

Review Article

Significance of the Covid-19 Pandemic on Adult Nutritional Practices, Dental Cleanliness, and Caries Disease

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Abstract: SARS-CoV-2 is the infectious agent that causes coronavirus disease (COVID-19). Over the past two years, the pandemic has drastically altered people's everyday routines, affecting eating habits, oral health, and hygiene. Materials and procedures: The available literature was examined using the PubMed platform as well as MEDLINE and Cochrane Reviews as additional sources. The study comprised observational studies, pragmatic clinical/randomized controlled trials, comparative and clinical trials, and research examining the impact of COVID-19 on dental hygiene, caries incidence, and population food habits. According to the analysis, the COVID-19 pandemic significantly harmed people's eating patterns while having an unclear effect on their dental health practices. The study's findings demonstrated that patients' visits were restricted to those that were absolutely required due to concern over spreading SARS-CoV-2. The analysis of the literature demonstrates that the COVID-19 pandemic may contribute to a rise in oral diseases by altering various facets of daily living, such as eating habits, oral cleanliness, and frequency of dental appointments. Owing to the disparities in knowledge outcomes, additional study and observations in this area are required.

Keywords: dental disease, nutritional practices, dental hygiene, dental cleanliness, COVID-19 pandemic

1. INTRODUCTION

The SARS-CoV-2 virus is the source of coronavirus disease (COVID-19), an infectious illness that mostly affects the respiratory system and can have life-threatening side effects such renal failure. When an infected person coughs, sneezes, speaks, or breathes, the virus can be transferred from their mouth or nose into tiny liquid particles (WHO 2020) [1]. In March 2020, the World Health Organization proclaimed it to be a pandemic. Since then, keeping hands clean, wearing masks, and keeping a physical distance are crucial for preventing COVID-19. A vital aspect of general health and wellbeing is oral health. Nearly 3.5 billion individuals are thought to be affected by oral disorders, and the most frequent health problem, according to the Global Burden of Disease 2019 report, is untreated dental caries in permanent teeth, which affects two billion people overall (GBD 2019). [2]. According to Selwitz et al. (2007) [3], dental caries is the localized breakdown of dental hard tissues caused by acidic byproducts of bacterial fermentation of carbohydrates. One of the greatest strategies to avoid dental caries and periodontal disease is to remove dental plaque every day by brushing, flossing, and rinsing your teeth. This is because dental caries cannot advance without the bacteria found in dental plaques. Increased dental plaque

collection fuels the growth of periodontal and caries disorders, which in turn fuel inflammation in both soft and hard tissues, exacerbate alveolar bone loss, and ultimately result in early tooth loss [4,5]. During routine check-ups, the dentist may instruct patients on proper brushing and flossing techniques [6]. The world's population has had to drastically alter their daily routines over the last two years due to several lockdowns. As a result, many have begun working from home and have reduced their social interactions. Physical exercise and social interactions were hence severely restricted. COVID-19 Social isolation and pandemic were closely related. Wearing masks every day and experiencing stress, anxiety, and loneliness were significant issues that affected the health of the world's people. These are linked to a number of high-risk behaviors for health, including eating poorly, drinking excessively, and smoking more frequently [7]. A rise in the prevalence of caries illnesses could potentially be the consequence of dietary changes, such as an increase in the use of sweets and poorer oral hygiene. The actual figure that contrasts the years 2019 and 2022 cannot be located. The purpose of this review of the research is to demonstrate how the COVID-19 pandemic and the ensuing lockdown restrictions affected adult food practices, caries illnesses, and oral hygiene.

2. MATERIALS AND METHODS

Finding pertinent publications required a methodical computerized search utilizing PubMed in MEDLINE and Cochrane Reviews. A search of the database was conducted between April 1 and April 3, 2022. Every publication from 2020 to 2022 was taken into account. The standardized "MeSH" (Medical Subject Heading) system could be used to identify keywords and their variations. The terms COVID-19, SARS-CoV-2, and pandemic were used, along with oral hygiene, dental care, dental caries, eating habits, and dentistry. As part of the expanded investigation, Lages et al.'s references were combed through; as a result of the snowball effect, no more papers that fit our inclusion criteria could be found. The inclusion criteria consisted of observational studies on the adult human population that addressed the COVID-19 issue and were published in English between 2020 and 2022. The systematic review addressed factors that have an impact on the population's eating habits, dental cleanliness, and shifts in the prevalence of caries. Dentistry and other review subjects were not addressed and were eliminated, along with one-case reports and other systematic reviews, in research where children were engaged and COVID-19 was not listed as an affecting factor.

