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Caries Prevalence in Patients With Autism Spectrum Disorder: A Review of the Literature

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ABSTRACT

Aim: The aim of this review is to present a qualitative synthesis of various studies concerning the presence of caries in people with ASD.

Methods and Results: A review of scientific articles was carried out by consulting the databases of Medline, Scopus, Web of Science and the Cochrane and SciELO libraries on December 1 and updated on January 15, 2024. Of the 21 comparative studies, only 12 reported prevalence figures for both ASD and non-ASD groups. Among them, seven studies found higher caries prevalence in individuals with ASD, while five reported higher prevalence in non-ASD populations, demonstrating inconsistency across the evidence. In the ASD-only studies, caries prevalence ranged widely, with several reporting values above 70%. Differences related to dentition were observed, with primary teeth generally showing higher caries prevalence than permanent teeth. Limited studies examined gender differences, but small variations were noted.

Conclusions: The evidence regarding dental caries prevalence in individuals with ASD is highly heterogeneous. Some studies suggest higher prevalence in autistic populations, while others report higher rates in non-ASD groups. Variations in dentition type, demographic characteristics, and methodological differences may contribute to these discrepancies. Further studies using uniform diagnostic criteria and robust designs are needed to clarify the relationship between ASD and caries prevalence.

1 | Background

Autism Spectrum Disorder (ASD) was first described by Leo Kanner (1943) and Hans Asperger (1944), ASD has been historically associated with features such as difficulties in maintaining relationships, lack of empathy, language disturbances, obsessive insistence on environmental constancy, high cognitive potential focused on specific interests, self-sufficiency, indifference to the surrounding environment, exaggerated reactions to sensory stimuli, and behavior akin to a state of hypnosis [1–4]. The current definition of ASD, as described in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5-TR), categorizes it as a neurodevelopmental disorder characterized by persistent deficits in communication and social interaction across various contexts, alongside restrictive and repetitive patterns of behavior, interests, or activities. The DSM-5-TR also introduces a severity grading system, ranging from Level 1 (requiring support) to Level 3 (requiring very substantial support) [4, 5].

Globally, approximately one in every hundred children is diagnosed with ASD. In 2022, Zeidan et al. [6], estimated the global prevalence of ASD to be approximately 65 per 10 000. Given the increasing prevalence of ASD, a growing number of individuals with autism are seeking dental care [7].

However, their heightened sensitivity to external stimuli such as bright lights, noises from dental instruments, sharp materials, and strong smells or tastes often provokes fear, thereby reducing

their cooperation during dental procedure [8]. These sensory sensitivities, combined with difficulties in communication, social interaction, and the need for predictability, pose significant challenges for dental professionals, potentially leading to dental anxiety and atypical reactions to non-sensory stimuli [8, 9].

Although numerous studies have examined oral health in individuals with ASD, the evidence regarding the prevalence of dental caries in this population remains inconsistent. Recent literature suggests that while individuals with ASD experience similar health issues as those without ASD, factors such as unhealthy diets, difficulties in self-care, self-injurious behaviors, and long-term medication use contribute to the development of chronic oral pathologies. These conditions can lead to oral diseases such as dental caries, gingivitis, and periodontal disease. However, the incidence of dental caries in individuals with ASD compared to those without ASD remains a subject of debate within the literature, with studies reporting varying results [10].

This review provides an updated and comprehensive qualitative synthesis of studies evaluating caries prevalence in individuals with ASD, including publications up to January 2024. Unlike previous reviews, it distinguishes between comparative studies (ASD vs. non-ASD populations) and studies focusing exclusively on ASD populations. This structured approach allows for a clearer understanding of the patterns and determinants of caries prevalence in autistic individuals and highlights specific gaps that future research should address.

2 | Methods

The objective of this review is to present a qualitative synthesis of studies addressing the prevalence of dental caries in individuals with ASD.

2.1 | Declaration and Protocol

The review was registered in PROSPERO on November 27, 2023, under the registration number CRD42023483661.

As a guide for the study of the review, the following PICO question (P: individuals with ASD; I: not applicable; C: individuals without ASD; O: prevalence of caries) is posed: What is the prevalence of caries in individuals with ASD?

2.2 | Inclusion and Exclusion Criteria

The inclusion criteria for this review were: (I) studies involving patients with ASD; (II) studies analyzing the caries index; (III) articles published in English, Spanish, French, or Arabic; and (IV) cross sectional studies, case-control studies, cohort studies. Exclusion criteria included: (I) studies not relating caries to patients with ASD; (II) articles published in languages other than English, French, Spanish, or Arabic; (III) systematic reviews, literature reviews, or meta-analyses; and (IV) studies without access to full text.

2.3 | Search Strategies

2.3.1 | Sources of Information and Search Strategies

The initial search was conducted on December 1, 2023, across databases including Medline, Scopus, Web of Science, The Cochrane Library, and SciELO, and was updated on January 14, 2024. The search included 3 MeSH (Medical Subject Heading): 'caries', 'autism' and 'ASD'. Boolean operators were used to relate terms to each other, 'OR' and 'AND': (caries) AND (autism OR 'ASD'). Articles published in English, Spanish, French or Arabic were considered. The earliest eligible study dated from 1977, and the most recent from January 2024.

2.3.2 | Selection of Studies

The articles resulting from the search were exported to a bibliographic reference manager. Endnote from Clarivate Analytics was used in this review. Two reviewers (CCT and MPPL) analyzed the titles and abstracts of the 636 references, after discarding duplicates. If the information was not obvious, the full text was read. After reading the full text, those that did not meet the inclusion criteria were removed.

2.3.3 | Data Extraction

The bibliometric analysis was carried out by MPPL and CCT, in case of discrepancies a third assessor was assessed (NPG), taking into account the year, country and journal of publication. For the synthesis of the methodology of the included studies, a summary table was made including the following data: author, year, type of publication, population, DMFT (index of decayed, missing and filled permanent teeth), dft (index of decayed and filled deciduous teeth), gender, age, intraoral examination, caries prevalence and comparison of caries in the study group with the control group.

