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Dental service utilization, accessibility, and treatment patterns among autistic and non-autistic children in Benghazi, Libya

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Keywords: Autism spectrum disorder, accessibility to dental care, healthcare needs, treatment patterns

Abstract: Children with autism spectrum disorder frequently experience barriers in accessing oral healthcare services due to behavioral, sensory, and communication difficulties. This cross-sectional comparative study aimed to evaluate differences in dental attendance, accessibility to dental care, and treatment patterns between autistic and non-autistic children in Benghazi, Libya. The study included 60 children aged 3-14 years, comprising 30 autistic children attending rehabilitation centers and 30 healthy children selected from relatives of autistic patients. The control group was matched to the autistic group with respect to age, gender, and socioeconomic status. Data were collected through structured parent-administered questionnaires during face-to-face interviews. Information regarding dental attendance, type of dental facility, accessibility to dental care, history of dental problems, and treatment modalities was obtained. Statistical analysis was performed using Chi-square, Fisher's exact test, Monte Carlo simulation, independent t-test, and Mann-Whitney U test, with statistical significance set at $p < 0.05$. The results demonstrated that autistic children were significantly less likely to have visited the dentist in the previous year than non-autistic children (26.7% vs. 50.0%, $p = 0.049$). Although all children received care in private clinics, parents of autistic children reported significantly greater difficulty in finding dentists willing or adequately trained to treat their children ($p = 0.001$). However, autistic children were more likely to undergo tooth extraction, while restorative treatments and pulp therapy were less frequently provided. These findings highlight significant disparities in access to dental care and treatment approaches among autistic children and emphasize the need for improved professional training, specialized dental services, and preventive oral healthcare programs for children with autism spectrum disorder.

Introduction

Oral health is a fundamental component of general health and quality of life in children, influencing nutrition, growth, speech, and psychosocial development [1]. Despite global improvements in oral healthcare, disparities persist among vulnerable populations, particularly children with special healthcare needs [2]. Children with special healthcare needs are defined as those who have physical, developmental, mental, sensory, behavioral, emotional, or chronic medical conditions requiring healthcare measures beyond those considered routine [3, 4]. Autism spectrum disorder (ASD) is a neurodevelopmental disorder characterized by impairments in communication, social interaction, and restricted or repetitive behaviors [5]. These characteristics can significantly affect the child's ability to tolerate dental procedures, maintain oral hygiene, and access dental care services. Sensory sensitivities, resistance to unfamiliar environments, and communication difficulties frequently complicate dental visits and may result in avoidance of dental care [6 - 9]. The provision of dental

care for this group often requires specialized knowledge, increased awareness, and behavioral management skills, yet it continues to receive limited attention within dental practice [10]. In addition, special diets, chronic medication use, and self-injurious behaviors may further contribute to poor oral health outcomes [10]. High prevalence of dental caries, periodontal disease, malocclusion, prolonged retention of primary teeth, and dental trauma has been reported among children with disabilities, negatively affecting nutrition, mastication, speech, facial appearance, and overall quality of life [11, 12].

Children with ASD are reported to have a higher risk of unmet dental needs, not necessarily because of increased disease prevalence, but due to multiple barriers affecting utilization of dental services [6, 7]. These barriers include behavioral management difficulties, dental anxiety, limited cooperation during dental procedures, lack of trained dental professionals, financial constraints, and limited availability of specialized services [10, 13]. Consequently, children with ASD are less likely to attend routine dental visits and more likely to present with untreated dental conditions [14]. Furthermore, parents of autistic children frequently report difficulties in locating dentists adequately trained or willing to provide care for children with special healthcare needs [13]. Previous studies have consistently demonstrated that children with ASD are less likely to receive preventive dental care than their non-autistic peers, leading to delayed diagnosis and treatment of oral diseases [14]. As a result, these children are more likely to undergo invasive dental procedures such as tooth extraction rather than conservative restorative treatments [15]. Although some studies have reported similar levels of dental caries between autistic and non-autistic children, others have suggested a higher risk among children with ASD due to poor oral hygiene practices, cariogenic dietary habits, and medication-related side effects [12, 16]. More importantly, even when disease prevalence is comparable, significant differences in dental service utilization and treatment approaches have consistently been reported [8]. In many developing countries, including Libya, oral healthcare systems face structural challenges such as limited public dental services, inadequate workforce training, and reliance on private clinics [17]. These challenges may disproportionately affect children with ASD and their families, further widening inequalities in access to oral healthcare and treatment outcomes. Despite the growing international literature on oral health among children with ASD, limited evidence is available from Libya. Previous local studies have primarily focused on the oral health status, dental needs, and oral hygiene practices of children with ASD [18 - 21]. However, there remains a scarcity of comparative data evaluating differences between autistic children and their non-autistic peers, particularly regarding dental attendance, accessibility to dental care, and treatment experiences. Such information is essential to support pediatric dentists in selecting and implementing appropriate behavior guidance techniques that are effective and acceptable to parents, thereby improving children's cooperation and enhancing the quality of dental care provided to this population. Therefore, the present study was conducted to assess and compare previous dental history, accessibility to dental care, and treatment patterns among autistic and non-autistic children in Benghazi, Libya, to identify disparities and contribute to improvements in oral healthcare delivery for children with ASD.

