

Parental attitude toward children's oral health during COVID-19 pandemic: a cross-sectional study in Italy



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Abstract

Aim During the COVID-19 pandemic, restrictive rules were imposed around the world to limit the spread of the virus. The present study aims to investigate how the pandemic and the consequent restrictions have affected the lives and oral health of Italian families with children aged 0–14 years.

Materials and methods Through a questionnaire distributed online from December 2020 to March 2021 the following aspects were investigated: family income during the pandemic, fear of the pandemic, dietary habits, perceived risk of infection in a dental practice and perceived children oral health status during the pandemic.

Results A total of 802 questionnaires were collected, 58% of the respondents were from the North of Italy, 19% from the Center and 23% from the South. The results showed that 78% of respondents did not experience a family income reduction, and the average level of fear was 6.6 on a scale from 0 to 10, with the highest value (7.1) in Southern Italy. There were no significant changes in food consumption for the 60% of the sample and more than 80% of the interviewees stated that they had not changed their intake of sugary foods, drinks, carbohydrates, frozen foods, fruit and vegetables. Regarding daily life, 25% of the total sample avoided "attending health offices/clinics", 54% "going outdoors for leisure", and 62% "visiting relatives/friends". Only 8% of respondents believed that the dental practice presented a greater risk of infection than other closed settings, and accordingly 8% would not take their children to a dental appointment. Fifty-two percent of the total sample would take their children to a dental appointment "only for urgent treatments" and 40% of the sample for "any procedure". However, regarding the experience of dental disease during the pandemic, more than 90% of the respondents reported that their children did not experience dental trauma, cavities or dental pain.

Conclusion The pandemic has not drastically changed the socio-economic conditions, the dietary habits and the oral health condition of most Italian children. Nevertheless, the pandemic seems to have highlighted significant macro-regional differences regarding the satisfaction with the response of the regional health services to the pandemic. The continuation of the pandemic and the possible socio-economic effects could favour new changes in lifestyles, oral health and discrepancies regarding health care access, which deserve to be the subject of further investigation.

KEYWORDS Children's oral health, dietary habits, COVID-19, Dental visits, Lifestyle.

Introduction

The first case of Coronavirus disease was reported during December 2019 to the World Health Organization China Office as a form of pneumonia of unknown aetiology. In January 2020, a novel coronavirus (SARS-Cov-2) was identified, and its genome was sequenced. This respiratory RNA virus turned out to be highly infectious and responsible for airway diseases ranging from asymptomatic to very severe symptoms [Paglia, 2020]. The COVID-19 pandemic was officially declared on March 2020 [WHO, 2020]. Italy was the first European country affected by the pandemic and initially the North was the most affected area, where restrictive measures were first implemented to contain the spread of the infection. To slow the contagion curve so as not to overload the National Health System, restrictive measures to contain the pandemic were then extended to the whole nation and adopted from March 2020 until May 2020. During the summer, the restrictive measures were reduced but this led to an increase in COVID-19 cases during autumn. During winter 2020/2021 and early spring, the restrictive measures were increased again to contain the spread of the infection. These measures included mobility restrictions, public and private events were forbidden as well as all educational activities and the closure of non-essential commercial activities. These indications were based on SARS-Cov-2's spreading mechanism through direct, indirect, or close contact with respiratory secretions such as saliva, droplets and aerosols from infected people [WHO,2020].

Based on the nature of dental procedures and the proximity of the dental team to patients, dental services were considered at high risk of infection. The WHO advised to delay routine check-ups, dental hygiene sessions, preventive care and aesthetic treatments. The management of urgent oral health care needs, such as acute odontogenic infections, significant or prolonged bleeding, severe pain and dental trauma was recommended [WHO,2020]. During the first pandemic outbreak in Italy, routine dental practices were differed, and only severe dental emergencies were attended [Ferrazzano et al., 2020]. Despite the high risk of virus transmission to dental staff, an observational study conducted in China [Meng et al.,2020] and one conducted in Germany [Walter et al.,2021] showed a low number of infections among dentists, certainly linked to the effectiveness of the preventive measures adopted, including protective masks and facial shields.

