ORIGINAL RESEARCH

Psychological Impacts of COVID-19 in Dental Patients are Moderated and Mediated by Hospital-Infection-Control-Policy and Satisfaction-with-Life: A Prospective Observational Dental-COVID Study

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Introduction: COVID-19 pandemic has imposed nation-wide lock-downs which severely impacted day-to-day lifestyle and caused anxiety, stress and fear among patients taking medical care including dental treatments. These psychological behaviors have also been observed during the strategic relaxation of social restrictions (Unlock). However, potential effect of these psychological behavior in endodontic cases have not been probed. Here, it is of great interest to explore the magnitude and buffering effect of two important psychological resources: satisfaction-with-life, and confidence in hospital-infection-control-policy in relation with COVID-19 risk perception on psychological impact due to fear for COVID-19.

Methods: Patients visiting Dental Clinic & Research Center for endodontic procedures were randomly asked to fill survey questionnaire, and were later enrolled as per the study criteria. The study carried out in two phases: from 15 Sept 2020 to 15 Dec 2020 (restrained confinement; Unlock 1.0); and from 16 Dec 2020 to 12 Feb 2021 (mild confinement; Unlock 2.0) with total sample size of 136. We used data collection tools such as fear-of-COVID-19 scale (FCV-19), perceived-stress-scale (PSS), modified-dental-anxiety-scale (MDAS), satisfaction-with-life scale (SWLS), COVID-19 risk perception, and confidence in hospital-infection-control-policy for COVID-19.

Results: A double moderation and dual moderated mediation structured model were used to establish the correlation of various parameters using SPSS (version 25.0) software suite. Confidence in hospital-infection-control-policy and SWLS were negatively correlated with FCV-19, MDAS, and PSS. Risk perception of COVID-19 was found to positively associated with FCV-19, MDAS, and PSS.

Discussion: Patient's confidence in hospital-infection-control-policy for COVID-19 and SWLS acted as independent moderator for FCV-19 and mental distress. FCV-19 and risk perception were found to be lower during mild confinement (Unlock 2.0), and were also the positive predictors of PSS; and negative predictors of SWLS. The higher SWLS correlated very well with lower COVID-19 risk perception, concerning PSS and MDAS.

Keywords: fear for COVID-19, risk perception of COVID-19, perceived stress, dental surgical procedures, satisfaction with life

Introduction

Our society, and the world as we know it, have been transformed in unprecedented ways by the COVID-19 pandemic. With finite resources and no evidence-based antiviral therapy, the COVID-19 outbreak created havoc, leading to severe

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mental insecurity and panic-like situation.[1] In order to manage the rapidly spreading infection and exponentially rising death tolls, the Government of India issued a 21-day nationwide lockdown on 25th March 2020. This put both healthy and unhealthy citizens, into an extemporaneous situation disrupting their day-to-day life. The situation soon led to widespread anxiety and stress, calling for mental health management, particularly, among the patients.[2] There were subsequent extensions of the lockdown, but with strategic lifts of certain restrictions, particularly, those pertaining to medical assistance and procurement of medical products and essential supplies. Dental clinics were declared essential services under the annex of the advisory order DE-22-BDS (Academic)- 2020/16042020 dated 16th April 2020. In this regard, the Dental Council of India, prioritized endodontic cases of "dental pain from pulpal inflammation, extensive dental caries or defective restorations" as imperative dental care, while suspending all others as nonessential procedures.

Increased public awareness on the risk of transmission of infective agents amongst dental patients and care providers has been shown to add extra preventative measures to clinical practices, during COVID-19 pandemic times.[3] Previous studies have registered a pooled prevalence of anxiety levels, due to both endodontic procedures related and unrelated factors.[4] Such endodontic procedures related to psychological effects are influenced mainly by prior experiences. In a pandemic situation, these psychological effects were compounded by the additional fear of contracting COVID-19.[5] The majority of psychosocial researches reported until now are in context of medical conditions unrelated to emergency and elective dental treatment. Thus, studies addressing the magnitude of mental health burden in dental patients in correlation with a pandemic as an unrelated contributing external factor will prove extremely informative. From a public health perspective, such organized studies can provide insights and clarity for dealing with psychological burdens in patients, who are under the influence of fear factors from more than one unrelated medical source. Aligning with this rationale, in the present study a double moderation and a dual moderated mediation model has been tested. In this model, patient satisfaction and confidence from emergency dental health services were expected to buffer the fear arising from the COVID-19 pandemic (Figure 1A). Satisfaction due to improved medical assistance experienced by the patients at the time of endodontic procedures helped in managing mental stress arising from the COVID-19 pandemic. This demonstrated how alleviation of stress from one medical condition could help in co-managing the mental burden from an unrelated medical cause. The above model was based on the postulation that COVID-19 fear could expand the risk perception, adding to the likelihood of mental distress. So, we also hypothesized that Satisfaction-with-Life would attenuate the association between risk perception and mental distress. Therefore, we further included the survey group (Unlock 1.0 and Unlock 2.0) as a moderator between fear for COVID-19 and risk perception. This is based on the fact that the COVID-19 is expressly circumstance related, while satisfaction of life is more steady and therefore likely to follow different temporal dynamics (Figure 1B).

Materials and Methods
Study Setting and Design
The present study was a prospective observational repeated cross-sectional study with a longitudinal design, which has been conducted as per STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) guidelines (Appendix Table 1). The study was carried out in two phases, from 15 Sept 2020 to 15 Dec 2020 (restrained confinement); and from 16 Dec 2020 to 12 Feb 2021 (mild confinement). For the purpose of comparatively analyzing the psychological impacts of COVID-19, these time periods have been labeled as "Unlock 1.0" and "Unlock 2.0", respectively. Study was conducted at Dental Clinic and Research Centre, Patanjali Bharatiya Ayurvigyan Evam Anusandhan Sansthan, Haridwar, Uttarakhand, India.

