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Oral Health Assessment of Children with Autism Spectrum Disorder: Literature Review

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ABSTRACT Children with autism have dental health problems that are often encountered, namely dental caries, periodontal disease, damage to the oral environment, tooth eruption disorders, and trauma. Coordination of irregular tongue movements causes food to often get stuck in the mouth and is not swallowed immediately, exacerbated by the habit of consuming cariogenic foods so that the risk of dental caries is higher in children with autism. This study aims to explain the oral health assessment in terms of oral hygiene in children with autism. The method used is a Systematic Literature Review obtained from four databases, namely Google Scholar, Pubmed, Wiley, and Science Direct. The results showed that the oral health assessment of children with autistic spectrum disorder was poor. There are still many autistic children who have caries and periodontal disease. It shows how difficult it is for autistic children and their parents to maintain healthy teeth and mouths. Factors that influence, among others, impaired concentration and interaction in children with autism is the lack of understanding of parents about maintaining dental and oral health. The benefit obtained from this literature review is to share insights that proper care by maintaining Dental oral and dental hygiene can improve tooth brushing skills in autistic children.

INDEX TERMS Autism, Oral Health Assessment, Oral Hygiene.

I. INTRODUCTION

Dental and oral health is an integral part of overall health that can affect the quality of life. Dental and oral health is important for general health and well-being and greatly affects the quality of life, including speech, mastication, and self-confidence. Good oral and dental health is important for everyone, including children with special needs [1]. Autism is a developmental disorder that affects several aspects of how children see the world and learn from their experiences. Children with autistic disorder are usually less able to feel social contact. They tend to be aloof and avoid contact with other people [2] [3]. Autism is a neurodevelopmental and brain disorder characterized by limitations in social interaction, language development, verbal and nonverbal communication, as well as performing certain repetitive activities starting in childhood and continuing throughout life [4]. According to Fernandes [5] autism has the following characteristics namely communication, social interaction, sensory disturbances, play patterns, behavioral disorders and also. emotional disorders. Autism is also understood to have a pervasive developmental disorder in children. The definition

of pervasiveness is the nature or state of the disorder that is very broad and has a profound effect on a person. Children with autism will be isolated from other humans and enter the repenerative world [6]. Dental and oral health problems that are most often found in children with autism are dental caries, periodontal disease, damage to the oral environment, tooth eruption abnormalities, and trauma. The role of parents is very influential in helping children carry out daily habits, one of which is in performing oral hygiene [7].

Dental caries is caused by the tendency to choose soft and sweet foods and poor oral hygiene maintenance. Children with autism often have poor muscle tone, poor coordination, constantly salivate (drooling) even though they generally use mediation and oral habits that cause problems, the frequency of caries and periodontal disease in people with autism is higher when compared to the general population [8]. Dental and oral hygiene is a condition that indicates that a person's mouth is free from impurities such as debris, plaque, and calculus. Dental and oral hygiene can be measured using an index known as the Simplified Oral Hygiene Index (OHI-S),

by adding up the Debris Index (DI) and Calculus Index (CI) [9]. Coordination of irregular tongue movements causes food to be held in the mouth and not swallowed immediately, exacerbated by the habit of consuming cariogenic foods so that the risk of dental caries is higher in children with autism and parents' habits in cleaning teeth and mouth are not good. Factors that children tend to experience dental caries [10].

Children with autism have limitations so they cannot maintain oral hygiene. Good and bad dental and oral hygiene as well as the high prevalence of periodontal disease and dental caries are common characteristics found in children with autism, so that the role of parents is needed in carrying

The clinical picture of the oral cavity in autistic children is not specific, most of the studies examining the disease or damage to the teeth and mouth in autistic patients stated that the tooth and mouth damage experienced by autistic patients is generally the same as normal people [18].

Based on the results of research on 35 autistic students at SLB Autism and TPA B SLB Branjangan Jember Regency, it shows that the level of oral hygiene of autistic students at SLB Branjangan is mostly moderate (57.1%) and most of the students examined have moderate caries and periodontal disease (70. %) All students who were examined had caries, both students with good, moderate and poor levels of oral

