

## ORIGINAL ARTICLE

# Psychological reactions to COVID-19 and epidemiological aspects of dental practitioners during lockdown in Italy

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## ABSTRACT

**BACKGROUND:** Due to droplet production and exposure to saliva and blood, dental practitioners are at high risk of COVID-19 contagion during their routine procedures. The aim of this study was to investigate the behavior of Italian dentists and to analyze their reactions in relation to Sars-CoV-2 pandemic professional restrictive measures.

**METHODS:** An online structured survey composed of 40 questions has been sent to dental practitioners all over Italy to investigate their behavior and to analyze their reactions in relation to Sars-CoV-2 pandemic restrictive measures introduced by the Italian national administrative order of 10 March 2020 (DM-10M20).

**RESULTS:** 1109 dentists replied. To assess concerns and psychological responses the sample was divided into two groups based on the number of cases registered in their work area. In the first group were included all the responders working in the Italian regions that had more than 15,000 confirmed cases of COVID-19 as of April 29, 2020. The second group included responders working in the Italian regions that had less than 15,000 confirmed cases. The 45.2% of the respondents showed minimal anxiety, 34.5% showed mild anxiety, 13.9% showed moderate anxiety, while 6.4% showed a score indicative of a severe level of anxiety.

**CONCLUSIONS:** The COVID-19-related emergency condition had a highly negative impact on dental practices in Italy. Those who completed the survey reported practice closure or reduction during the lockdown, and a high level of concern about the professional future for all dental practitioners. Concerns related to professional activity were accompanied by severe anxiety levels.

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**KEY WORDS:** COVID-19; Severe acute respiratory syndrome Coronavirus 2; Epidemiology; Anxiety; Surveys and questionnaires.

Year 2020 will be remembered as the year of the world pandemic caused by Coronavirus disease 19 (COVID-19). This highly infective Coronavirus, named severe acute respiratory syndrome - Coronavirus – 2 (Sars-CoV-2), is

a new virus responsible of an acute respiratory syndrome, often asymptomatic but potentially lethal.<sup>1, 2</sup> This virus is transmitted through micro- and macro-droplets, and diffusion mainly occurs through exhalation, sneezing, coughing

and saliva. Droplets  $>5 \mu\text{m}$  in diameter can reach 1 meter, whereas droplets  $<5 \mu\text{m}$  are grouped in aerosol that can reach distances well above 1 meter.<sup>3,4</sup>

Based on data retrieved from the World Health Organization (WHO), at the date of the present article (June 13, 2020), there have been 7,553,182 confirmed cases of Coronavirus infected patients worldwide, and 423,349 cases of deaths. From February 21, 2020, Italy has seen a quick and massive diffusion of COVID-19 and in mid-June showed 236,305 COVID-19 cases, with 34,223 deaths.<sup>5</sup>

Health care workers certainly are the category with the highest diffusion of the contagion, and due to droplet production and exposure to saliva and blood, dental practitioners are at high risk of contagion during their routine procedures.<sup>6</sup> SARS-CoV-2 transmission during dental procedures can occur through direct contact with mucous membranes, oral fluids and contaminated instruments and surfaces, or the inhalation of aerosol/droplets from infected individuals.<sup>2,4</sup>

In a previously published study, it has been shown that the 85% of dentists from one of the most affected Italian area reported being extremely worried of contracting the infection during their clinical activity. Moreover, 9% of them showed severe levels of anxiety, demonstrating that COVID-19 emergency had a highly negative impact on their activity.<sup>7</sup>

The aim of this study was to investigate the behavior of dentists from different parts of Italy and to analyze their reactions in relation to Sars-CoV-2 pandemic professional restrictive measures due to Italian national administrative order of 10 March 2020 (DM-10M20).

## Materials and methods

An online structured survey composed of 40 questions has been sent to dental practitioners all over Italy to investigate their behavior and to analyze their reactions in relation to Sars-CoV-2 pandemic restrictive measures introduced by the Italian national administrative order of March 10, 2020 (DM-10M20). Data collection took place in the time period from April 2 to April 29, 2020.