Participants
Dental patients visiting Dental Clinic and Research Centre, Patanjali Bharatiya Ayurvigyan Evam Anusandhan Sansthan, Haridwar, Uttarakhand, India for endodontic procedure were randomly asked to fill survey questionnaire, and were later enrolled on the basis of study criteria. Inclusion criteria for the study were ≥18 years of age, complaints of dental pain with over-sensitization and discomfort with a confirmed diagnosis for need of endodontic or dental extraction procedures. The lockdown restrictions and the contextual requirement for recruitment time frame had a significant impact on the
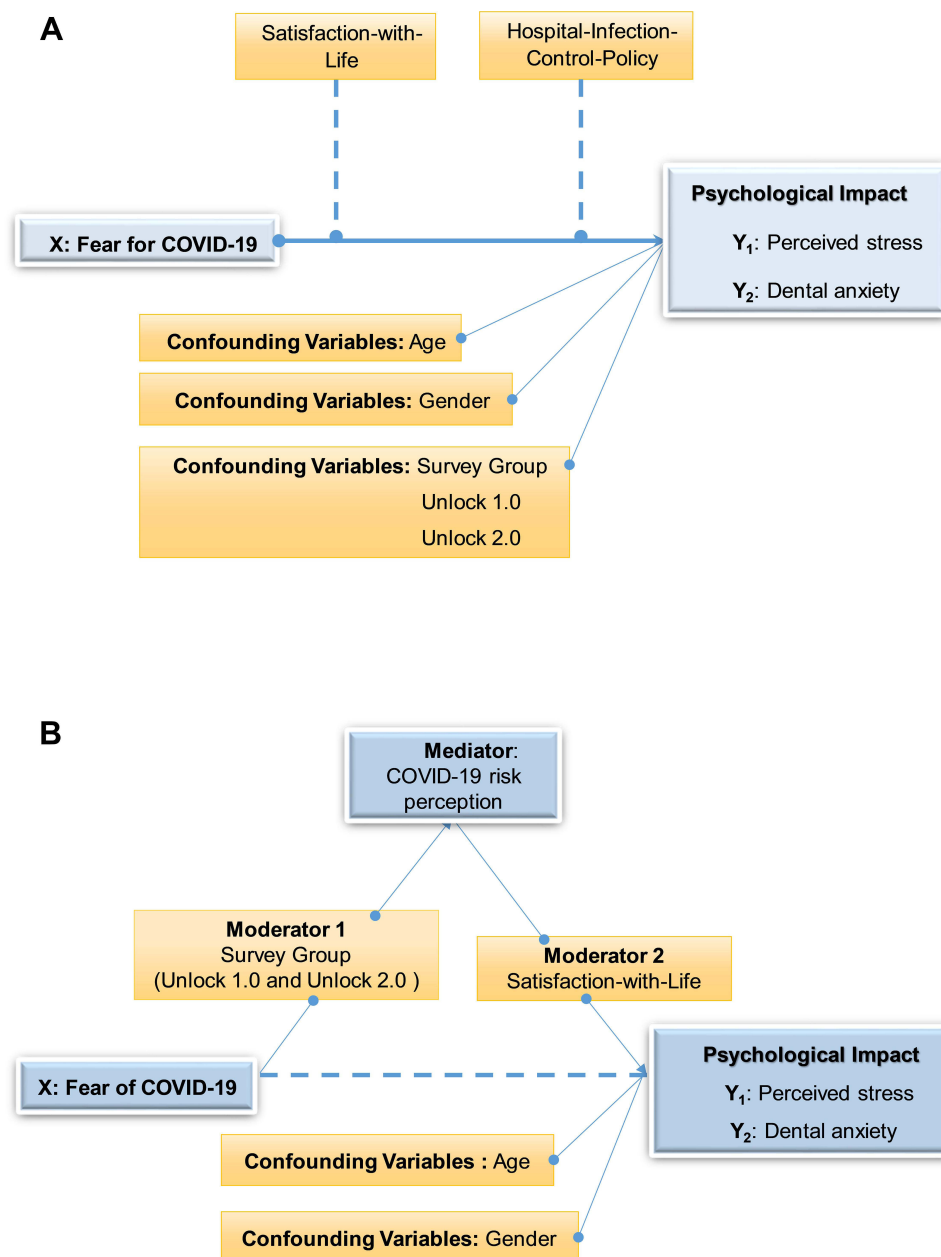
A

B

Figure 1 The hypothetical schema for dental-COVID study. (**A**) Confidence on hospital-infection-control-policy and satisfaction-with-life (SWL) moderate relationship between fear of COVID-19 (FCV-19) and psychological impact (dental anxiety perceived stress). (Double moderation process model 2). (**B**) COVID-19 risk perception mediates the relationship between fear for COVID-19 (FCV-19) and psychological impact (dental anxiety, perceived stress) with survey group and satisfaction-with-life (SWL) as a moderator. (Dual moderated mediation, process model 21).
Abbreviation: CV, covariates.

sample size of the study. Total of 72 participants were enrolled during restrained confinement (Unlock 1.0); whereas 64 participants were enrolled during mild confinement (Unlock 2.0), taking the study sample size to 136 dental patients.

