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REVIEW

Prevalence of bruxism in down syndrome patients: A systematic review and meta-analysis

Mohammad Khursheed Alam[1,2,3] | Ahmed Hamoud L. Alsharari[1] | Maher A. L. Shayeb[4] | Sittana Elfadil[5] | Gabriele Cervino[6] | Giuseppe Minervini[7]

[1]Preventive Dentistry Department, College of Dentistry, Jouf University, Sakaka, Saudi Arabia

[2]Department of Dental Research Cell, Saveetha Institute of Medical and Technical Sciences, Saveetha Dental College and Hospitals, Chennai, India

[3]Department of Public Health, Faculty of Allied Health Sciences, Daffodil International University, Dhaka, Bangladesh

[4]Clinical Science Department, Center of Medical and Bioallied Health Sciences Research, Ajman University, Ajman, UAE

[5]Department of Clinical Sciences, Prosthodontics, College of Dentistry, Center of Medical and Bio-Allied Health Sciences Research. Ajman University, Ajman, UAE

[6]Department of Biomedical and Dental Sciences and Morphofunctional Imaging, School of Dentistry, University of Messina, Messina, Italy

[7]Multidisciplinary Department of Medical-Surgical and Dental Specialties, University of Campania, Naples, Italy

Correspondence
Mohammad Khursheed Alam, Preventive Dentistry Department, College of Dentistry, Jouf University, Sakaka 72345, Saudi Arabia.
Email: mkalam@ju.edu.sa

Giuseppe Minervini, Multidisciplinary Department of Medical-Surgical and Dental Specialties, University of Campania, Luigi Vanvitelli, Naples 80138, Italy.
Email: giuseppe.minervini@unicampania.it

Abstract

Background: Bruxism is a parafunctional activity characterised by grinding or clenching of teeth and is a common oral health concern in individuals with down syndrome (DS). Understanding the prevalence of bruxism in this population is crucial for developing effective management strategies. This systematic review and meta-analysis is aimed to investigate the prevalence of bruxism among individuals with DS and explore its association with other oral health issues.

Methods: A comprehensive search was conducted across multiple electronic databases to identify relevant studies. Cross-sectional and observational studies were included. Data on bruxism prevalence and associated factors were extracted, and a meta-analysis was performed using both fixed-effects (FE) and random-effects (RE) models of MedCalc software. Heterogeneity among studies was assessed using I^2 statistics. New Castle-Ottawa Scale was used to evaluate methodological quality of the included studies.

Results: Eight studies met the pre-defined inclusion criteria and were included in the analysis. Seven studies used a questionnaire to assess bruxism. The pooled proportion estimate for occurrence of DS across the included studies was found to be 0.33 (95% CI: 0.22–0.45) as per the RE model and 0.35 (95% CI: 0.31–0.450) as per FE model in the quantitative analysis. All studies exhibited good methodological quality.

Conclusion: This systematic review and meta-analysis provide evidence of a significant prevalence of bruxism among individuals with DS. The findings highlight the association of bruxism with other oral health issues and specific chromosomal abnormalities. Comprehensive oral health assessments, including diagnostic procedures like Polysomnography, are essential for addressing the unique oral health needs of individuals with DS. Further studies are recommended with a valid tool for the diagnosis. Early interventions and management strategies need to be tailored to this population, considering the multifaceted nature of oral health concerns in individuals with DS.

Mohammad Khursheed Alam and Ahmed Hamoud L. Alsharari are equal contribution in this manuscript.

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KEYWORDS
bruxism, down syndrome, management strategies, orofacial pain, prevalence, risk factors, sleep disturbances, temporomandibular disorders, TMD

1 | INTRODUCTION

Bruxism, a parafunctional behaviour characterised by recurrent teeth clenching or grinding, is a common and complex oral health issue.[1] It entails the involuntary contraction of the masticatory muscles, whether awake bruxism (AB) or sleep bruxism (SB).[2] There are many underlying etiological factors for bruxism, which can affect both children and adults.[3] It is thought that a complex interplay of biological, psychological, and environmental factors plays a role in the pathophysiology of bruxism, which is still not fully understood.[4,5] Occlusion irregularities, psychological stress, anxiety, genetic susceptibility and central nervous system dysregulation are potential contributory causes.[6] These elements may affect the neuromuscular regulation of the masticatory system, which could result in bruxism.[7] Individuals with down syndrome (DS) and other types of general cognitive impairment face a range of issues that impact their overall functioning and quality of life.[8] These issues encompass various domains, including cognitive, physical, behavioural and social aspects. Individuals with DS commonly exhibit distinctive physical features, such as a flattened facial profile, upward-slanting eyes, a small nose and a protruding tongue.[9] These physical characteristics may contribute to difficulties with speech and language development, leading to communication impairments. Additionally, individuals with DS are susceptible to a range of medical conditions, including congenital heart defects, hearing and vision impairments, thyroid dysfunction and respiratory issues, which further compound their physical challenges.[10,11] Wetsleaar reported a SB prevalence of 20.0%, 21.0%, 16.5%, 14.5% and 8.3% in 25–34 years, 35–44 years, 45–54 years, 55–64 years and 65–74 years, respectively in the Dutch population. The prevalence rate in a Brazilian cross-sectional study was 8.1%, with individuals older than 40 reporting a higher occurrence.[12,13]

