and Kruskal-Wallis tests were used to compare parents' AAC perception scores across sociodemographic and child-related variables.

The existence of extra child disorders was substantially correlated with parents' perception scores ($p = 0.003$). Compared to parents whose children had cognitive, auditory, or other impairments, parents of children without other abnormalities had higher mean ranks (mean rank = 39.65) of AAC perception.

child gender ($p = 0.085$), age group ($p = 0.492$), father's education level ($p = 0.478$), and mother's education level ($p = 0.337$) did not significantly affect perception levels.

Additionally, spearman correlation was done to examine correlation between AAC perception and number of children in family as well as length of AAC training, both of which were insignificant ($p=.479$, $.148$) respectively. (Table 6)

Table 5: Associations between parents' AAC perception scores and sociodemographic variables (n = 75)

Independent Variable	Categories	Mean Rank	p-value
Gender	Male	32.20	0.085
	Female	40.98	
Child age group	<3	44.58	0.492
	4–5	35.35	
	6–12	34.14	
Child has other disorders	No	39.65	0.003
	Cognitive	23.77	
	Auditory	5.50	
	Other	35.67	
Father's education level	≤Secondary	42.55	0.478
	BA	33.93	
	Master	31.63	
	PhD	26.00	
	Diploma	43.00	
Mother's education level	≤Secondary	37.24	0.337
	BA	37.03	
	Master	23.21	
	PhD	26.00	
	Diploma	52.50	

Significant associations are indicated in bold at a significance level of $p < 0.05$.

☒Mann–Whitney U test.

☒Kruskal–Wallis test

Table 6: Spearman correlations between continuous factors and parents' AAC perception scores (n = 75)

Variable	Correlation coefficient (rs)	p-value
Number of children in family	0.082	0.497
Length of AAC training (months)	-0.176	0.148

Significant associations are indicated in bold at a significance level of $p < 0.05$.

Spearman correlation test

Sociodemographic Factors related to the experience of parents during AAC intervention

The Mann-Whitney U and Kruskal-Wallis tests were used to look at relationships between parents' AAC experience scores and sociodemographic factors, as indicated in Table 7.

Table 7: Factors related to the experience of parents during AAC use (n=75)

Independent Variable	Categories	Mean Rank	p-value
Gender	Male	36.39	0.563
	Female	33.91	
Child has other disorders	No	36.35	0.100
	Cognitive	22.38	
	Auditory	41.33	
	Other	45.33	
Child age group	<3	33.75	0.864
	4–5	36.67	
	6–12	34.03	
Father's education level	≤Secondary	45.29	0.013
	BA	31.95	
	Master	25.21	
	PhD	55.25	
	Diploma	1.00	
Mother's education level	≤Secondary	45.28	0.062
	BA	31.65	
	Master	24.80	
	PhD	51.50	
	Diploma	51.00	

☒ Significant associations are indicated in bold at a significance level of $p < 0.05$.

☒ Mann–Whitney U test.

☒ Kruskal–Wallis test

Fathers' educational attainment and parents' experience scores were shown to be statistically significantly correlated ($p = 0.013$). Parents with a PhD (mean rank = 55.25) and those with only a secondary education or less (mean rank = 45.29) had higher mean ranks than parents with bachelor's or master's degrees.

Experience scores did not differ statistically significantly by child gender ($p = 0.563$), child age group ($p = 0.864$), occurrence of additional child disorders ($p = 0.100$), or mother's educational attainment ($p = 0.062$).

Similarly, correlation between number of children per family and length of AAC training with parental AAC experience was assessed through spearman correlation. Only number of children showed weak positive correlation ($p=.028$) compared to no correlation for length of AAC training ($p=.408$). (Table 8)

Table 8: Spearman correlations between continuous factors and parents' AAC experience scores (n = 75)

Variable	Correlation coefficient (rs)	p-value
Number of children in family	0.262	0.028
Length of AAC training (months)	-0.102	0.408

Significant associations are indicated in bold at a significance level of $p < 0.05$.