The Covid-19 pandemic has undoubtedly changed the people's daily routine and social interactions. Being made redundant, social distancing and fear of contagion have

reduced families' well-being [Il Sole 24 Ore, 2020; Di Renzo et al., 2020]. Increased levels of stress and boredom favoured by these changes together with the obligation to spend much more time at home have favoured the consumption of foods with a high sugar content and low nutritional value [Di Renzo et al., 2020]. An excess in sugar consumption may affect the general health and increase the risk of developing caries, especially in the paediatric population [Paglia, 2019; Giugliano et al., 2018]. Guidelines in paediatric dentistry have always emphasised the importance of regular dental check-ups and a healthy diet, low in added sugars [Ferro et al., 2014; Paglia, 2018; Paglia et al., 2016; Giannattasio et al., 2015; Campus et al., 2007]. During the Covid-19 pandemic, especially during the lockdown in which medical and dental services were reduced, preventive measures for paediatric oral health suffered a decrease. A survey conducted in Brazil using a questionnaire filled in by the parents of 0–12-year-olds showed a significant association between the level of fear of the pandemic with a decreased access to dental care [Campagnaro et al., 2020]. In addition, anxiety and fear were accompanied by a considerable increase in economic uncertainty due to job insecurity, which spread during the pandemic period. This is the reason why the pandemic exacerbated socio-economic inequalities leading to oral health inequalities in Europe [Watt, 2020].

The aim of the present survey was to evaluate the impact of the COVID-19 pandemic on the daily activities, the dietary habits and the access to dental care of Italian families.

Materials and methods

This cross-sectional study involving parents/legal guardians of Italian children aged 0–14 years was approved by the Bioethics Committee of the Bologna University (Prot n. 26978, February 5, 2021). Based on the number of 0–14 years-olds in the Italian population of 2020 (7,727,554) [ISTAT, 2020] the sample size with a 95% confidence interval and an estimated error margin of 5% was computed in 384 subjects; with an estimated error margin of 4% was computed in 600 subjects.

The questionnaire adopted in this study was developed and validated in a previous cross-sectional study conducted in Brazil [Campagnaro et al., 2020]. The English version was translated into Italian using the forward-backward technique following the approach outlined in the literature [Behling O., 2000; Tsang et al., 2017]. The aim was to design an Italian questionnaire as consistent as possible to the original English version in terms of its overall meaning. The initial translation was carried out by two independent Italian mother-tongue investigators fluent in English. Discrepancies between the two translators were discussed and resolved between them. The Italian draft was independently back-translated by two English mother-tongue consultants fluent in Italian (not members of our team and unaware of the objective of the questionnaire) to ensure the accuracy of the translation. Discrepancies between the two translators were discussed and resolved between them. The two English versions (the original and the one produced by backward translation) were found to achieve semantic, idiomatic, experiential, and conceptual equivalence. Only minor adjustments were made to the Italian version. The prefinal version of the translated questionnaire was pilot tested on a sample of 30 respondents. The respondents were verbally asked to elaborate what they thought each item meant to make sure that the translated items retained the same meaning as the original one.

The questionnaire contained mandatory questions regarding: socio-economic and demographic data (geographical area of residence, age, level of education, parental role, number of

cohabitants), fear of the pandemic, family income during the pandemic, dietary habits, perceived children oral health status during pandemic and perceived risk of infection in a dental practice compared to other closed settings. The questionnaire was preceded by a Consent Statement, which clarified the objective of the research, and the participants were informed about the processing of data and the anonymous nature of the form. All the respondents were requested to agree to take part in the survey. The questionnaire was distributed through an online form, using the Google Modules platform and shared on instant messaging applications such as Whatsapp Messenger (WhatsApp Inc., California, United States), e-mail and social networks.

Statistical analyses

The responses, collected in an Excel file (Microsoft Corp., Redmond, USA), were processed using the Statistical Package for the Social Sciences (SPSS for Windows, version 27.0, SPSS Inc, Chicago, IL, USA). Crosstables described the data and chi-square test was used to investigate the significance of the associations (a-level a priori set at 0.05). For the quantitative variables, means and standard deviations were calculated. The total sample was divided in three subgroups according to the geographic area of residence (North, Center, South and Islands). The comparison between the means in the three subgroups was carried out with the one-way ANOVA test after verifying the homogeneity of the variance with the Levene test. To correct the low sample size of some geographical subgroups, the described statistics were corrected by performing the bootstrap technique and calculating the 95% confidence intervals with the Bca (Bias accelerated correction).