Although bruxism has been thoroughly investigated in a number of populations, little is known about its frequency and associated factors in people with DS.[14] The most prevalent chromosomal condition, DS, which results from an extra copy of chromosome 21, affects about 1 in 700 live births.[15] The prevalence of bruxism may be influenced by the distinctive orofacial traits that people with DS frequently exhibit, such as macroglossia, micrognathia and altered muscle tone.[16] Additionally, people with DS typically have other oral health problems, such as malocclusions, irregular teeth and obstructive sleep apnea (OSA).[17] Bruxism can place excessive and prolonged pressure on the TMJ, leading to discomfort or pain in the jaw joint.[18] The repetitive grinding or clenching motion can strain the joint, resulting in inflammation, muscle fatigue and soreness.[19] Chronic bruxism can contribute to the development of temporomandibular joint disorder (TMD). TMD encompasses a range of conditions affecting the TMJ, including pain, restricted jaw movement, clicking or popping sounds and difficulty opening or closing the mouth.[20,21] Bruxism-induced pressure and muscle tension can contribute to the onset or exacerbation of TMD symptoms. DS individuals with bruxism may exhibit excessive force during grinding or clenching, leading to accelerated tooth wear. This can result in shortened dental crowns, exposed dentin, and compromised occlusal surfaces. Tooth wear in this population can be further exacerbated by factors such as malocclusion, altered oral muscle function, or abnormal tooth alignment. Early detection of bruxism, often through careful observation of clinical signs and symptoms such as tooth wear patterns and reports of grinding sounds, can facilitate timely intervention. Therefore, it becomes quite critical to comprehend the prevalence of bruxism and its relationships to these elements in the DS community in order to provide suitable dental care and enhance the general oral health of affected people. Therefore, this systematic review and meta-analysis were conducted to address the need for a comprehensive evaluation of the prevalence of bruxism in individuals with DS and its associations with relevant oral health factors. By synthesising the available evidence and applying rigorous methodologies, this review aims to contribute valuable insights into the prevalence and characteristics of bruxism in individuals with DS, paving the way for improved oral health care and further research in this population.

2 | MATERIALS AND METHODS

2.1 | Eligibility criteria

The PECOS (Population, Exposure, Comparison, Outcome, Study design) strategy was employed in this review. This strategy guided the selection and inclusion criteria for the studies, ensuring a focused and comprehensive approach.

Population (P): Human population of all ages and gender.

Exposure (E): Exposure is the occurrence of DS in human population.

Comparison (C): No comparator group was chosen, as the objective was to determine the prevalence of bruxism in DS patients rather than comparing it to another group or intervention. Therefore, studies reporting the prevalence of bruxism in DS patients without the need for a specific comparison group were included.

Outcome: Outcome is the prevalence of bruxism in DS patients. Studies that reported the proportion or percentage of DS patients diagnosed with bruxism were included. The prevalence of bruxism could be determined through various diagnostic methods or tools, such as questionnaires, clinical assessments, or polysomnography (PSG).

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Study Design: Cross-sectional and observational studies were looked into for inclusion.

Inclusion criteria: Studies were included if they met the following criteria: (1) Literature that examined the prevalence of bruxism in individuals diagnosed with DS, without any restriction on age, gender, or geographic location. (2) Reported quantitative data on the prevalence of bruxism, such as the proportion or percentage of DS patients diagnosed with bruxism. (3) Employed any study design except for case reports, literature reviews and systematic reviews. (4) Included a clear description of the methods used to diagnose bruxism in DS patients, which could involve questionnaires, clinical assessments, or PSG. (5) Published in peer-reviewed journals and available in English.

Exclusion criteria: Studies were excluded in cases of: (1) Case reports, literature reviews, or systematic reviews on the prevalence of bruxism in DS patients. (2) Studies that did not specifically focus on individuals with DS or included other populations without providing separate data for DS patients. (3) Studies lacking quantitative data on the prevalence of bruxism or only reporting qualitative or narrative information. (4) Studies published in languages other than English. (5) Studies published in non-peer-reviewed sources, such as conference abstracts or unpublished manuscripts.