Spearman correlation test

Relationship between parental AAC systems perception and their experience during the intervention

Finally, spearman correlation test found no association between parental perception of AAC and their experience during AAC intervention. ($p=.171$) (Table 9)

Table 9: Relationship between perception and experience

Variables	Correlation coefficient (rs)	p-value
(Experience) vs (Perception)	0.167	0.171

Significant associations are indicated in bold at a significance level of $p < 0.05$.

Spearman correlation test

Discussion

In this study, the usage of Augmentative and Alternative Communication (AAC) systems for children with autism spectrum disorder was examined from the perspective of their parents including assessment of parental perception of AAC interventions as well as their experience during it. Overall, parents' perceptions and experiences were variable and influenced by a number of family and child-related factors.

Most parents in our study found that AAC systems enhance communication opportunities for children and improve behavior and interaction at home closely aligning with previous literature ; for example ; in a meta-analysis , AAC was found to have better effects on communication functions and reduction of challenging behaviors(17) . However, our findings contradict in certain aspects with other studies specially regarding suitability of AAC interventions to all; most parents said AAC isn't for all children , however in another study it is claimed that AAC should be applied to a wide range of children including

different ages , different cognitive abilities and skills , although it emphasizes on individualized experience for each child according to their characteristics. (18)

Interestingly, AAC does not only improve child communication and lessens their frustration but also it had a significant impact on parent-child interaction and improved over all parental wellbeing. In our study many parents realize that AAC helped them understand their child's needs and interact with them. In a systematic review, parents reported enhanced ability to communicate and engage with their children and many of them expressed joy when AAC worked. Around two thirds of parents in our study are not aware of alternative systems or interventions for communication improvement, this is critically concerning, especially in the context of low-income country such as Palestine where it is not always possible to receive early diagnosis and intervention let alone being able to access resources. The limited parental knowledge about AAC systems identified in this study highlights the importance of professional guidance and family education. This matches with literature which showed different awareness across different income levels. The families from racial/ethnic minority backgrounds, 55% said they had never heard of AAC devices before.

In comparison, only 12% of white, non-Hispanic households said they had never heard of AAC devices before (19) . This can be partially attributed to variation in parental education, availability and accessibility of services, and doctor involvement.

In addition, we examined the effects that families experience when using Augmentative and Alternative Communication (AAC) systems, our findings revealed a positive experience during intervention in terms of getting appropriate guidance and support from team, efficient teamwork cooperation, alignment with the child individual needs, and taking family situations into account. Although most parents struggled to accept AAC devices despite their proven efficacy. This resistance stemmed from worries about their children being bullied. Previous studies showed similar worries in other parents which have different sources. There are a number of practical, emotional, and knowledge-related reasons why parents are hesitant to use AAC systems. According to research, parents may be concerned that AAC would take the place of natural speech, lessen their child's desire to communicate vocally, or be too complicated for them to use successfully. In addition, parents often describe difficulties incorporating AAC into everyday activities, fear of social stigma or unfavorable reactions from classmates and instructors, and inadequate professional training or support. Parental reluctance is often influenced by time restraints, financial expenses, and confusion about the best system to meet their child's requirements. (20)

Regarding the association between parental AAC perception and sociodemographic, only presence of other disorders was significant, with parents of patients having no other disorders having highest AAC perception, possibly as a result of increased caring responsibilities, more difficult communication, or doubts about whether AAC is appropriate for complicated clinical profiles. The opinion of AAC systems and parents' educational attainment did not significantly correlate. This implies that opinions of AAC, whether favorable or unfavorable, may be more impacted by real-world experience, expert assistance, and services availability than by formal education alone. These findings exactly match results of a study done in 2022 implying that while parental education level exhibited inconsistent or weak connections,

child requirements, comorbidities, and functional outcomes had a significant impact on parents' perceptions and experiences with AAC.(2) Age wasn't also significant which coincides with previously mentioned study that showed ability of AAC application among wide range of children(5) . Overall, the results show that sociodemographic characteristics like gender, age, and parental education have no bearing on how parents view AAC systems. Rather, parents' opinions of AAC use seem to be more influenced by the child's clinical profile, especially the existence of other diseases.

