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WORK DEMANDS AND PSYCHOLOGICAL DISTRESS AMONG DENTISTS: MEDIATION ROLE OF COVID-19-RELATED FACTORS



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PURPOSE. This study was designed to explore the mediating role of fear of COVID-19 infection from patients and fear of infecting family with COVID-19 in the association between work demands and psychological distress among dental staff from different countries.

MATERIALS AND METHODS. An online self-report questionnaire was filled out by 1302 dentists from China, Italy, Israel, India and the United Kingdom. Data on basic demographics was gathered in addition to COVID-19-related questions and psychological distress scale scores.

RESULTS. Fear of contracting COVID-19 from patients was found to mediate significantly the association between work demands and psychological distress (standardized coefficient: 0.2587 ($t = 9.65$; $p < .001$)), as was fear of family contracting COVID-19 (standardized coefficient: 0.2227 ($t = 8.45$; $p < .001$)). The direct relationship between work demands and psychological distress was also found to be significant (standardized coefficient: 0.2072 ($t = 8.67$; $p < .001$)).

CONCLUSIONS. Action should be taken to mitigate the potential risk of acquiring COVID-19 infection from patients and/or transmitting COVID-19 to family members among dental professionals, as it threatens not only their physical health but also their mental health.

CONFLICT OF INTEREST STATEMENT. The authors declare that they completely self-funded the study, and that there are no conflicts of interest.

INTRODUCTION

Health workers are on the front line of the COVID-19 outbreak response, and as such are exposed to hazards that put them at risk of infection while caring for patients with this disease¹. Recent evidence suggests that even someone who is asymptomatic can spread COVID-19 with high efficiency, and conventional measures of protection, such as face masks, provide insufficient protection². Given this, dental practitioners can be at high risk of infection due to the unique characteristics of dental procedures, which the standard protective measures in daily clinical practice are not effective enough to prevent, especially when patients are in the incubation period, are unaware they are infected, or choose to conceal their infection³. Moreover, problems such as stress, anxiety, depressive symptoms, insomnia, denial, anger, and fear have been noted among healthcare workers involved in the fight against the 2019 novel coronavirus [2019-nCoV]⁴. In line with this notion, Shanafelt et al. [2020], by delivering eight listening sessions to groups of health care professionals, found several sources of anxiety, among which was "being exposed to COVID-19 at work and taking the infection home to their family"⁵. Hence, this study was designed to explore the mediating roles of fear of COVID-19

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infection from treating patients and fear of infecting family members with COVID-19 in the association between work demands and psychological distress among dental staff from various regions around the world (i.e., China, India, Israel, Italy and the UK).

MATERIALS AND METHODS
Procedure and participants

An internet platform was set up to conduct the cross-sectional survey. Participants were approached using social media such as Facebook, LinkedIn, WeChat, and dedicated mailing lists from personal contacts in the authors' address books (E.M., F.L., A.N.D., L.M., J.C., M.S.), as well as dedicated forums for dental professionals. A call to participate in the study was published once through social media, and dentists on mailing lists were contacted only once. No incentives were offered to participants, and each signed an electronic informed consent form. In order to prevent duplications, we used the SPSS code to find and remove cases identical on all variables in the sample. The study was approved by the institutional review board of the authors' (M.S., Y.H-R., M.B.E.) university, Ariel University review body, approval number #z_march20_7. The manuscript partially adheres to STROBE guidelines, as we used convenience sampling.

During the period spanning 30 March to 12 April 2020, we collected data regarding dentists from China (n = 515), India (n = 470), Israel (n = 202), Italy (n = 88), and the UK (n = 27). A total of 1302 dentists responded to the survey, thereby serving as a convenience sample. Basic demographics pertaining to each subgroup and the whole sample can be found in **TABLE 1**.

Measures

The following demographic details were sampled: age, country of origin, sex, underlying illness and being in a committed relationship. Beyond the aforementioned basic demographic details, the following self-report questions were asked:

Fear of contracting COVID-19 from patients was measured by the question: "Are you afraid of being infected with COVID-19 because of your profession?", scored from 1 for "not at all" to 4 for "very afraid" (a score of 2 corresponding to "slightly afraid" and 3 "quite afraid").

TABLE 1 DESCRIPTIVE ANALYSIS OF BASIC DEMOGRAPHICS, PSYCHOLOGICAL DISTRESS, FEAR OF CONTRACTING COVID-19 FROM PATIENTS AND FEAR OF INFECTING A FAMILY MEMBER. ADAPTED FROM MIJIRITSKY ET AL. (2020)⁸

