

**SHORT PAPER**

# Comparative analysis of perceived stress in dermatologists and other physicians during national lock-down and COVID-19 pandemic with exploration of possible risk factors: A web-based cross-sectional study from Eastern India

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**Abstract**

Since the declaration of coronavirus disease 2019 (COVID-19) as global pandemic, several countries including India have enforced a national lock-down. We aimed to compare the perceived stress of dermatologists and nondermatologists, due to lock-down and COVID-19 pandemic and analyze the role of possible risk factors. We conducted a web-based cross-sectional study to determine the perceived stress of doctors using the Perceived Stress Scale-10 and evaluate possible risk factors. Among 384 valid responders, we had 37.5% dermatologists and 62.5% nondermatologists. Perceived stress was more in nondermatologists compared to dermatologists, but not statistically significant ( $P = 0.1$ ). Degree of stress was also comparable ( $P = 0.5$ ). Higher stress was significantly associated with females and unmarried individuals in both groups. Risk of infecting self or colleagues or family members and lack of protective gear at work place were top causes of stress. Perceived stress is increased in all doctors due to COVID-19 pandemic and lock-down. Even dermatologists have developed high stress due to current situation, comparable to nondermatologists, despite being traditionally considered an outpatient speciality with minimum stress. Thus, proper mental health care policies should be adopted for all doctors, including dermatologists.

**KEYWORDS**

COVID-19, dermatologists, nondermatologists, pandemic, perceived stress, lock-down

**1 | INTRODUCTION**

Coronavirus disease 2019 (COVID-19) emerged in China in late 2019,<sup>1</sup> and spread rapidly across the world to be declared a global pandemic by World Health Organization in March 2020,<sup>2</sup> India has also witnessed an explosion of cases, reaching 1300 infections by March end.<sup>3</sup> So, the central government declared a national lockdown from March 25, 2020 to May 31, 2020 to contain its spread,<sup>4</sup> by prohibiting nonemergency travel.

COVID-19 has caused immense psychological stress in doctors due to its unpredictable course, high infectivity, and mortality, even involving their peers, without any definite cure.<sup>5</sup> Stress may be

aggravated by home confinement<sup>1</sup> and loss of interpersonal communications may instill a feeling of isolation, frustration, boredom, anger, and even impending death,<sup>1,6</sup> leading to widespread, substantial, and long-lasting psychosocial impact.<sup>7</sup>

In India, the situation is more critical as doctors are overworked without adequate protection gears, thus increasing their risk of infection. The biggest risk is transmission to family members as there is none to take care of them during lock-down. Besides, the lockdown has caused severe economic depression,<sup>4</sup> uncertain availability of food, transport, and other necessary items and lack of leisure activities—thus worsening their mental health. Additionally, in countries like India doctors are being socially discriminated as potential

infective sources despite their professional commitment. Collectively, these factors may impair cognitive functioning, decrease decision-making capabilities, and increase chance of medical errors eventually worsening patient care.<sup>8</sup>

In India, doctors from all disciplines are being entrusted COVID-19 duties, including dermatologists, without adequate training. Dermatologists may be exposed during triage and infection screening of outpatients and managing indoor patients with COVID-19 infection.<sup>9</sup> Home confinement due to lock-down is an additional stressor. Traditionally, dermatology is considered an outpatient speciality with minimum stress. However, the authors contest the popular view in this situation. We need to evaluate the mental health of doctors in this context and address them adequately, to improve their performance. "Perceived stress" is the amount of stress one has to deal over a given time period, providing an objective assessment of one's mental health.<sup>10</sup>

Few studies have examined psychological stress in doctors during COVID-19 pandemic, especially in India. So, we attempted to compare the psychological stress of dermatologists and nondermatologists

engaged in COVID-19 care in Eastern India and analyze its causes. Considering national lockdown, we conducted a web-based survey.