2.2 | Search strategy

The present review followed the guidelines outlined by PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses)[22,23] (Figure 1). The review is registered with PROSPERO number CRD42023396937. The adherence to these guidelines ensured a systematic and comprehensive approach to the systematic review and meta-analysis on the prevalence of bruxism in DS patients. A comprehensive database search strategy was employed across six different databases. The search strategy incorporated a combination of MeSH (Medical Subject Headings) keywords and Boolean operators to identify relevant studies. The following MeSH keywords and Boolean operators were employed:

1. Down Syndrome OR Trisomy 21 OR Down's Syndrome OR Mongolism
2. Bruxism OR Teeth Grinding OR Tooth Grinding OR Tooth Clenching
3. Prevalence OR Epidemiology
4. NOT Case Reports NOT Literature Review NOT Systematic Review

The search strategy combined these keywords using Boolean operators (AND, OR) to create comprehensive search queries. These operators were used to ensure the inclusion of relevant studies related to the prevalence of bruxism in DS patients while excluding case reports, literature reviews, and systematic reviews, as shown in Table 1. The search was conducted in each database individually, utilising the appropriate syntax and features specific to each database.

2.3 | Data extraction

The data extraction protocol used for this investigation involved a comprehensive and structured approach to collecting relevant information from the selected studies. Two independent reviewers conducted a thorough reading of each selected study to identify relevant data related to the prevalence of bruxism in DS patients. A standardised data extraction form was developed, incorporating key variables such as study characteristics (author, year, country), study design, participant characteristics (sample size, age range, gender distribution), bruxism prevalence (percentage), bruxism diagnosis method, other oral issues assessed and inferences from the study. Two reviewers then independently extracted the data from each study, and any discrepancies or disagreements were resolved through discussion and consensus. A third reviewer was consulted in cases of persistent disagreements. The extracted data were then compiled and organised systematically for further analysis. The extracted data were subsequently used for quantitative synthesis.

2.4 | Quality assessment

Newcastle-Ottawa Scale (NOS) tool was used for quality assessment of the included studies. The NOS tool[24] is a widely recognised instrument for evaluating the methodological quality and risk of bias, which was included in this review. The reviewers independently assessed the selected studies using the NOS tool to evaluate several key domains as shown in Figure 2. Each criterion was assigned a certain number of stars, indicating the level of methodological quality or risk of bias. By systematically assessing key aspects of study design and conduct, the NOS tool facilitated the identification of potential biases that could impact the reliability and validity of the study findings.

2.5 | Statistical analysis

MedCalc software[25] was used for meta-analysis. Both random-effects (RE) and fixed-effects (FE) model was employed to calculate the odds ratio (OR) for the prevalence rate of bruxism in DS patients across the included studies. First, the relevant data from each study were extracted, including the number of events (occurrence of bruxism) and the total sample size. These data were then entered into the software for analysis. The FE model was chosen based on the assumption of homogeneity across the included studies. This model assumes that the true effect size is the same across all studies, and any observed variation is due to random error. Both FE and RD model in MedCalc accounted for the weights assigned to each study based on the sample size, giving more weight to larger studies. This approach ensured that the pooled estimate was representative of the overall effect size in the population.