Materials and methods

Study design and population: A cross-sectional comparative study was conducted in Benghazi, Libya, to evaluate dental service utilization, dental history, and treatment experiences among autistic and non-autistic children. A total of 60 children aged 3-14 years were included and allocated into two groups: 30 children diagnosed with ASD attending rehabilitation centers for disabled children, and 30 healthy children selected from relatives of autistic patients over four months (9 - 12, 2025). The control group was matched to the autistic group with respect to age, gender, and socioeconomic status. Participants in the autistic group were included if a confirmed diagnosis of autism had been established by pediatricians, medical specialists, or psychologists, and if written informed consent had been obtained from parents or legal guardians. The control group comprised healthy children who were matched to the autistic participants and were free from any systemic diseases.

Data collection: Data were obtained through face-to-face interviews with parents or caregivers using a structured questionnaire after securing informed consent. The questionnaire was adapted from previously validated Arabic instruments and was designed to collect comprehensive information on socio-demographic characteristics, including age, gender, birth order, and parental education and occupation [21]. It also gathered details regarding dental visit history during the previous year, the type of dental facility attended, and the specialty of the treating dentist. In addition, information related to difficulties in accessing dental care, history of dental problems, and their impact on the child's general health and school attendance was recorded. Data on the type of dental treatment received, such as extractions, fillings, and pulp therapy, were also included.

Ethical considerations: Ethical approval for this study was obtained from the ASD Rehabilitation Center, Benghazi, Libya (ASD Center, 2025). All study procedures were conducted in accordance with internationally recognized ethical standards for research involving human participants [Reference No. 072/MJ/2025]. Before participation, written informed consent was obtained from the parents or legal guardians of all children after providing a comprehensive explanation of the study objectives, procedures, and potential implications. Participation was entirely voluntary, and participants were informed of their right to withdraw from the study at any stage without any consequences. Strict measures were implemented to ensure the confidentiality and anonymity of all collected data, including secure data handling and restricted access to research records. Furthermore, any child identified as requiring dental treatment during the course of the study was referred for appropriate management in accordance with ethical obligations.

Statistical analysis: Data are presented as frequencies and percentages for qualitative variables, and as mean ± standard deviation or median for quantitative variables. Normality of distribution was assessed using the Shapiro-Wilk test. Comparisons between groups were performed using the Chi-square test for categorical variables, with Fisher's exact test or Monte Carlo correction applied when more than 20.0% of expected cell counts were less than 5. For continuous variables, an independent samples t-test or Mann-Whitney U test was used as appropriate. All tests were two-tailed, and a $p < 0.05$ was considered significant.

Results

In this study, there were 60 Libyan matched children, 30 with autism and 30 healthy kids without autism. Overall, 60.0% of participants were males and 40.0% were females. The age of participants ranged from three to 14 years, with a mean age of 7.41 ± 2.41 years in the autistic group and 7.32 ± 2.53 years in the control group, with no significant difference between the groups ($p = 1.0$). Matching between groups was achieved through siblings (40.0%) and cousins (60.0%).

Regarding dental attendance, a significantly lower proportion of autistic children had visited a dentist within the previous year compared to non-autistic children (26.7% vs. 50.0%, $p = 0.049$). All participants in both groups received dental care in private clinics, with no statistically significant differences observed in the type of dental facility or the specialty of the treating dentist. The majority of children were treated by general practitioners (62.5% in the autistic group vs. 73.3% in the control group). Access to dental care differed significantly between the groups ($p = 0.001$). A higher proportion of parents of autistic children (87.5%) reported considerable difficulty in finding dentists willing to treat their children, whereas 73.3% of parents of non-autistic children reported moderate difficulty, as shown in **Figures 1** to **4**.