## 2 | MATERIALS AND METHODS

We conducted a cross-sectional web-based survey using an English questionnaire, designed using Google forms. It was circulated among frontline doctors across Eastern India from April 3, 2020 to April 10, 2020 using online platforms like WhatsApp, Facebook, and email. Since India was under lock-down during the study period, we could additionally assess its effect. The questionnaire was validated by five independent psychiatrists (subsequently excluded) and pilot tested. We

**TABLE 1** Demographic characteristics and stress of the survey participants (n = 384)

Parameters	Dermatologists (n = 144)	Nondermatologists (n = 240)
Age (years)*		
Mean (SD)	33.7 (9.3)	30.8 (7.8)
Age group in years, n (%)*		
23-34	106 (73.6)	202 (84.2)
35-49	23 (15.9)	28 (11.7)
≥50	14 (9.7)	10 (4.2)
Sex (M:F)	1:1.1	1.5:1
Marital status, n (%)*		
Single	63 (43.8)	139 (57.9)
Married	81 (56.3)	101 (42.1)
Area of work		
Rural: urban	1:8.6	1:6.7
Type of service, n (%)*		
Government service	44 (30.6)	47 (19.6)
Private practice	59 (40.9)	162 (67.5)
Both	41 (28.5)	31 (12.9)
PSS score		
Mean (SD)	18.7 (6.2)	19.6 (5.7)
Degree of stress, n (%)		
Low stress	23 (15.9)	31 (12.9)
Moderate stress	107 (74.3)	179 (74.6)
High stress	14 (9.7)	30 (12.5)

Abbreviations: M:F, male:female, PSS score, Perceived Stress Scale score. \* $P < .05$ .

**TABLE 2** Baseline characteristics and magnitude of stress in survey participants (intragroup analysis; n = 384)

Parameters	Dermatologists (n = 144)	Non-dermatologists (n = 240)
	PSS score—mean (SD)	PSS score—mean (SD)
Age (years)		
• 20-34	19.2 (6.2)	19.9 (5.7)
• 35-49	17.5 (5.7)	18.8 (5.5)
• ≥50	16.3 (6.3)	16.1 (4.5)
Sex*		
• Males	17.1 (6.04)	18.2 (5.8)
• Females	19.97 (6.04)	21.7 (4.8)
Marital status*		
• Single	19.6 (5.6)	20.2 (5.6)
• Married	17.9 (6.5)	18.8 (5.6)
Work experience (years)		
• ≤5	19.3 (6.2)	19.8 (5.8)
• 6-9	15.3 (4.3)	18.7 (4.4)
• ≥10	17 (5.8)	17.5 (4.2)
Residence**		
• Rural	21.9 (3.4)	20.3 (6.3)
• Urban	18.3 (6.3)	19.5 (5.6)
Type of job/service		
• Government job	19.3 (5.7)	18.6 (5.1)
• Private practice/job	19.2 (6.1)	20.1 (5.7)
• Both	17.1 (6.6)	18.7 (5.9)
Type of duty at workplace		
• Regular OPD	17.8 (5.3)	19.3 (5.3)
• Outdoor screening of suspected patients	19.5 (6.4)	19.9 (6.9)
• Indoor care of suspected patients	21.5(4.6)	20.8 (5.7)
• Indoor care of confirmed COVID-19 patients	13	18.5 (9.9)
• None of the above	19.2 (7.3)	19.8 (5.1)

Abbreviation: PSS, Perceived Stress Scale.

\* $P < .05$  for both dermatologists and nondermatologists; \*\* $P < .05$  only for dermatologists.

categorized the participants into two groups: dermatologists and non-dermatologists (internists, pediatricians, otorhinolaryngologists, respiratory medicine specialists, psychiatrists, and general physicians). Active COVID-19 infection was the exclusion criteria. All participants were assured about the anonymity and confidentiality of their responses.