The survey was created using the free-access

Google Forms application and the link to the online survey was sent through an anonymous mailing list. At the beginning of the survey participants were informed that their participation was voluntary, their responses were anonymous, and that they could drop out at any time. Then they were explicitly asked if they wanted to participate in the research study before starting the survey.

The structured survey was composed of 40 questions, divided into five sections (Table I).

The first part of the questions collected demographic data (age and gender), the level of work experience and the type of activity carried out by the interviewees. The second section assessed whether the professionals closed their dental practice or reduced their clinical activity following the outbreak of the emergency, and whether this occurred before or after the restrictive measures introduced by the Italian government in 10 March 2020 (DM-10M20); which modalities were used to inform patients; and whether patients understood the reasons for the closure/activity reduction. The third section was composed of questions investigating the impact of the COVID-19 outbreak on dental practice: questions regarding the most common protective personal equipment (PPE), their retrieval and use before, during and after COVID-19 outbreak. The fourth group of questions assessed practitioners' direct or indirect contact with COVID-19, the feelings and emotions experienced while thinking at the COVID-19 outbreak, the dentists' perception of infection likelihood for themselves and patients. Questions taken from the generalized anxiety disorder 7-item (GAD-7) scale<sup>8</sup> were also included to assess the presence of general anxiety symptoms. The questions assessed whether in the previous two weeks responders had been bothered by: 1) feeling nervous, anxious, or on edge; 2) being unable to stop or control worrying; 3) worrying too much about different things; 4) experiencing difficulties in relaxing; 5) being restless; 6) becoming easily annoyed or irritable; and 7) feeling afraid as if something awful might happen. The fifth and final section of the survey assessed the dentists' main concerns about the professional future, what measures they consider use-

TABLE I.—Survey composed of 40 questions that has been sent in order to investigate dentist behavior and to analyze their reactions in relation to COVID-19 pandemic restrictive measures.

| Question   | Answer(s)  |
|--|--|
| 1. Do you want to participate in this survey?  | Yes<br>No  |
| 2. Age   | <35 year<br>35-55 year<br>>55 year   |
| 3. Sex   | Male<br>Female   |
| 4. Dental practice in<br>[One answer allowed]  | Modena<br>Reggio Emilia<br>Other (specify)   |
| 5. Professional experience<br>[One answer allowed]   | 0-5 years<br>6-10 years<br>11-15 years<br>>15 years  |
| 6. Professional setting<br>[One answer allowed]  | Owner of private practice<br>Partner or employed in private practice<br>Employed in public structure |
| 7. Number of dental chairs<br>[One answer allowed]   | One<br>Two/Three<br>>Three   |
| 8. Number of dental assistants and/or secretaries<br>[One answer allowed]  | One<br>Two/Three<br>>Three   |
| 9. Number of partners or employees<br>[One answer allowed]   | None<br>One<br>>One  |
| 10. Weekly average working time<br>[One answer allowed]  | <20 h<br>20-30 h<br>30-40 h<br>>40 h   |
| 11. Average number of patients treated daily before Italian national administrative order of 10 March 2020 (DM-10M20)            |  |
| 12. Due to Coronavirus disease 19 (COVID-19), was the practice closed/reduced to urgent procedures only?<br>[One answer allowed] | Yes<br>No  |
| 13. When was the practice close or clinical activity reduced to urgent procedures only?<br>[One answer allowed]                  | Before DM-10M20<br>After DM-10M20  |
| 14. A telephonic availability was guaranteed for dental emergencies?<br>[One answer allowed]                                     | Yes<br>No  |
| 15. In case of dental emergencies, did you personally take care of them?<br>[One answer allowed]                                 | Yes<br>No  |
| 16. In case of dental emergencies, were the dental assistant(s) present?<br>[One answer allowed]                                 | Yes<br>No  |
| 17. Did patients understand motivations for practice closure/clinical activity reduction?<br>[One answer allowed]                | Yes<br>No  |
| 18. How were patients notified of practice closure/clinical activity reduction?<br>[Multiple answers allowed]                    | By telephone<br>By email<br>By web site<br>By social networks (Facebook, Instagram, etc.)            |
| 19. Average number of patients treated daily after DM-10M20  |  |
| 20. Did patients cancel their previously taken appointments after DM-10M20?<br>[One answer allowed]                              | Yes<br>No  |
| 21. Did COVID-19 pandemic condition negatively your professional activity?<br>[One answer allowed]                               | Not at all<br>Little<br>Quite<br>A lot<br>Extremely  |