No significant differences were observed between the two groups in terms of the occurrence of dental problems ($p = 0.118$) or their impact on general health and school attendance ($p = 0.559$). However, significant differences were noted in treatment patterns. Autistic children were more likely to undergo tooth extraction (87.0%) compared to non-autistic children (53.8%). In contrast, non-autistic children were more likely to receive restorative treatments such as fillings (30.8% vs. 12.2%). Notably, none of the autistic children received pulp therapy, whereas 15.4% of non-autistic children underwent this treatment (**Table 1**).

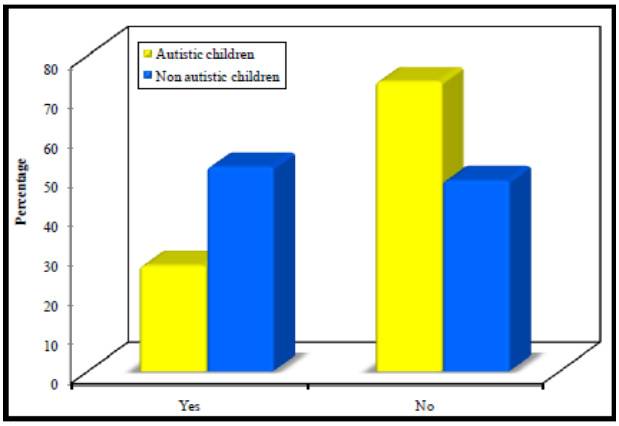

Figure 1: Comparison between the two studied groups regarding the child's dental visit in the previous year

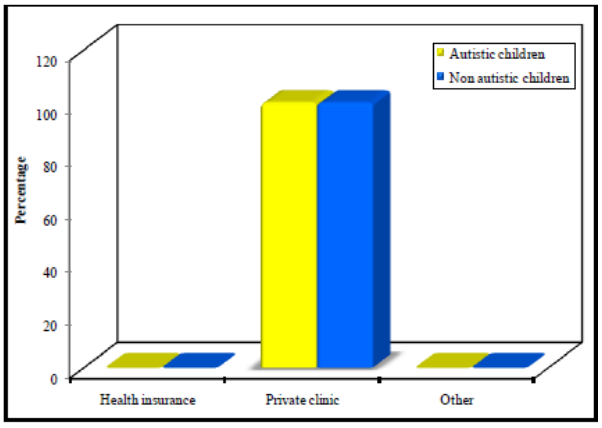

Figure 2: Comparison between the two studied groups regarding the dental facility in which the child received dental treatment

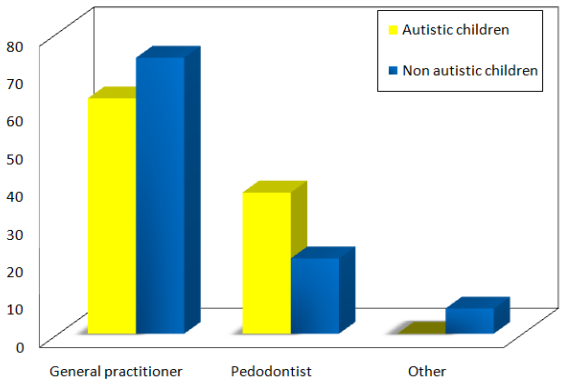

Figure 3: Comparison between the two studied groups regarding the specialty of treating dentists

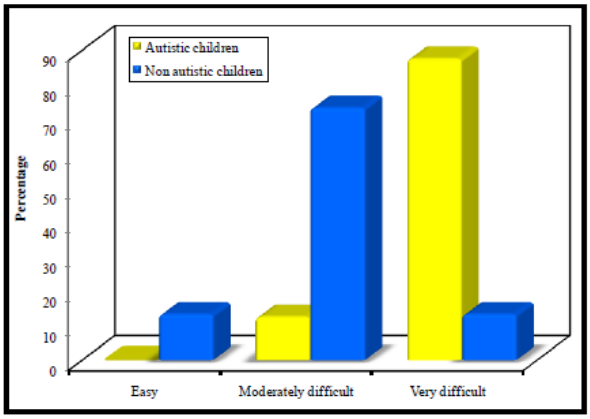

Figure 4: Comparison between the two studied groups regarding the availability of dentists to provide the required treatment

Table 1: Comparison between the studied groups about the previous child's dental problems and treatment received

	Autistic children (n = 30)		Non autistic children (n = 30)		X^2	p
	No.	%	No.	%		
Previous dental problem						
Yes	14	46.7	20	66.7	2.443	0.118
No	16	53.3	10	33.3		
Previous dental problems that caused absence from school, and systemic Manifestation (fever)	**n = 14**		**n = 20**			
Yes	9	64.0	7	35.0	0.341	0.559
No	5	36.0	13	65.0		
Treatment received	**n = 14**		**n = 20**			
Yes	8	57.0	13	65.0	1.168	$^{MC}p=0.526$
No	6	43.0	07	35.0		
Extraction	**n = 8**		**n = 13**		2.524	$^{FE}p= 0.147$
	7	87.5	07	53.8		
Filling	1	12.5	04	30.8	0.911	$^{FE}p= 0.606$
Pulp therapy	0	0.0	02	15.4	1.168	$^{FE}p= 0.526$

