

Gingival Health and Oral Hygiene Measures among Junior High School Children during the Covid-19 Pandemic: A Systematic Review

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ABSTRACT

Background: Patients undergoing dental treatment when the lockdown was the most affected due to discontinued treatment and persistent dental problems. Those who ignore oral health problems should either use home remedies or continue with the previously prescribed treatment. Patients experiencing dental problems during this partial lockdown should adopt a new dental consultation method. Including children, who are patients who are considered vulnerable to being invaded by Covid-19, so that children's health problems are of particular concern while at home. **Aim:** This is to determine the condition of gingival health and oral hygiene measures among junior high school children during the Covid-19 pandemic. **Methods:** Data collection was carried out by searching the literature on article search sites, namely Google search and Pubmed published from 2020, the search was carried out in January 2021. The search for data was carried out systematically using the keywords *Gingival health, Oral hygiene measures, Junior high school children, Covid-Pandemic 19*. **Result:** After eliminating duplicate articles, the titles and abstracts of each article were analyzed across 78 articles resulting in an exclusion of 50 articles. The full-text articles in the remaining 28 articles were re-analyzed and excluded 28 articles, resulting in 10 articles which were then entered into the analysis. **Conclusion:** The Covid-19 pandemic is affecting gingival health and oral hygiene practices in children, thus having a significant impact on the number of junior high school children who need dental care. **Keywords:** *Gingival health, Oral hygiene measures, Junior high school children, Covid-19 pandemic*

INTRODUCTION

The World Health Organization (WHO) announced that Coronavirus Disease 2019 (Covid-19) will be a pandemic on March 11th, 2020. This disease was first reported in December 2019 at the WHO China Office as pneumonia of unknown cause. In January 2020, a novel coronavirus (SARS-CoV-2) was identified and its genome was discovered.^{1,2}

Various aspects regarding Covid-19 are related to dental practice, in addition to infection control, including prevention and treatment. There are also a number of clinical manifestations that affect the orofacial region and which the dentist should be aware.^{3,4} This review examines the medical-dental aspects of Covid-19 infection. Dental health workers are directed to update them on recommended guidelines for the provision of dental health services during this critical period and to explain

important aspects of Covid-19 infection that are relevant to the orofacial region and oral health care.^{5,6}

Among all health care services, oral health and dental care were the most influential during the declared lockdown in response to the SARS CoV-2 pandemic.⁷ Dental practice is classified as a high-risk mode of disease transmission and cross- infection because it involves close contact of the patient during naso-oropharyngeal examination. The World Health Organization (WHO) in its guidelines on August 3rd 2020 recommends prioritizing dental care primarily and postponing dental procedures until there is a sufficient reduction in the number of Covid-19 transmission.⁸

Patients undergoing dental treatment when the lockdown was the most affected due to discontinued treatment and persistent dental problems. Those who ignore oral health problems should either use home remedies or continue with the previously prescribed treatment. Patients experiencing dental problems during this partial lockdown should adopt a newer dental consultation method. This includes children, who are patients who are considered vulnerable to being invaded by Covid-19, so that children's health problems are of particular concern while at home. Of course, the Covid-19 pandemic limits direct interactions during intra-oral examinations in pediatric patients, resulting in the emergence of periodontal tissue health problems (including gingiva) and monitoring of dental practice practices which have become limitations for dentists during the Covid-19 pandemic.^{9,10} After searching various literature, there has never been a publication of a systematic review of gingival health and oral hygiene practices among junior high school children during the Covid-19 pandemic. Based on the background description, the author is interested in compiling a systematic review that can serve as an additional reference for all readers.

METHODS

Data Source

Data collection was carried out by searching the literature on article search sites, namely Google search and Pubmed published from 2020, this search was carried out in January 2021. The search for data was carried out systematically using the keywords *Gingival health, Oral hygiene measures, Junior high school children, Covid-19 Pandemic*.