International sample (n = 1302)					
Factors	China (n = 514)	India (n = 470)	Israel (n = 202)	Italy (n = 88)	United Kingdom (n = 27)
Age, years [M/SD]	38.7 [8.3]	34.9 [9.4]	47.0 [11.4]	44.8 [12.5]	44.7 [9.6]
Sex, male % (n)	55.4 [285]	54.3 [255]	69.8 [141]	73.9 [65]	[70.4] 19
Committed relationship, % (n)	97.1 [499]	64.7 [304]	80.2 [162]	80.7 [71]	85.2 [23]
Underlying illness, % (n)	5.8 [30]	7.7 [36]	23.3 [47]	4.5 [4]	11.1 [3]
Fear of contracting COVID-19, [M/SD]	2.5 [.9]	2.4 [.9]	2.7 [.8]	2.5 [.9]	3.1 [.8]
Fear of infecting family, [M/SD]	2.3 [.9]	2.5 [.9]	3.0 [.9]	2.8 [.9]	3.1 [.9]
Subjective overload, [M/SD]	16.1 [4.6]	14.8 [4.8]	14.4 [5.8]	15.7 [5.7]	18.6 [4.8]
Psychological distress, [M/SD]	12.6 [4.7]	12.2 [4.2]	12.0 [4.6]	12.7 [4.8]	14.6 [5.0]

Fear of family contracting COVID-19 was measured by the question: "Are you afraid of infecting your family with COVID-19 due to your profession?", scored from 1 for "not at all" to 4 for "very afraid" (a score of 2 corresponding to "slightly afraid" and 3 "quite afraid").

Work demands were measured using the Demands Scale - Short Version⁶. The six items exploring various aspects of stress were: 1. "I cannot handle the contradicting demands required from me during my work"; 2. "The amount of work time available to me is insufficient"; 3. "My job poses demands without having the right equipment and resources"; 4. "I would never leave my work feeling that I have finished all my chores"; 5. "I am unable to perform my job to the best of my ability given the time allocated"; 6. "I am required to perform simple chores that prevent me from performing more sophisticated ones". Respondents provided a score ranging from 1 for "not at all" to 5 for "very much".

Psychological distress was measured using Kessler's K6⁷, which includes six items on feeling nervous, hopeless, restless/fidgety, depressed, everything being an effort, and worthless in the last 30 days. Scores ranged from 0 to 30, with 19 or higher indicating elevated psychological distress. Sample size determination was aimed at mediation analysis, as well as other analyses as previously reported⁸. For a 95% confidence interval and 5% margin of error we needed a sample size of at least 385 participants.

Data analysis

Parallel mediation model analyses were conducted using the Process module (Model 4-)⁹ for SPSS version 25 (IBM, Armonk, NY). The independent variable was work demands, and the dependent variable was psychological distress. The mediator variables were fear of contracting COVID-19 from patients and fear of family contracting COVID-19. The aim of these analyses was to check the mediating effect of fear of contracting COVID-19 from patients and fear of family contracting COVID-19 on the association between work overload and psychological distress. Age, sex, relationship status, having an underlying illness, and country of origin were controlled for. The effect of the mediating variables was tested using the bootstrapping procedure.

RESULTS

Descriptive analysis regarding basic demographics, psychological distress, fear of contracting COVID-19 from patients and fear of infecting a family member are summarized in Table 1, as previously reported⁸. The mean score for fear of contracting COVID-19 from patients was 2.50 (SD = 0.90), for fear of family contracting COVID-19 it was 2.55 (SD = 0.92). Cronbach's Alpha for the work demands scale was 0.87 in the current study, and the mean score was 15.41 (SD = 5.03). Cronbach's Alpha for the psychological distress scale in the current study was 0.86, and the mean score was 12.42 (SD = 4.57).

The results showed the two mediator variables had a significant mediation effect. Specifically, fear of contracting COVID-19 from patients mediated significantly the association between work demands and psychological distress (standardized coefficient: 0.2587 [$t = 9.65$; $p < .001$]). Likewise, fear of family contracting COVID-19 mediated significantly the association between work demands and psychological distress (standardized coefficient: 0.2227 [$t = 8.45$; $p < .001$]). In addition, the direct relationship between work demands and psychological distress was significant (standardized coefficient: 0.2072 [$t = 8.67$; $p < .001$]). The same was found for the two mediators in terms of psychological distress (fear of contracting COVID-19 from patients: standardized coefficient 0.2223 [$t = 7.21$; $p < .001$]; fear of family contracting COVID-19: standardized coefficient 0.1220 [$t = 3.89$; $p < .001$]).

Both mediators had a significant mediation effect (standardized indirect effect of fear of

contracting COVID-19 from patients = 0.0575; $p < .05$; standardized indirect effect of fear of family contracting COVID-19 = 0.0272; $p < .05$). See **FIG. 1** for direct effect and mediation model.

DISCUSSION

Our results shed light on the need to reduce the risk of dental professionals contracting COVID-19 from patients and/or being a means of transmitting the infection to family members, as it threatens not only their physical health but also their mental health. In addition, our results reveal a direct link between work demands and psychological distress related to the uncertainty and unpredictability of a COVID-19 outbreak, potentially preventing provision of high-quality care to patients who need dental treatment³. The sample size varied across the different participants' countries, with further elaboration required, as reported earlier⁸. Nevertheless, such variations did not seem to affect the outcomes of our mediation analysis, as the sample size determination was mainly required for minimizing marginal error and decreasing the likelihood of type II error. Several limitations of the current study should be noted. In particular, the cross-sectional design of the study does not allow any inferences regarding causal relationships. Furthermore, as the sample was a convenience sample, the compliance rate cannot be presented, and we cannot compare those who responded to the survey to those who did not. Moreover, the study findings rely on self-report measures, which might be subject to selection bias. Finally, the questionnaires were collected over a relatively short period of time in several countries, which may limit the potential generalizability of the results.