3 | Results

3.1 | Selection of Studies and Flowchart

The search found from January 1977 to January 2024, 636 preliminary references related to autism and caries: 137 in Medline, 8 in Scielo, 229 in Scopus, 18 in The Cochrane Library and 244 in Web Of Science. A total of 270 duplicate references were discarded and the remaining 366 titles were analyzed. After analysis of the title and abstract of each reference, 299 were removed as they did not meet the inclusion requirements of the review. The 67 remaining articles were analyzed by full text, of which 31 were discarded for different reasons: 14 because they were reviews, 8 because they did not directly relate caries and autism, and 7 because there was no access to full text. Finally, 38 articles were obtained for analysis (Figure 1).

3.2 | Study Characteristics

To make it easier to analyze the articles, we have divided them into two groups, group A with comparative studies and group B without comparative studies (Tables 1–3).

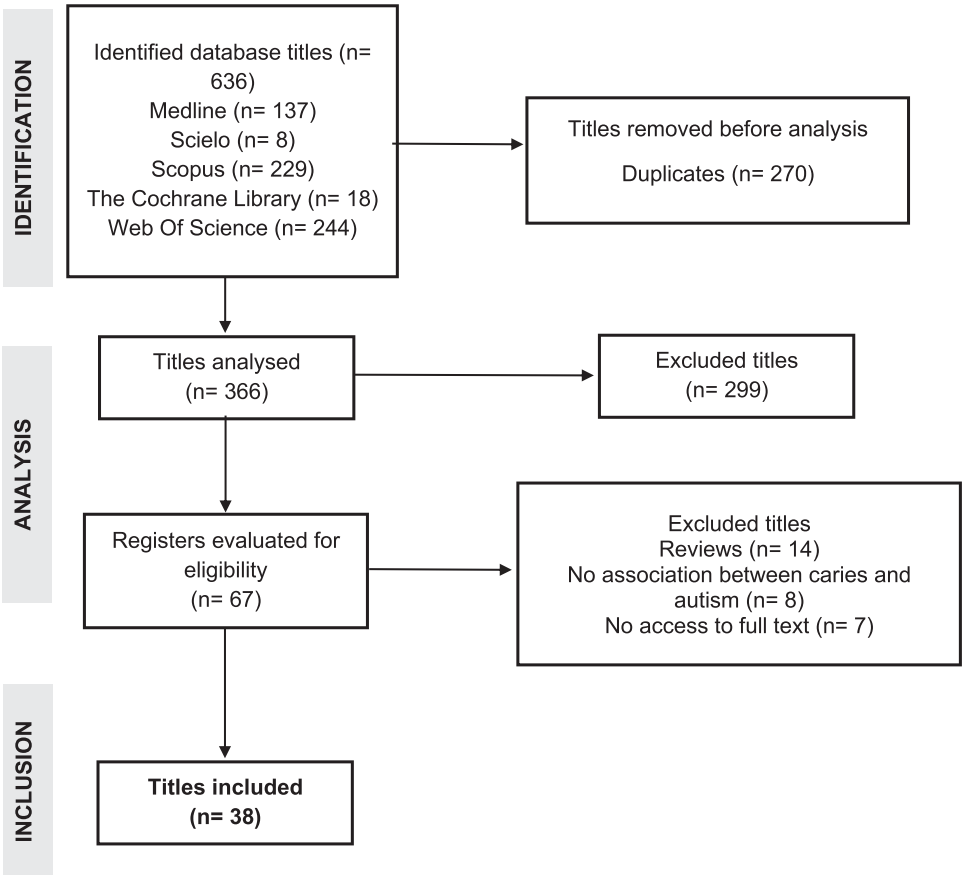

FIGURE 1 | Flow diagram PRISMA 2020.

3.2.1 | Caries Diagnosis

Of the articles reviewed, only 7 [11, 12, 14, 16, 18, 45, 46] did not specify how caries diagnosis was performed. Of the remaining thirty, 90% of the studies used a screening kit, consisting of a mirror and a probe. Light was added to the examination kit in 14 of the studies [13, 15, 19, 22, 23, 27–30, 35, 38–40, 42]. The use of radiographs to confirm the diagnosis was only carried out in two studies, one of them using bitewing 8 and the other orthopantomography 32 (Tables 1 and 2).

3.2.2 | Caries Prevalence and DMFT Index

Twenty-one studies (Table 1) compare the incidence of caries in individuals with ASD compared to individuals without ASD, of which only 12 indicate the caries prevalence of one population and the other. In seven articles [11, 17, 20, 21, 34, 36, 45], the prevalence of caries is higher in the study population. In contrast, in the remaining five articles [12, 28, 32, 37, 46] caries prevalence was higher in non-autistic individuals.

The highest prevalence of caries in people with ASD has been seen in the study by Tulumbacı et al. [36] with 83.1%, followed by 82.1% in the study by Hasell et al. [11]. Regarding the studies in which the value in individuals without ASD was higher, the study by Loo et al. [12] stood out with 86% caries in a population without ASD (386 individuals) compared to 68.1% in the study population.

During the analysis of these studies, there were 5 that highlighted because they included other criteria, such as gender, age or dentition, to indicate caries prevalence. Firstly, El Khatib et al. [46] relate caries prevalence to the type of dentition of individuals. In both primary and permanent dentition, caries prevalence was higher in individuals without ASD: primary and permanent dentition with ASD, 56.7% and 55.6%, respectively; primary dentition without ASD 66.7%, permanent dentition without ASD 71.4%. Secondly, Kuter and Guler [32] published an article in 2019 comparing the incidence of caries in people with and without autism. In this study the population is divided into two groups, according to age 5–11 years and 12–16 years. The results were very clear, as in both groups the prevalence of caries was higher in the non-autistic population. Finally, Kuter and Uzel [28], reported the prevalence of caries in both groups according to gender. It was observed that both non-autistic males (71.43%) and females (75.44%) had higher caries prevalence than autistic males (58.01%) and females (72.22%).