Research Criteria

A. Inclusion criteria

1. Articles published from 2020

2. Articles in English
 3. Scientific articles that have been published and are available online
 4. Articles that examine gingival health and oral hygiene practices among junior high school children during the Covid-19 pandemic
- B. Exclusion criteria
1. Articles included in systematic reviews, literature reviews, and case reports.
 2. Articles that cannot be accessed for free

Data Collection

The data that will be used in this research are secondary data. The data is obtained from articles that are searched for in the article database which will then be reviewed according to the research criteria set by the researcher. The literature research was carried out on an online database, namely Pubmed using the keywords gingival health, oral hygiene measures, school children, the Covid-19 pandemic found 78 articles.

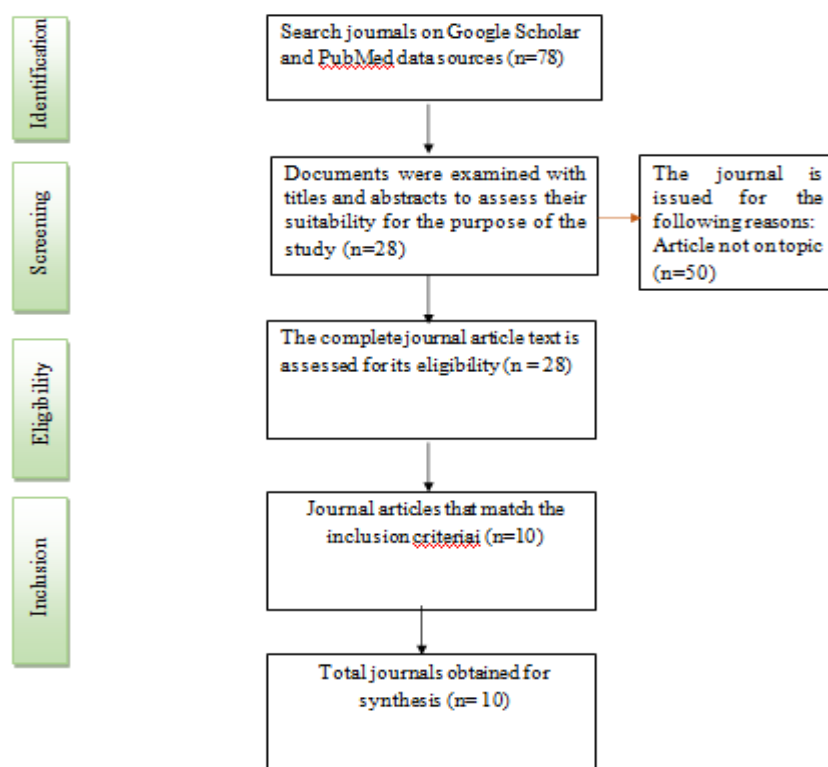


Figure 1. The flow chart of the journal search to be synthesized

RESULT

After eliminating duplicate articles, the titles and abstracts of each article were analyzed across 78 articles resulting in an exclusion of 50 articles. The full-text articles in the remaining 28 articles were re-analyzed and excluded 28 articles, resulting in 10 articles which were then entered into the analysis.

Table 1. Gingival Health and Oral Hygiene Measures among Junior High School Children during the Covid-19 Pandemic

No.	Author	Year	Title	Method	Conclusion
1.	Giovana Bernardes Credie, Amanda A. Coelho, Karla Mayra Rezende ¹¹	2020	Coronavirus (Covid-19) in Children: History and Pediatric Oral Health	A bibliographical research was carried out in the PUBMED database, with the keywords COVID-19 and dental practice, until April 5 of 2020.	Everyone who has had close contact with an infected individual is susceptible to COVID-19. Up-to-date oral health helps in the general health of the children prevent dental care during the pandemic, minimizing the risk of contamination. Healthcare guidance is being updated with frequency, as to how best to proceed in a care setting.
2.	Saad Masood Al-Qahtani, Pervez Abdul	2020	Knowledge and Practice of	Information about oral health was collected	A large number (62.7%) of the school children