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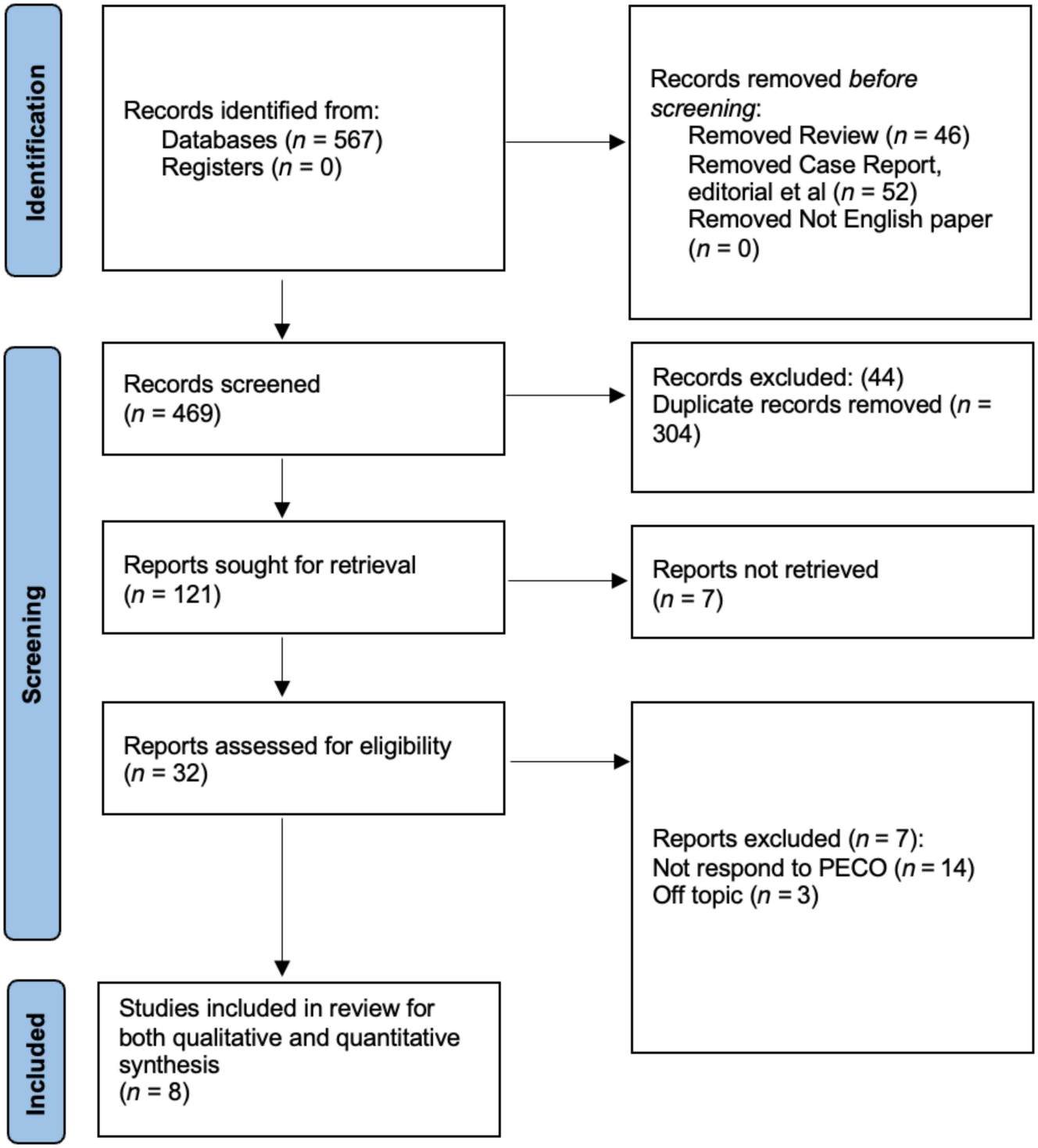

FIGURE 1 Framework depicting the utilisation of PRISMA guidelines for study selection in this review.

3 | RESULTS

3.1 | Study characteristics

Table 2 provides information on the eight studies[26–33] selected for analysing the prevalence of bruxism in individuals with DS. The studies include Ashworth et al.[26] from England, Breslin et al.[27] from the USA, Carter et al.[28] from England, Giannasi et al.,[29] Miamoto et al.,[30] and Ruy et al.[31] from Brazil, Lopez et al.[32] from Mexico, and Bell et al.[33] from Australia. These studies encompassed varying sample sizes and age ranges. The gender ratio of the participants was also reported. The sample sizes varied across the studies, suggesting that a range of participants were included in the investigations. The age ranges of the participants spanned from early childhood to adolescence, indicating that bruxism can occur across different developmental stages in

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TABLE 1 Databases that were used for identifying relevant papers for this review.

Database	Search query
PubMed/MEDLINE	(Down Syndrome OR Trisomy 21 OR Down's Syndrome OR Mongolism) AND (Bruxism OR Teeth Grinding OR Tooth Grinding OR Tooth Clenching) AND (Prevalence OR Epidemiology) NOT (Case Reports OR Literature Review OR Systematic Review)
Embase	(Down Syndrome OR Trisomy 21 OR Down's Syndrome OR Mongolism) AND (Bruxism OR Teeth Grinding OR Tooth Grinding OR Tooth Clenching) AND (Prevalence OR Epidemiology) NOT (Case Reports OR Literature Review OR Systematic Review)
Scopus	(Down Syndrome OR Trisomy 21 OR Down's Syndrome OR Mongolism) AND (Bruxism OR Teeth Grinding OR Tooth Grinding OR Tooth Clenching) AND (Prevalence OR Epidemiology) NOT (Case Reports OR Literature Review OR Systematic Review)
Web of Science	(Down Syndrome OR Trisomy 21 OR Down's Syndrome OR Mongolism) AND (Bruxism OR Teeth Grinding OR Tooth Grinding OR Tooth Clenching) AND (Prevalence OR Epidemiology) NOT (Case Reports OR Literature Review OR Systematic Review)
PsycINFO	(Down Syndrome OR Trisomy 21 OR Down's Syndrome OR Mongolism) AND (Bruxism OR Teeth Grinding OR Tooth Grinding OR Tooth Clenching) AND (Prevalence OR Epidemiology) NOT (Case Reports OR Literature Review OR Systematic Review)
CINAHL	(Down Syndrome OR Trisomy 21 OR Down's Syndrome OR Mongolism) AND (Bruxism OR Teeth Grinding OR Tooth Grinding OR Tooth Clenching) AND (Prevalence OR Epidemiology) NOT (Case Reports OR Literature Review OR Systematic Review)