Study Construct and Outcome Measures

Patient information was extracted through forward and backward translation of the filled questionnaires, that included two sections. The information on demographic features (age, gender, education, type of diet and co-morbid) and COVID-19 were collected from the first section, whereas the second section provided study measures and variables. The first section also collected information on frequency of dental visits per year, last visit for dental check-up, number of decayed teeth, and last

diagnosis. Information pertaining to individual COVID-19 infection and infection/death in the family was also obtained from this section.

An individual's COVID-19-related fear was measured from a seven-itemed, fear for COVID-19 Scale (FCV-19),[6] giving a total score between 7 and 35, with higher score indicating greater fear for COVID-19. Global level of stress felt by the participants was evaluated on a ten-itemed Perceived-Stress-Scale (PSS) questionnaire that assessed thoughts and feelings from the previous month, on a five-point Likert scale (1 = never, 2 = rarely, 3 = sometimes, 4 = often, and 5 = always).[7,8] The score ranged from 10 to 50, with a higher score indicating increased perceived stress.[9–11] Prior to treatment, dental-related psychological construct was created on a five-itemed Modified-Dental-Anxiety-Scale (MDAS), with a minimum-maximum range of 5–25, and a cut-off of ≥19, empirically accepted as indicative of high dental anxiety.[12–15] The Satisfaction-with-Life scale (SWLS) appraised the global cognitive judgments of one's life satisfaction,[16] based on the total scores (sum of all five items) ranging from 5 to 35, with higher scores suggesting greater life satisfaction.[17] A two-part questionnaire for COVID-19 Risk Perception and Hospital-Infection-Control-Policy for COVID-19 was designed in-house, reviewed, revised and validated by epidemiologists. The four-itemed first part on COVID-19 risk perception determined the magnitude of the uneasiness experienced by the participants upon personal or family exposure/diagnosis of COVID-19, with a Cronbach alpha (α) reliability score of 0.74. The second part, Hospital-Infection-Control-Policy for COVID-19, assessed a patient's confidence in infection-control measures practiced by hospital management, with a high internal reliability coefficient of 0.90.[18]

Statistical Analysis

SPSS Version 25.0 (PROCESS 3.5) was used to conduct a double moderation and a dual moderated mediation at <0.05 significance level, through bootstrapping of 5000 samples. The pattern of data distribution was identified from the Kurtosis and skewness coefficients.[19] Analysis of co-variance (ANCOVAs) were used to assess for differences between two categorical groups. Pearson correlation coefficient analysis was used to determine the relationships between the variables.

Results

Descriptive Statistics

All variables were found to be continuous in nature except for gender, survey group, and COVID-19 testing. Close to 60% of respondents were men. The age and education categorization, showed no significant differences in the demographic parameters between the two groups (Appendix Table 2).

It was observed that patients were affected by their synergistic dental and COVID-19 conditions. During Unlock 1.0, 16.2% of patients reported moderate; whereas 34.6% stated severe stress symptoms. These dynamics were different during Unlock 2.0, with 34.6% and 5.6% moderate and severe stress symptoms, respectively. Almost 50% reduction was observed in these dynamics from Unlock 1.0 to Unlock 2.0, as evident from 22.4% to 12.9% patients having cut-off beyond 19 on MDAS. Confidence in Hospital-Infection-Control-Policy also increased from 27.9% during Unlock 1.0 to 44.1% in Unlock 2.0 in the patients. SWLS showed a similar upward trend during Unlock 2.0 with a 24.3% increase from Unlock 1.0 (Figure 2 and Table 1).

