Section: Anatomy

Original Research Article

FEAR OF COVID-19 AND PREVENTIVE BEHAVIOURS AMONG MEDICAL AND PARAMEDICAL STUDENTS: A CROSS-SECTIONAL STUDY

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ABSTRACT

Background: The COVID-19 pandemic has imposed significant psychological stress on healthcare trainees globally. Limited data exist on the comparative assessment of fear and preventive behaviours among various cadres of medical and paramedical students during the pandemic. The objective is to assess fear related to COVID-19 and adherence to preventive behaviours among medical and paramedical students, and to compare these parameters across different professional streams and gender.

Materials and Methods: A questionnaire-based cross-sectional survey was conducted during the third wave of the pandemic among 382 medical and paramedical students from a tertiary institution in Northern India. The Fear of COVID-19 Scale (FCV-19S) and Preventive COVID-19 Behaviour Scale (PCV-19BS) were used as assessment tools. Data were analysed using SPSS version 23, with statistical comparisons performed using ANOVA, the Kruskal-Wallis test, the t-test, and the Mann-Whitney U test.

Results: Among 382 participants (mean age 19.6±1.6 years), 69.9% were female. The overall mean FCV-19S score was 17.42 ± 5.55, with BDS students demonstrating the highest scores (18.56 ± 5.55). Female students exhibited significantly higher emotional fear scores compared to males (11.54 ± 3.33 vs. 10.70 ± 4.07, $p < 0.05$). The mean PCV-19BS score was 38.49±5.69, with no statistically significant differences between professional streams. Preventive behaviour compliance was notably high across all groups (mean 76.1% adherence).

Conclusion: While fear of COVID-19 was prevalent among medical trainees, particularly in females and BDS students, preventive behaviour adherence remained consistently high across all professional streams. Gender-specific mental health interventions and targeted psychological support should be integrated into medical curricula during crisis situations.

Keywords: COVID-19, Fear, Preventive behaviour, medical students, FCV-19S, Mental health, Pandemic.

INTRODUCTION

The COVID-19 pandemic represents one of the most significant public health crises of the twenty-first century, rapidly evolving from a localised outbreak in Wuhan, China, in December 2019 to a global pandemic affecting over 200 countries within four months. The World Health Organisation declared COVID-19 a pandemic on March 11, 2020, prompting governments worldwide to implement urgent containment and mitigation strategies, including social distancing, case isolation, contact tracing, and quarantine measures.[1,2]

Beyond its immediate medical consequences, the COVID-19 pandemic has precipitated a global mental health crisis. The uncertainty surrounding disease transmission, mortality risk, and lack of effective therapeutic interventions during the initial phases has subjected populations to profound psychological stress. Research has documented a

spectrum of psychological sequelae ranging from anxiety and depression to post-traumatic stress disorder (PTSD) and cognitive impairment.[3,4]

Healthcare professionals, including medical and paramedical students, constitute a particularly vulnerable population during pandemics. Their proximity to infected individuals, heightened occupational exposure risk, and frontline responsibilities create unique psychological pressures. A cross-sectional study among North Indian undergraduate medical students revealed that COVID-19 significantly impacted mental health, with increased prevalence of anxiety and stress, poor sleep quality, and interpersonal relationship difficulties. Furthermore, the fear of contracting the virus and transmitting it to family members compounded psychological distress.[5,6]

Understanding the psychosocial impact of COVID-19 on medical trainees is essential for developing targeted intervention strategies. This study aimed to assess fear related to COVID-19 and adherence to preventive behaviours among medical and paramedical students, with specific analysis of variations across professional streams and gender.

MATERIALS AND METHODS

Study Design: It was a Questionnaire-based cross-sectional survey with descriptive analysis in the third wave of the COVID-19 pandemic.

Study Setting: Anatomy Department, PGIMS Rohtak, Haryana, India. The institution serves as a tertiary care teaching hospital affiliated with the University of Health Sciences Rohtak (UHSR).

Study Population: All consenting medical and paramedical students enrolled in various programmes at UHSR, including MBBS, BDS (Bachelor of Dental Surgery), nursing, and other paramedical streams (physiotherapy, perfusion technology).