The final questionnaire contained 27 items in 3 sections: *sociodemographic and professional data* (age, sex, marital status, residence, speciality [dermatology/nondermatology], work experience, and type of service) termed "basic characteristics"; *stress assessment* (10 items of the Perceived Stress Scale-10 [PSS-10])<sup>10</sup> to assess the perceived stress of responders due to pandemic and lock-down—the total score ranged from 0 to 40; severity of stress graded as low (0-13), moderate (14-26), and high (27-40); and *possible risk factors/etiology of stress* (7 dichotomous questions [yes/no] regarding some plausible causes of stress in this context like "Economic uncertainty," "Uncertain availability of food transport and other necessary activities," "Personal or family health problems [pregnancy, comorbidities, children, aged parents, etc.]," "Lack of leisure activities due to home quarantine," "Risk of transmission of COVID-19 infection to family and friends," "Risk of self-infection with COVID-19 due to exposure at workplace," and "Lack of protective gear at workplace/hospital while attending COVID-19 patients").

All valid responses were statistically analyzed using MedCalc v12.5.0, with standard and appropriate methods. A *P* value of <.05 has been considered significant.

### 3 | RESULTS

We received 384 valid responses during the study period, using snow-ball sampling technique for statistical analysis.

#### 3.1 | Demographic characteristics and stress

Table 1 shows the demographic variables. PSS score was higher in nondermatologists (*n* = 240) compared to dermatologists (*n* = 144); however, this difference was not statistically significant (*P* = 0.1). In both groups, maximum participants suffered from moderate stress, followed by low and high stress (*P* = 0.5, Chi square; Table 1).

#### 3.2 | Basic characteristics and stress

In both groups, stress score was significantly high in females and unmarried individuals, and in rural dermatologists. Younger age, ≤5 year work experience, and indoor care of suspected COVID-19 patients were other important causes of stress in both groups. Interestingly, among nondermatologists, higher education (post-graduation) resulted in lesser stress (*P* = 0.1; Table 2). Regression model showed residence and sex to be significant predictors of high PSS score in dermatologists and nondermatologists, respectively.

**TABLE 3** Baseline characteristics and severity of perceived stress in survey participants (*n* = 384)

Baseline characteristics	Dermatologists ( <i>n</i> = 143)			Nondermatologists ( <i>n</i> = 240)		
	Number (%)	Low stress ( <i>n</i> )	Moderate and high stress ( <i>n</i> )	Number (%)	Low stress ( <i>n</i> )	Moderate and high stress ( <i>n</i> )
Age (years)						
• 20-34	106 (73.6)	13	93	202 (84.2)	25	177
• 35-49	23 (15.9)	5	18	28 (11.7)	4	24
• ≥50	14 (9.7)	5	9	10 (4.2)	2	8
Sex						
• Males	69 (47.9)	15	54	144 (60)	28	116
• Females	75 (52.1)	8	67	96 (40)	3	93
Marital status						
• Single	63 (43.8)	8	55	139 (57.9)	14	125
• Married	81 (56.3)	15	66	101 (42.1)	17	84
Work experience (years)						
• ≤5	109 (75.7)	13	96	213 (88.8)	28	185
• 6-9	8 (5.6)	3	5	10 (4.2)	1	9
• ≥10	27 (18.8)	7	20	17 (7.1)	2	15
Residence						
• Rural	15 (10.4)	5	10	31 (12.9)	5	26
• Urban	129 (89.6)	23	106	209 (87.1)	26	183
Type of job/service						
• Government job	44 (30.6)	4	40	47 (19.6)	7	40
• Private practice/job	59 (40.9)	9	50	162 (67.5)	19	143
• Both	41 (28.5)	10	31	31 (12.9)	5	26

Note: *P* values represent intragroup values, calculated using Chi-square test.

Intergroup analysis showed significantly higher stress in non-dermatologists in the following parameters: female gender ( $P < .001$ ), 6 to 9 years work experience ( $P < .001$ ), regular outpatient department (OPD) duties ( $P = 0.008$ ), and those engaged in both government and private practice ( $P = .01$ ). However, rural dermatologists showed a significantly higher stress compared to rural nondermatologists ( $P = 0.005$ ; Table 2).