Correlation matrix of all the six study variables, namely, COVID-19 risk perception, Confidence in Hospital-Infection-Control-Policy, FCV-19, MDAS, PSS and SWLS, from both Unlock 1.0 and Unlock 2.0 revealed that the data was coherent with its distribution well within the respective confidence limits (Figure 3A and B). The regression correlation coefficient (r) was observed to be at an optimal level (0.05 < r < 0.6) (Table 2). Confidence in Hospital-Infection-Control-Policy and SWLS were negatively correlated with FCV, MDAS, and PSS. COVID-19 risk perception had a positive association with FCV, MDAS, and PSS. We also conducted a multi-collinearity test on all the study data. Commonly, there could be a multi-collinearity skew when the correlation coefficient (r) is above 0.9, so a correlation coefficient of less than 0.6, as observed in our study, would be an acceptable baseline for validated analysis.[20] In addition, variance of inflation (VIF) is directly proportional to multi-collinearity. More specifically, multi-collinearity is not a problem if the tolerance value is greater than 0.10 or VIF is less than 10. In our study, the lowest tolerance value is 0.63 and the highest VIF is 3.78, confirming no bearing of multi-collinearity on our datasheet and its analysis.
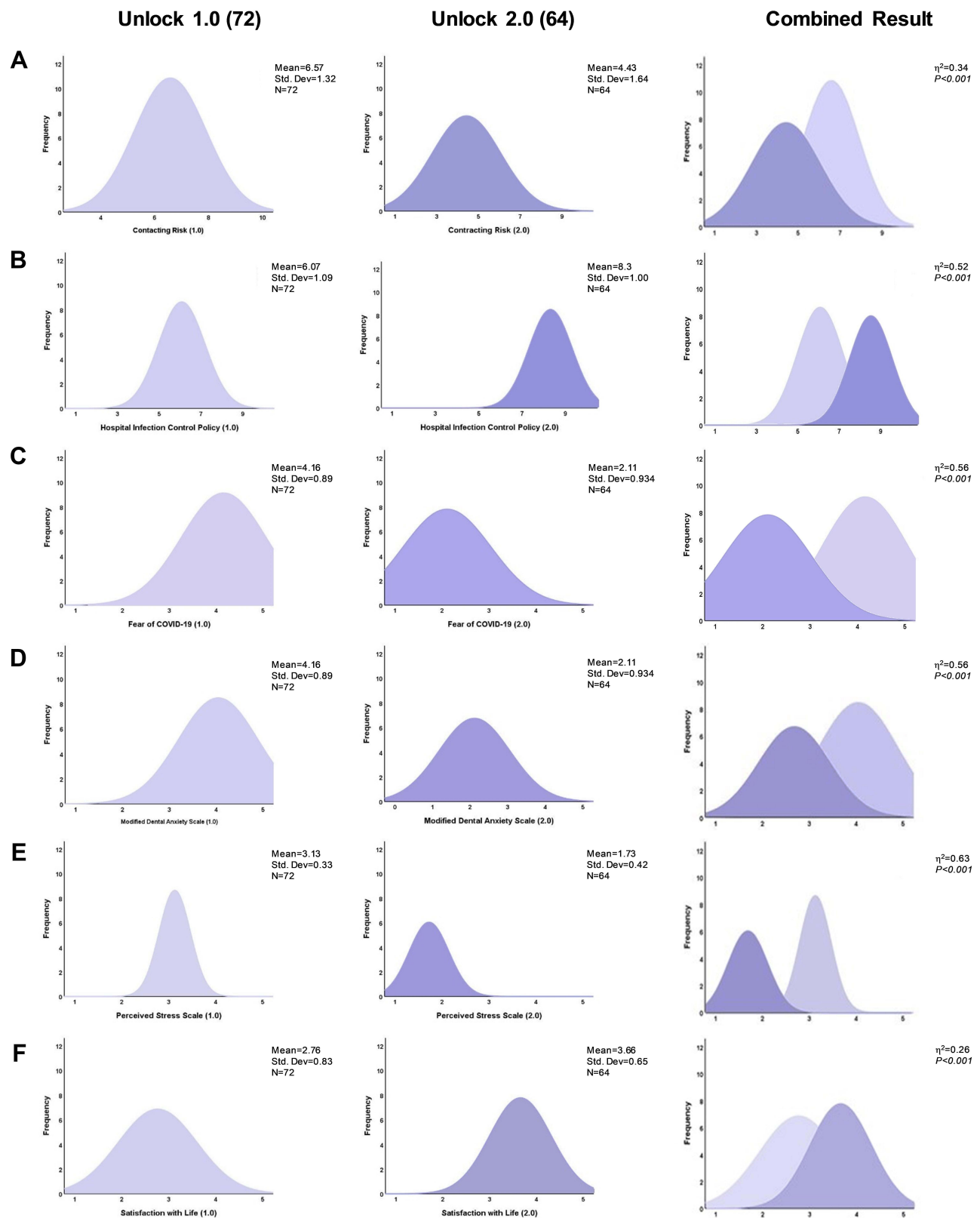
Figure 2 Difference [mean, standard deviation, effect size, and significance ($p < 0.05$)] in Unlock 1.0 and Unlock 2.0 for all the study variables: (**A**) COVID-19 risk perception; (**B**) hospital-infection-control-policy; (**C**) fear for COVID-19 (FCV-19); (**D**) dental anxiety; (**E**) perceived stress; (**F**) Satisfaction-with-life (SWL). [Std Dev: standard deviation; η^2 (effect size) which measures the strength of relationship between two variables].

Table 1 Cut-off Distribution of All Study Variable (COVID-19 Risk Perception, Hospital Infection Policy for COVID-19, Fear of COVID-19, Dental Anxiety, Perceived Stress, and Satisfaction with Life) Based on Demographic Factor (Age, Gender), Dental Procedure (Extraction and Root Canal Treatment; RCT) and Survey Group (Unlock 1.0); Restrained Confinement; (Unlock 2.0) Mild Confinement

Variable	Total	Gender		Age Group				Type of Dental Procedure		Survey Group		p (chi)*
		Male (%)	Female (%)	19–29 (%)	30–39 (%)	40–49 (%)	>50 (%)	Extraction (%)	RCT (%)	Unlock 1.0 (%)	Unlock 2.0 (%)	
COVID-19 risk perception												
Beyond cutoff of 60%	50.7	41.9	26.5	13.2	19.1	11.8	24.3	43.4	25	**45.6**	**22.8**	**<0.001***
Dental hospital infection control policy for COVID-19												
Beyond cutoff of 60%	72.1	40.4	31.6	15.4	23.5	11.0	22.1	51.5	20.6	**27.9**	**44.1**	**<0.001***
Fear of COVID-19												
Beyond cutoff of 47.14%	72.8	44.9	27.9	13.2	20.6	12.5	26.5	48.5	24.3	50.7	22.1	0.185
Dental anxiety												
% Beyond cutoff 19	35.3	14.0	21.3	5.1	7.4	8.1	14.7	24.3	11.0	**22.4**	**12.9**	**<0.001***
Perceived stress												
Medium	50.7	23.5	27.2	8.8	14.7	7.4	19.9	30.9	19.9	**16.2**	**34.6**	**<0.001***
High	40.4	14.7	25.7	8.8	12.5	6.5	12.5	33.1	7.4	**34.6**	**5.9**	**0.016***
Satisfaction with life												
Extremely dissatisfied	50.7	30.1	20.6	11.8	19.9	5.1	14.0	38.2	12.5	**13.2**	**37.5**	**<0.001***