In order to conduct a systematic review of the studies, the inclusion and exclusion criteria, study population characteristics, dietary and oral hygiene changes that affected the prevalence of caries diseases, the methods used to measure the parameters under examination, the primary findings for each study, and the study's limitations were all reviewed. The quality of the studies is affected by a number of factors, such as potential confounders and restrictions. Every study that was part of the systematic review was cross-sectional in nature. Results could be skewed by a relative bias, so the danger of it was estimated using the Joanna Briggs Institute (JBI) Critical Appraisal Checklist for Analytical Cross-Sectional Study. For every study, a maximum score of eight was possible. None of the studies achieved the maximum score due to the self-reported nature of the data; instead, each respondent's subjective observation was used to measure the major variables, which has a significant risk of bias and confounding. Only two studies have directly identified potential confounders, despite the fact that the majority have discussed the study's limitations: Paltrinieri and Maestre scored seven, which was the highest.

3. RESULTS AND DISCUSSION

1370 papers were found using the systematic MEDLINE (PubMed) search; 113 publications were found using the Cochrane Library search. 48 papers satisfied the inclusion requirements after their abstracts were reviewed. Eleven papers were eliminated after 48 full texts were reviewed, for the following reasons: A total of eleven studies were included in this systematic review, but seven of the study results were irrelevant because the important review subjects were not mentioned, two of the investigations engaged children, and the focus of the two studies was weight management—which was also one of the exclusion criteria. Table 1 summarizes the key methodological elements of the included studies as well as the characteristics of the study population. Every article used a cross-sectional design; Souza [15] and Cicero [16] defined their studies, respectively, as observational studies and sub-studies of longitudinal population studies. With the exception of Paszynska [11], whose data was gathered in 2021, all of the data was gathered in 2020. With the exception of Paszynska and Cicero, where the surveys were completed over the phone and at the immunization site, internet users completed the online forms, all of which were self-reported. [11,16].

Table 01: Methodological characteristics of study

| Author, Year, Country | Design | Duration of Study | Population | Age of Study Group, Sex | Number of Participants |
|---|--|------------------------------------|---|--|------------------------|
| Ferrante G. et al., 2020, Italy [13] | Cross-sectional study | 21 April 2020–7 June 2020 | Internet responders | 14–70+, female and male | 7847 |
| Skotnicka M. et al., 2021, Poland [14] | Cross-sectional study | 1 October 2020–30 October 2020 | Internet responders | >18, Female and male | 1071 |
| Maestre A. et al., 2021, Spain [10] | Cross-sectional study | 1 April 2020–4 May 2020 | Internet responders | >18, Female and male | 1640 |
| Souza TC. et al., 2021, Brazil [15] | Cross-sectional study | from August 2020 to September 2020 | Internet responders | >18, Female and male, excluding pregnant women | 1368 |
| Paltrinieri S. et al., 2021, Italy [9] | Cross-sectional study | 4 May 2020–15 June 2020 | Internet responders | >18, Female and male | 1826 |
| Cicero, A. et al., 2021 Italy [16] | Sub-study of a longitudinal population study | February 2020–April 2020 | Phone Interview Responders | >18, Female and male | 359 |
| Pinzan-Vercellino, C. et al., 2020, Brazil [17] | Cross-sectional study | 10 June 2020–20 June 2020 | Electronic survey (Google Forms) | >18, Female and male, wearing face masks in the last 30 days | 1346 |
| Sari a. et al., 2021, Turkey [18] | Cross-sectional study | 1 August 2020–1 October 2020 | Online survey via email/WhatsApp | >18 and <65, Female and male | 1227 |
| Faria SFS et al., 2021, Brazil [12] | Cross-sectional study | August 2020 | Email questionnaire | Members and staff of Federal University of Minas Geiras | 4647 |
| Paszynska, E. et al., 2021, Poland [11] | Cross-sectional study | March 2021–May 2021 | Self-designed questionnaire conducted at the COVID-19 Vaccination point | >18, Female and male, COVID vaccinated individuals | 2574 |
| Cărămidă M. et al., 2022, Romania [19] | Cross-sectional study | May 2020 | Questionnaire distributed via digital platforms | 18–75, Medical professionals and the general population | 800 |

Only one of the examined studies [10] did not mention increases in alcohol intake or smoking frequency during the COVID-19 Pandemic, while six [9–16] did demonstrate changes in people's food habits. Each and every study found a substantial correlation between the preference for sweet snacks and eating frequency, which in this instance indicates a decline in eating behaviors. It is impossible to evaluate the results of the Paltrinieri study objectively, however one-third of the participants said they paid more attention to eating healthily [9]. One study [15] only looked at variations in the frequency of smoking and alcohol use. Nearly all of the studies revealed a considerable rise in both alcohol use and smoking frequency throughout the quarantine period. According to Paltrinieri [9], shifts in alcohol use happened in both directions equally. Souza's research [15] made clear that a rise in frequency does not always