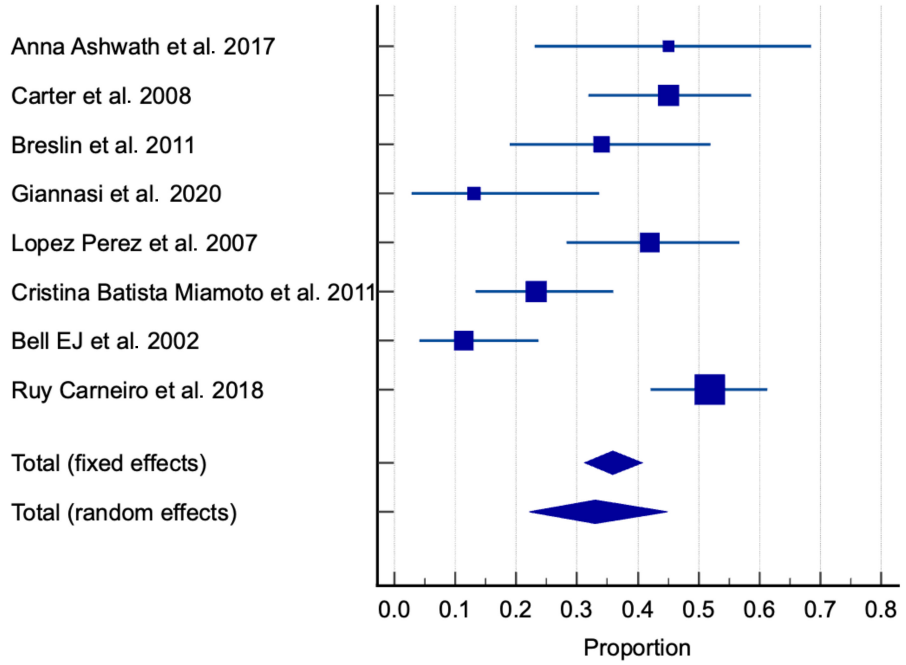

FIGURE 2 Forest plot depicting proportion of bruxism in DS patients.

this population. A predominance of males was noted in several of the investigations.

3.2 | Main findings

The findings from these studies indicate that bruxism is a commonly observed phenomenon in individuals with general cognitive impairment. Bruxism is a significant concern among individuals with DS. The reported prevalence of bruxism ranged from 11.4% to 51.8%, depending on the study and the specific population examined in the qualitative data. Bruxism diagnosis methods included questionnaires, assessments of dental casts and PSG tests. In addition to bruxism, the studies also assessed other oral health-related issues. TMJ-related pain, OSA, snoring, finger sucking, oral habits, tooth wear, crossbite and buccal breathing were among the issues investigated. The results indicate a substantial association between bruxism and these factors, highlighting the complex nature of oral health challenges in individuals with DS. These findings emphasise the unique oral health needs and challenges experienced by individuals with DS. The collective findings of these studies contribute to our understanding of bruxism in

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TABLE 2 Demographic variables pertaining to the selected papers.

Author	Year	Region	Sample size (*n*)	Age range (in years)	Gender ratio
Ashworth et al.[26]	2013	England	22	6–12	11 males
Breslin et al.[27]	2011	USA	35	7–18	19 males
Carter et al.[28]	2008	England	58	0.65–18	28 males
Giannasi et al.[29]	2020	Brazil	23	Unspecified	Unspecified
Miamoto et al.[30]	2011	Brazil	60	Unspecified	19 males
Ruy et al.[31]	2018	Brazil	112	5–16	60 males
Lopez et al.[32]	2007	Mexico	57	3–15	34 males
Bell et al.[33]	2002	Australia	49	4–18	26 males

individuals with DS, highlighting its high prevalence and association with various oral issues. The results uphold the importance of comprehensive oral health assessments, including the systematic implementation of diagnostic procedures such as PSG, to effectively address the needs of individuals with DS and improve their overall oral well-being.