Notes: *p value was considered significant at <0.05 between survey group (unlock 1.0 and unlock 2.0), significance level analysis was performed through chi-square (chi) test. All significant values have been marked in bold text.
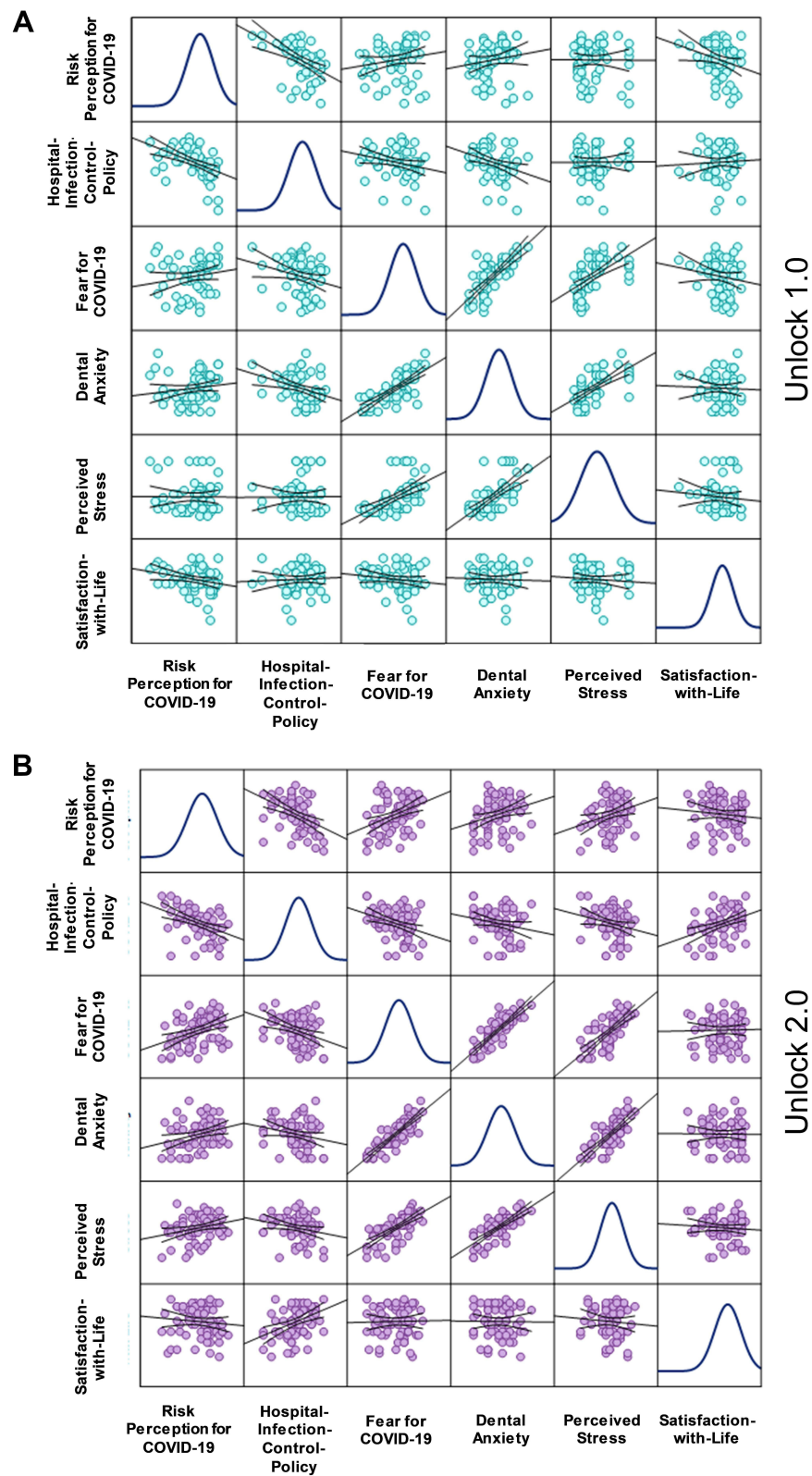
Figure 3 Pearson correlation analysis of patients included in the study with all the study variables: COVID-19 risk perception; hospital-infection-control-policy; fear for COVID-19 (FCV-19); dental anxiety; perceived stress; satisfaction-with-life (SWL) in the survey group (**A**) Unlock 1.0 (restrained confinement); (**B**) Unlock 2.0 (partial confinement).
Note: Blue colour normal distribution (bell curve) depicts perfect positive correlation between two variables.

Table 2 Summary Representation of Pearson Correlation of Significant Continuous Variables as Depicted in Figure 3

Variable	Fear for COVID-19	Dental Anxiety	Perceived Stress
COVID-19 risk perception Dental hospital infection control policy for COVID-19	0.547** −0.357**	0.550** −0.565**	0.460** −0.550**
Fear of COVID-19	1	0.689**	0.465
Dental anxiety	0.689**	1	0.752**
Perceived stress	0.465**	0.752**	1
Satisfaction with life	−0.254**	−0.338**	−0.482**

Note: **Correlation was significant at p value 0.001 level (two tailed).

Predicting Variables for Fear for COVID-19

Before testing our main hypothesis, we have reported the effect sizes (partial η^2) of potential predictors, namely, demographics and dental associated information, for increased FCV-19 (Appendix Table 3). The major effect was attributed to age ($p < 0.00$), education status ($p < 0.001$), and frequency of dental visits per year ($p = 0.002$). According to the data spread, participants in 40–49-year age group contributed most to FCV-19 variable (mean = 3.59 ± 0.34, $p < 0.001$). Based on this analysis, age was controlled during the subsequent testing of our hypothesis. We also observed that intermediate levels of education contributed to a higher level of FCV-19 (mean = 3.96 ± 0.13, $p < 0.001$). Likewise, a 3–4 dental visits were associated with raised FCV-19 (mean = 3.25 ± 0.14, $p = 0.002$).