Respondents were further stratified according to cumulative incidence (CI) (COVID-19 cases per 100,000 people) of SARS-Covid derived from the national data at the time of the study (ISS).

Fear level was classified as: low (0–4), moderate (5–7), and high (8–10). Multiple correspondence analysis was carried out aiming to describe the associations between daily activities, dietary habits and dentist attendance with the fear of the pandemic, the geographic area of residence and the CI of SARS-Covid-2 reported in the respondents' area of residence.

Results

A total of 802 questionnaires were collected. Descriptive characteristics of the total sample and subgroups were reported in Table 1: 58% of the respondents were from the North of Italy, 19% from the Center and 23% from the South. As for education, significantly fewer respondents from the South attended post-graduate courses and significantly more completed their studies at high school level in comparison with the other two geographic areas ($p=0.04$). The mean age of the respondents was 37.3 ± 6.1 yrs in the North, 35.8 ± 6.3 yrs in the Center and 36.4 ± 5.8 yrs in the South; the family size was 4.0 ± 0.7 members in the North, 3.0 ± 0.6 in the Center and 4.0 ± 0.8 members in the South. The mean number of children was 1.0 ± 1 in the North, 1.0 ± 1 in the Center and 2.0 ± 1 in the South.

Thirty-nine percent of the respondents described the family income during the pandemic as "not impacted", 39% as "slightly reduced", 18% as "drastically reduced", 3% as "increased", and 1% reported a "total loss of income". Significantly more respondents from the South and the Center declared a "drastic reduction" during the pandemic in comparison with the North (respectively 24% and 23% versus 16%, $p=0.01$).

The mean fear of the pandemic was equal to 6.5 ± 2.2 in the total sample of which: 6.1 ± 2.2 in the North, 6.6 ± 1.9 in the Center and 7.1 ± 2.1 in the South (ANOVA: $p=0.001$).

	Total sample N=802	North N=463 n. (%) 95% CI	Center N=153 n. (%) 95% CI	South and Islands N=186 n. (%) 95% CI	p-value*
Respondent					
Mother	743	431 (93) 90.5% - 95.5%	138 (90) 85.1% - 95.2%	174 (93) 89.8% - 96.8%	0.257
Father	41	21 (5) 2.8% - 6.4%	13 (9) 4.5%-12.7%	7 (4) 1.6% -6.5%	
Legal guardian	18	11 (2) 1.1% - 4%	2 (1) 0% -3.4%	5 (3) 0.5% - 5.1%	
Education					
Primary school	65	40 (9) 6.1% - 11.1%	11 (7) 3.5% - 11.5%	14 (7) 3.9% -11.6%	0.041
High School	361	188 (41) 35.9% -44.9%	72 (47) 38.7% -55.3%	101 (54) 46.5% - 62.5%	
Degree	283	173 (37) 32.6% - 42%	51(33) 26% -40.7%	59 (32) 25.5% -38%	
Post-graduate	93	62 (13) 10.3% -16.7%	19(13) 6.7% - 18%	12 (7) 3.3% - 10%	

TABLE 1 Descriptive characteristics of the sample, stratified by geographic area (n=802).

Chi-square test

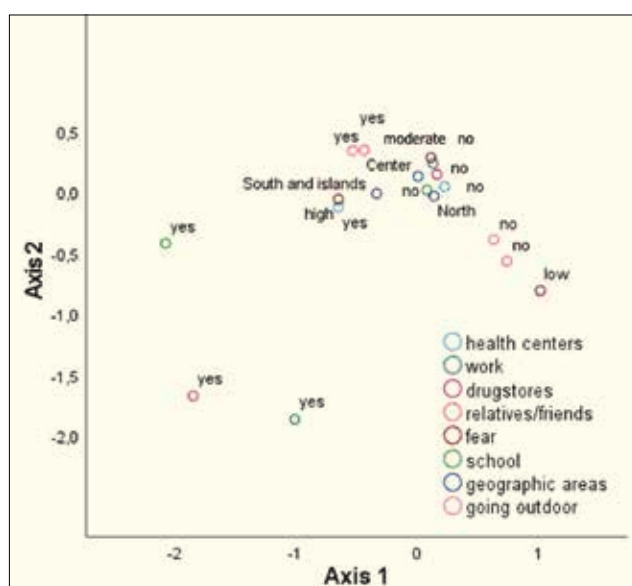


FIG. 1 Influence of geographic area and fear on attending usual activities.