Table 2 shows 15 studies that include only individuals with ASD. Of these, 13 articles indicate the prevalence of caries. The highest value was 78.6% in the study by Hariyani et al. [41]. In this group, there were six studies that differentiated caries prevalence according to gender [31], age [15] and dentition type [18, 35, 43, 44] of the individuals.

It has been observed that the prevalence of caries in the primary dentition is higher compared to the permanent dentition with 76%, 73.8% and 29.38% in the studies [18, 35, 44]. In contrast,

TABLE 1 | Summary of the main results of the Group A studies.

Author	Population		DMFT	dmft	Gender	Age	Caries Diagnosis		CP	*P*
Al-Maweri et al. [11]	ASD	42	2.00 ± 2.18	5.23 ± 2.34	M > F 3,7: 1	5–16	M, P, G and LL		NI	DMFT $p > 0.05$ dmft $p < 0.001$*
	NO ASD	84	1.27 ± 1.77	4.06 ± 2.98						
Al-Zaidi [12]	ASD	30	DMFS 11.45±13.35	dmfs 7.05 ± 4.26	21 M, 9 F	3–14	M and P		NI	DMFS $p < 0.05$* dmfs $p > 0.05$
	NO ASD	30	3.67 ± 1.80	7.50 ± 5.06	18 M, 12 F					
Babu and Roy [13]	ASD	50	2.32 ± 1.73	2.28 ± 1.93	56 M, 44 F	3–13	M P and LL		NI	DMFT $p =$ 0.0001* dmft $p =$ 0.005*
	NO ASD	50	0.78 ± 1.29	0.8 ± 1.27						
Bagattoni et al. [14]	ASD	64	2.30 ± 1.80	3.00 ± 1.20	42 M, 22 F	9 ± 2.9	M and P		NI	$P < 0.001$*
	NO ASD	64	1.00 ± 1.10	1.80 ± 1.10	37 M, 27 F	8.4 ± 3				
Blomqvist et al. [8]	ASD	46	DMFS 14.9 ± 18.9	NI	25 M, 22 F	33	M, P and x-ray		NI	$p = 0.381$
	NO ASD	69	15.9 ± 14.6		34 M, 35F					
Burgette and Rezaie [15]	ASD	1228	NI	NI	992 M, 236F	2–17	NI		14.7%	$P < 0.001$*
	NO ASD	43927			22122 M, 21805 F				9.5%	
Du et al. [16]	ASD	257	NI	dmfs 3.73	217 M, 37 F	2–7	M		37%	dmfs $p = 0.038$* CP% $p < 0.001$*
	NO ASD	257		5.41	217 M, 37 F				52.5%	
El Khatib et al. [17]	ASD	100	3.40 ± 4.54	3.53 ± 4.57	75 M, 25 F	3–13	NI	ASD	56.7% (17) TD 55.6% (15) PD	DMFT $p = 0.59$ dmft $p = 0.66$
	NO ASD	100	3.50 ± 3.63	3.56 ± 3.86	73 M, 27 F			NO ASD	66.7% (18) TD 71.4% (15) PD	

(Continues)

TABLE 1 | (Continued)

Author	Population		DMFT	dmft	Gender	Age	Caries Diagnosis	CP	*P*
Fakroon et al. [18]	ASD	50	0.22 ± 0.08	1.13 ± 1.84	40 M, 10 F	3–14	M, P, G and LL	NI	DMFT $p < 0.001$* dmft $p = 0.001$*
	NO ASD	50	1.15 ± 0.27	2.85 ± 3.23	40 M, 10 F				
Hasell et al. [19]	ASD	173	8.18 ± 1.62		125 M, 48 F	6–14	NI	82.1%	DMFT $p = 0.007$* CP% $p = 0.01$*
	NO ASD	173	4.93 ± 0.58		125 M, 48 F			59.0%	
Jaber [20]	ASD	61	1.60 ± 0.69	0.80 ± 0.20	45 M, 16 F	6–16	M and P	77%	DMFT $p < 0.05$* dmft $p < 0.05$*
	NO ASD	61	0.60 ± 0.29	0.30 ± 0.30				46%	
Kassab et al. [21]	ASD	45	0.72 ± 1.35	1.87 ± 3.09	24 M, 21 F	3–16	M and P	51.1%	$P > 0.05$
	NO ASD	45	0.85 ± 1.53	2.15 ± 3.04	21 M, 24 F			48.9%	
Kuter and Guler [22]	ASD	285	5–11 years: 0.52 ± 1.21 12–16 years: 2.07 ± 2.49	5–11 years: 1.66 ± 2.07	319 M, 88 F	5–16	M and P	5–11 Y: 50% 12–16 Y: 57.14%	$P < 0.05$*
	NO ASD	122	5–11 years: 1.14 ± 1.48 12–16 years: 3.37 ± 2.32	5–11 years: 2.80 ± 2.45				5–11 Y: 80.47% 12–16 Y: 79.06%	
Kuter and Uzel [23]	ASD	226	1.73 ± 1.59	1.17 ± 1.77	NI	5–15	M, P and LL	M: 58.01% F: 72.22%	$P < 0.05$*
	NO ASD	112	2.15 ± 1.98	2.77 ± 2.42				M: 71.43% F: 75.44%	
Loo et al. [24]	ASD	395	68.1 % DMFT > 0	NI	317 M, 78 F	3–28	NI	68.1%	$P < 0.0001$*
	NO ASD	386	86% DMFT > 0	NI	193 M, 193 F	3–20		86%	

(Continues)

TABLE 1 | (Continued)