With reference to association between parental experience during AAC intervention and sociodemographic, only parental education was significant to positive experience. This result implies that father educational attainment may have an impact on how parents interact with or view their use of AAC systems, potentially due to variations in information availability, problem-solving abilities, or self-assurance when interacting with medical and educational services.

Concerning relationship between both parents' perceptions and experiences of Augmentative and Alternative Communication (AAC) interventions with number of children in family and length of AAC training, there was only significant association between number of children per family with AAC parents' experience, although it was weak, a positive relationship with higher number of children had a more positive AAC experience. This can be surprising as parents with smaller families will be default have more time confined to their children. Nevertheless, higher level of experience in caregiving, problem-solving, and advanced adaptability as well as parental and social skills are likely present among parents running larger families, which may help them feel more comfortable and confident when using AAC techniques.

At last, in the present study, there is no significant correlation between how parents perceive AAC and their actual experiences with these interventions. Inconsistent with these findings, Previous research suggests a dynamic relationship between parents' perceptions of AAC and their experiences with AAC therapies. Interestingly, it goes either way; positive experience means better perception of family, according to systemic review, Parents report more positive emotional reactions and a stronger sense of connection when AAC use improves children's communicative and relational outcomes, demonstrating the close relationship between perceived child advantages and parental experience and acceptance (21). Concurrently, the idea that positive intervention affect perception is indirectly supported by quantitative survey data, which also indicates that parental satisfaction rises when AAC is used more frequently and when parents believe it improves their comprehension of their child's needs.(22)

In sum, our results emphasize the need for establishing AAC systems in low- and middle-income nations, where accessibility, availability, and understanding of these systems are frequently restricted. In order to customize interventions, maximize support, and eventually improve communication outcomes for children with developmental disabilities in such circumstances, it is essential to comprehend parents' perspectives and experiences. These findings highlight the necessity of focused counseling, continuing education, and tactics to overcome possible obstacles in order to successfully incorporate AAC systems into regular family life.

Strengths and limitations

This study has a number of noteworthy advantages. By analyzing parental opinions and experiences of AAC therapies in a low- and middle-income setting, it tackles an understudied topic and offers insightful information from Palestine, where local data are hard to come by. In order to provide a thorough picture of AAC implementation within families, the study took a broad approach, evaluating not only parental acceptability but also perceived effects on child behavior and family interactions. Also, this study contains a number of limitations that should be taken into account when interpreting the data, despite its positives. Inferring causal links between AAC therapies and parental views or experiences is limited by the cross-sectional approach. Convenience sampling may further limit the findings' applicability to all Palestinian households with autistic children. Self-reported questionnaires were used to gather data, which could be biased by social desirability or recollection. Additionally, the power to identify subtle relationships is limited by the relatively small sample size, especially when it comes to subgroup analyses such as comorbid diseases or educational levels. Lastly, the study may not accurately reflect the true efficacy of AAC therapies because it depended on parental reports rather than objective measurements of child communication or behavioral outcomes.

Conclusion

This study offers crucial information about how parents in Nablus, Palestine, view and interact with augmentative and alternative communication (AAC) interventions for autistic children. Overall, parents expressed favorable opinions of AAC, especially in relation to its ability to improve family relationships, communication, and child conduct. Nonetheless, significant gaps were found in parents' perceptions of the applicability of AAC for all children and in their knowledge of other communication systems. The results show that the clinical profile of the kid has a greater impact on parents' perceptions of AAC than sociodemographic traits like age, gender, or parental education.

Parents' experiences throughout the AAC intervention were usually favorable, however they were influenced by things including family size and educational background. The challenge of implementing AAC is highlighted by the lack of a substantial correlation between parental perceptions and experiences, which emphasizes the necessity of ongoing professional assistance and family-centered intervention methods. To maximize communication outcomes for children with autism and support their families in low- and middle-income settings where resources are scarce, it is crucial to improve parental education, increase service availability, and incorporate AAC into routine clinical and educational practice.