(To be continued)

TABLE I.—*Survey composed of 40 questions that has been sent in order to investigate dentist behavior and to analyze their reactions in relation to COVID-19 pandemic restrictive measures (continues).*

| Question  | Answer(s)   |
|---|---|
| 22. Which personal protective equipment (PPE) were used usually before COVID-19?<br>[One answer allowed]                                      | Gloves and surgical masks<br>Gloves, surgical masks and disposable isolation gowns<br>Gloves, surgical masks, disposable isolation gowns, disposable protective cap and glasses/face shield<br>Others (specify)   |
| 23. Since DM-10M20, did you modify the choice of PPE?<br>[One answer allowed]   | Yes<br>No<br>No, I am waiting government guidelines   |
| 24. Since DM-10M20, did you hold informative sessions dedicated to coworkers and employees on the correct use of PPE?<br>[One answer allowed] | Yes<br>No<br>No, but I will do it   |
| 25. Dental associations had been useful in giving instructions about PPE?<br>[One answer allowed]   | Yes<br>No<br>I do not know  |
| 26. During clinical activity, which measures do you use to prevent COVID-19 infection?<br>[Multiple answers allowed]                          | Telephone screening/anamnesis to exclude COVID-19 related symptoms<br>Telephone screening/anamnesis to identify possible critical cases<br>Reduction of number of patients in the waiting room<br>Body temperature measurement<br>Environment aeration<br>Environment sanitation<br>Disinfectant agents and surgical mask supply to all patients while waiting in waiting room<br>Use of PPE (Respirator masks, disposable gowns, double layered gloves, etc.)<br>Other (specify) |
| 27. Since the beginning of the pandemic, did you have difficulties in finding PPE?<br>[One answer allowed]                                    | Yes<br>No<br>I do not know  |
| 28. Since the beginning of the pandemic, have you noticed delays in the delivery timing of dental materials?<br>[One answer allowed]          | Yes<br>No<br>I don't know   |
| 29. Do you know someone who contracted COVID-19?<br>[Multiple answers allowed]  | Me<br>One or more relatives<br>One or more employees<br>One or more patients<br>One or more acquaintances<br>No   |
| 30. How worried are you of contracting COVID-19 during your clinical activity?<br>[One answer allowed]  | Not at all<br>Little<br>Quite<br>A lot<br>Extremely   |
| 31. In your opinion, how likely is it that a patient can contract COVID-19 during a dental service?<br>[One answer allowed]                   | Not at all<br>Little<br>Quite<br>A lot<br>Extremely   |

(To be continued)

TABLE I.—Survey composed of 40 questions that has been sent in order to investigate dentist behavior and to analyze their reactions in relation to COVID-19 pandemic restrictive measures (continues).

| Question  | Answer(s)  |
|---|--|
| 32. How much do you think your patients are worried of contracting COVID-19 during a dental service?<br>[One answer allowed]  | Not at all<br>Little<br>Quite<br>A lot<br>Extremely  |
| 33. Which of the following emotions do you feel when thinking about COVID-19?   | Fear<br>Anxiety<br>Concern<br>Sadness<br>Anger   |
| 34. How frequently one of these issues bothered you in the past two weeks?  | Not at all    Several days    More than half the days    Nearly every day  |
| Being more nervous and/or anxious<br>Being unable to stop worrying<br>Being too much worried for various things<br>Having difficulties in relaxing<br>Being agitated and unable to stay still<br>Getting easily irritated<br>Having fear that something terrible could happen |  |
| 35. How worried are you for your professional future?<br>[One answer allowed]   | Not at all<br>Little<br>Quite<br>A lot<br>Extremely  |
| 36. What worries you the most?<br>[Multiple answers allowed]  | I do not know when this emergency situation will end<br>Patients will have less money to spend<br>The crisis of dental environments will get worse<br>The need of new procedures and new devices for safety and infection prevention<br>The chance of losing my job or having to fire my employees |
| 37. Which aids do you think could help dental professionals during COVID-19 pandemic?<br>[Multiple answers allowed]   | Economic relieves from Italian government<br>Improvement of communication with patients<br>Economic relieves from dental associations<br>Bank account support<br>Social security institutions support and subsidy  |
| 38. Which aids do you think could help dental professionals after COVID-19 pandemic?<br>[Multiple answers allowed]  | Economic relieves from Italian government<br>Improvement of communication with patients<br>Economic relieves from dental associations<br>Bank account support<br>Social security institutions support and subsidy  |