Author	Population		DMFT	dmft	Gender	Age	Caries Diagnosis	CP	*P*
Meshki et al. [25]	ASD	51	59.16	65.74	48 M, 3 F	7–12	NI	NI	$p \leq 0.001$*
	NO ASD	51	40.60	34.53	29 M, 21 F				
Orellana et al. [26]	ASD	30	3.70	NI	27 M, 3 F	20–41	M and P	60%	$p = 0.032$*
	NO ASD	30	5.63	NI	23 M, 7 F			56.67%	
Sam et al. [27]	ASD	20	0	0	14 M, 6 F	6–12	M, P and LL	NI	$p = 0.035$*
	NO ASD	20	0	2	12 M, 8 F				
Suhaib et al. [28]	ASD	58	NI	NI	46 M, 12 F	2–10	M and P	50%	$P < 0.05$*
	NO ASD	27			17 M, 10 F			22.2%	
Tulumbacı et al. [29]	ASD	44	5.10	3.25	37 M, 7 F	3–17	M and P	83.1%	$p = 0.430$
	NO ASD	51	4.90	3.10	31 M, 20 F			81.1%	
Vajawat and Deepika [30]	ASD	117	1.2966	NI	M:F 3.6:1	5–22	M, P and LL	NI	$p = 0.000$*
	NO ASD	126	3.736						

Abbreviations: dmft: index of deciduous teeth that are decayed, missing and filled. DMFT: index of decayed, missing and filled primary teeth. dmfs: index of decayed, missing, and filled deciduous teeth or surfaces. DMFS: index of decayed, missing, and filled permanent teeth or surfaces. CP: caries prevalence.

*$p < 0.05$, there are significant differences in the study population. M: mirror P: probe. DD: deciduous dentition. MD: mixed dentition. DP: permanent dentition. (*n*): number of persons. NI: No information. Y: Years. M: Male. F: Female. LL: light lamp. G: gauze.

TABLE 2 | Summary of the main results of the Group B studies.

Author	Population		DMFT	dmft	Caries Diagnosis	CP	*P*
Alhumaid et al. [31]	ASD	75	1.03 ± 2.90	0.85 ± 1.90	M, P and LL	76% DD. 68%PD.	DMFT $p = 0.22$ dmft $p = 0.02$*
Bossù et al. [32]	ASD	229	2.91		M, P and x-ray	M: 66 % F: 69%	$p = 0.890$ (gender)
Ferrer-Coba et al. [33]	ASD	26	0.8	2	NI	57.7%	NI
Gaçe et al.47	ASD	84	2.6 ± 3.2	3.9 ± 3.8	M, P	73.8% DD, 60% PD	$p = 0.029$*
Gonçalves et al. [34]	ASD	26	2–8 Y:0.67 ± 1.12 10–15 Y: 0.70 ± 1.06 20–40 Y: 3.00 ± 2.31		M, P and LL	50%	NI
Hariyani et al. [35]	ASD	70	< 13 Y: 5.20 ± 4.65 > 13 Y: 3.24 ± 2.20		LL	78.6%	$p = 0.02$*
Makkar et al. [36]	ASD	30	1.87 ± 2.68	1.27 ± 2.13	M and P	76%	NI
Morales-Chávez [37]	ASD	96	0.96	2.41	M, P and LL	41.7%	NI
Naidoo and Singh [38]	ASD	149	3.42	0.97	NI	17.9% PD 29.38% DD	NI
Oda et al. [39]	ASD	83	4,76 ± 3,67		M, P and LL	NI	NI
Orellana et al. [40]	ASD	123	2.60 ± 3.30		M, P and LL	33.3%	$p = 0.032$*
Piraneh et al. [41]	ASD	217	2,36 ± 2,38 M:2.31 ± 2.31 F:2.71 ± 2.81	NI	M, P and LL	NI	$p = 0.51$ (gender)
Santosh et al. [42]	ASD	142	3–6 Y: 0 7–11 Y: 1.42 ± 1.83 12–17 Y:3.61 ±3.60	6.14 ± 3.47 3.85 ± 3.26 0.53 ± 1.54	M, P and LL	3–6 Y: 90.4% 7–11 Y: 94.9% 12–17 Y: 83.87%	DMFT y dmft $p < 0.001$* (age)
Subramaniam and Gupta [43]	ASD	106	4–5: 0.08 ± 0.28 6–8: 0.06 ± 0.36 9–12: 0.33 ± 0.69 13–14: 0.21 ± 0.58	2.33 ± 3.57 1.77 ± 2.43 1.47 ± 2.09 0.29 ± 1.07	M, P and LL	51.2%	NI
Vishnu et al. [44]	ASD	483	NI	NI	M and P	12.31% DD 46.15% MD 41.54% PD	NI

Abbreviations: dmft: index of deciduous teeth that are decayed, missing and filled. DMFT: index of decayed, missing and filled primary teeth. CP: caries prevalence.

*$p < 0.05$, there are significant differences in the study population. Examination kit: mirror and probe. DD: deciduous dentition.MD: mixed dentition. DP: permanent dentition. (n): number of persons. NI: No information.Y: Years M: Male F: Female [1]: Orthopantomography is performed in cases where possible. M: mirror. P: probe: LL: light lamp.

TABLE 3 | Prevalence of caries and DMFT and dmft indices in autistic females and males.

Author	Gender (*n*)		DMFT	dmft	CP	*P*
Al-Zaidi [12]	M (7/15)[b]		12 ± 16.06[d]	6.67 ± 4.34[d]	NI	NI
	F (4/7)[c]		10.5 ± 8.74[d]	7.86 ± 4.3[d]		
Bossù et al. [32]	M (174)		2.988		66%	CP:0.890 DMFT/dmft:0.703
	F (55)		2.655		69%	
Hariyani et al. [35]	M (52)		4.44 ± 3.99		NI	0.841
	F (18)		4.67 ± 4.34			
Jaber [20]	M (45)		0.49 ± 0.52	0.75 ± 1.5	NI	> 0.05
	F (16)		0.50 ± 0.49	0.65 ± 1.4		
Kuter and Uzel [23]	M	5–12	0.63 ± 1.30	1.17 ± 2.19	58.62%	< 0.05 en CP y DMFT > 0.05 en dmft
		12–15	2.17 ± 2.32	NI	57.40%	
	F	5–12	0,00 ± 0,00	1.16 ± 1.34	66.66%[a]	
		12–15	4.10 ± 2.75[a]	NI	77.77%[a]	
Piraneh et al. [41]	M (186)		2.31 ± 2.31	NI	NI	0.51
	F (31)		2.71 ± 2.81			

Abbreviations: dmft: index of deciduous teeth that are decayed, missing and filled, DMFT: index of decayed, missing and filled primary teeth, CP: caries prevalence, (*n*): number of persons, NI: No information, M: Male, F: Female.

a$p < 0.05$, there are significant differences in the study population.