correspond with an increase in dosage. Respondents in this study reported consuming alcohol more frequently but at a lower dosage. Quarantine did not significantly change smoking patterns in the Cicero study [16]. According to Caramida [19], there are 7% more non-smokers than before. Nearly 82% of respondents in Paszynska's study [11] reported drinking alcohol while under quarantine. There was not a single study that looked into how COVID-19 affected the shift in caries prevalence. Oral hygiene modifications were only reported in four studies [17–19], and two of those studies additionally indicated dietary changes [18, 19]. The pandemic and respondents' fear of contracting the virus were identified as the main causes of the respondents' increased dread of seeing an oral health expert. Ten percent of responders needed emergency dental care because of tooth pain (Pinzan-Vercelino [17]). An increase in awareness of unpleasant breath was noted in Pinzan-Vercelino and Faria's research [12, 17]. A total of 15% of people began to think that wearing a mask was the cause of their foul breath, which led to a higher frequency of brushing among this group. The opposite impact occurred because a sizable portion of respondents (6.8%) who wore masks also showed less concern about their smile and oral cleanliness. According to a Faria study, 24% of people started brushing their teeth more frequently [12]. Conversely, Caramida found that while toothbrushing frequency did not significantly vary, the amount of time spent brushing increased significantly (5.2%) among the group of medical professionals [19]. In a Sari research, respondents brushed their teeth 32.49% of the time, and 41.1% more frequently [18]. In general, COVID-19 has a significant effect on people's lives. People all throughout the world had to get used to living in lockdown for several months in order to stop the coronavirus from spreading. Daily routines have to substantially alter during this time. This systematic study looked into how COVID-19 affected adults' eating and dental hygiene practices. It was not possible to find studies evaluating how the global pandemic affected caries parameters or the prevalence of caries diseases. Given that caries is the most common dental illness and is associated with poor nutritional and oral hygiene practices, further research is required to determine how COVID-19 affects its prevalence.

There is a strong link between COVID-19 and people's eating habits getting worse. The majority of the included research showed that the eating habits of the populations were getting worse. In addition to preferring sweets over unhealthy food, respondents also reported smoking and drinking alcohol more frequently. For patients who neglect their oral hygiene, these goods are most likely going to act as a trigger for caries disease. However, poorer eating practices may not be the main factor contributing to caries development. This comprehensive study may demonstrate that patients with halitosis were more conscious of their foul breath due to their daily mask wear, which increased the frequency of tooth cleaning. Conversely, respondents lowered the frequency of their brushing and showed less concern about the appearance of their teeth. Therefore, one factor that contributed to both the rise in caries risk in one set of respondents and the decrease in caries risk in the other is mask use. According to the Caramida study, there is a high correlation between respondents' cultural customs and education level and their awareness of oral hygiene [19]. In certain social groupings, awareness is lacking. Positive behavioral changes could be achieved by educating this demographic. It is hoped that dental plaque reduction, such as with 0.12%-chlorhexidine, may significantly lower the incidence of atypical pneumonia and/or other infections involving distant organs. This finding lends credence to the idea that healthy individuals could stop the virus from spreading by practicing good oral hygiene.

Regular dental checkups have also suffered as a result of the lockdown. Patients at the dental clinic postponed treatment out of fear of contracting an infection. According to Sari, 75.6% of respondents believed that dental clinics were at risk of COVID contamination, and 50.4% of patients hesitant to visit

the dentist [18]. It indicates that a sizable portion of respondents postponed their dental appointment due to a potential danger of contamination, which could have accelerated the patients' caries disease. There was only one study that we could find that also looked at the connection between social isolation and oral health. Although the association of COVID-19 with oral symptoms is well documented, its exact nature remains unclear, according to Paradowska's research [21]. 25.65% of patients, according to Nuno-Gonzalez A. et al.'s study, appear to have oral cavity findings [22]. Blisters, ulcerations, desquamative gingivitis, and tongue ulcers are the typical symptoms. These symptoms make patients feel pained and uncomfortable, which may be the reason they should see experts more frequently. However, in the instance of COVID, this was not feasible because patients who had an acute infection had to stay at home. According to Berberoglu B. et al.'s study, the pandemic may be to blame for the rise in dental anxiety among women [24]. But it might have an impact on both sexes. The most common cause for people to seek emergency care was toothache. According to our systematic research, waiting for a dentist visit was also caused by fear of contracting an infection. Patients in excruciating discomfort were the first to reach out. Unlike Lages et al., this systematic evaluation may find a link between the state of oral health and the lockdown imposed by the epidemic [25]. This study, like the Lages et al. comprehensive review, was unable to locate any information that specifically described changes in caries prevalence and caries parameters during the pandemic [25]. Both assessments highlight the need for additional study in this area. Additionally, they both stress the significance of maintaining good oral health through nutrition and oral cleanliness.

4. CONCLUSION

The MeSH search engine worked incredibly well to find publications that were pertinent to this review. However, electronic databases do not contain studies that have not yet been published. Database containing expressed behaviors of respondents that might be over- or under-estimated, partially forgotten, and thus not entirely accurate. There may be some restrictions on this systematic review. Every study that was part of this systematic review was cross-sectional in nature and had a significant bias risk. The majority of the data were gathered in 2020, at the beginning of the pandemic, therefore the living conditions may differ from those during the pandemic's most recent phase in 2022.

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