3.3 | Meta-analysis

A comprehensive search identified eight relevant studies meeting the inclusion criteria, which were subsequently analysed using MedCalc software. The meta-analysis focused on proportions as the primary outcome measure. The pooled proportion estimate for the occurrence of DS across the included studies was found to be 0.33 (95% CI: 0.22–0.45) as per the RE model and 0.35 (95% CI: 0.31–0.450) as per the FE model, as seen in Table 3. This suggests that 33% of the overall targeted population showed bruxism, as per RE. The forest plot (Figure 2) visually displays the individual study estimates along with the pooled proportion estimate. Heterogeneity analysis revealed a higher level of heterogeneity among the studies ($I^2 = 83.41\%$, $p < .05$), as seen in Table 4. This suggests that differences in study characteristics or population variations might have contributed to the observed heterogeneity. The assessment of publication bias using a funnel plot indicated potential asymmetry, suggesting the presence of publication bias, as seen in Figure 3. However, due to the limited number of studies included in the meta-analysis, caution is advised when interpreting these results (Table 5).

3.4 | Quality assessment of included studies

The bias assessment shows the methodological assessment of the included studies. Scores for each study ranged from 5 to 9. Studies are thought to be of good quality when NOS scores range from 5 to more. The studies of Ashwath et al.,[26] Breslin et al.,[27] Carter et al.,[28] Giannasi et al.,[29] and Ruy et al.[31] evaluated Bruxism by a questionnaire filled out by parents and thus scored "1" in the assessment of the outcome.

4 | DISCUSSION

This study has significant findings and future implications. The pooled analysis of these studies indicates a noticeable prevalence of bruxism in DS patients. These findings provide important insights for clinicians and researchers in the fields of dentistry and medical care for DS patients, emphasising the importance of early identification, monitoring and management of bruxism in this population.

Bruxism exhibits a greater prevalence in the DS population, beginning at a younger age and usually persisting for a lifetime. The higher frequency could be related to chronic anxiety, an underdeveloped neural system, malocclusion and TMJ dysfunction as a result of the supporting ligaments' hypotonicity, hyperflexibility and laxity. The clinical appearance in the beginning is the erosion of the occlusal surface (pits and fissures), which may permit self-cleaning with the tongue. But the resultant strain on the teeth and their supporting structures is not to be overlooked. Tooth fractures are therefore a common occurrence in this population. Hence, bruxism needs to be detected early on and monitored constantly. At times, repositioning of the jaw to decrease grinding of the teeth may also be necessary.

Ashworth et al.[26] compared sleep problems between the population affected by DS and Williams syndrome (WS), yet another developmental disorder affecting the nervous system. As per the Children's sleep health questionnaire (CSHQ) assessment, DS children had greater bruxism prevalence as compared to their WS counterparts. Bruxism was investigated personally by the examiner, considering the subjective variation when reported by parents. Breslin et al.[27] reported an elevated parasomnia subscale primarily due to bruxism. The authors also reported an inverse relationship between sleep disorders and age. Carter et al.[28] reported data on 58 of the 73 children registered in the database. In order to ensure CSHQ standardisation, participants were divided into three age groups (up to 3.9 years, 4–12.9 years, and 13–18 years). Bruxism was reported in children aged 3 years and older and was not dependent on a learning disability or gender. Giannasi et al.[29] assessed both SB and AB among 23 adults affected by DS. Bruxism criteria were set as RMMA index >2 episodes per hour of sleep as per PSG diagnosis. AB was reported in all the patients, while SB was reported in only 13.1%. To ensure uniformity, this review included only the SB rate for quantitative analysis. Miamoto et al.[30] confirmed the

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TABLE 3 Technical variables assessed in the selected papers.