(To be continued)

TABLE I.—Survey composed of 40 questions that has been sent in order to investigate dentist behavior and to analyze their reactions in relation to COVID-19 pandemic restrictive measures (continues).

| Question   | Answer(s)  |
|--|--|
| 39. During clinical activity, which measures will you use to prevent COVID-19 infection?<br>[Multiple answers allowed] | Telephone screening/anamnesis to identify possible critical cases<br>Reduction of number of patients in the waiting room<br>Body temperature measurement<br>Environment aeration<br>Environment sanitation<br>Disinfectant agents and surgical mask supply to all patients while waiting in waiting room<br>Use of PPE (Respirator masks, disposable gowns, double layered gloves, etc.)<br>Other (specify)<br>Prevention procedures standardization |
| 40. Which improvements do you think can result from the COVID-19 emergency?<br>[Multiple answers allowed]              | Reduction of dental practices competition<br>Improvement of communication with patients<br>Professional rhythm slowdown<br>Stabilization of relationship with dental associations<br>No improvements   |

ful to support professionals during and after the emergency and whether they believed that the emergency situation could lead to improvements.

### Results

One thousand one hundred and nine dentists replied to the survey. For each question, we computed the percentage of respondents that gave a particular answer with respect to the number of total responses to the questions.

Of the total responders, 29.6% (N.=328) were females, 70.4% (N.=781) were males. The majority of them were aged between 35 and 55 (44.3%), 39.7% were over 55 years old, while only 16.0% of them were under 35 years old. Therefore, most had been working for more than 15 years (68.8%), 21.2% had been working for 6-14 years, while 10% had been working for less than 5 years. The majority of the compilers (820, 74%) reported working 30-40 h or more per week, while the remaining 289 (26%) reported working less than 30 h per week. A large number of dentists were practice owners (70.2%), while

the others were private (27.4%) or public (2.3%) structures employees (Table II).

The majority of the respondents (1102, 99.4%) closed or highly reduced their activity to urgent procedures, 41.2% before and 58.8% after the DM-10M20; only 7 professionals said they did not close the business. A high percentage of patients (88.9%) cancelled their previously-taken appointments after the DPCM-10M20. Patients were contacted by phone (92.3%), only 6.5% through social channels or websites and a limited number by e-mail (1.2%). Most of them understood the reasons for the closure of dental practices or for the reduction in clinical activity. A large number of dentists (1075, 97.5%) guaranteed telephone availability for dental emergencies and for this reason a high percentage reported going personally to the office (1011, 91.7%). In case of dental emergencies, 51.7% of respondents took care of it alone, and 48.3% of them were helped by an assistant.

Each practitioner asserted a routinely use of the most common protective personal equipment (PPE), such as gloves, masks, disposable gowns, and protective glasses before the SARS-CoV-2

TABLE II.—*Demographic information of dental practitioners (total = 1109).*

| Demographics                     |                           | Number (%) |
|----------------------------------|---------------------------|------------|
| Gender                           | Male                      | 781 (70.4) |
|                                  | Female                    | 328 (29.6) |
| Age (years)                      | Less than 35              | 177 (16)   |
|                                  | 35-55                     | 491 (44.3) |
|                                  | Above 55                  | 441 (39.7) |
| Type of activity                 | Practice owner            | 779 (70.2) |
|                                  | Private practice employee | 304 (27.4) |
|                                  | Public structure employee | 26 (2.3)   |
| Work experience (years)          | 0-5                       | 111 (10)   |
|                                  | 6-10                      | 115 (10.4) |
|                                  | 11-15                     | 120 (10.8) |
|                                  | More than 15              | 763 (68.8) |
| Numbers of hours worked per week | Less than 20              | 64 (5.8)   |
|                                  | 20-30                     | 225 (20.3) |
|                                  | 30-40                     | 490 (44.2) |
|                                  | More than 40              | 330 (29.7) |

pandemic. The 74.5% of dentists replied that they had changed the type of PPE used during the pandemic by COVID-19, or in any case that they were waiting for directives to do so (18.8%); only 6.8% have not changed their PPE. Most of the interviewees (769, 69.3%) report having held information sessions dedicated to the staff on the correct use of PPE, 20% said that they will soon, but 10.6% did not.