TABLE 1
Inclusion and Exclusion Criteria

Criteria	Inclusion	Exclusion
Population	Autistic Children	Apart from Autistic Children
Interventions	Interventions on Dental and Oral Hygiene	Interventions other than dental and oral hygiene
Comparator	-	-
Outcomes	Maintenance of dental and oral health in terms of dental and oral hygiene of autistic children	In addition to maintaining oral and dental health in terms of dental and oral hygiene for autistic children
Study Design and Publication Types	Quantitative, non-experimental (cross sectional, retrospective, prospective) experimental (pre-experimental, quasi-experimental, pure experimental) Type : original article	qualitative Type : non original article
Publication Year	2016 or later	Before 2016
Languages	Indonesian and English	Apart from Indonesian and English

out or maintaining the health of their children's teeth and mouth [11]. Causes of Autism Along with the increasing number of autistic individuals, there are also more and more studies on the causes of autism that change the initial understanding of society. Initially hereditary and biological factors were seen as the cause of autism. Mothers who are cold and unresponsive are also thought to be the cause of autism [12]. Riskesdas [13] states that the behavior of brushing teeth every day is 94.6%, while the correct brushing behavior is 2.8% [14]. Results of research conducted Maharani et al. [15] shows that the status of dental and oral hygiene in autistic children in the city of Manado is the highest in the moderate and poor categories, respectively 39.21% [16].

Behavior is an activity or activity of organisms (living things) concerned from the biological point of view all living things from plants, animals to humans behave, because they have their respective activities. basically talking, crying, laughing, working, studying, writing, reading, etc., it can be concluded that what is meant by (human) behavior is all human activities or activities, both those that can be observed directly, and those that cannot be observed by outsiders [17].

hygiene. It is recommended to the autistic student to always maintain the cleanliness and health of his oral cavity [19].

According to Cirio et al. [21], the success of dental care in children with autism requires a close cooperative relationship with the parents and the operator. Try not to let autistic children wait too long for treatment visits and plan short visits. Maintenance of dental and oral hygiene of children with autism is important to maintain the health of their oral cavity. Uncooperative and aggressive behavior during dental treatment has the potential to inhibit, change, or reduce access to care for children with autism [22]. According to Lawrence Green, behavior is influenced by three factors, namely predisposing factors which include knowledge and attitudes, enabling factors which include the availability of facilities and infrastructure or health facilities, and reinforcing factors which include behavior and attitudes. health workers.

The family in this case is the closest and main environment in the lives of children with special needs. The effectiveness of various programs for handling and improving the life skills of children with special needs will be largely determined by