[b]7 males in the DMFT index and 15 in dmft

[c]4 females in DMFT index and 7 in dmft

[d]DMFS/dmfs

Vishnu et al. [43] indicated that there is a higher prevalence of caries in mixed dentition (46.15%) and permanent dentition (41.54%).

Caries incidence was assessed according to the DMFT or dmft indices. Thirty of the studies analyzed reported DMFT and/or dmft indices depending on the type of dentition present in the individuals studied. Three studies [8, 24, 37] reported caries incidence by examination of tooth surfaces (DMFS and dmfs). Only the studies by Burgette and Rezaie11, Suhaib 33 and Vishnu [43] did not indicate the DMFT/dmft ratio.

In group A, Tulumbaci et al. [36] is the study with the highest DMFT index with a value of 5.10, compared to the population without ASD which had an index of 4.90. On the other hand, in group B, the study with the highest DMFT index was the study by Hariyani et al. [41] with a value of 5.20 ± 4.65.

3.2.2.1 | Presence of caries in autistic individuals by gender. Table 3 analyzed the presence of caries in autistic individuals according to gender. Only six articles reported such data [17, 24, 28, 31, 41, 42]. It can be seen that there are slight differences in caries rates and prevalence. In the study by Kuter and Uzel [28], it can be seen that caries differences between males and females are significant.

4 | Discussion

Dental caries is a noncommunicable disease and one of the most prevalent chronic conditions worldwide. It results from the prolonged interaction of oral microbiota, fermentable carbohydrate intake, salivary components, and teeth [25, 26, 33]. Several factors influence the prevalence of caries in individuals with ASD, including diet, oral hygiene practices, salivary composition, medication use, and genetic predisposition.

It is noteworthy that several comparative studies included in this review reported a higher caries prevalence in the non-ASD populations [12, 28, 32, 37, 46]. These findings are consistent with earlier systematic reviews, which also reported heterogeneous results, with some studies showing higher caries prevalence in individuals with ASD and others finding similar or even higher prevalence in non-ASD population [47, 48]. This finding contrasts with the general assumption that individuals with ASD are at higher risk of dental caries. Several hypotheses may explain these discrepancies.

First, the consumption of high-sugar foods is a significant risk factor for dental caries, and several studies included in this review noted that individuals with ASD consume sugar more frequently than the general population [16, 26, 31, 34, 35, 42]. These studies also showed that a minority of the ASD population did not maintain a cariogenic diet. Compared to the control population, sugar consumption in individuals with ASD was higher ($p = 0.289$)33. Additionally, the duration of exposure, frequency, texture and shape of sugary foods, salivary flow and the presence of buffers in saliva can affect the caries process. Murshid et al. [26] reported that snacking, especially between meals, in the autistic population was a high risk for the development of dental caries. Whereas some children with ASD follow highly restricted or selective diets that may inadvertently limit cariogenic intake

Second, behavioral challenges in the ASD population often lead caregivers to supervise oral hygiene more closely, which may partially compensate for difficulties with brushing. Third, differences in study design, diagnostic criteria, and sample characteristics may contribute to variations in reported prevalence. Finally, some studies with higher caries rates in the non-ASD groups involved populations from diverse regions as Hong Kong [37], Turkey [28, 32], Egypt [46] or USA [12]. Differences in socioeconomic context, access to preventive dental care, dietary patterns highlight the need for caution when interpreting overall trends and underscore the heterogeneity of caries risk within and across ASD and non-ASD populations.

The type of dentition plays a role, with higher caries rates observed in primary teeth compared to permanent teeth Tables 1 and 2 show that, in the study population, caries rates in the primary dentition are higher than in the permanent dentition [14–16, 19, 20, 23, 27, 32, 39, 44, 46, 49]. This is likely due to anatomical and biochemical differences, such as thinner enamel and higher carbonate ion content in primary teeth, making them more susceptible to demineralization [33]. Therefore, it could be said that primary teeth are more susceptible to dental caries, that is, the dental age of the individual influences the prevalence of caries.

In the studies reviewed, as presented in Table 3, the prevalence of dental caries appears to be higher in autistic women compared to autistic men; however, these differences are not statistically significant. Nevertheless, the 2019 study by Kuter and Guler [28] indicates that both the prevalence of caries and the DMFT (Decayed, Missing, and Filled Teeth) index are significantly higher in women compared to men.

Previous research has consistently shown a higher prevalence of caries in females than in males. Lukàcs et al. [50], attribute this difference primarily to three factors: the earlier eruption of teeth in females, which results in longer exposure to demineralization; hormonal fluctuations during menstruation and pregnancy, which affect both the flow and biochemical composition of saliva; and a tendency towards a more cariogenic and acidic diet in women [50, 51].