Among nondermatologists, more females (96.9%) demonstrated higher (moderate or severe) stress than males (80.6%), this difference being statistically significant ( $P = 0.005$ ; Table 3).

Logistic regression showed exclusive private practice to be a significant risk factor for higher stress among dermatologists ( $P = 0.04$ ), while female nondermatologists were more prone to develop higher stress ( $P = 0.001$ , AOR [adjusted odd's ratio] 8.01, 95% CI [confidence interval] 2.3-27.8).

### 3.3 | Risk/etiologic factors and stress

Regarding possible risk/etiologic factors, most respondents had  $\geq 1$  cause. In both groups, risk of transmitting infection to family and friends was the commonest cause, followed by lack of protective gear at workplace and risk of self-infection. However, the difference was statistically significant only regarding "lack of protective gear at workplace" (59.2% nondermatologists vs 45.8% dermatologists;  $P = 0.02$ ; Table 4).

Intragroup analysis showed higher stress scores to be significantly associated with all risk factors except lack of leisure activities (all  $P$  values  $< 0.05$ ; Table 5) However, linear regression showed risk of self-infection to be the only significant risk factor in dermatologists ( $P = 0.003$ ) compared to uncertain availability of food, transport, and other necessary items ( $P = 0.02$ ) and lack of protective gear at work place ( $P = 0.006$ ) in nondermatologists (Table 5).

**TABLE 4** Risk factors and severity of perceived stress in survey participants (n = 384)

Etiology/reason of stress	Dermatologists (n = 144)				Nondermatologists (n = 240)			
	Number (%)	Low stress (n)	Moderate stress (n)	High stress (n)	Number (%)	Low stress (n)	Moderate stress (n)	High stress (n)
Economic uncertainty during home quarantine/lockdown:								
• Yes	49 (34)	4	39	6	72 (30)	6	55	11
• No	95 (66)	19	66	10	168 (70)	25	124	19
Uncertain availability of food, transport, and other necessary supplies during home quarantine/lockdown*								
• Yes	44 (30.6)	6	32	6	70 (29.2)	5	49	16
• No	100 (69.4)	17	75	8	170 (70.8)	26	130	14
Personal or family health problems (pregnancy, comorbidities, children, aged parents, etc.)								
• Yes	55 (38.2)	5	43	7	100 (41.7)	9	76	15
• No	89 (61.8)	18	64	7	140 (58.3)	22	103	15
Lack of leisure activities due to home quarantine								
• Yes	31 (21.5)	3	24	4	63 (26.3)	9	47	7
• No	113 (78.5)	20	83	10	177 (73.4)	22	132	23
Risk of transmission of COVID-19 infection to family and friends*								
• Yes	93 (64.6)	11	72	10	166 (69.2)	11	132	23
• No	51 (35.4)	12	35	4	74 (30.8)	20	47	7
Risk of self-infection with COVID-19 due to exposure at workplace**								
• Yes	62 (43.1)	7	45	10	121 (50.4)	8	93	20
• No	82 (56.9)	20	58	4	119 (49.6)	23	86	10
Lack of protective gear at workplace/hospital while attending COVID-19 suspected/infected patients*¶								
• Yes	66 (45.8)	7	51	8	142 (59.2)	9	106	27
• No	78 (54.2)	16	56	6	98 (40.8)	22	73	3

\* $P < .05$  only for nondermatologists (intragroup); \*\* $P < .05$  for both dermatologists and nondermatologists (intragroup); ¶ $P < .05$ , intergroup