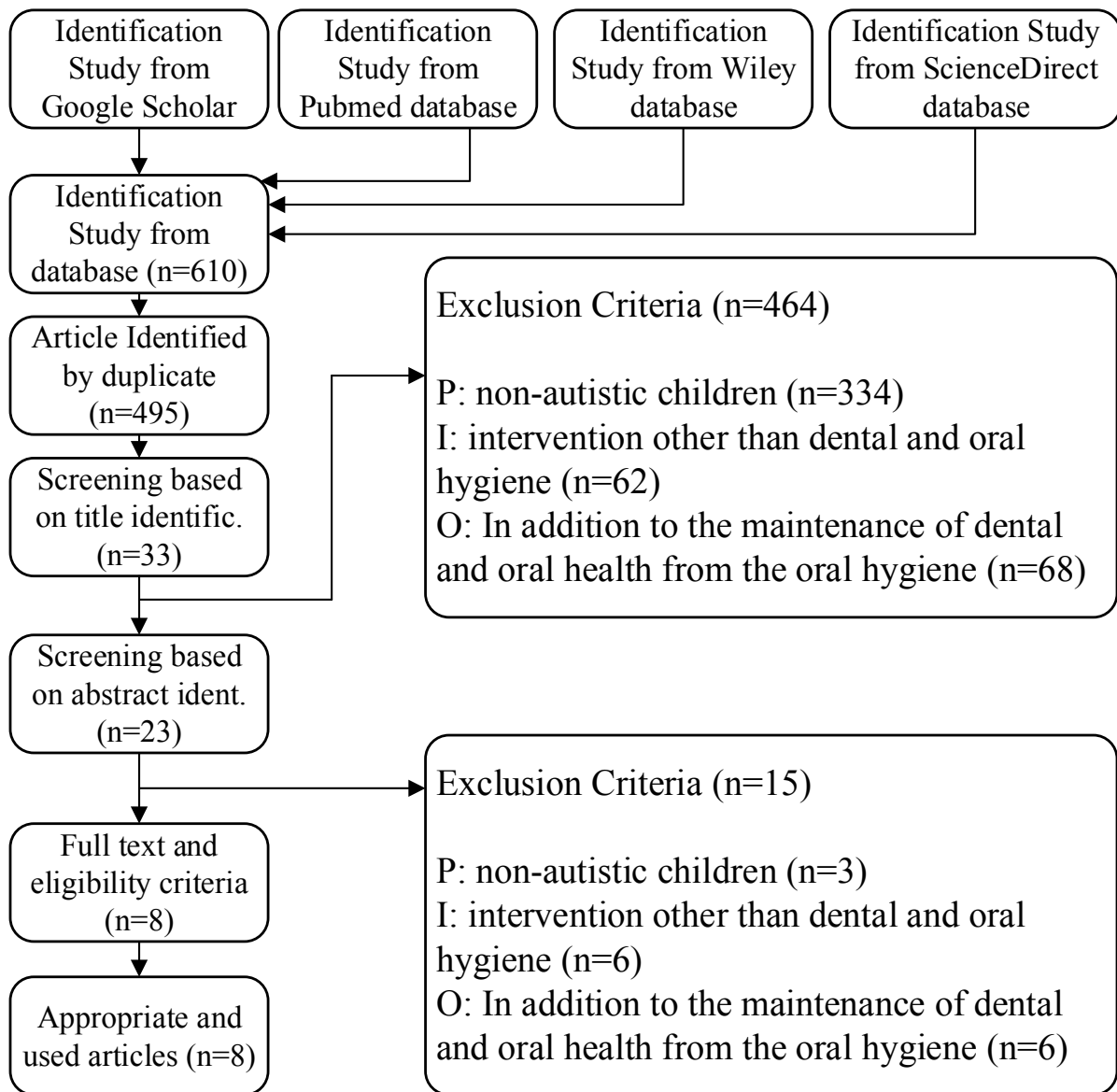


FIGURE 1. Flowchart of Oral Health Assessment of Children with Autism Spectrum Disorder References

the full participation and support of the family. Family is the party who knows and understands various aspects of a person much better than other people [20]. Explain the existence of two mechanisms that show the path of influence of social support on individual health. The first path is the direct effect, where both the positive effect of the availability of support and the negative effect of the limited support and the occurrence of social isolation will have a direct influence on the health of individuals, which in this case are children with special needs [20]. This study aims to explain the oral health assessment in terms of oral hygiene in children with autism.

II. METHOD

The research study taken is Literature Review, namely by looking for theoretical references related to the topic or problem raised by the researcher. This literature is obtained from academic databases, namely: Google Scholar, Willey, ScienceDirect and Pubmed. The number of articles planned is 10 articles published in the last 5 years with a time span of 2016-2020. The search for this article uses the following keywords: "Autism", "Dental Health Care" and "Oral Hygiene". How to use Keywords or Keywords is the Boolean Searching method, namely: "Autism" OR "Autism" AND "Oral health care" OR "Dental Health Care" AND "Teeth and Oral Hygiene" OR "Oral Hygiene". This Boolean Searching method usually uses (AND, OR NOT,

Referring to PICOS, the inclusion and exclusion criteria are set as follows: Based on a search of academic databases such as Google Scholar, Pubmed, Willey and ScieneDirect with the keywords "Autism", "Dental Health Care" and "Oral Hygiene" several journals were obtained including: Google Scholar 144 journals, Pudmed 27 journals, Willey 165 journals and ScieneDirect 274 So that the total journals obtained are 610 journals. Of the 610 journals need to be identified to see duplication. The identification includes the title, year and name of the author. If similarities are found, it

can be concluded that the journal contents are the same. After identification, it turns out that there are 115 similar journals. Then the total of 610 journals is reduced by 115 duplication journals so that 495 journals are obtained without duplication. Of the 495 journals there are 33 journals that match the theme of literature review. A total of 464 journals were excluded because they did not meet the inclusion criteria. The next stage, from 33 journals, which were reanalyzed based on abstracts, obtained 23 journals that