Sample Size and Sampling: All consenting students of UHSR who were accessible via email and WhatsApp were contacted and recruited. This convenience sampling approach ensured accessibility despite pandemic-related restrictions on in-campus activities.

Questionnaire Design: A structured questionnaire in English and Hindi was developed based on two validated instruments: the Fear of COVID-19 Scale (FCV-19S) and the Preventive COVID-19 Behaviour Scale (PCV-19BS). The questionnaire was administered via Google Forms with links distributed through email and WhatsApp.

Research Tools:

- **Fear of COVID-19 Scale (FCV-19S):** A seven-item, Likert-type scale assessing fear-related emotional and somatic responses to COVID-19. Items are rated from 1 (strongly disagree) to 5 (strongly agree), with higher scores indicating greater fear. The scale captures both emotional fear (anxiety, worry) and symptomatic fear (physical manifestations). The FCV-19S demonstrates excellent reliability (Cronbach's $\alpha = 0.82$) and has been validated across diverse populations and cultures.[7]
- **Preventive COVID-19 Behaviour Scale (PCV-19BS):** A self-reported measure assessing adherence to recommended COVID-19 preventive practices including mask wearing, hand hygiene, physical distancing, avoiding crowds, and compliance with public health guidelines. Items are Likert-scaled with higher scores indicating greater adherence to preventive measures.[8]

Inclusion Criteria

- Medical and paramedical students registered with UHSR
- Accessible via email or WhatsApp
- Willing to provide informed consent

Exclusion Criteria

- Students who declined to participate or did not provide consent

Informed Consent and Ethics: Informed written consent was obtained from all participants before questionnaire administration. The study was conducted in accordance with Indian Council of Medical Research (ICMR) guidelines and Helsinki Declaration principles. Ethics committee approval was obtained prior to study commencement. Participants were assured of anonymity and confidentiality, with the option to remain anonymous. Participants retained the right to withdraw at any time without penalty.

Data Analysis: Recorded data were entered into Microsoft Excel and analyzed using SPSS Statistics version 23 (IBM Corporation, New York, United States). Qualitative variables were reported as frequencies and percentages. Quantitative variables were expressed as mean ± standard deviation (SD), median, and interquartile range (IQR). Comparisons between subgroups based on professional stream were performed using one-way ANOVA and the Kruskal-Wallis test. Gender-based comparisons utilised an independent samples t-test and a Mann-Whitney U test. Statistical significance was defined as $p<0.05$. All statistical tests were two-tailed.

RESULTS

Sociodemographic Characteristics: The study enrolled 382 participants across four professional streams. The majority were MBBS students (n = 208, 54.5%), followed by nursing students (n = 91, 23.8%), BDS students (n = 62, 16.2%), and students from other paramedical disciplines (n = 21, 5.5%). The overall mean age was 19.6±1.6 years, ranging from 19.2±1.1 years (paramedical students) to 19.8±1.1 years (BDS students). Female students comprised 69.9% (n = 267) of the cohort, while males made up 30.1% (n = 115). Most participants belonged to nuclear families (69.1%), with 51.6% from urban backgrounds and 48.4% from rural areas. The majority of students (77.2%) were residing in

institutional hostel facilities during the survey period. [Table 1]

Fear of COVID-19 scores: The mean total FCV-19S score was 17.42±5.55 (range: 4-28). BDS students demonstrated the highest mean fear scores (18.56 ± 5.55), while paramedical students recorded the lowest (16.00 ± 4.79). MBBS and nursing students showed intermediate scores of 17.00 ± 5.69 and 17.92 ± 5.28, respectively. The difference in total fear scores between professional streams was not statistically significant (F = 1.83, p = 0.14). [Table 2 and Figure 1]

Analysis of Fear subscales: Emotional Fear Domain: Mean 11.29±3.58 (range: 4-20). BDS students scored highest (12.00±3.35), while paramedical students scored lowest (10.52±3.06). Symptomatic Fear Domain: Mean 6.13±2.84 (range: 0-14). BDS students again demonstrated the highest scores (6.56 ± 2.94).