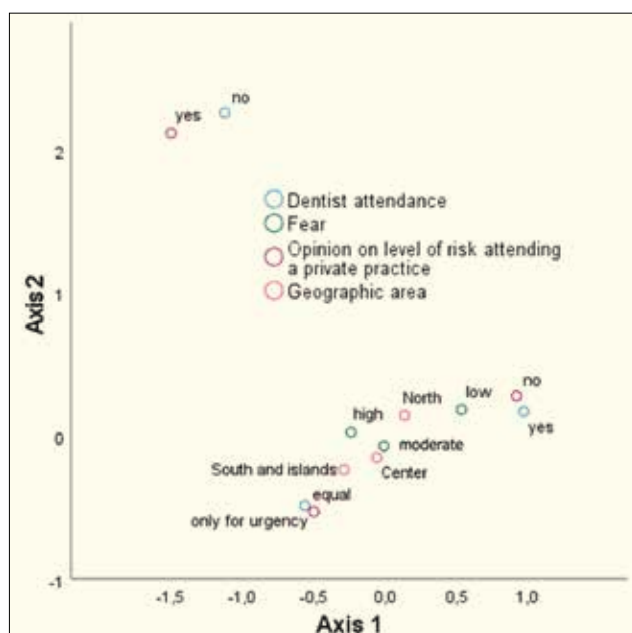


FIG. 2 Influence of geographic area and fear on dentist attendance.

Considering the “activities you used to do and have not done during the pandemic due to fear of getting COVID-19”, 25% of the total sample stopped “attending health offices/clinics”, 54% “going outdoors for leisure”, and 62% “visiting relatives/friends”. The influence of geographic area and fear the pandemic on attending usual activities is shown in Figure 1. The respondents from the South who declared high level of fear consequently reduced all the usual activities and significantly reduced their children’s attendance to health centers (p=0.014; chi-square test) and schools (p=0.003; chi-square test). The respondents from the Center who declared a moderate level of fear reduced, above all, “going outdoors” and “visiting relatives/friends”. The respondents from the North who declared a low level of fear declared a lower limitation in usual activities. Sixty percent of the respondents declared no change in their dietary habits. In particular, 88% did not consume “more snacks and/or frozen food”, nor 84% consume “more processed food with sugar such as soft drinks, sweets and cookies”, and 81% denied eating “more pasta and carbohydrates”. No significant differences were observed between the subgroups (p>0.05; chi-square test).

Regarding the experience of dental disease during the pandemic, more than 90% of the respondents reported that their children did not experience dental trauma, cavities or dental pain. Only 8% of the total sample believed that the dental practice presented a greater risk of infection than other closed settings and accordingly the 8% would not take their children to a dental visit. Fifty-two percent would take their children to a dental appointment “only for urgent treatments” whereas 40% would “for any procedure”. The influence of geographic area and fear of the pandemic on dentist attendance is shown in Figure 2. The Northern respondents, who declared a low level of fear, believed that a dental practice did not present a greater risk of infection than other closed settings and would regularly take their children to dental appointments. Accordingly, Center and South respondents with a moderate/high level of fear would take their children only for urgent treatments (p= 0.0001), believing that the risk of infection was comparable to other closed settings (p=0.0001). Table 2 describes the behaviour towards dentist attendance of the respondents classified according to CI of SARS-Covid in the period of observation. The low/intermediate CI strata grouped the regions of Southern and Central of Italy, where the attitude to attend a dentist only for urgent treatments is major; the high CI stratum grouped the regions of the North of Italy where the attendance of dentist seemed not to be influenced by the pandemic. This association was statistically significant (p=0.0001; chi-square test). As for the perceived risk of infection

CI	Attending dental practice			Perceived risk of dental practice vs other closed settings		
	yes n (%)	urgent treatments n (%)	no n (%)	greater n (%)	equal n (%)	no n (%)
1500-3000	22 (30)	58 (68)	5 (7)	5 (6)	54 (59)	26 (31)
3001-4500	81 (48)	169 (63)	19 (9)	17 (9)	158 (45)	94 (35)
≥ 4501	215 (40)	191 (43)	42 (8)	39 (8)	204 (52)	205 (46)

TABLE 2 Respondents' behavior towards dentist attendance classified according to CI of SARS-Covid in the period of observation.

in a dental practice compared to other closed settings, the high CI (North) stratum considered the dental practice with a similar risk or absent risk in comparison with other closed settings ($p=0.002$; chi-square test). The influence of CI and fear of the pandemic on the dentist attendance and the perceived risk of dental practice compared to other closed settings is shown in Figure 3. When CI is intermediate or low and the fear of the pandemic high or moderate, respondents would take children to the dentist only for urgent treatments; when CI is high and the fear of the pandemic is low, respondents would regularly take children to the dentist. Table 3 reports the characteristic of the models: the first axis explains most variance and Cronbach's alfa denote similar reliability.