X^2: Chi-square test MC: Monte Carlo test FE: Fisher Exact test

Discussion

The present study highlights significant disparities in dental service utilization and treatment patterns between autistic and non-autistic children, reflecting individual and systemic barriers to oral healthcare. A significantly lower proportion of autistic children visited the dentist within the previous year compared to non-autistic children (26.7% vs. 50%, p = 0.049). This finding is consistent with previous studies reporting reduced dental attendance among children with ASD, who are more likely to seek dental care only when symptomatic rather than for preventive purposes [7, 13, 14]. Reduced utilization of dental services among children with ASD has been attributed to behavioral challenges, sensory sensitivities, and difficulty coping with unfamiliar dental environments [6, 7]. Despite the observed difference in dental attendance, no statistically significant variation was found between the two groups regarding the type of dental facility or the specialty of the treating dentist. All participants in the present study received dental care in private clinics. This finding likely reflects structural limitations in public oral healthcare services rather than equal access to care. Similar observations have been reported in developing countries, where dependence on private healthcare services creates additional financial and accessibility barriers for families of children with special healthcare needs [13, 17]. This issue may be particularly relevant in Libya, where specialized public dental services and special care dentistry programs remain limited. One of the most important findings of this study was the significant difficulty reported by parents of autistic children in locating dentists willing or adequately trained to provide dental care for their children (p = 0.001). This finding is in agreement with previous studies demonstrating that access to oral healthcare remains a major challenge for children with ASD and other developmental disorders [7, 12, 13]. Nelson et al. [13] reported that parents of children with special healthcare needs frequently encounter limited provider availability and prolonged waiting times. Such findings suggest insufficient professional training and preparedness among dental practitioners in managing children with developmental and behavioral disorders. Interestingly, no statistically significant differences were observed between autistic and non-autistic children regarding the prevalence of dental problems (p = 0.118) or their impact on general health and school attendance (p = 0.559). This finding is consistent with previous studies suggesting that autism is not necessarily associated with higher caries prevalence [16]. However, other studies have reported increased levels of oral disease among children with ASD, potentially due to poor oral hygiene practices, cariogenic dietary habits, and medication-related side effects [12, 16]. Variations among studies may be related to differences in study design, sample characteristics, parental involvement, and accessibility to preventive dental care services. Although the occurrence of dental problems was similar between groups, marked differences were identified in treatment patterns. Autistic children were considerably more likely to undergo tooth extraction (87.0%) compared to non-autistic children (53.8%), whereas restorative treatments such as fillings and pulp therapy were less frequently provided. These findings are consistent with previous studies indicating that children with ASD are more likely to receive invasive dental treatment because of delayed presentation, behavioral management difficulties, and limited cooperation during treatment procedures [13, 15]. The preference for extraction over conservative treatment may be explained by several factors. Dentists may choose extraction as a definitive and time-efficient treatment option, particularly when treating uncooperative patients or when repeated visits are difficult to achieve [15]. Moreover, limited training in special care dentistry and lack of behavioral management experience may reduce the feasibility of providing complex restorative or endodontic treatment for autistic children [11, 13]. The absence of pulp therapy among autistic children in the present study is particularly concerning, as it may reflect a tendency toward extraction rather than tooth preservation. This may be attributed to time limitations, insufficient specialized training, and challenges associated with completing multi-visit procedures in children with behavioral difficulties. Similar findings were reported by Dao et al. [14], who noted that dentists often prefer extractions for special needs patients in order to minimize repeated stressful dental visits. Within the Libyan healthcare context, these findings may additionally reflect the limited availability of specialized dental centers, sedation facilities, and trained personnel in special care dentistry. Such limitations may contribute to treatment approaches that

prioritize immediate management of dental problems rather than long-term preventive and conservative care. Similar concerns have also been highlighted in recent Libyan studies addressing oral healthcare among children with ASD [18 - 21]. Overall, the findings of the present study demonstrate significant inequalities in access to dental care and treatment approaches among autistic children. Addressing these disparities requires improvements in professional education, expansion of specialized dental services, enhancement of preventive oral healthcare programs, and increased awareness regarding the oral healthcare needs of children with ASD. The findings of this study should be interpreted in light of certain limitations. The relatively small sample size may limit the generalizability of the results. Additionally, reliance on parental reporting introduces the possibility of recall bias. The cross-sectional design restricts the ability to establish causal relationships. Still, contextual factors such as the severity of autism and socioeconomic variations were not deeply explored.