A gender-based analysis revealed that female students had significantly higher emotional fear scores (11.54 ± 3.33) compared to male students (10.70 ± 4.07), as determined by the Mann-Whitney U test (U = 14432, p = 0.032). However, total FCV-19S scores (males: 16.75 ± 6.28 vs. females: 17.71 ± 5.19) and symptomatic fear scores did not differ significantly between genders. [Table 3 and Figure 2]

Preventive COVID-19 Behaviour Scores: The mean total PCV-19BS score was 38.49±5.69 (range: 14-50), representing approximately 76.1% overall compliance with recommended preventive measures. Paramedical students achieved the highest preventive behaviour scores (39.76±4.29), while MBBS students recorded the lowest (37.99±5.70). These differences were not statistically significant between professional streams (H=1.87, p=0.58). Gender analysis revealed no significant differences in total PCV-19BS scores or preventive behaviour across male and female participants (p>0.05). [Table 2, Table 3 and Figure 3]

The correlation between total FCV scores and PCV scores was not significant (r=-0.05, P-value=0.98). [Figure 4].

Table 1: Socio-demographic Profile of Participants

		MBBS (n=208)	BDS (n=62)	Nursing (n=91)	Others (n=21)
Age (in years)		19.7±1.2	19.8±1.1	19.4±2.1	19.2±1.1
Gender	Male	87	18	0	10
	Female	121	44	91	11
Family	Nuclear	134	45	68	17
	Joint	74	17	23	4
Residence	Urban	121	36	33	7
	Rural	87	26	58	14

Table 2: The mean scores of total FCV scores, FCV emotional domain, FCV symptomatic and total PCV scores in various groups of participants

Stream	N	Mean±SD(FCV total)*	Mean±SD (Emotional Fear)*	Mean±SD (Symptomatic Fear)**	Mean±SD (PCV Total)**
MBBS	208	17.00±5.69	10.98±3.73	6.02±2.45	37.99±5.70
BDS	62	18.56±5.55	12.00±3.35	6.56±2.94	38.29±5.58
Nursing	91	17.92±5.28	11.67±3.43	6.25±2.27	39.45±5.58
Others	21	16.00±4.79	10.52±3.06	5.48±2.11	39.76±4.29
Total	382	17.42±5.55	11.29±3.58	6.13±2.84	38.49±5.69

The mean difference was nonsignificant in different streams. *-One way ANOVA, **- Kruskal Wallis Test

Table 3: The mean scores of total FCV scores, FCV emotional domain, FCV symptomatic and total PCV scores in males and females

Gender	N	Mean±SD (FCV total)*	Mean±SD (Emotional Fear)**##	Mean±SD (Symptomatic Fear)**	Mean±SD (PCV Total)**
Male	115	16.75±6.28	10.70±4.07	6.05±2.68	38.09±5.91
Female	267	17.71±5.19	11.54±3.33	6.17±2.40	38.66±5.47

The mean difference was nonsignificant in males and females, except for emotional fear##.
*-T- test, **- Man-Whitney Test

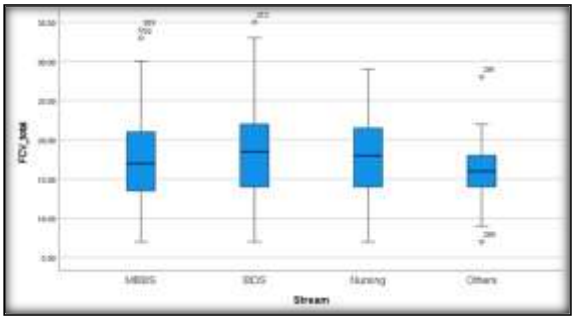

Figure 1: FCV total scores in various group of medical students

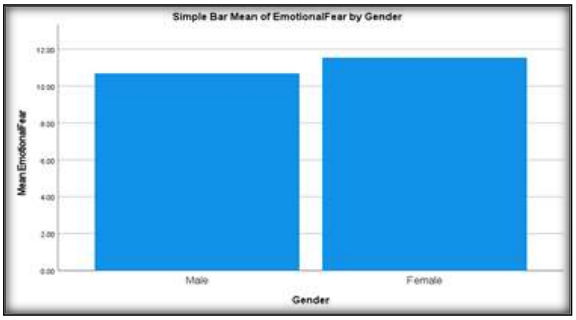

Figure 2: Comparison of mean scores of the Emotional domain scores of FCV scale among males and females