Patient's Confidence in Hospital-Infection-Control-Policy for COVID-19 Moderated the Effects of FCV-19 on Components of Psychological Distress (MDAS and PSS)

We postulated that psychological distress is a function of personal characteristics and external stressors such as health conditions. We specifically asked whether confidence in Hospital-Infection-Control-Policy for COVID-19 and SWLS would moderate the effect of FCV-19 on psychological impact. FCV-19, confidence in Hospital-Infection-Control-Policy for COVID-19, SWLS, age, and survey group contributed to 66% of variance in PSS and 75% variance in MDAS. The pooled effect of these variables on PSS was significant with a variance (R^2) of 0.66 at F (8127) = 102.9330 ($p < 0.001$). Likewise, these variables moderated the MDAS model with a variance (R^2) of 0.75 at F (8127) = 92.84 ($p < 0.001$) (Table 3). Confidence in Hospital-Infection-Control-Policy for COVID-19 independently affected the association between FCV-19 and PSS with a variance (R^2) of 0.001 at F (1, 127) = 1.02 ($p = 0.01$). Association of FCV-19 with MDAS was also significantly affected by this variable as evident from a variance (R^2) of 0.004 at F (1, 127) = 4.26 ($p = 0.04$). SWLS also independently moderated the interactions between FCV-19 and PSS [$R^2 = 0.005$, F (1, 127) = 11.01 ($p = 0.008$)] and MDAS [$R^2 = 0.004$, F (1, 127) = 4.26 ($p = 0.04$)].

Risk Perception as a Moderated Mediator Between Fear for COVID-19 and Psychological Distress (MDAS and PSS)

The outputs of the dual moderated mediation analysis are provided in (Table 4). Our second hypothesis suggested that increased risk perception for contracting COVID-19 might jeopardize existential security and influence psychological well-being of patients.[21] This hypothesis assumes COVID-19 risk perception as a mediator between FCV-19 and psychological distress (PSS/MDAS). SWLS is assumed to reduce the probability of experiencing perceived stress and dental anxiety, thus moderating the path between COVID-19 risk perception and psychological distress. COVID-19 risk perception are lower in Unlock 2.0, making it another possible moderator of the path between FCV-19 and COVID-19 risk perception, as evident from the observed significant variance of (R^2) 0.41 [F (1, 132) = 32.44 ($p < 0.001$)]. With higher SWLS, patients experience lower levels of FCV-19, whereas patients with raised COVID-19 risk perception experience more FCV-19 post Unlock 2.0 [$R^2 = 0.40$, F (3, 132) = 18.44 ($p < 0.001$)]. The interaction of both of these parameters indicates a significant reduction in

Table 3 Conditional Direct Model of Satisfaction with Life and Dental Hospital Infection Control Policy Through Fear of COVID-19 and Double Moderated Effect of Psychological Impact (Perceived Stress and Modified Dental Anxiety)

Effect	Coeff.	SE	t	95% CI for Estimated Mean		p*	Coeff.	SE	t-test	95% CI for Estimated Mean		p*
				LL	UL					LL	UL	
	Perceived Stress Scale						**Modified Dental Anxiety Scale**					
Constant	2.14	0.62	3.45	0.92	3.37	**<0.00**	1.80	0.86	2.09	0.09	3.51	**<0.000**
Fear of COVID 19 (X)	0.28	0.14	1.95	−0.00	0.56	**<0.00**	0.56	0.19	2.81	0.16	0.95	**0.005**
Dental Hospital Infection Control Policy (Mod 1)	−0.01	0.01	−0.53	−0.03	0.02	**<0.00**	−0.53	0.02	−2.43	−0.09	−0.01	**0.010**
Interaction 1 (X*Mod 1)	0.01	0.00	0.44	−0.01	0.01	**<0.00**	0.13	0.00	2.36	0.00	0.02	**0.002**
Satisfaction with Life (Mod 2)	−0.23	0.13	−1.77	−0.49	0.02	**0.03**	−0.15	0.18	0.84	−0.20	0.51	**0.005**
Interaction (X*Mod 2)	0.02	0.04	0.68	−0.05	0.10	**0.02**	−0.53	0.05	−1.05	0.15	0.04	**0.004**
Age	0.00	0.00	0.11	−0.00	0.00	**<0.00**	−0.01	0.01	0.63	0.05	0.024	**0.002**
Gender[a]	0.01	0.05	0.25	−0.09	0.12	0.79	−0.61	0.49	1.23	1.58	0.365	0.218
Survey Group[b]	−0.88	0.08	−1.91	−1.04	−0.72	**<0.00**	−0.99	0.84	−1.18	−2.64	0.662	0.237
	R^2 =0.66, F (8127) =102.93; $p < 0.00$						R^2 =0.75, F (8127) =92.84; $p < 0.00$					

Notes: *p value was significant at <0.05. All significant values have been marked in bold text. [a]Male = 1, female = 2; [b]Unlock 1.0 =1, unlock 2.0 =2.
Abbreviations: SE, standard error; CI, confidence interval; LL, lower limit; UL, upper limit; DV, dependent variable.