	Razak, Siraj DAA Khan ¹²		Preventive Measures for Oral Health Care among Male Intermediate Schoolchildren in Abha, Saudi Arabia	through a questionnaire containing closed-ended questions, which was distributed to children of six randomly selected intermediate schools.	stated that rinsing with water after each meal is the best way to keep their gums healthy. For boys in intermediate schools, properly designed oral health educational programs should be implemented to improve their knowledge and behavior toward oral health.
3.	Gitumoni Konwar, Anamita Borah, Angeline ¹³	2020	A descriptive study to assess the knowledge of oral hygiene among middle school students in selected school of Ranchi, Jharkhand	The sample in this study is the selected students of middle school of standard VI – VIII.	The findings of the study reveal that majority of students 53% (n=100) had an average level of knowledge regarding oral hygiene; it indicates that middle school students have moderate level of

					<p>knowledge regarding oral hygiene. The finding reveals that there is significant association, except “Resident” between age, gender, religion, family size, socioeconomic status. After the study the researcher concluded that majority of students were having average knowledge on oral hygiene and there was no significant association found between the Sociodemographic variables.</p>
4.	Deepa Austin, Hosadurga L Jaya Kumar,	2020	Cross-sectional Study on White	Relatively higher DMFS-dmfs scores, the	It is important to be cognizant of the initiation of

	Krishnaswamy M Chandra, Vanishree Kemparaj, Priyanka Prahladka ¹⁴		Spot Lesions and its Association with Dental Caries Experience among School Children	number of WSLs, GBI, and OHI were recorded among the cases.	caries in children through the initial stages so that efforts can be pooled in towards prevention rather than extensive curativemeasures.
5.	Saeed Bashirian, Shabnam Seyedzadeh- Sabounchi, Samane Shirahmadi, Ali- Reza Soltanian, Akram Karimi- shahanjarini, Farshid Vahdatinia ¹⁵	2020	Socio- demographic determinants as predictors of oral hygiene status and gingivitis in schoolchildren during Covid- 19.	Research was carried out in the Google database, with the keywords COVID- 19 and dental practice, until June 10 th of 2020.	In general, the periodontal health status is poorer in students attending suburban schools compared to those in urban schools in Hamadan. Since there are significant associations between gender, school districts and mother's occupation with oral hygiene index among schoolchildren in primary schools, considering them in schools' oral

					health program design might be useful.
6.	Shradha Singh, Apoorv Rana, Vanshika Jain, Deborah Sybil, Himani Khatter ¹⁶	2020	Effect of COVID-19 Lockdown on Dental Care of Patients: A Survey Analysis	Google forms platform was utilized to create an objective pattern, validated questionnaire and disseminated using various online communication means among 600 patients who had previously reported to the out-patient department. The questionnaire consisted of multiple choice questions enquiring about dental care during lockdown period and awareness and willingness towards	Age and gender are not significant barriers to acceptance of teledentistry and can be used to facilitate continued dental care. Use of existing mobile dental applications for basic oral hygiene maintenance.

				teledentistry tools. Collected responses were descriptively analyzed and correlation established using chi-square test.	
7.	Paloni B. Koticha, Debapriya Pradhan, Farhin Katge, Vamsi Krishna, Parin Bhanushali, Devendra Patil ¹⁷	2020	COVID-19 in Children: Its Impact on Oral Health and Paediatric Dentistry	Relevant and swiftly evolving information regarding the SARS-CoV-2 and COVID-19 pandemic and any dental insinuations was obtained from electronic databases such as PubMed, PubMed Central, Medline, Scopus, and Google Scholar using the following search terms.	COVID-19 seems to affect children less severely as compared to adults. However, they remain vulnerable to infection and pose a substantial transmission risk.
8.	Lina Obeidat, Nader	2020	Dental Treatments for	Data such as number of	The COVID-19 pandemic had a