TABLE 2
Summary of Literature Review Results

No	Author, Year	Method (Design, sample, variables, Instrument)	Results
1.	Popple, et.al [23]	D : the type of research is experimental and uses randomized control trials S : The population of this study is 18 autism V : Dental and oral hygiene and video modeling I :-	This study shows that the brushing intervention 3-week video modeling delivered to autistic children via the internet. Links to videos are emailed twice a day. The clinical examiner ranked the plaque index at the midpoint, end point The results showed an improvement in oral hygiene in both groups, with a larger effect size in the Intervention condition. Internet-based intervention to improve oral hygiene for children with autism
2.	Fageeh, et.al [24]	D : The type of research used is cross sectional S : 15 Autistic Children aged 6-12 years V : Oral Hygiene and Applied Behavior I : Closed Questionnaire	This study was conducted to apply the ABA method used during behavioral therapy of children with ASD and convey through avatars in instructional videos to increase knowledge about oral hygiene practices among cooperatives. Maintaining good oral and dental hygiene in autistic children is difficult due to insufficient interest, hypersensitivity to various stimuli and required manual dexterity, and objections to the taste or texture of toothpaste or toothbrush products and lack of knowledge resulting in poor oral and dental hygiene and increased caries and periodontal conditions
3.	Krishnan, et.al [25]	D : this research uses prospective S: the population of this study is teenagers aged 13 to 17 years V : Sensory-based health education and adolescent oral hygiene on autism I : Questionnaire, mouth mirror, periodontal probe	This study found that both the visual card and the mobile-based application (brush up) had a significant difference in plaque ($P = 0.001$ and gingival scores ($P = 0.001$ seen between groups after 6 and 12 weeks post-intervention). That there was a statistically significant decrease in the mean plaque and gingival scores seen after brushing instructions
4.	Ganapathy [26]	D : this study uses a descriptive inferential test including the chi-square test S : 60 autistic children between the age group of 6-14 years in Chennai V: oral hygiene, caries, malocclusion status I : questionnaire	The results showed that 60% ($n = 36$) children with autism brushed their teeth once a day and 40% ($n = 24$) children brushed their teeth twice a day. 38.3% ($n=23$) children have the habit of sucking their thumb followed by sticking out their tongue 31.7% ($n=19$); biting lips 15% ($n=9$); biting cheek 15% ($n=9$). 40% ($n=24$) children with autism have poor oral hygiene, 33.3% ($n=20$) have moderate oral hygiene and 26.7% ($n=16$) children have good oral hygiene. 36.6% ($n=24$) children have a score of $20 > dmft$. 71.7% ($n=43$) children with autism had malocclusion, and 0.28.3% ($n=17$) children did not have malocclusion.

TABLE 2
(Continued)

5.	Doichinova, et.al [27]	D : this research uses quantitative S : The population of this study is 35 autistic children aged 6 to 11 years V: Oral hygiene and brushing teeth I :-	The oral hygiene index (OHI) assessment showed that among the children included in this study, none of the children had good oral hygiene. This study shows that the PECS non-verbal communication image system is an appropriate method to improve oral and dental hygiene in autistic children. Children with poor oral hygiene dominate (93.3%) and only a few children have good enough oral hygiene (6.7%). This fact strongly points to the great difficulty these children and their parents have in implementing oral hygiene care due to the specificity of neuromental disorders.
6.	Sarnat, et.al [28]	D : This research uses descriptive S : The population of this study is 47 ASD . children V: Oral hygiene and brushing teeth I : Questionnaire	Demonstrated oral hygiene habits of ASD and control group as reported by parents. While in the control group there were no reports of not brushing at all, in the ASD group 25% did not brush at all. The dental and oral hygiene were in the good category of 64.16%, the moderate category of dental and oral hygiene was 64.22% and the poor category of dental and oral hygiene was 41.40% in both groups.
7.	Bhandary [29]	D : This type of research is descriptive. Chi Square test is used for comparison of categorical variables and unpaired t-test is used for comparison of mean between the study group and the control group. S : The population of this study is 30 ASD children aged 6-12 years and 30 normal healthy siblings V : salivary biomarker level, oral hygiene and oral health I :-	In this study, 16 (53.3%) of the ASD children had good oral hygiene and gingival bleeding, 5 (16.6%) had poor oral hygiene when compared to their healthy peers who had 10 (33.3%) and 3 (10%). No significant difference was found in oral health status between the two groups. This could be attributed to factors such as parent/guardian awareness and supervision regarding their child/ward oral hygiene practices and not simply to the children's physical/manual dexterity.
8.	Ramassamy, et.al [30]	D : This study uses cross sectional, statistical analysis, comparison of group categorical variables carried out by the Chi-square test S : The population of this study is 72 children, aged 7 to 12 years V : Motor skills and oral hygiene I :-	as many as 72 autistic children aged 7-15 years who were divided into 2 groups, each group consisted of 36 autistic children who described oral and dental hygiene within 6 months with yoga therapy for traditional tooth brushing training in autistic children. The basic PI in group 1 (1.78%) in the moderate category and the PI in group 2 (1.75%) in the moderate category, the basic GI in group 1 (1.76%) and the GI in group 2 (1.72%), that the mean PI and GI scores began to show a significant difference from the second month PI group 1 (1.60%) and PI group 2 (1.42%), the second month GI group 1 (1.67%) and GI group 2 (1.51%) between the two groups and continued so in the third month PI group 1 (1.55%) and PI in group 2 (1.22%), the third month GI group 1 (1.59%) and GI group 2 (1.36%) and sixth month PI group 1 (1.35%) and PI group 2 (0,

entered the inclusion criteria. There were 15 journals not included in the inclusion criteria were excluded.