Recommendations

A number of suggestions can be made in light of the study's findings. First and foremost, it is crucial to raise parental awareness and knowledge of AAC systems, especially with regard to the availability of alternative communication options and the fact that AAC supports speech development rather than replaces it. Multidisciplinary teams' structured parent education programs, workshops, and counseling

sessions may assist dispel myths, handle emotional issues, and increase acceptance of AAC therapies. Second, each child's clinical profile, communication skills, and family situation should be taken into consideration while using AAC, particularly for kids with co-occurring disorders.

Optimizing results and boosting parental confidence can be achieved through customized counsel and ongoing professional follow-up. Additionally, efforts should be focused on enhancing the affordability and accessibility of AAC services in low- and middle-income environments like Palestine through improved professional training, integration into public health and educational institutions, and governmental support. Lastly, it is advised that future studies use longitudinal designs to investigate how parental perspectives and experiences evolve over time as well as the long-term effects of AAC use on family dynamics and child communication.

Abbreviations

AAC
Augmentative and Alternative Communication
ASD
Autism Spectrum Disorder
ABA
Applied Behavior Analysis
CBRS
Child Behavior Rating Scale
PSI
Parenting Stress Index
FQoL
Family Quality of Life
SD
Standard Deviation
SPSS
Statistical Package for the Social Sciences
CI
Confidence Interval
IRB
Institutional Review Board.

Declarations

Ethics approval and participation consent

The An-Najah National University Institutional Review Board (IRB) and the local health authorities accepted the study protocol. All participants provided their explicit consent, and NNUH approved the

data collection. It is guaranteed that the data collected will be kept private for the duration of the study and used only for research. Along with information on privacy protections, the participants were reassured that their data would be kept confidential and utilized exclusively for research. The IRB of An-Najah National University waived the need for written informed permission in favor of verbal informed consent because our study did not gather identifiable information and did not endanger subjects. Every method utilized in research involving human subjects complied with the ethical standards set forth by the institutional and/or national research committee, the 1964 Helsinki Declaration and its subsequent amendments, or similar ethical standards.

Consent of publication

Not relevant

Conflicting interests

The authors have reported no conflicting interests.

Funding

There was no funding for this project.

Author Contribution

H.J. conceived the study idea, supervised the project, and led the development of the manuscript. L.M. contributed to study design, methodology, and critical revision of the manuscript. A.M. performed data collection, literature review, and assisted in drafting the results section. M.O. contributed to data analysis, interpretation, and preparation of tables. N.D. assisted with literature review, data verification, and drafting parts of the introduction. R.A. contributed to clinical data acquisition, patient history compilation, and manuscript editing. S.D. assisted in preparing the discussion section and cross-checking references. S.M.K. contributed to data curation, formatting, and final quality checks of the manuscript. Z.A.S. prepared the figures, assisted with visualization, and contributed to final manuscript revision. All authors reviewed and approved the final manuscript.

Acknowledgement

We appreciate the help from each and every participant. We also like to express our gratitude to An-Najah National University and the PMOH for their support and ethical approval of this work.

Data Availability

Due to privacy concerns, the datasets used and/or analyzed during the current inquiry are available from the associated authors upon reasonable request.