A significant portion of the ASD population is under pharmacological treatment to manage symptoms such as irritability, agitation, self-injurious behavior, aggression, repetitive behaviors, delusions, and hallucinations [12, 43]. Research indicates that individuals with autism are prescribed medications more frequently than the non-autistic population [8, 31, 32, 46, 49]. Autism is frequently associated with comorbid conditions such as epilepsy, depression, anxiety, and attention deficit hyperactivity disorder [5, 49]. To manage these conditions, various medications are commonly prescribed, including anticonvulsants, psychotropics, antidepressants, antipsychotics, and anxiolytics [16, 21, 22, 32, 45, 46]. Among the most frequently used medications are phenytoin, citalopram [46], risperidone [12, 32], valproic acid, sertraline [32], fluoxetine, methamphetamine [19], carbamazepine, selective serotonin reuptake inhibitors, and tricyclic antidepressants [12]. Many of these drugs induce hyposalivation and/or xerostomia, conditions that can significantly increase the risk of dental caries, as saliva plays a critical role in buffering acids and restoring pH levels after sugar consumption [26, 33, 52]. Although the studies included in this review did not provide quantitative data to allow direct comparison between medicated and non-medicated individuals with ASD. Thus, its role in caries prevalence within this review should be interpreted cautiously.

Oral hygiene practices, including regular brushing, the use of fluoride toothpaste, and dental floss, are crucial for preventing and controlling dental caries. Various studies have highlighted that the oral health of individuals with ASD is generally poorer compared to those without ASD [17, 19, 35, 46, 49]. This disparity is attributed to factors such as the frequency and thoroughness of brushing, the use of fluoride toothpaste, and the level of awareness and involvement of both the individuals themselves and their caregivers in maintaining oral hygiene [46].

Challenges associated with the autistic population, such as difficulties in communication, social interaction, concentration, and comprehension, significantly hinder the maintenance of good oral hygiene [40]. The severity of autism also plays a role, with more severe cases often correlating with poorer oral hygiene compared to milder cases. Although toothbrushing is generally part of the daily routine for most individuals with autism, a substantial majority require assistance from parents or caregivers [13, 21, 29, 34, 35, 42]. These caregivers often face considerable challenges, which can affect their motivation and ability to provide adequate oral health care. It has been suggested that the constant need for supervision can lead to caregiver fatigue, resulting in diminished attention to the oral health needs of children with ASD [46, 53].

Most individuals with autism do not receive adequate exposure to fluoride [49]. Du et al. [37] found that there is a significant reluctance among this population to use toothpaste, coupled with shorter brushing times, which further reduces their exposure to topical fluoride.

A lack of awareness regarding the importance of dental visits, combined with patient refusal, were significant factors contributing to the delay in scheduling a first dental appointment. Consequently, some individuals had no prior dental experience before the studies were conducted [21].

Loo et al. [54] define dental treatment for individuals with autism as often being incomplete and unsatisfactory. This inadequacy is likely due to the scarcity of facilities and trained dental professionals equipped to manage patients with special needs. General dentists frequently hesitate to accept individuals with ASD because the challenges in managing their behavior and the potential lack of cooperation may necessitate treatment under anesthesia [23, 54, 55].

Several barriers impede adequate oral health and access to dental treatment for individuals with autism. To address these challenges, it is recommended to introduce oral health programs in special care schools and implement training programs for parents and caregivers [19, 24, 35].

4.1 | Limitations

The primary limitation of this review is that seven of the included studies did not specify the clinical criteria or diagnostic procedures used to assess dental caries. These studies were retained because they contained primary data relevant to the aims of the review and met all other inclusion criteria (as seen in Tables 1 and 2). However, the lack of reported diagnostic methodology may introduce variability in the accuracy and comparability of caries measurements across studies. These limitation affects the ability to draw objective conclusions, as the studies are not fully comparable. Additionally, the inclusion of multiple studies by the same author, such as those by Kuter et al. [28, 32] or Orellana et al. [13, 21], may introduce a potential bias.

A further limitation of this review is the exclusion of grey literature, which may contain additional relevant data. Grey literature was excluded to ensure that only peer reviewed studies with clearly defined methodologies were analyzed.

To reach a definitive conclusion regarding the prevalence of caries in individuals with ASD compared to those without ASD, further research is needed. Future studies should consider incorporating the degree of autism as a variable and comparing a broader range of parameters to enhance the reliability of the findings.

5 | Conclusion

This review shows that the prevalence of dental caries in individuals with ASD varies considerably across studies. Among the comparative studies, some reported higher caries prevalence in autistic individuals, while others found higher prevalence in non-autistic populations, underscoring the heterogeneity of the available evidence. Within the ASD population, factors such as sex (woman) and dentition type (primary dentition) appear to influence caries experience, although findings are not fully consistent across studies.

Due to substantial variations in study designs, diagnostic methods, population characteristics, and reporting formats, firm conclusions regarding the overall direction of the association between ASD and caries cannot be definitively established. Future research using standardized diagnostic criteria and more rigorous methodology is needed to clarify these relationships and strengthen these findings.

Author Contributions

Chaima Chachmi-Tahiri: methodology, data curation, conceptualization. **Paula García-Ríos**: writing – review & editing, writing – original draft. **María Pilar Pecci-Lloret**: writing – review & editing, writing – original draft, formal analysis, data curation, conceptualization. **Nuria Perez-Guzmán**: Writing – review & editing, Formal analysis.

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The authors declare no conflicts of interest.

Data Availability Statement

The datasets used in this study are available from the corresponding author on reasonable request.

References

1. J. Artigas-Pallares and I. Paula, "El Autismo 70 Años Después de Leo Kanner y Hans Asperger," *Revista de la Asociación Española de Neuropsiquiatría* 32 (2012): 567–587.

2. F. Cuxart, "Evolución Conceptual del Término 'autismo': Una Perspectiva Histórica," *Revista de historia de la psicología* 19, no. 2–3 (1998): 369–388.

3. S. Cohmer, "Autistic Disturbances of Affective Contact" (1943), by Leo Kanner," (Embryo Project Encyclopedia: Arizona State University. School of Life Sciences. Center for Biology and Society, 2014), Embryo Project Encyclopedia.

4. H. Hodges, C. Fealko, and N. Soares, "Autism Spectrum Disorder: Definition, Epidemiology, Causes, and Clinical Evaluation," *Translational Pediatrics* 9 (2020): S55–S65.

5. Association AP, *Manual Diagnóstico y Estadístico de los Trastornos Mentales DSM-5* (American Pyschiatric Publishing, 2014).