III. RESULT.

This is a summary of the results of a literature review on the maintenance of oral health in terms of dental and oral

hygiene in children with autism of the 8 journal articles that have been assessed as feasible, they can then be classified into dental and oral health maintenance in terms of dental and oral hygiene. Some of the respondents came from groups of children with special needs or people with autism. The average instrument used is a questionnaire. A description of

the systematization of the characteristics that includes the research design, the number of samples, research locations and media discussed can be seen in table 3.

IV. DISCUSSION

Dental and oral health problems in autistic children are increasing with age and the need for care is increasing as well. Dental health problems that are often found in autistic children are dental caries, periodontal disease, oral cavity damage, tooth eruption abnormalities and trauma. Factors that affect dental health problems are: coordination of irregular tongue movements causes food to be often held in the mouth and not directly swallowed, exacerbated by the habit of consuming cariogenic foods so that the risk of caries is higher [28]. Dental and oral hygiene is a condition that shows that a person's mouth is free from impurities such as plaque and calculus. Assessment of the dental and oral hygiene index in children with autism shows that poor oral and dental hygiene dominates and only a few have good hygiene [27]. Factors affecting dental and oral hygiene poor knowledge about dental and oral hygiene care and lack of interest in maintaining dental and oral hygiene [24]. Based on this statement, it can be shown that hygiene in autistic children is poor, if these factors can be controlled or improved, then dental and oral hygiene in autistic children will slightly improve for the better.

Brushing your teeth properly and correctly is one of the simplest and most effective measures to prevent oral disease. Most autistic children only brush their teeth once a day and only some brush their teeth twice a day [26]. Children with autism brush their teeth in less than one minute from the remaining one to two minutes [30]. The causal factors are caused by the inability of children with autism to brush their teeth properly and correctly, impaired concentration and interaction of children so that it is difficult to receive instructions on how to brush their teeth. Children with autism have difficulty brushing their teeth, difficulties in brushing their teeth include difficulty in placing the toothbrush in the mouth, sensitivity to the taste and texture of the toothpaste or toothbrush used [30]. Some autistic children brush their teeth independently under the supervision of their parents or family members. Factors influencing improper hygiene practices and difficulty in following parental instructions.

As for children with autism, an effective method is needed so that children want to brush their teeth, for example by using an electric toothbrush so that the movement of the brush can be controlled more easily considering the physical and mental limitations that autistic children have [25]. Choosing a toothbrush or paste that autistic children like and always giving rewards to children after brushing their teeth to motivate and make children want to brush their teeth.

Check your teeth at the dental clinic every 6 months, to prevent and treat dental health problems experienced by autistic children. Parents must provide information if the autistic child is sensitive to certain things (light, sound, vibration, the taste of toothpaste, and so on). Visits to the dental clinic are carried out when the child is relaxed and

should be done in the morning and parents bring the child's favorite toy to accompany him in the treatment process. Make regular visits so that children get used to having their teeth checked at the dental clinic [27].

The behavior of maintaining dental and oral health in autistic children depends on their parents or caregivers when they are at home, while at school the behavior of maintaining oral health is assisted by accompanying teachers [24]. The behavior of maintaining dental and oral health is by brushing your teeth properly and correctly because brushing your teeth properly and correctly is important in reducing the occurrence of dental and oral diseases such as caries and periodontal tissue. This behavior is largely influenced by the environment through experiences gained from the environment, both family, school and community [27].

Children with autism have a habit of eating sweet, salty and spicy foods. Sugary foods can damage teeth if eaten in excess. There are several types of foods that cause allergic reactions in children with autism such as sugar, cow's milk, wheat, chocolate, nuts and fish in addition to gluten (a protein in flour and wheat) and casein (a protein in milk). These foods need to be avoided because they can harm the nervous tissue [28]. Foods that are good for the dental health of autistic children are vegetables and fruits. Children with autism should consume it because it is good for their dental health and prevents tooth decay.

V. CONCLUSION

The results showed that the oral health assessment of children with autistic spectrum disorder was poor. There are still many autistic children who have caries and periodontal disease. It shows how difficult it is for autistic children and their parents to maintain healthy teeth and mouths. Factors that influence, among others, impaired concentration and interaction in children with autism is the lack of understanding of parents about maintaining dental and oral health. The limitation of this study is that it only uses a few articles from 2016 to 2021. Suggestions for further research are to add the article's information with the same theme and add the publication year.

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