Since the start of the COVID-19 lockdown, 86.2% of respondents have encountered difficulties in finding PPE and 62.5% have encountered problems in the delivery time of dental materials.

Only seventeen (1.5%) respondents contracted COVID-19, while 27.4% did not know anyone who has contracted the disease. In total, 77.8% knew at least one person who has been infected (relatives, employees, acquaintances, patients).

Given the different distribution of the COVID-19 pandemic in the Italian regions, to assess concerns and psychological responses we divided the sample into two groups based on the number of cases registered in their work area. In the first group we included all the responders working in the Italian regions that had more than 15,000 confirmed cases of COVID-19 as of April 29, 2020.<sup>9</sup> These regions were Lombardy, Emilia-Romagna, Piedmont and Veneto and the responders working in these regions were 828. The second group included responders working in all the other Italian regions, that had less than

15,000 confirmed cases. This group was composed of 281 responders.

Overall, for 71.1% of the respondents, COVID-19 was having an extremely negative impact on their professional activity and the majority of them was quite (41.1%) or a lot (25.8%) concerned about the professional future, mostly due to the uncertainty about the end of the emergency situation (54.0%) and people's reduced spending capacity (41.5%). These percentages were quite similar in the two groups. Indeed, the impact was judged as extreme by 71.9% of dentists in the first group and by 68.7% of dentists in the second group.

Dentists reported being from moderately (39.0%) to highly (24.3%) concerned of contracting COVID-19 during their clinical activity. Only 3.4% were not concerned at all. 40.1% of them believed patients' concern of contracting the infection during a dental visit was moderate, even though 45.8% of them considered the patient's likelihood of infection as low. For these questions, response categories were assigned a score ranging from 0 to 4 (0 = "not at all;" 4 = "extremely") and a *t*-test for independent samples was performed on these recoded values. Results of the comparisons between the two groups regarding these questions showed no significant difference (all *ps* >0.14) (Table III).

When thinking about COVID-19, only 10.4% of the respondents reported to experience fear intensely, while the majority reported to feel

TABLE III.—*Dentists' concern of contracting COVID-19, perception of the infection likelihood for patients and level of concern attributed to patients for the two groups.*

| Question  | Group | Not at all<br>N. (%) | Little<br>N. (%) | Quite<br>N. (%) | A lot<br>N. (%) | Extremely<br>N. (%) |
|---|-------|----------------------|------------------|-----------------|-----------------|---------------------|
| How worried are you of contracting COVID-19 during your clinical practice?                      | 1     | 28 (3.4)             | 156 (18.8)       | 320 (38.6)      | 206 (24.9)      | 118 (14.3)          |
|   | 2     | 10 (3.6)             | 56 (19.9)        | 112 (39.9)      | 64 (22.8)       | 39 (13.9)           |
| In your opinion, how likely is it that a patient can contract COVID-19 during a dental service? | 1     | 200 (24.2)           | 364 (44.0)       | 169 (20.4)      | 65 (7.9)        | 30 (3.6)            |
|   | 2     | 58 (20.6)            | 144 (51.2)       | 45 (16.0)       | 27 (9.6)        | 7 (2.5)             |
| How much do you think patients are worried of contracting COVID-19 during a dental procedure?   | 1     | 69 (8.3)             | 210 (25.4)       | 338 (40.8)      | 182 (22.0)      | 29 (3.5)            |
|   | 2     | 9 (3.2)              | 84 (29.9)        | 107 (38.1)      | 69 (24.6)       | 12 (4.3)            |

Group 1: responders from Lombardy, Emilia Romagna, Veneto and Piedmont; group 2: all other regions.