Table 4 Conditional Indirect Model with Mediating Effects of COVID-19 Risk Perception and Double Moderating Effects of Satisfaction with Life and Survey Group Besides Perceived Stress as Dependent Variable

Effect	Coeff.	SE	t	95% CI for Estimated Mean		p*	Coeff.	SE	t-test	95% CI for Estimated Mean		p*
				LL	UL					LL	UL	
	Survey Group						**Perceived Stress (DV)**					
Constant	3.03	0.38	8.05	2.29	3.78	**<0.00**	1.62	0.42	3.88	0.79	2.44	**<0.00**
Fear of COVID-19 (X)	0.15	0.09	1.69	−0.03	0.32	**<0.00**	0.19	0.11	1.69	−0.03	0.41	**0.01**
COVID-19 Risk Perception (Med)							0.02	0.00	3.39	0.01	0.03	**<0.00**
Survey Group (Mod 1)												
Interaction (X*Mod 1)	0.07	0.05	1.30	−0.04	0.18	**<0.00**						
Satisfaction with life (Mod 2)							−0.26	0.11	−2.30	−0.48	−0.04	**0.02**
Interaction (Med*Mod 2)							0.04	0.03	1.46	−0.02	0.10	**0.05**
Age	0.001	0.004	0.46	−0.01	0.10	0.65	0.00	0.00	0.55	−0.01	0.01	0.19
Gender[a]	0.07	0.14	0.48	−0.21	0.34	0.63	0.24	0.15	1.62	−0.05	0.53	0.11
	R^2 =0.63, F (2132) =103.9; $p < 0.00$						R^2 =0.39, F (2132) =112.90; $p < 0.00$					

Notes: *p value was significant at <0.05. All significant values have been marked in bold text. [a]Male = 1, female = 2.
Abbreviations: SE, standard error; CI, confidence interval; LL, lower limit; UL, upper limit; DV, dependent variable.

SWLS after mild confinement. The pooled effect of FCV-19, COVID-19 risk perception, along with survey group as a moderator between these two, interaction between SWLS and COVID-19 risk and demographics of age and gender accounted for 63% of the variance [F (1, 127) = 103.9 (p < 0.001)]. We also found that COVID-19 risk perception decreases with a decrease in patient's fear for COVID-19 during Unlock 2.0 (Appendix Figure 1A). Likewise, the pooled effect of all these variables affected perceived stress [R^2 = 0.39, F (2, 132) = 12.90 (p < 0.001)]. Higher COVID-19 risk perception was found to be associated with lower SWLS concerning PSS [R^2 = 0.04, F (1, 132) = 0.06 (p = 0.049)].

Similar to PSS, the pooled effect of the analyzed variables moderated MDAS [R^2 = 0.39, F (2, 132) = 28.44 (p = 0.001)] (Table 5). The interaction between FCV-19 and the survey group independently also moderated MDAS [R^2 = 0.46, F (2, 132) = 32.72 (p = 0.021)].

The mediator-moderator crosstalk between COVID-19 risk perception and SWLS generated a variance (R^2) of 0.01 [F (2, 132) = 2.81 (p = 0.10)], indicating that high COVID-19 risk perception in patients with low SWLS led to increased PSS and MDAS, in contrast to patients with high SWLS (Appendix Figure 1B).

An index value of −0.09 (SE = 0.20, 95% CI = 0.2–0.02) of the moderated mediation model supported the hypothesis that the mediator, COVID-19 risk perception, modulated the effect of FCV-19 on psychological impacts through the moderators, survey group and SWLS.

Discussion

The present study reports the acute psychological stress in patients seeking emergency dental services during the COVID-19 Unlock 1.0 and Unlock 2.0 phases in India. Generation of high aerosols and small distance between the patients and doctors increases the risk of infection.[22,23] Previous studies have highlighted the impact of COVID-19 on mental health on patients with different health conditions.[24] Similarly, we found a reduction in the association with SWLS and confidence in Hospital-Infection-Control-Policy for COVID-19.

Moderate FCV-19 was observed in the participants of this study, with moderate to high psychological distress levels in most cases. Such psychological distresses can be attributed to dental surgical experiences with high probability of

Table 5 Conditional Indirect Model with Mediating Effects of COVID-19 Risk Perception and Double Moderating Effects of Satisfaction with Life and Survey Group Besides Dental Anxiety as Dependent Variable

Effect	Coeff.	SE	t	95% CI for Estimated Mean		p*	Coeff.	SE	t-test	95% CI for Estimated Mean		p*
				LL	UL					LL	UL	
	Survey Group						**Modified Dental Anxiety Scale (DV)**					
Constant	0.65	0.67	0.97	−0.68	1.99	**0.033**	0.27	0.61	0.77	0.14	1.49	**0.006**
Fear of COVID-19 (X)	0.88	0.16	1.60	0.57	1.20	**0.000**	0.81	0.16	4.98	0.49	1.14	**0.000**
COVID-19 Risk Perception (Med)							0.01	0.01	1.20	0.01	0.02	**0.003**
Group (Mod 1)												
Interaction (X*Mod 1)	0.06	0.10	0.58	0.05	0.14	**0.042**						
Satisfaction with Life (Mod 2)							0.08	0.17	0.17	0.06	0.30	**0.030**
Interaction (Med*Mod 2)							0.09	0.04	0.13	0.08	0.18	**0.002**
Age	0.00	0.00	−0.79	−0.01	0.00	0.43	0.00	0.01	−0.55	−0.01	0.01	0.59
Gender[a]	−0.16	0.10	−1.64	−0.36	0.03	0.10	0.24	0.15	1.62	−0.05	0.53	0.11
	R^2 =69, F (2132) =59.01; p < 0.00						R^2 =0.39, F (2132) =28.44; p < 0.00					

Notes: *p value was significant at <0.05. All significant values have been marked in bold text. [a]MALE = 1, female = 2.
Abbreviations: SE, standard error; CI, confidence interval; LL, lower limit; UL, upper limit; DV, dependent variable.