References

1. Lima Antão JYF, Oliveira ASB, Almeida Barbosa RT, Crocetta TB, Guarnieri R, Arab C, et al. Instruments for augmentative and alternative communication for children with autism spectrum disorder: a systematic review. *Clin (Sao Paulo Brazil)*. 2018;73:e497.
2. Berenguer C, Martínez ER, De Stasio S, Baixauli I. Parents' Perceptions and Experiences with Their Children's Use of Augmentative/Alternative Communication: A Systematic Review and Qualitative Meta-Synthesis. *Int J Environ Res Public Health*. 2022;19(13).
3. Association AP. Autism Spectrum Disorder American Psychological Association (APA) web page2025 [Available from: <https://www.apa.org/topics/autism-spectrum-disorder>
4. (CDC) CfDCaP. Data and Statistics on Autism Spectrum Disorder 2025 [Available from: <https://www.cdc.gov/autism/data-research/index.html>
5. Prevention CfDCa. Prevalence of Autism Spectrum Disorder Among Children Aged 8 Years — Autism and Developmental Disabilities Monitoring Network, 11 Sites, United States, 2014 Morbidity and Mortality Weekly Report (CDC Surveillance Summary)2018 [Available from: <https://www.cdc.gov/mmwr/volumes/67/ss/ss6706a1.htm>
6. Aresti-Bartolome N, Garcia-Zapirain B. Technologies as Support Tools for Persons with Autistic Spectrum Disorder: A Systematic Review. *Int J Environ Res Public Health*. 2014;11(8):7767–802.
7. Kolaski K. Are Communication Interventions Effective for Minimally Verbal Children with Autism Spectrum Disorder? A Cochrane Review Summary with Commentary. *Dev neurorehabilitation*. 2020;23(8):557–9.
8. Communication ISAA, About AAC. What is AAC? ISAAC – International Society for Augmentative and Alternative Communication 2023 [Available from: <https://isaac-online.org/english/about-aac/>
9. Beukelman DR, Light JC. Augmentative and Alternative Communication: Supporting Children and Adults with Complex Communication Needs. Baltimore, MD: Paul H. Brookes Publishing Co.; 2020.
10. Schlosser RW, Wendt O. Effects of augmentative and alternative communication intervention on speech production in children with autism: a systematic review. *Am J speech-language Pathol*. 2008;17(3):212–30.
11. White EN, Ayres KM, Snyder SK, Cagliani RR, Ledford JR. Augmentative and Alternative Communication and Speech Production for Individuals with ASD: A Systematic Review. *J Autism Dev Disord*. 2021;51(11):4199–212.
12. Abdullah M. Autism Center: An–Najah National University / Architectural Engineering Department (student project); 2023 [Available from: <https://repository.najah.edu/items/19f17fa4-0e72-4de4->

13. Calculator.net. Sample Size Calculator [Available from: <https://www.calculator.net/sample-size-calculator.html>]
14. Andzik N, LaRouech A, Gladfelter A. Parents' Perspectives of Augmentative and Alternative Communication: From Assessment to Implementation. *Perspectives of the ASHA Special Interest Groups*. 2023;9:201 – 14.
15. Drager K, Light J, McNaughton D. Effects of AAC interventions on communication and language for young children with complex communication needs. *J Pediatr Rehabil Med*. 2010;3(4):303–10.
16. Ganz JB. AAC Interventions for Individuals with Autism Spectrum Disorders: State of the Science and Future Research Directions. *Augmentative and alternative communication* (Baltimore, Md: 1985). 2015;31(3):203 – 14.
17. Walker VL, Snell ME. Effects of augmentative and alternative communication on challenging behavior: a meta-analysis. *Augmentative and alternative communication* (Baltimore, Md: 1985). 2013;29(2):117 – 31.
18. Ronski M, Sevcik R. Augmentative communication and early intervention: Myths and realities. *Infants Young Child*. 2005;18:174–85.
19. Angeles CSHL. Study reveals wide gap in awareness of AAC devices for children with autism 2025 [Available from: <https://www.chla.org/blog/experts/research-and-breakthroughs/study-reveals-wide-gap-awareness-aac-devices-children-autism>]
20. Donato C, Spencer E, Arthur-Kelly M. A critical synthesis of barriers and facilitators to the use of AAC by children with autism spectrum disorder and their communication partners. *Augmentative and alternative communication* (Baltimore, Md: 1985). 2018;34(3):242 – 53.
21. Gardiner S, Bowden C, Kennedy S, Waddington H. A Systematic Qualitative Review of Parent Perceptions and Experiences of Augmentative and Alternative Communication for Their Autistic Children. *Rev J Autism Dev Disorders*. 2025.
22. Joginder Singh S, Mohd Ayob N, Hassan FH. Parents' perception on the use of augmentative and alternative communication by children with complex communication needs in Malaysia. *Disabil rehabilitation Assist Technol*. 2023;18(1):118–26.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [appendix.docx](#)