	Masarwa, Amjad AlWarawreh, Waddah El-Naji ¹⁸		Children During the COVID-19 Pandemic in Three Hospitals in Jordan: Retrospective Study	patients, patients' age and gender, and performed dental treatments were collected retrospectively from the hospital records and were analyzed.	significant effect on the number of children seeking dental treatments. It also affected the types of treatments performed.
9.	Ricardo Campagnaro, Giulia de Oliveira Collet, Mariana Podadeiro de Andrade, João Pedro da Silva Lopes Salles, Marina de Lourdes Calvo Fracasso, Debora Lopes Salles Scheffel, Karina Maria Salvatore Freitas,	2020	COVID-19 pandemic and pediatric dentistry: Fear, eating habits and parent's oral health perceptions	Questionnaire containing 19 questions was remotely applied to 1003 parents of children. The questions addressed topics regarding changes in daily routine, dietary habits, fear level, oral health, and variation of income during the pandemic. Data analysis included the	Most families have experienced changes in daily routine and eating habits during the pandemic. Parents fear COVID-19 and it impacts their behavior regarding seeking dental care for their children.

	Gabriela Cristina Santin ¹⁹			description of the relative and absolute frequencies of the variables. Association tests were performed using Fisher's exact and Kruskal-Wallis tests.	
10.	Rikko Hudyono, Taufan Bramantoro, Benni Benyamin, Irfan Dwiandhono, Pratiwi Soesilawati, Aloysius Pantjanugraha Hudyono, Wahyuning Ratih Irmalia, Nor Azlida Mohd Nor ²⁰	2020	During and post COVID-19 pandemic: prevention of cross infection at dental practices in children	Research was carried out in the Google scholar, pubmeddatabase, with the keywords COVID-19 and children, dental survey.	Currently there is no active treatment and diagnosis is still a challenge. We suggest to combine the protocol listed above to minimize to self and cross-contamination 'new normal' practice.

DISCUSSION

Focusing on the child population as a means of preventing the spread of disease is essential. Children were less likely to report symptoms of Covid-19 and were more likely to have clinical or asymptomatic features. However, asymptomatic individuals can still actively transmit the virus, transmit the disease so that it is related to Covid-19 transmission in children, there are still many gaps in our understanding, including the transmission route, susceptibility, patient clinical course, disease pathogenesis, pharmacological therapy and prognosis.²¹⁻²⁵ People who have Covid-19 symptoms are not encouraged to leave the house, but the problem is that asymptomatic people, as children, also have the opportunity to infect other people. If people are less mobile and interact less with each other, the virus has less chance of spreading.²⁶⁻³⁰

According to research by Di Renzo et al. by 2020, new routines, parents working at home, remote classes for children and economic instability have contributed to changing eating habits.³¹ About 77% of respondents said they had a high carbohydrate intake. Based on research according to Pietrobelli et al. in 2020 linking periods of social distancing with summer holidays, when children's carbohydrate intake increases rapidly and will have a direct impact on the health of the periodontal tissues and the condition of the child's teeth.³² Families with drastic or total income losses reported eating less or choosing cheaper food during the pandemic.³³⁻³⁵

According to research by Spinelli, Lionetti, Pastore, & Fasolo in 2020, at the same time, there are psychological effects of the pandemic in children related to changes in food intake patterns and oral hygiene routines.³⁶ Although this study found no association between parental perception of carious lesions, dietary intake, and oral hygiene, it should be considered that the questionnaire was completed in the early stages of the pandemic in Brazil.³⁷⁻⁴⁰ The effects of eating habits and decreased oral hygiene care are very influential. Compared to their Saudi counterparts, non-Saudi school children showed clear differences in oral health knowledge and practice of precautions on most of the items answered. All these differences were statistically significant due to variations in their eating and brushing habits as well as their culture and their parents' educational level. They have optimal oral health knowledge and

practice good preventive measures that enable them to have better oral health. It should also be noted that in Saudi Arabia, health care, including dentistry, is provided free of charge to Saudi nationals.⁴¹⁻⁴⁵