Discussion

This study assessed the impact of SARS-CoV2 pandemic on Italian families' daily routine, dietary habits and oral health habits. The pandemic's effect on the family income was also analysed: it was "drastically reduced" or totally cleared in almost 20% of the sample, while "not impacted" in 39%. Significantly more respondents from the South and the Center declared a "drastic reduction" compared to the North. Similar results were found in Brazil [Campagnaro et al., 2020], where a family income reduction was reported by 73% of the respondents and a severe or total reduction by 20%.

In the present study, the mean fear of the pandemic was equal to 6.5 and similar to that reported in Brazil [Campagnaro et al., 2020], where 65% of the respondents reported a level of fear ≥ 6 . The Italian population experienced a change in usual activities due to the pandemic: 25% of the total sample declared to have stopped "attending health offices/clinics", 54% "going outdoor for leisure" and 62% "visiting relatives/friends". The results showed greater fear levels in the South and the Center than in the North. This data may justify the greater tendency in these areas to reduce all the usual activities, including the attendance to health centers.

Regarding the perceived risk of infection in the dental practice, a Chinese survey showed that 66% of the respondents rated the dental office more dangerous than other public and private settings [Sun et al.,2020]. Another survey was conducted in Turkey, including 250 parents of children aged 8-14 years old. In this study, 34% of the respondents considered the dental setting more dangerous than others and 39% were afraid that their children could be infected through the instruments used

for dental treatments [Surme et al.,2021]. In contrast with these findings, in the present survey only 8% of the respondents believed that the dental practice presented a greater risk of infection than other closed settings and accordingly 8% would not take their children to a dental visit. Instead, 52% of the total sample would take their children to a dental appointment "only for urgent treatments" and 40% of the sample for "any procedure". The results showed that the fear of infection and the tendency to postpone dental visits was greater in the Center and the South of Italy. In Brazil, [Campagnaro et al.,2020] 66.6% of the parents would take their children to the dentist only for urgent treatments and 15% would not take them at all. These data are comparable to those found in Southern Italy. In the North, where the CI was the highest, the respondents were less afraid of the pandemic, and declared a lower limitation in the usual activities. Accordingly, the access to dental care was less impacted. This apparent contradiction could be justified by different levels of confidence toward the National Health System among different geographic areas. An increased fear of the pandemic could be related to a low level of satisfaction with the pandemic management by the health services in the southern regions. A survey promoted by Confindustria Medical Devices and carried out by Community Research & Analysis analysed the Italians' perception towards the National Health Service one year

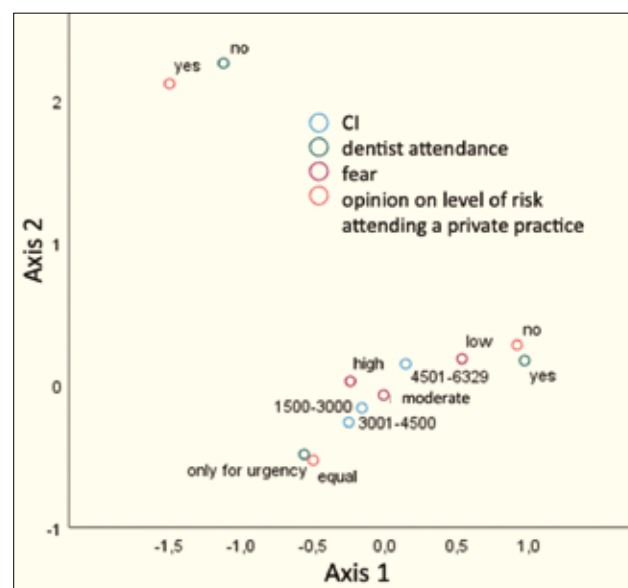


FIG. 3 Influence of CI and fear on the dentist attendance and the perceived risk of dental practice compared to other closed settings.