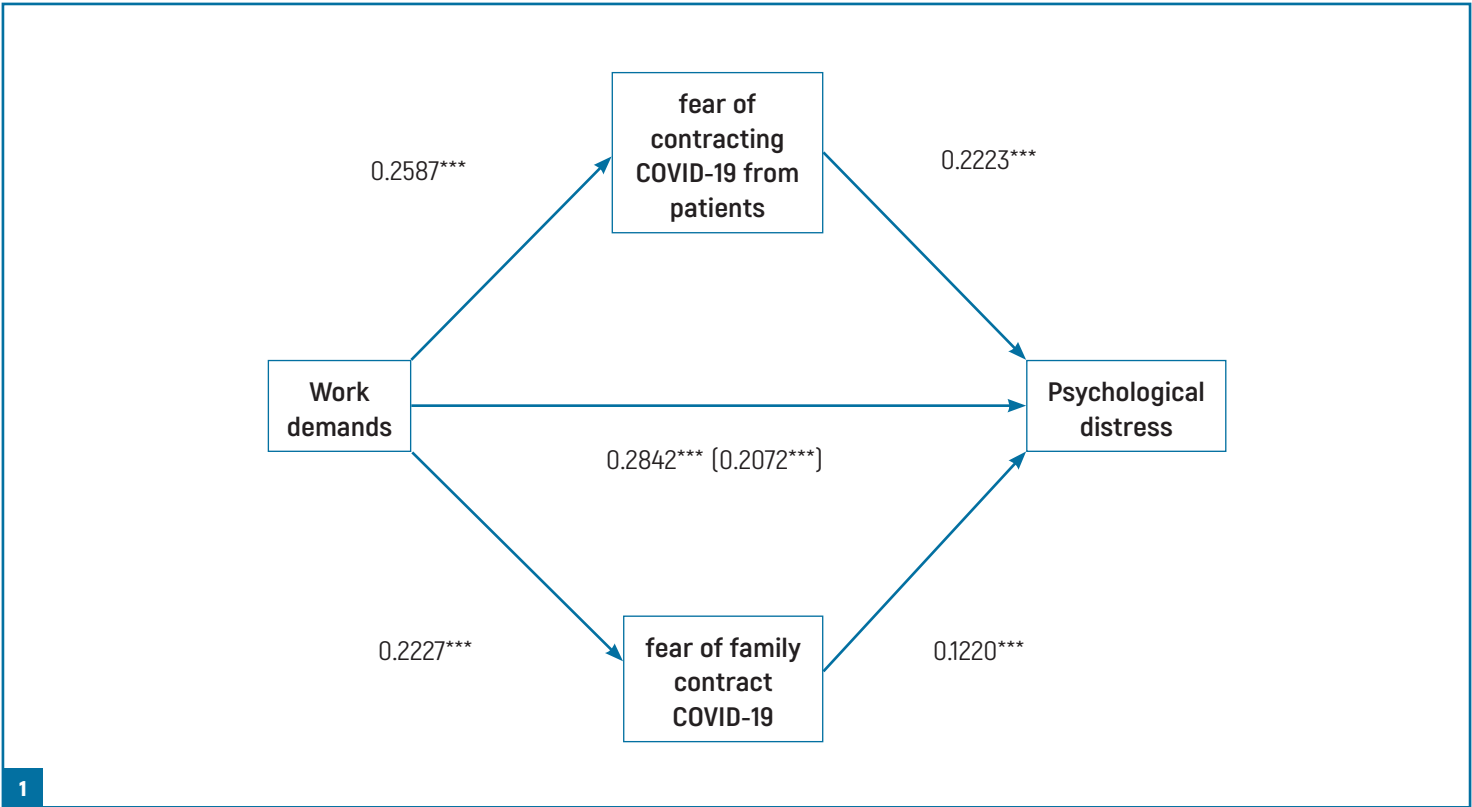


FIG. 1: The direct effect and mediation model of fear of contracting COVID-19 from patients and transmitting COVID-19 to the family presented by standardized coefficients (***) indicates $p < .001$

Nevertheless, our findings should serve to encourage the dental community to reinforce the applied infection control measures, both to enable high-quality care of patients and to safeguard professionals' mental health. In light of our findings, providing adequate personal protection equipment, and rapid access to tests if symptoms appear, as well as information and resources on avoiding taking the infection home, are recommended. Policy makers who plan guidelines/protocols for dental practitioners during the COVID-19 outbreak are to be advised to meet these needs, as occurred for the previous Severe Acute Respiratory Syndrome (SARS) outbreak¹⁰.

CONCLUSIONS

The risk of acquiring COVID-19 from patients and/or transmitting the infection to family members should be minimized among dental professionals, as it threatens not only their physical health but also their mental health.

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