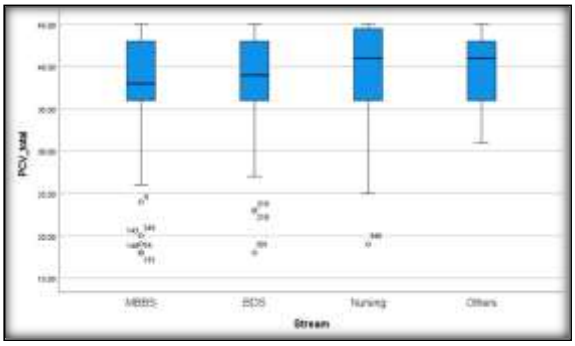

Figure 3: PCV total scores in various groups of medical students

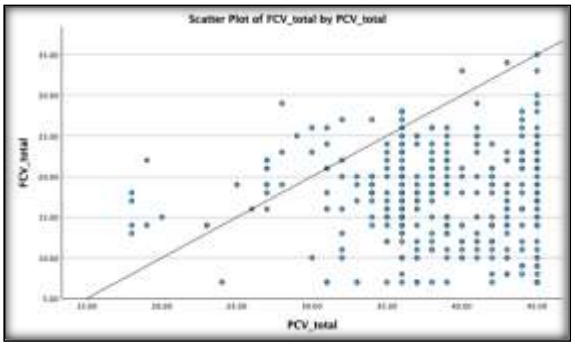

Figure 4: Scatter plot between total FCV and PCV scores

DISCUSSION

Our study documents a mean FCV-19S score of 17.42±5.55 among 382 medical and paramedical students in Northern India during the second year of the COVID-19 pandemic. This finding demonstrates that the fear of COVID-19 persisted among healthcare trainees despite the availability of vaccines and the accumulation of clinical knowledge. Importantly, our results are comparable to, and in some instances exceed, FCV-19S scores reported in international studies. Another Indian study from Maharashtra reported a lower FCV score (15.01 ± 3.69) than ours.[5] A cross-sectional study conducted among university students in Vietnam reported a mean FCV-19S score of 16.6 ± 5.2, which is marginally lower than our findings. However, another study in an Iranian cohort reported slightly higher scores, 17.99±5.67. (9,10) The pooled mean of FCV scores in the systematic review and meta-analysis by Luo et al. was slightly higher (17.95) than that in our cohort. In contrast, a meta-analysis examining fear prevalence among healthcare professionals revealed that medical staff (19.51) consistently demonstrated higher fear scores than the general population (19.05), with significantly elevated scores among female healthcare professionals.[11] Asian people had higher fear scores than European and Australian cohorts in the same meta-analysis. Our observation that BDS students recorded the highest mean fear scores (18.56±5.55) warrants particular attention and may reflect the heightened occupational exposure risk associated with dental aerosol procedures during the pandemic period.

Gender Differences in Fear Responses: A significant finding of our study was that female students exhibited statistically higher emotional fear scores (11.54 ± 3.33 vs. 10.70 ± 4.07, p = 0.032) compared to their male counterparts. This gender dichotomy in psychological responses to COVID-19 aligns with existing literature. Eight studies in the systematic review by Luo et al reported lower mean of fear of COVID-19 in men (18.21, 95% CI: 15.99–20.42) than in women (20.67, 95% CI: 18.62–22.73).[11] A study among Iranian medical students similarly found higher total FCV-19S scores in females (18.34) compared to males (17.23), although this difference did not achieve statistical significance.[9] The gender-specific vulnerability to emotional aspects of fear may be attributable to multiple factors, including differential stress response patterns, greater empathic engagement, and distinct psychobiological processes in processing threat stimuli. Research on the neurobiology of gender differences in fear and anxiety suggests that women demonstrate amplified activity in brain regions associated with threat detection and emotional processing, potentially explaining their heightened emotional fear responses during crisis situations.[11–13]

Preventive Behaviour Compliance: A salient strength of our findings is the consistently high adherence to preventive COVID-19 behaviours across all professional streams and genders (mean 38.49±5.69, representing 76.1% compliance). This robust preventive behaviour, despite psychological distress, suggests that medical and paramedical students possess adequate health literacy regarding COVID-19 transmission routes and protective measures. Notably, Vietnamese medical students demonstrated even higher compliance rates with preventive behaviour (94.12% adherence), although this may reflect stricter governmental enforcement and earlier population-level interventions in Vietnam.[11] Studies from other parts of the world reported varying rates of preventive behaviour, ranging from 71.90% to 94.4%.[10,14–16] Fear of COVID-19, female gender, knowledge about disease, risk perception, and place of residence were important determinants of preventive behaviour reported in various studies around the world.[17–21] Our students' high compliance despite moderate to high fear levels indicates that knowledge and adherence to recommended practices can be maintained despite psychological distress—a finding with significant implications for public health messaging during crisis situations.