**TABLE 5** Risk factors and magnitude of stress in survey participants (n = 384)

Risk factors	Dermatologists (n = 144)	Nondermatologists (n = 240)
	PSS score—mean (SD)	PSS score—mean (SD)
Economic uncertainty during home quarantine/lockdown*		
• Yes	19.9 (6.1)	20.7 (5.4)
• No	17.9 (6.1)	19.1 (5.7)
Uncertain availability of food, transport and other necessary supplies during home quarantine/lockdown*¶		
• Yes	19.8 (6.4)	21.7 (5.5)
• No	18.2 (6)	18.7 (5.5)
Personal or family health problems (pregnancy, comorbidities, children, aged parents, etc.)*		
• Yes	20.1 (6.6)	20.7 (5.1)
• No	17.8 (5.8)	18.8 (5.9)
Lack of leisure activities due to home quarantine		
• Yes	19.3 (5.9)	19.8 (5.8)
• No	18.5 (6.2)	19.5 (5.6)
Risk of transmission of COVID-19 infection to family and friends*		
• Yes	19.4 (5.9)	20.4 (4.8)
• No	17.3 (6.4)	17.7 (6.8)
Risk of self-infection with COVID-19 due to exposure at workplace*		
• Yes	20.8 (5.5)	20.4 (4.9)
• No	17 (6.2)	18.3 (6.1)
Lack of protective gear at workplace/hospital while attending COVID-19 suspected/infected patients*¶		
• Yes	19.7 (5.5)	21.2 (4.9)
• No	17.8 (6.6)	17.3 (5.8)

Abbreviation: PSS, Perceived Stress Scale.

\* $P < .05$  for both dermatologists and nondermatologists (intragroup); ¶ $P < .05$  intergroup for “yes” option.

Intergroup analysis (Table 5) showed stress scores to be high in nondermatologists regarding two parameters: “Uncertain availability of food, transport and other necessary items” ( $P = 0.002$ ) and “Lack of protective gear at hospitals/workplace” ( $P = 0.006$ ). Intragroup analysis revealed following observations: 56.9% dermatologists did not consider risk of self-infection to be associated with higher stress ( $P = 0.02$ ); 70.8% nondermatologists did not find uncertain availability of food, transport, and other necessary items to affect the severity of stress ( $P = 0.004$ ), while 50.4% and 69.2% nondermatologists reported that risk of self-infection due to exposure at work place ( $P = 0.004$ ) and fear of its transmission to family members and friends ( $P = 0.0001$ ) to result in higher stress (Table 4).

In dermatologists, risk of self-infection was a significant predictor of higher stress (moderate/high;  $P = 0.02$ , AOR 4.9, 95% CI 1.3-18.6), while in nondermatologists, fear of transmitting infection to family/friends was the only significant risk factor for moderate or severe stress ( $P = 0.003$ , AOR 3.6, 95% CI 1.5-8.5).

## 4 | DISCUSSION

Our study included 144 (37.5%) dermatologists (mean age 33.7 years) and 240 (62.5%) nondermatologists (mean age 30.8 years). This age group is the most conversant with newer technologies including internet usage, thus explaining their predominance.

In our study, the overall mean (SD) PSS-10 score for all doctors was 19.2 (5.9), higher than the global mean due to COVID-19 pandemic (17.4 [6.4])<sup>11</sup> or severe acute respiratory syndrome (SARS) outbreak (18.5).<sup>12</sup> This difference may be attributed to exclusive inclusion of doctors in our study while others included general population.

In our study, 330 (85.9%) doctors suffered from moderate/severe stress (PSS score  $\geq 14$ ), much higher when compared to Wang et al<sup>13</sup> (China, general population, 8.1%) and Chew et al<sup>14</sup> (multinational, health care workers [HCWs], 2.2%); both studies used a different stress scale [DASS (depression-anxiety-stress scale-21)], in non lockdowned milieu, probably accounting for the discrepancy. Our result

is comparable to Zhang et al<sup>1</sup> (82.6%, general population) and slightly higher than Du et al<sup>13</sup> (59%, frontline HCWs)—both studies conducted during quarantine at China. Thus, in our setup, doctors have stress comparable to the Chinese general population, and more than Chinese HCWs, which may be attributed to varying socioeconomic and administrative policies (eg, supply of protective equipment to HCWs) in these countries.