Conclusion: The present study demonstrates that autistic children face significant challenges in accessing dental care and are less likely to receive preventive and conservative treatments compared to non-autistic children. While the prevalence of dental problems was similar between the groups, notable disparities were observed in dental attendance and treatment approaches, with autistic children more frequently undergoing extractions. These findings highlight the need for improving accessibility, enhancing professional training, and promoting preventive dental care strategies for children with autism.

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Author contribution: NME conceived and designed the study. NMA collected data. AE & NMA contributed to data analysis. NME & NMA performed the analysis and interpreted the data analysis. NME drafted the manuscript. All authors approved the final version of the manuscript and agreed to be accountable for its contents.
Conflict of interest: The authors declare the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.
Ethical issues: All authors are responsible for ethical issues, including plagiarism, informed consent, data fabrication or falsification, and duplicate publication or submission.
Trial Registration: This trial was registered with the Ethical Committee of Tripoli Medical Center.
Data availability statement: The raw data that support the findings of this article are available from the corresponding author upon reasonable request.
Author declarations: The authors confirm that they have followed all relevant ethical guidelines and obtained any necessary IRB and/or ethics committee approvals.
Generative AI disclosure: No generative AI was used in the preparation of this manuscript.

ام خدمات طب الأسنان، وإمكانية الوصول إليها، وأنماط العلاج لدى الأطفال المصابين بالتوحد وغير المصابين به في بنغازي، ليبيا

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ملخص: غالبًا ما يواجه الأطفال المصابون باضطراب طيف التوحد صعوبات في الوصول إلى خدمات الرعاية الصحية الفموية نظرًا لمشاكل سلوكية وحسية وتواصلية. هدفت هذه الدراسة المقارنة المستعرضة إلى تقييم الاختلافات في معدلات زيارة أطباء الأسنان، وسهولة الوصول إلى خدمات طب الأسنان، وأنماط العلاج بين الأطفال المصابين بالتوحد وغير المصابين به في بنغازي، ليبيا. شملت الدراسة 60 طفلًا تتراوح أعمارهم بين 3 و14 عامًا، منهم 30 طفلًا مصابًا بالتوحد يرتادون مراكز إعادة التأهيل، و30 طفلًا سليمًا تم اختيارهم من أقارب مرضى التوحد. تمت مطابقة المجموعة الضابطة مع مجموعة التوحد من حيث العمر والجنس والوضع الاجتماعي والاقتصادي. جُمعت البيانات من خلال استبيانات منظمة يُجريها أولياء الأمور خلال مقابلات شخصية. تم الحصول على معلومات حول زيارات أطباء الأسنان، ونوع عيادة الأسنان، وسهولة الوصول إلى خدمات طب الأسنان، وتاريخ مشاكل الأسنان، وطرق العلاج. أُجري التحليل الإحصائي باستخدام اختبار مربع كاي، واختبار فيشر الدقيق، ومحاكاة مونت كارلو، واختبار t المستقل، واختبار مان-ويتني U، مع تحديد مستوى الدلالة الإحصائية عند $p < 0.05$. أظهرت النتائج أن الأطفال المصابين بالتوحد كانوا أقل عرضةً بشكل ملحوظ لزيارة طبيب الأسنان خلال العام الماضي مقارنةً بالأطفال غير المصابين بالتوحد (26.7% مقابل 50.0%، $p = 0.049$). على الرغم من أن جميع الأطفال تلقوا الرعاية في عيادات خاصة، فقد أفاد أولياء أمور الأطفال المصابين بالتوحد بصعوبة بالغة في العثور على أطباء أسنان مستعدين أو مدربين تدريباً كافياً لعلاج أطفالهم ($p = 0.001$). مع ذلك، كان الأطفال المصابون بالتوحد أكثر عرضةً لخلع الأسنان، بينما كانت علاجات ترميم الأسنان وعلاج لب الأسنان أقل شيوعاً. تُسلط هذه النتائج الضوء على تفاوتات كبيرة في الحصول على رعاية الأسنان وأساليب العلاج بين الأطفال المصابين بالتوحد، وتؤكد على الحاجة إلى تحسين التدريب المهني، وتوفير خدمات طب الأسنان المتخصصة، وبرامج الرعاية الصحية الفموية الوقائية للأطفال المصابين باضطراب طيف التوحد.