lightly (37.7%) or moderately (24.3%) scared. Only 14.5% reported to experience anxiety intensely, while 33.1% reported to feel lightly and 22.6% moderately anxious. Only 23.6% reported to experience concern intensely, while the majority reported levels of concern ranging from light (27.6%) to moderate (30.0%). Only 17.2% of respondents felt intensely sad, while 23.5% did not experience sadness at all. Anger was experienced in an intense way by only 12.0% of respondents, while 39.7% of respondents did not experience anger at all. For the questions assessing the emotions experienced when thinking about COVID-19, response categories were assigned a score ranging from 0 to 4 (0 = "I do not feel it," 4 = "I feel it intensely"). The obtained values were submitted to a *t*-test for independent samples. Again, the *t*-test confirmed that the two groups did not differ (all *p*s >0.14) (Table IV).

As regards the GAD-7 scores, 45.2% of the respondents showed minimal anxiety (score

0-4), 34.5% showed mild anxiety (score 5-10), 13.9% showed moderate anxiety (score 10-14), while 6.4% showed a score indicative of a severe level of anxiety (score 15-21). The mean GAD-7 score was 6.04 (SD=4.69) for group 1 and 6.19 (SD=4.65) for group 2. The *t*-test for independent samples showed that the two scores did not differ (*P*=0.64).

Dentists have shown a good understanding of what is reported in the most recent indications from the literature regarding the prevention of COVID-19: to the question: "During clinical activity, which measures do you use to prevent COVID-19 infection?" The highest frequency of answers concerned "reduction of number of patients in the waiting room" (89.1%) and "environment aeration" (87.8%). Less frequently, "telephone screening/anamnesis to exclude COVID-19 related symptoms" (84.2%), "use of PPE" (76.2%) or "Disinfectant agents and surgical mask supply to all patients while waiting in waiting room" (74.1%) were indicated.

TABLE IV.—*Responses to the question "Which of the following emotions do you feel when thinking about Covid-19?" for the two groups.*

| Emotions | Group | I do not feel it<br>N. (%) | Lightly<br>N. (%) | Moderately<br>N. (%) | Quite intensely<br>N. (%) | Intensely<br>N. (%) |
|----------|-------|----------------------------|-------------------|----------------------|---------------------------|---------------------|
| Fear     | 1     | 196 (23.7)                 | 311 (37.6)        | 205 (24.8)           | 93 (11.2)                 | 23 (2.8)            |
|          | 2     | 76 (27.0)                  | 107 (38.1)        | 64 (22.8)            | 22 (7.8)                  | 12 (4.3)            |
| Anxiety  | 1     | 201 (24.3)                 | 276 (33.3)        | 187 (22.6)           | 129 (15.6)                | 35 (4.2)            |
|          | 2     | 79 (28.1)                  | 91 (32.4)         | 64 (22.8)            | 32 (11.4)                 | 15 (5.3)            |
| Concern  | 1     | 42 (5.1)                   | 219 (26.4)        | 249 (30.1)           | 202 (24.4)                | 116 (14.0)          |
|          | 2     | 11 (3.9)                   | 87 (31.0)         | 84 (29.9)            | 60 (21.4)                 | 39 (13.9)           |
| Sadness  | 1     | 196 (23.7)                 | 182 (22.0)        | 209 (25.2)           | 143 (17.3)                | 98 (11.8)           |
|          | 2     | 65 (23.1)                  | 67 (23.8)         | 68 (24.2)            | 48 (17.1)                 | 33 (11.7)           |
| Anger    | 1     | 337 (40.7)                 | 177 (21.4)        | 119 (14.4)           | 94 (11.4)                 | 101 (12.2)          |
|          | 2     | 103 (36.7)                 | 55 (19.6)         | 47 (16.7)            | 39 (13.9)                 | 37 (13.2)           |

Group 1: responders from Lombardy, Emilia Romagna, Veneto and Piedmont; group 2: all other regions.

The answer “body temperature measurement” received the lowest frequency of preferences (35.3%). Instead other indications provided by medical organizations and media - “environment sanitation” and “telephone screening/anamnesis to identify possible critical cases” - received 73% and 46.8%, respectively. This question could be answered by placing multiple preferences.