		Cronbach's alfa	Eigenvalues	Inertia	% of explained variance
Figure 1	Axis 1	0.468	1,670	0,239	24
	Axis 2	0.160	1,159	0,166	17
	Total		2,829	0,404	
Figure 2	Axis 1	0.709	2.443	0.407	41
	Axis 2	0.327	1.375	0.229	23
	Total		3.818	0.636	
Figure 3	Axis 1	0.438	1.281	0.640	64
	Axis 2	0.137	1.073	0.537	59
	Total		2.354	1.177	

TABLE 3 Characteristics of the model.

after the beginning of the SARS-CoV2 pandemic, focusing on the fear. Significant macro-regional differences were observed regarding the satisfaction with the response of the regional health services to the pandemic. The most satisfied were the respondents from the North-East (88%) and the Center (80%). Respondents from the Islands (53.8%) and the South (48.2%) were little or not at all satisfied. This survey highlighted a decrease in preventive and diagnostic visits: almost 4 out of 10 Italians postponed a medical examination or a medical treatment, mostly in the South (43.6%) and in the Islands (46.6%). The reason was the fear of the infection for 46.9% of subjects, followed by the reorganisation of health facilities to treat COVID-19 patients (39%) [Confindustria, 2021]. A survey on a sample of 30,000 Italians carried out by the Universities of Milan and Bern [ANDI, 2021] highlighted that during the pandemic about a third of the sample went to the dentist only for urgent treatments. In the South, the percentage exceeded 40%. This data showed the important impact of the pandemic on the access to prevention and dental care, particularly in the South of Italy. A high level of fear may reduce the daily activities and be associated with a reduced search for medical treatment, explaining the trend that emerged from the present study, especially in the South. Taking children to the dentist only for urgent treatment can have a negative impact on oral health. It is therefore important, in a context of progressive resolution of the pandemic, to stress the importance of preventive programmes, informing parents about the safety measures adopted in the dental setting [Docimo et al., 2021].

The fear of the virus and the limitations of individual freedom imposed during the most critical periods of the pandemic, in particular the lockdown, may have increased the burden of stress in people, provoking lifestyle changes. The evaluation of possible dietary changes is very important to prevent a possible increased risk for obesity and dental caries [Docimo et al., 2021]. Di Renzo et al. [2020] conducted a survey in Italy with the aim of investigating the impact of the lockdown on the dietary habits and lifestyle changes in adolescents and adults. A greater adherence to the Mediterranean diet was found and the nutritional quality remained high. During lockdown, the consumption of homemade bread and pizza increased, while the consumption of snacks, processed meats and soft drinks decreased. A survey from the Tor Vergata University of Rome focused on the paediatric population found that 51% of participants had not changed their dietary habits, although during the lockdown an increased consumption of sweets, biscuits and snacks and a reduced consumption of fresh foods such as fruit and vegetables were found [Docimo et al., 2021]. A similar result was observed in a Spanish survey [Lopez-Bueno et al., 2020] in which a reduction in the consumption of fruit and vegetables was observed, especially in children between 3 and 5 years of age. According to the authors, many parents may have had greater difficulty in preparing healthy meals, having to reconcile smart working with family life. A study conducted in France [Philippe et al., 2021] showed a greater demand from children for more comforting foods, rich in sugar, and a greater frequency of snacking. A reason could be the lack of activities during the days spent at home and a more permissive attitude toward food during lockdown [Philippe et al., 2021]. The results emerged from the present study were contrasting: most of the respondents referred no changes in the family diet, with no differences among geographic areas. Previous studies that emphasized changes in the dietary habits were focused on the lockdown period. The present study began 8 months after the lockdown and may therefore be more reliable for long-term changes in the families' diets. Another possible explanation could be the tendency of respondents to answer questions in a manner that will be viewed favourably by others, while not reflecting

the reality (desirability-bias). However, the online distribution of the questionnaire and the absence of a direct relationship between investigator and participant reduced this bias. The main statistical limit is represented by sample size that doesn't account for stratification in North, Center and South Italy. The low reliability of the MCA models can be affected by the reduced sample size. The persistence of the pandemic could lead to new changes in lifestyles and access to dental care, which will require further investigation.

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