6. J. Zeidan, E. Fombonne, J. Scorah, et al., "Global Prevalence of Autism: A Systematic Review Update," *Autism Research* 15 (2022): 778–790.

7. D. H. Como, L. I. Stein Duker, J. C. Polido, and S. A. Cermak, "Oral Health and Autism Spectrum Disorders: A Unique Collaboration Between Dentistry and Occupational Therapy," *International Journal of Environmental Research and Public Health* 18 (2020): 135.

8. M. Blomqvist, S. Bejerot, and G. Dahllöf, "A Cross-Sectional Study on Oral Health and Dental Care in Intellectually Able Adults With Autism Spectrum Disorder," *BMC Oral Health* 15 (2015): 81.

9. A. Fallea, R. Zuccarello, M. Roccella, et al., "Sensory-Adapted Dental Environment for the Treatment of Patients With Autism Spectrum Disorder," *Children (Basel)* 9 (2022): 393.

10. G. F. Ferrazzano, C. Salerno, C. Bravaccio, A. Ingenito, G. Sangianantoni, and T. Cantile, "Autism Spectrum Disorders and Oral Health Status: Review of the Literature," *European Journal of Paediatric Dentistry* 21 (2020): 9–12.

11. S. Hasell, A. Hussain, and K. Da Silva, "The Oral Health Status and Treatment Needs of Pediatric Patients Living With Autism Spectrum Disorder: A Retrospective Study," *Dentistry Journal* 10 (2022): 224.

12. C. Y. Loo, R. M. Graham, and C. V. Hughes, "The Caries Experience and Behavior of Dental Patients With Autism Spectrum Disorder," *Journal of the American Dental Association* 139 (2008): 1518–1524.

13. L. Mirtala Orellana, C. Cantero-Fuentealba, L. Schmidlin-Espinoza, and L. Luengo, "Oral Health, Hygiene Practices and Oral Habits of People With Autism Spectrum Disorder," *Revista Cubana de Estomatología* 56 (2019): e1959.

14. R. Meshki, L. Basir, S. Motaghi, and M. Kazempour, "Comparison of Oral Health Status Between Autistic and Normal Children in Ahvaz:

A Case-Control Study," *Clinical Schizophrenia and Related Psychoses* 15 (2021): 1–6.

15. A. Santosh, A. Kakade, S. Mali, V. Takate, B. Deshmukh, and A. Juneja, "Oral Health Assessment of Children With Autism Spectrum Disorder in Special Schools," *International Journal of Clinical Pediatric Dentistry* 14 (2021): 548–553.

16. S. Ferrer-Coba, N. L. Martínez-Hernández, T. Recio-Díaz, and O. Ferrer-Coba, "Atención Estomatológica Integral a Niños con Trastorno Del espectro autista," *Revista de Ciencias Médicas de Pinar del Río* 26 (2022): e5160.

17. M. A. Jaber, "Dental Caries Experience, Oral Health Status and Treatment Needs of Dental Patients With Autism," *Journal of Applied Oral Science* 19 (2011): 212–217.

18. M. Naidoo and S. Singh, "The Oral Health Status of Children With Autism Spectrum Disorder in KwaZulu-Nata, South Africa," *BMC Oral Health* 18 (2018): 165.

19. S. A. Al-Maweri, E. S. Halboub, W. A. Al-Soneidar, and G. A. Al-Sufyani, "Oral Lesions and Dental Status of Autistic Children in Yemen: A Case-Control Study," *Journal of International Society of Preventive & Community Dentistry* 4 (2014): S199–S203.

20. R. B. Kassab, A. Osman, and A. Tarabaih, "Assessment of Caries Prevalence and Related Risk Factors Among a Group of Lebanese Children With Autism Spectrum Disorder: A Case-Control Study," *International Arab Journal of Dentistry* 14 (2023): 13–21.

21. L. Orellana, F. J. Silvestre, S. Martínez-Sanchis, V. Martínez-Mihi, and D. Bautista, "Oral Manifestations in a Group of Adults With Autism Spectrum Disorder," *Medicina Oral, Patologia Oral y Cirugia Bucal* 17 (2012): e415–e419.

22. N. V. Babu and A. Roy, "Comparative Analysis of the Status of Dental Caries and Selected Salivary Electrolytes in Children With Autism," *International Journal of Clinical Pediatric Dentistry* 15 (2022): S242.

23. S. Fakroon, A. Arheiam, and S. Omar, "Dental Caries Experience and Periodontal Treatment Needs of Children With Autistic Spectrum Disorder," *European Archives of Paediatric Dentistry* 16 (2015): 205–209.

24. R. R. Al-Zaidi, "Oral Health Status in Autism Patients Children in Iraq," *NeuroQuantology* 19 (2021): 54–60.

25. V. P. Mathur and J. K. Dhillon, "Dental Caries: A Disease Which Needs Attention," *Indian Journal of Pediatrics* 85 (2018): 202–206.

26. E. Z. Murshid, "Diet, Oral Hygiene Practices and Dental Health in Autistic Children in Riyadh, Saudi Arabia," *Oral Health and Dental Management* 13 (2014): 91–96.

27. P. Subramaniam and M. Gupta, "Oral Health Status of Autistic Children in India," *Journal of Clinical Pediatric Dentistry* 36 (2011): 43–48.

28. B. Kuter and I. Uzel, "Evaluation of Oral Health Status and Oral Disorders of Children With Autism Spectrum Disorders by Gender," *Archives de Pediatrie* 28 (2021): 33–38.

29. S. S. Sam, V. Shetty, and V. Amma, "Oral Health of Autistic Children and Awareness of Care Providers Towards Their Oral Hygiene," *Journal of Clinical and Diagnostic Research* 15 (2021): ZC19–ZC23.

30. M. Vajawat and P. C. Deepika, "Comparative Evaluation of Oral Hygiene Practices and Oral Health Status in Autistic and Normal Individuals," *Journal of International Society of Preventive and Community Dentistry* 2 (2012): 58–63.