Author	Protocol	Bruxism prevalence (percentage)	Bruxism diagnosis method	Other oral issues assessed	Results assessed
Ashworth et al.[26]	Comparative	45	CSHQ	None	A spectrum of manifestations related to sleep-disordered breathing was observed, alongside an array of additional challenges, one being the occurrence of bruxism
Breslin et al.[27]	Cross-sectional	34	CSHQ	None	Bruxism was frequently reported, manifesting a minimum frequency of two nights per week in 34% of the cohort.
Carter et al.[28]	Cross-sectional	45 (33 in females and 55 in males)	CSHQ	None	In comparison to the existing literature on typically developing populations, children diagnosed with DS exhibited statistically significant elevations in the frequency of bruxism episodes, as reported in the available data.
Giannasi et al.[29]	Observational	100 (AB) and 13.1 (SB)	Questionnaire and PSG test	TMJ-related pain	Significant prevalence of OSA, snoring, and SB, in addition to the significant occurrence of snoring as an isolated symptom, provides substantial evidence to advocate for the systematic implementation of PSG as a standard diagnostic procedure in the adult DS population.
Miamoto et al.[30]	Comparative	23.3 (24.3 in males and 21.7 in females)	Questionnaire along with clinical examination	Finger sucking, oral habits, tooth wear and crossbite	The observed prevalence of bruxism among individuals diagnosed with DS and CP exhibited a comparable magnitude to that identified in individuals lacking cognitive impairment.
Ruy et al.[31]	Cross-sectional	63.3 (in 8–12-year-olds) and 31.4 (in 13–16-year-olds)	Questionnaire	Finger sucking, oral habits and buccal breathing	Mouth breathers were nearly three times more likely to be among the group with reported bruxism in children and adolescents.
Lopez et al.[32]	Cross-sectional	42 (35 in males and 52 in females)	Questionnaire and assessment of dental casts	None	A noteworthy correlation was established between bruxism and the specific chromosomal abnormality, whereby individuals exhibiting mosaicism demonstrated a higher propensity for the occurrence of bruxism.
Bell et al.[33]	Cross – sectional	11.4	Questionnaire and photographs	Erosive potential of the diet consumed	Tooth wear (attrition and erosion) was significantly noted though no link was established with diet

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TABLE 4 Metanalytic prevalence of bruxism among included studies with weighted statistics.

Study	Sample size	Proportion (%)	95% CI	Weight (%)	
				Fixed	Random
Ashwath et al.[26]	20	45.000	23.058–68.472	5.05	10.48
Carter et al.[28]	58	45.000	31.903–58.625	14.18	13.21
Breslin et al.[27]	35	34.000	18.902–51.921	8.65	12.10
Giannasi et al.[29]	23	13.100	2.801–33.658	5.77	10.92
Lopez Perez et al.[32]	51	42.000	28.321–56.641	12.50	12.96
Cristina Batista Miamoto et al.[30]	60	23.300	13.357–36.002	14.66	13.27
Bell et al.[33]	49	11.400	4.108–23.726	12.02	12.88
Ruy Carneiro et al.[31]	112	51.800	42.161–61.341	27.16	14.19
Total (fixed effects)	408	35.899	31.283–40.716	100.00	100.00
Total (random effects)	408	33.016	22.148–44.892	100.00	100.00

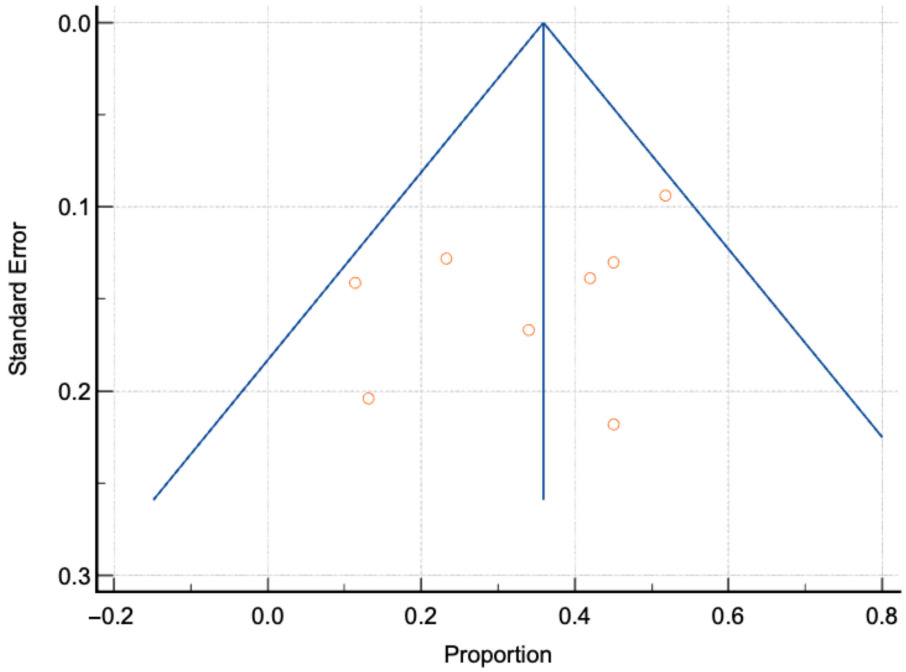

FIGURE 3 Funnel plot depicting publication bias of the included studies.

TABLE 5 Test for heterogeneity.