hospital-acquired infection transmission.[25,26] In previous studies, the prevalence of FCV-19 has not been specified as other emotional states predictive of fear, such as anxiety in dental patients.[27]

Elderly patients, patients with post-graduate education status and those with dental hospital visits more than seven times during the confinement period experienced greater fear for COVID-19. The previous studies reveal that the two main factors that can generate high levels of fear and anxiety are the virulence and lethality of COVID-19, especially in aged individuals and those with existing comorbidities.[28] This finding is insightful for the predictors of critical experiences. In addition, hospital visits have also been an independent factor for increased fear for COVID-19. This new and unexpected pandemic situation has caused changes in hospital routines and protocols which could well be a speculated reason for the observed increase in fear in the population.[29]

COVID-19 risk perception has a significant association with three components: FCV-19, MDAS, and PSS. Previous studies showed that a strong correlation of risk perception with the seriousness of an endemic such as Middle East Respiratory Syndrome and H1N1 flu is an independent predictor of protective behaviors.[30] Researchers accept that a higher level of risk perception can stimulate anxiety and stress, which encourages the adoption of mediating strategies.[31] The current study has demonstrated that the confidence in the Hospital-Infection-Control-Policy of COVID-19 was negatively related to psychological distress. The present study also shows that SWLS has a negative association with psychological distress, in line with the earlier observations.[32]

Besides investigating the occurrence and complex impact of fear during the pandemic, the present study showcases positive direct and moderating effects of two psychological resources: confidence in Hospital-Infection-Control-Policy for COVID-19, and SWLS. As expected, decreased FCV-19 was associated with substantially less psychological distress, when patients had satisfaction with their lives, due to confidence in medical services for managing the pandemic. SWLS and the confidence in Hospital-Infection-Control-Policy for COVID-19 had buffering effects that attenuated the acute psychological impact due to COVID-19.

Hospital-Infection-Control-Policy for COVID-19 and SWLS were two parameters which acted as individual supportive structures in the patient's duration of a hospital visit and surgical endodontic procedures during this COVID-19 pandemic. The reduction in risk perception for COVID-19 and FCV-19 were significantly marked in Unlock 2.0 when compared to Unlock 1.0.

The findings might have a few inherent limitations. The sampling method, with a 78.8% response rate, infused a chance of bias due to non-respondents, which may limit the generalization of our findings. The correlative findings from this study should cautiously extended to cases other than endodontic procedures. Some scales were newly developed, whose suitability was preliminarily validated for the current study. Preliminary indications of its validity can be inferred from the fact that the scale correlated with demographic characteristics and study variables. Finally, the cross-sectional samples to yield insights on mental health outcomes and existential endpoints with the mediation model could be less probable as hypothesized. We tried to mitigate this problem by testing models with different implied directions. Albeit, follow-up studies are programmed to make it more representative and longitudinal research to explore the relationship between defined variables.

Conclusion

This study indicated that elderly patients had relatively higher fear of contracting COVID-19. This problem will likely be even further worsened if the hospitals are filled with COVID-19 patients, leading to interrupted access of regular healthcare to non-COVID patients. In response to this delinquency, the policymakers should put efforts to provide tele-health consultations remotely. From our findings, Hospital-Infection-Control-Policy and SWLS were independent moderators to psychological distress and fear for contracting COVID-19. Considering that as an underlying important measure for mitigation of COVID-19, availability of adequate health care facilities under designed policy should be considered at utmost priority. Robust infection control measures could be implemented as an indicator of the performance of health-care systems. We observed a relatively high psychological impact and risk perception for COVID-19 especially during the refrained confinement, suggesting that long-term negative developments are being triggered by the lockdown. Also, higher SWLS correlated with lower COVID-19 risk perception and psychological distress. Hence, mental health intervention programs would be important to increase the training activities aimed at increasing life satisfaction, in order to protect

public mental health, especially for the dental patients. It would strengthen the patient's resilience, coping strategies and reduce stress, eventually resulting in overall psychological well-being.

Future Directions

Implementing robust hospital-infection-control-policy markedly reduce the possibility of nosocomial infections during these challenging times of COVID-19 pandemic. Therefore, importance of an effective implementation of Hospital-Infection-Control-Policy for COVID-19 becomes central to SWLS of dental patients, especially in the developing world. This study lays a stronger foundation for longer term psycho-somatic studies across geographical boundaries. This would hopefully direct towards better patient compliances in terms of their dental well-beings.

Ethical Consideration and Informed Consent Form

The study and the related procedures were conducted in compliance with the guidelines of "Ethical principles for medical research involving human subjects" of the Helsinki Declaration. The study was approved by the Institutional Ethics committee (IEC), Patanjali Bhartiya Ayurvigyan Evam Anusandhan Sansthan, Haridwar, Uttarakhand, India (vide approval # PAC/IEC/2021/01). The study and surgical procedures were executed according to standard local dental protocols classified as surgical procedures done in the oral and maxillofacial area. These were consistent with the hospital policy following dental advisory issued by the Ministry of Health and Family Welfare (MoHFW), India.[33] The written informed consent was obtained from each participant after the nature of the study procedures was explicitly explained.

Acknowledgments

Disclosure

Acharya Balkrishna is an honorary trustee in Divya Yog Mandir Trust that governs Divya Pharmacy, Haridwar; and holds an honorary managerial position in Patanjali Ayurved Ltd., Haridwar, Uttarakhand, India. Divya Pharmacy and/or Patanjali Ayurved Ltd., Haridwar were not involved in any aspects of the study reported here. All other authors declare no conflicts of interests.

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