We asked the same question at the end of the test, with reference to future behavior, and different percentages emerged: the highest frequency of answers concerned “reduction of number of patients in the waiting room” (87.8%) and “use of PPE” (86.5%), then in descending order “telephone screening/anamnesis to identify possible critical cases” (82.6%), “environment aeration” (82.6%), “environment sanitation” (82.5%), “disinfectant agents and surgical mask supply to all patients while waiting in waiting room” (71.3%) and “body temperature measurement” (50.8%).

We asked the question “Which aids do you think could help dental professionals during COVID-19 pandemic?” Two preferences could be expressed: the respondents indicated “economic relieves from Italian government” (74.4%), “social security institutions support and subsidy” (47.6%), “economic relieves from dental associations” (35%), “improvement of communication with patients” (18.7%) and “bank account support” (14.7%). The answers to the successive question, which analyzes the category aid measures to be adopted after the emergency, maintained almost the same order of frequency in the answers. There was a change in the percentages which, in decreasing order were: “economic relieves from Italian government” (78.1%), “economic relieves from dental associations” (34.9%), “social security institutions support and subsidy” (33.6%), “improvement of communication with patients” (24.3%) and “bank account support” (19.5%). The main change was a significant reduction in “social security institutions support and subsidy” while greater importance was given to communication campaigns with patients and to “bank account support.”

The last question asked: “Which improve-

ments do you think can result from the COVID-19 emergency?” For this question multiple answers could be indicated. A high percentage of the interviewees considered “prevention procedures standardization” very important (64.8%). Most of the dentists answered that there will be a “Professional rhythm slow down” (38.7%) and “improvement of communication with patients” (21.3%). Lower preferences resulted for “stabilization of relationship with dental associations” (9.7%) and “reduction of dental practices competition” (6.2%). 23.3% of dentists believe that there is no improvement from the Coronavirus emergency.

## Discussion

Health-coworkers have been widely affected by the SARS-CoV-2 pandemic with a dramatic toll, in terms of lives, nationwide.<sup>6, 10</sup> Many hypotheses have been made, so far, about the pathogenesis of this new disease, but little is known about its psychological impact on health co-workers in general and on dental practitioners, in particular. The pandemic infection of SARS-CoV-2 is having a profound impact on dentistry, mainly due to the way the pathogen is passed on, which poses a danger in almost all dental procedures. The virus predominantly spreads through droplets and aerosol, requiring a revision of the cross-infection prevention protocol to include SARS-CoV-2 related risks.<sup>11</sup>

Dental practice has been recognized as a necessary service by the Italian Prime Minister’s Decree of March 22, 2020 and its update on March 25, 2020,<sup>12</sup> but isolation and its financial impact have produced physical and psychological pressure, depression, social anxiety or other mental health concerns among dental practitioners. The aim of this study was to measure the impact of this turmoil on dentists in Italy, one of the most involved nations in the COVID-19 outbreak in Europe and, perhaps, worldwide. The questionnaire was designed in the Italian language and enclosed questions pertaining to socio-demographic characteristics, dentists’ attitudes and perceptions toward COVID-19 and infection control in dental clinics. The survey emphasized the psychological impact on our profes-

sion and provided insight into whether dentists in Italy have made any changes in their routine dental treatment practices since the COVID-19 pandemic started.

In a previous survey, severe levels of anxiety have been reported by 9% of the 356 interviewed dentists, demonstrating that COVID-19 emergency had a highly negative impact on their psychological wellness.<sup>7</sup> All of the respondents closed or highly reduced their activity to urgent procedures. For 74.4% of the respondents, COVID-19 was having a highly negative impact on their occupation and the majority of them (89.6%) was quite concerned about their professional future. In addition, 20.2% were extremely worried about contracting COVID-19 during their clinical activity while 2.2% were not concerned at all.<sup>7</sup>

Other investigations have been proposed by other international institutions, targeting the aftermath of this new pandemic on dental professionals. One inquiry was performed in Saudi Arabia, with a more global reach: 650 dentists spread out in many countries, mostly in Pakistan, India and Malaysia, where the dental setting might differ from Western standards and where the majority of the colleagues are employed in public settings.<sup>13</sup>