31. M. Bossù, M. Trottini, D. Corridore, et al., "Oral Health Status of Children With Autism in Central Italy," *Applied Sciences* 10 (2020): 2247.

32. B. Kuter and N. Guler, "Caries Experience, Oral Disorders, Oral Hygiene Practices and Socio-Demographic Characteristics of Autistic Children," *European Journal of Paediatric Dentistry* 20 (2019): 237–241.

33. R. H. Selwitz, A. I. Ismail, and N. B. Pitts, "Dental Caries," *Lancet* 369 (2007): 51–59.

34. F. Suhaib, A. Saeed, H. Gul, and M. Kaleem, "Oral Assessment of Children With Autism Spectrum Disorder in Rawalpindi, Pakistan," *Autism* 23 (2019): 81–86.

35. J. Alhumaid, B. Gaffar, Y. Alyousef, F. Alshuraim, M. Alhareky, and M. El Tantawi, "Oral Health of Children With Autism: The Influence of Parental Attitudes and Willingness in Providing Care," *Scientific World Journal* 2020 (2020): 8329426.

36. F. Tulumbaci, E. Korkut, and H. Ozer, "Comparative Evaluation of Oral Health Status in Healthy Children and Children With Autism Spectrum Disorder," *Journal Of Pediatric Infectious Diseases* 15 (2020): 223–227.

37. R. Y. Du, C. K. Y. Yiu, N. M. King, V. C. N. Wong, and C. P. J. McGrath, "Oral Health Among Preschool Children With Autism Spectrum Disorders: A Case-Control Study," *Autism* 19 (2015): 746–751.

38. L. Gonçalves, F. Gonçalves, B. M. L. Nogueira, et al., "Conditions for Oral Health in Patients With Autism," *International Journal of Odontostomatology* 10 (2016): 93–97.

39. M.-C. Morales-Chavez, "Oral Health Assessment of a Group of Children With Autism Disorder," *Journal of Clinical Pediatric Dentistry* 41 (2017): 147–149.

40. G. Oda, A. Karayagmurlu, I. Dagli, G. Aren, and N. Soylu, "Oral Health Status in Children With Autism Spectrum Disorder: A Cross Sectional Study From Turkey," *Psychiatry and Behavioral Sciences* 11 (2021): 186–192.

41. N. Hariyani, R. H. Soebekti, D. Setyowati, et al., "Factors Influencing the Severity of Dental Caries Among Indonesian Children With Autism Spectrum Disorder—A Pilot Study," *Clinical, Cosmetic and Investigational Dentistry* 11 (2019): 227–233.

42. H. Piraneh, M. Gholami, K. Sargeran, and A. R. Shamshiri, "Oral Health and Dental Caries Experience Among Students Aged 7-15 Years Old With Autism Spectrum Disorders in Tehran, Iran," *BMC Pediatrics* 22 (2022): 116.

43. C. Vishnu Rekha, P. Arangannal, and H. Shahed, "Oral Health Status of Children With Autistic Disorder in Chennai," *European Archives of Paediatric Dentistry* 13 (2012): 126–131.

44. E. Gaçe, M. Kelmendi, and E. Fusha, "Oral Health Status of Children With Disability Living in Albania," *Materia Socio-Medica* 26 (2014): 392–394.

45. J. M. Burgette and A. Rezaie, "Association Between Autism Spectrum Disorder and Caregiver-Reported Dental Caries in Children," *JDR Clinical and Translational Research* 5 (2020): 254–261.

46. A. A. El Khatib, M. M. El Tekeya, M. A. El Tantawi, and T. Omar, "Oral Health Status and Behaviours of Children With Autism Spectrum Disorder: A Case-Control Study," *International Journal of Paediatric Dentistry* 24 (2014): 314–323.

47. P. P. Lam, R. Du, S. Peng, C. P. McGrath, and C. K. Yiu, "Oral Health Status of Children and Adolescents With Autism Spectrum Disorder: A Systematic Review of Case-Control Studies and Meta-Analysis," *Autism* 24 (2020): 1047–1066.

48. D. Corridore, G. Zumbo, I. Corvino, et al., "Prevalence of Oral Disease and Treatment Types Proposed to Children Affected by Autistic Spectrum Disorder in Pediatric Dentistry: A Systematic Review," *Clinica Terapeutica* 171 (2020): e275–e282.

49. S. Bagattoni, L. Lardani, G. D'Alessandro, and G. Piana, "Oral Health Status of Italian Children With Autism Spectrum Disorder," *European Journal of Paediatric Dentistry* 22 (2021): 243–247.

50. J. R. Lukacs and L. L. Largaespada, "Explaining Sex Differences in Dental Caries Prevalence: Saliva, Hormones, and "Life-History" Etiologies," *American Journal of Human Biology* 18 (2006): 540–555.

51. J. Velosa-Porras and N. Rodríguez Malagón, "Prevalence of Dental Caries in Pregnant Colombian Women and its Associated Factors," *BMC Oral Health* 23 (2023): 793.

52. A. M. L. Pedersen, C. E. Sørensen, G. B. Proctor, G. H. Carpenter, and J. Ekström, "Salivary Secretion in Health and Disease," *Journal of Oral Rehabilitation* 45 (2018): 730–746.

53. J. Marshall, B. Sheller, and L. Mancl, "Caries-Risk Assessment and Caries Status of Children With Autism," *Pediatric Dentistry* 32 (2010): 69–75.

54. C. Y. Loo, R. M. Graham, and C. V. Hughes, "Behaviour Guidance in Dental Treatment of Patients With Autism Spectrum Disorder," *International Journal of Paediatric Dentistry* 19 (2009): 390–398.

55. L. P. Dao, S. Zwetchkenbaum, and M. R. Inglehart, "General Dentists and Special Needs Patients: Does Dental Education Matter?," *Journal of Dental Education* 69 (2005): 1107–1115.