Q	42.1986
DF	7
Significance level	$p < .0001$
I^2 (inconsistency)	83.41%
95% CI for I^2	68.83–91.17

bruxism habit by clinical examination along with the parent's report. It examined bruxism between DS, cerebral palsy (CP) and patients requiring orthodontic treatment and reported it to be 23%, 25% and 23%, respectively. This suggests that cognitive impairment was not a predictive factor of bruxism ($p = .970$). Natália Cristina Ruy Carneiro et al.[31] recruited their study participants from a dental school and a non-government organisation providing assistance to the DS population. A significant association was noted for bruxism and age ($p = .017$) and type of breathing ($p = .022$). Another observation was that 52.2% of the respondents with bruxism were associated with oral breathing. Lopez Perez et al.[32] confirmed bruxism by examining for dental wear facets in both deciduous and permanent dentition, along with parental reports. Dental casts were also used for reaffirmation. They also reported a greater prevalence of grinding in children with mosaic trisomy ($p = .03$). Age and gender were not significantly associated with bruxism. Bell et al.[33] also recorded a diet history of 3 days to check for the erosive risk of the diet consumed. Most parents in their study mentioned that they were shocked by their child's high level of tooth grinding, as they

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were unaware of this issue before receiving the questionnaire. Occasional intraoral photography and dental impressions were used to evaluate bruxism.

A key aspect to be noted is that five out of eight studies relied only on parental or carer reporting for bruxism, which relies on subjective observation. Parents may not always be aware of their child's bruxism episodes, as noted in one of our studies, especially if they occur during sleep. They might miss subtle signs or attribute them to other causes, leading to underreporting or misinterpretation. Parents might feel the need to provide socially desirable responses, which could influence their reporting of bruxism. They may understate or overstate the occurrence of bruxism based on their perception of what is expected or desired by healthcare professionals. Despite this, the use of a reliable and valid screening tool such as CSHQ in both high-risk population and community surveys warrants the high quality of the included studies.[34]

A key factor to bear in mind is the difficulty in diagnosing Bruxism in DS patients. Cognitive impairments and speech and language delays in this population hinder their ability to clearly express their symptoms such as grinding and clenching. This population may exhibit challenging behaviours like self-stimulatory or repetitive behaviour that could be mistaken for or mask the symptoms of bruxism. Cooperation and compliance with assessment procedures, such as palpation or range of motion measurements, may also be limited due to behavioural considerations.[35]

The DC-TMD provides a standardised set of criteria for the diagnosis of various temporomandibular disorders, including bruxism.[36] Future studies employing DC-TMD criteria for bruxism diagnosis can enhance consistency and comparability across research settings, leading to more reliable and accurate assessments. The DC-TMD encompasses a thorough assessment of various aspects related to bruxism, including clinical examination, self-report questionnaires and functional assessments. By utilising these comprehensive measures, future studies can provide a more holistic understanding of bruxism, considering not only the physical signs but also associated symptoms, psychological factors and functional impact.

The present review has certain limitations that should be taken into consideration. Firstly, the analysis is based on a review of cross-sectional and observational studies, which limits the ability to establish causal relationships between the noticeable prevalence of bruxism and DS. The included studies may suffer from selection bias, as they were conducted by different research groups and as they utilised different criteria for diagnosing and assessing bruxism. Secondly, the heterogeneity analysis revealed substantial variability among the included studies, indicating potential differences in study design, participant characteristics, and measurement methods, which could contribute to the observed heterogeneity.[33] Additionally, the sample sizes of some individual studies were relatively small, which may affect the precision and generalizability of the findings. Furthermore, the analysis relied on the pooled estimates derived from a limited number of studies, which may not fully represent the entire body of evidence on the topic. Further research with larger sample sizes and more rigorous study designs is needed to confirm these findings and provide a more comprehensive understanding of the relationship between bruxism and DS.

5 | CONCLUSION

The collective findings obtained through this review advance our comprehension of bruxism in individuals with DS, emphasising its elevated prevalence and association with various oral issues. From the eight studies evaluated in the analysis, a prevalence of 33.3% and 35% was noted as per the RE and FE model. This suggest that the occurrence of bruxism was on the higher side in DS population. All of the studies used a questionnaire for assessment, thus highlighting the need for studies employing a valid and reliable instrument. Early diagnosis and prompt intervention of bruxism can help minimise or prevent problems such as tooth wear, fractures and damage to existing restorations. This will not preserve the integrity of the teeth but also reduce the need for extensive dental treatment. Consequently, comprehensive oral health assessments are of paramount importance, necessitating the systematic integration of diagnostic procedures to effectively address the specific requirements of individuals with DS and enhance their overall oral well-being. Further studies are warranted to explore potential interventions and management strategies tailored to this population, accounting for the multifaceted nature of oral health concerns in individuals with DS.

CONFLICT OF INTEREST STATEMENT

The Authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ORCID

Giuseppe Minervini https://orcid.org/0000-0002-8309-1272

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