Furthermore, in our study, stress score of dermatologists was statistically comparable to that of nondermatologists (19.6 [5.7] vs 18.7 [6.2],  $P = 0.1$ ), contesting the popular belief that dermatology is a relatively nonemergency discipline with minimum stress. So, all doctors, irrespective of speciality, are prone to develop higher stress during COVID-19 pandemic, which may be further precipitated by quarantined living conditions. Thus, there is need for appropriate mental health support for all doctors, including dermatologists, to ensure their optimum performance.

We observed significantly high stress in females and unmarried doctors in both groups. Several authors have reported higher stress in women HCWs.<sup>5,13-15</sup> All female doctors have an additional involvement in household and family matters, thus increasing their stress. In our study, marriage acted as a protective factor against stress, contrary to Chew et al<sup>15</sup> and Du et al,<sup>13</sup> probably because of sharing of stress among partners. In our study, the overall mean age was 31.9 (8.5) years, comparable to Urooj et al.<sup>5</sup> Indoor duty for care of COVID-19 patients, government job, and rural residence are plausible causes of increased stress due to fear of acquiring infection, forceful long duty hours without rest, and scarcity of updated health care facilities, respectively. Among nondermatologists, higher education caused less stress, probably because of detailed understanding regarding the pandemic and current situation; however,  $\leq 5$ -year work experience contributed to stress due to limited work experience. Exclusive private practice caused more stress in dermatologists due to low patient footfall at clinics due to economic depression and lack of public transport.

In both groups, fear of getting infected for themselves and family/colleagues was the commonest cause of stress, followed by lack of protective gear at workplace. This is in agreement with Urooj et al,<sup>5</sup> Du et al,<sup>13</sup> and Cai et al,<sup>16</sup> who reported fear of infecting family members and self-infection to be the top causes of stress in HCWs. Similar findings were reported among medical staff during SARS epidemic.<sup>17</sup> Cai et al<sup>16</sup> also found concerns for personal safety to be significantly associated with higher stress in frontline medical staff. Regarding lock-down, the presence of an aged family member with chronic disease or pregnancy or children was the commonest cause of stress followed by economic uncertainty. This is understandable as it is difficult to access medical treatment or care and procure essential medications during lockdown.<sup>14</sup> In dermatologists, risk of self-infection caused moderate/severe stress (AOR 4.9,  $P = 0.02$ ), while in nondermatologists, risk of its transmission to friends and families were the predominant factors (AOR 3.6,  $P = 0.003$ ). Nondermatologists are accustomed to work in high-risk situations so they are more concerned about their family and friends, while dermatologists are more vulnerable to their own risk of developing COVID-19, as they are not habituated to work in such infective environments. The authors

recommend implementation of telemedicine to minimize contact and self-infection, as proposed by other authors.<sup>4,16</sup>

#### 4.1.1 | Limitations

Our study's limitations include relatively small sample size, potential selection bias, for example, only those with smartphones/computers could participate in our online survey, inability to verify whether a single responder filled the survey multiple times, use of snowball (non-probability) sampling technique, subjectivity of responses, and lack of information on doctor's work hours and work load.

## 5 | CONCLUSIONS

To conclude, all frontline doctors are vulnerable to develop higher stress during COVID-19 pandemic and lockdown, including dermatologists, although traditionally considered a nonemergency outpatient speciality with minimum stress. Fear of infecting themselves and family/colleagues and inadequate work place protection are top causes. Economic uncertainty and presence of a vulnerable family member (children/aged/pregnancy/chronic disease) are factors attributable to quarantined living conditions. So, all frontline doctors should be monitored closely as a high-risk group for mental stress with special attention to females and provided adequate training before deployment and psychological intervention when needed. Greater protection gear supplies and strong family support may increase their resilience to stress and prevent the breakdown of health care system during a public health emergency.

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