Comparative Analysis with Healthcare Professionals and General Population: The literature comparing psychological responses between healthcare professionals and the general population demonstrates consistent patterns. Healthcare workers, particularly those in direct patient contact roles, exhibit higher psychological

burden than non-exposed populations. A systematic review and meta-analysis examining 44 studies across multiple countries found that mean FCV-19S scores were significantly higher among healthcare professionals than the general population, with the effect most pronounced among females.[11] Our study population, comprising medical and paramedical students, occupies an intermediate position in this hierarchy—possessing greater medical knowledge than the general public yet less clinical experience than established healthcare professionals. The relatively lower mean fear scores in our paramedical student subset (16.00 ± 4.79) may reflect either a lower perceived occupational risk or different threat perception patterns across professional disciplines.[17-21]

Implications for Mental Health Support and Educational Interventions: While our findings demonstrate that the fear of COVID-19 remained prevalent among healthcare trainees during September-October 2021, the consistently high compliance with preventive behaviour indicates that psychological distress did not significantly compromise adherence to recommended practices. However, the statistically significant elevation in emotional fear among female students suggests that psychological support initiatives should employ gender-sensitive approaches. Recent systematic reviews examining mental health interventions for medical students during the COVID-19 pandemic have documented the effectiveness of multimodal approaches, including mindfulness-based interventions, peer mentoring programmes, formal counselling services, and stress management workshops.[22] A particularly effective model implemented in European and North American institutions involved pairing junior medical students with senior student mentors who provided guidance on stress management, relaxation techniques, exercise engagement, and maintenance of social connections.

The present findings provide evidence that medical education institutions require systematic integration of psychological support services during pandemic situations. The institutional responses should include: establishing accessible counselling services with trained mental health professionals; implementing peer support networks leveraging senior students as mentors; incorporating resilience-building and stress management training into formal curricula; providing gender-sensitive mental health awareness programmes; and ensuring protective institutional policies that balance educational continuity with student wellbeing. The World Health Organisation and national medical education bodies have increasingly emphasised that medical curricula must include competencies in psychological first aid, stress management, and self-care to prepare future healthcare professionals for crisis situations.

Study Strengths and Limitations: Strengths of this study include the use of validated and culturally-adapted assessment scales (FCV-19S and PCV-19BS), structured questionnaire design, reasonable sample size encompassing multiple professional streams, and participation of both medical and paramedical students, enabling comparative analysis. The temporal proximity to the pandemic's second year provides relevant contextual data for that period. However, several limitations merit acknowledgement. First, this study employed convenience sampling, which was limited to students accessible via digital platforms, potentially introducing selection bias by excluding students without access to email or WhatsApp. Second, the cross-sectional design precludes the determination of causal relationships or the temporal sequence of psychological responses. Third, the study was conducted at a single institution, which limits its generalizability to broader healthcare trainee populations. Fourth, the assessment relied on self-reported questionnaires, which are subject to response bias and social desirability effects. Fifth, the study did not assess potential confounding variables such as prior COVID-19 infection, loss of family members to COVID-19, or concurrent anxiety disorders that might influence fear responses.

CONCLUSION

This study demonstrates that fear of COVID-19 persisted among medical and paramedical students during the second year of the pandemic, with vulnerability in female students and BDS professionals. Despite significant psychological distress, preventive behaviour compliance remained consistently high across all subgroups. These findings underscore the necessity for medical institutions to establish comprehensive, gender-sensitive psychological support systems as routine components of healthcare professional training. The COVID-19 pandemic has established that mental health support is as essential to healthcare professionals preparedness as clinical knowledge and technical competencies.

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