Additionally, the obligation to answer all questions and not have the "don't know" answer option can lead to unreliable results in the same way. This study could be scaled up in the near future by addressing the reasons mentioned above, and carrying out an oral examination which can be important for an objective assessment of the relationship between oral health knowledge and practice (Table 2).⁴⁶

Table 2. Multiple logistic regression analysis of cases and controls by other variables

Variables	Controls		Cases		Odds ratio (OR)	SE	95% CI for OR		p value
	n	%	n	%					
Type of school									
Government	90	38.14	52	30.41					
Private	146	61.86	119	69.59	2.6	0.84	1.38	4.91	0.0030*
SES									
Low	217	91.95	156	91.23					
High	19	8.05	15	8.77	0.7	0.37	0.25	1.99	0.505
DMFS-dmfs									
<20	232	98.31	150	87.72					
≥20	233	98.73	151	88.3	2.47	2.02	0.5	12.3	0.268
No. of WSLs**									
Absent	171	72.46	18	10.53					
≥1	65	27.54	153	89.47	18.78	6.29	9.74	36.21	0.0001*
DMFS-dmfs + WSL total									
<20	236	100	161	94.15					
≥20	0	0	10	5.85	30.75	12.25	1.8	525.28	0.0001*
Eruption degree									
Partial	21	8.9	32	15.79					
Full	215	91.1	139	84.21	0.59	0.26	0.25	1.39	0.228
GBI***									
≤0.5	217	91.95	77	45.03					
>0.5	19	8.05	94	54.97	8.46	3.18	4.05	17.66	0.0001*
OHI****									
0-1.2	225	95.34	113	66.08					
1.3-3.0	11	4.66	58	33.92	2.83	1.35	1.11	7.23	0.0300*

*p < 0.05; **WSL, white spot lesions; ***GBI, gingival bleeding index; ****OHI, oral hygiene index

Sources: (Austin D, Kumar HLJ, Chandra KM, Kemparaj V, Prahladka P. Cross- sectional Study on White Spot Lesions and its Association with Dental Caries Experience among School Children. International Journal of Clinical Pediatric Dentistry. March–April 2020. Volume 13 Issue 2: 107-112.)¹⁴

This study also confirmed that oral hygiene status and GBI can be significant predictors for the development of dental caries. The study conducted by Ferreira et al. detected a positive and highly significant correlation between high plaque index and enamel caries (OR 2.04; CI 1.86–3.47) and dentinal caries (OR 3.18; CI 2.26–4.47). A similar association of poor oral hygiene with a higher risk for developing caries (OR

3.59; CI 2.53-5.06) was reported from the study by Retnakumari et al. in junior high school children.^{14,47,48}

Sources: (Singh S, Rana A, Jain V et.al. Effect of COVID-19 lockdown on dental care of patients: a survey analysis. *International Journal of Research and Review*. 2020; 7(11):1-8)¹⁶

For pediatric patients, nine respondents did not experience dental problems during the lockdown period. Among those requiring dental consultation, dental pain was the most common complaint (18.4%) followed by gingival inflammation (15.8%) (Figure 2). Oral health is a reflection of general health and therefore people's oral health care needs must be adequately addressed even though dental services are partially closed due to the Covid-19 pandemic. With the increasing awareness of oral health among the general public, there is an increasing need for better dental care. It was observed that almost half (48.5%) of the respondents in this study faced one or more dental problems during the lockdown, where only 36.8% of respondents were able to consult professionally.^{49,50,51,52,53,54,55}

CONCLUSION

The Covid-19 pandemic is affecting gingival health and oral hygiene practices in children, thus having a significant impact on the number of junior high school children who need dental care. However, they are still susceptible to infection and pose a significant risk of transmission, so preventive measures can be primarily taken at home in pediatric patients.

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