Another analysis was conducted among Turkish dentists.<sup>14</sup> The results of the survey revealed that, although some have increased protective measures against the COVID-19 pandemic, the majority have not reached sufficient levels of awareness in terms of attitudes and behaviors, since 26% of them reported no changes in their practice in terms of new prophylactic measures for COVID-19 prevention and only 18.6% have partially reduced the number of patient's admission. Surprisingly, only 1.35% of them was concerned about being infected by the SARS-CoV-2.<sup>14</sup>

Measuring anxiety by the means of self-report questionnaires is useful<sup>15</sup> and has been already performed among dental practitioners and patients.<sup>16</sup> Moreover, the interest for the psychological impact of a sanitary crisis among health care workers is not new. Previous researches conducted in Europe, Asia and North America, on H1N1 flu and SARS-CoV-1 epi-

demic, have shown moderate to severe level of anxiety among physicians with a markedly increased risk for psychiatric morbidity among the most exposed categories of health professionals.<sup>17, 18</sup> The most commonly reported psychiatric symptoms have been related to the post-traumatic stress disorder (PTSD) with risk factor being the absence of psychological consult, older age, social isolation, social stigmatization and high level of stress at the working place. Interestingly, this post-traumatic psychiatric condition can arise even in the long term, on average after 1 to 2 years after exposure to the traumatic event.<sup>19</sup>

The way this SARS-CoV-19 pandemic has rapidly spread out, its severity, the high mortality rate among health care workers and the lack of knowledge have raised the psychological burden among dentists. Moreover, the need for new and more restrictive working protocols, the fear for a global economic crisis, the inadequacy of economic aids from the national government have probably boosted the level of fear and anxiety toward the future of our profession.

The literature reports that approximately four in five patients are asymptomatic, demonstrating the importance of preventive measures regardless of patients' clinical conditions.<sup>20</sup> Italy is now in the so called "phase-two" of the restrictive measures enforced by the national government, being the incidence of daily new cases very low and probably at its minimum rate since the beginning of the pandemic. The Italian health care system is no longer overwhelmed by new COVID-19 cases and the critical phase seems to be overstepped. Dentists are now treating not only emergency patients but are also performing those elective procedures that have been postponed for months, during the outburst of the pandemic. However, the preventive measures, previously recommended by the national dental institutions, are generally still held valid. Four phases are considered crucial in patient management: patient triage, patients' entrance into the practice, dental treatment, and after-treatment management.<sup>6</sup> Patients should be asked a set of questions aimed at evaluating the risk of exposure to SARS-CoV-2 and should be admitted to the dental office only if the entire questionnaire

is negative; otherwise, the appointment must be postponed.<sup>2</sup> Moreover, body temperature has to be registered through a contactless thermometer and hand disinfection encouraged before entering the operative area.<sup>2,3</sup> A patient restriction is also recommended in the waiting room with a suggested distance of at least 1 meter between chairs. Accompanying subjects should be asked to wait outside the dental office in order to prevent overcrowding.<sup>2-4</sup> Dental practitioners should perform thorough hand washing for at least 60 s, employing a hydro-alcoholic solution, prior to wearing gloves.<sup>2</sup> Highly filtering face masks (filtering face - piece level 2 or 3) should be worn by the whole team, including nonclinical staff members and eye protection should be guaranteed with the use of protective safety glasses and shields, which should undergo thorough disinfection with 70% isopropyl after each procedure.<sup>2-4</sup> A 5-10 min air exchange is advised in between patients.<sup>2-4</sup> Despite these recommendations, the fear of contagion among dental practitioners and patients is still high, although the mortality rate is 2-3%. Its prevention has brought serious consequences to the global economy with catastrophic results for many small- and middle-sized businesses. In most of countries affected by COVID-19, Italy being one of them, dental practices are predominantly small to medium-sized business operated privately. The longer restrictive measures are extended, the more likely they seem to affect the economic capacity of dental practices, which may translate into job losses and qualitative and quantitative changes in care provision.<sup>21</sup>

### Conclusions

The COVID-19-related emergency condition had a highly negative impact on dental practices in Italy. All of the dentists that completed the survey reported practice closure or reduction during the lockdown, a high level of concern about the professional future for all dental practitioners. Concerns related to professional activity were accompanied by severe anxiety levels. This essay must be contextualized with the lockdown in Italy, since it was delivered during the most critical period of the pandemic.

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