INTRODUCTION

Burnout once known to be endemic in physician population has taken epidemic proportion with estimates predicting

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prevalence of more than 50%.[11-13] This physician suffering of emotional nature is gradually turning into a public health challenge. In terms of impact on physicians, burnout often results in depression, anxiety, substance abuse, suicidal ideation, and even suicide.[14,15] It adversely impacts physician’s efficiency and also has an adverse impact on patient outcome, increased cost of service, and reduced patient satisfaction.[16,17] Academic centers and professional societies globally are devising organizational- and individual-level interventions to address this growing menace.[9,10]

Burnout begins somewhere during the period of medical graduation, increases in residency, and remains at high levels during early periods of being a faculty and then starts showing declining trends with increasing age.[11,12] Medical students show higher burnout rates than general population which might be due to the fact that medical training is stressful. This occupational stress often results in reduction in academic performance and adversely impacts professional qualities.[13] It often results in poor mental health and suicidal ideation among students in addition to adverse impact on patient outcomes.[14]

Multiple organizational and personal factors determine burnout experience. Curricular factors such as grading schemes, time duration of academic activities, and learning environment have a significant impact on student burnout perception.[14] An individual’s dynamic adaptive skills to withstand stress and perform to the capacity are known to protect from burnout. These coping skills and art of self-protection are termed “resilience” and are documented to protect medical students from distress, depression, and suicidality.[15]

Burnout in medical practitioners, residents, and faculty population has been addressed in Indian studies,[16-21] however, to the authors’ knowledge, only a few studies have reported on medical students’ burnout.[22-24] None of the studies have estimated the prevalence of burnout or reported on the influence of resilience on burnout. Hence, the present study was conceptualized to assess the prevalence of burnout and its relationship with resilience in a student population in a tertiary care medical center.

**MATERIALS AND METHODS**

**Study settings and participants**

Fifty students from each of the four semesters of MBBS from All India Institute of Medical Sciences, Bhubaneswar, were randomly selected for participation. Stratified random sampling using www.randomizer.org was used to generate the numbers. Anonymous questionnaires were distributed and participants were asked to return the questionnaires in the dropbox kept in the lecture theater premises.

**Sample size calculation**

For calculating sample size, the prevalence of burnout was considered to be 50% as per prevalence reported in a review on medical student’s burnout.[25] Considering 10% nonresponse rate and 0.05% error, the minimum sample size was calculated to be 194. It was decided to include 200 individuals in the study.

**Study instruments**

**Sociodemographic pro forma**

Participants’ age, gender, semester, choice of medicine (self-driven/externally influenced), and future career choice (continue with medicine/discontinue from medicine) were included in the socio-demographic proforma.

**Maslach Burnout Inventory**

We used the 22-item Maslach Burnout Inventory (MBI) which consists of three subscales of emotional exhaustion (EE), depersonalization (DP), and personal accomplishment (PA) rated on Likert-type scale of 0 meaning never to 6 meaning every day. The EE and DP subscales comprise seven items each and PA comprises eight items. As per the authors, a cutoff score of 18–29 on the EE subscale indicates moderate burnout, whereas a score of ≥30 indicates severe burnout. On the subscale of DP, a score of 6–11 indicates moderate burnout, and a score of ≥12 indicates severe burnout. On the PA subscale, a score of 34–39 indicates moderate burnout, and a score ≤33 indicates severe burnout.[26] MBI showed good internal consistency scores in our sample, with Cronbach’s alpha scores of 0.85 in EE subscale, 0.69 in DP subscale, and 0.76 in PA subscale.

Validation of MBI as a diagnostic tool has identified EE as the most crucial element of burnout. For making a diagnosis of burnout as per MBI, high EE alongside high DP and/or low PA are the essential criteria.[27] Furthermore, two-dimensional diagnosis of burnout with high scores on EE has been recognized as the best method for diagnosis of burnout in nonclinical populations.[28] We used the two-dimensional method for diagnosis of burnout in our sample population.

**Resilience Scale for Adults**

The Resilience Scale for Adults (RSA) was devised by authors to assess protective factors (both intra- and interindividual) that help an individual in coping with distress. The scale consists of 33 items in six domains: perception of self, perception of future, social competence, structured style, family cohesion, and social resources rated on a five-point rating scale. Total RSA scores can hence range from 33 to 165, higher scores indicating better resilience.[29] In our sample, the internal consistency of different subscales of RSA was good to excellent, with Cronbach’s alpha observed for perception of self: 0.72, perception of future: 0.82, structured style: 0.52, social competence: 0.79, family cohesion: 0.76, and social resources: 0.79.
Statistical analysis
We carried out the statistical analysis using SPSS 21.0. (SPSS Inc., Chicago, Ill., USA). Descriptive analysis of sociodemographic variables and scores on MBI and RSA was carried out. Kolmogorov–Smirnov tests were carried out to assess the normality of data. Nonnormality of data resulted in the use of nonparametric tests to assess the difference in mean ranks of MBI subscales in different sociodemographic categories. Spearman’s rho correlation analysis was used to see the correlation between MBI and RSA scores. Binomial logistic regression was carried out to assess the relationship presence/absence of burnout in MBI subscales with total RSA scores. All the statistical analysis was carried out while keeping statistical significance at 0.05.

RESULTS
Out of 200 students approached for the study, 196 returned completed pro forma which were included in the final analysis. The mean age of participants was 20.35 (±1.50) years, age range: 17–24 years, and 68% were males. The detailed sociodemographic characteristics of the population are given in Table 1.

The mean score in EE domain of MBI was 10.87, which is below the cutoff score for burnout. The mean score in DP was 11.71, which is above the cutoff score for burnout. The mean score on PA was 25.71, which is below the cutoff for severe burnout. The mean score for total RSA was 126.43, and 46.42% had total RSA scores below mean scores. The percentage of participants having scores lower than mean scores in subscales and total RSA scores is depicted in Figure 1.

As per the cutoff scores for burnout,[26] 17% of the participants met the criteria for burnout in two dimensions of EE and DP. Furthermore, when low scores on PA were taken into account, 15% of the participants met criteria for burnout. The prevalence of burnout and distribution of burnout scores as per severity in MBI domains is shown in Table 2.

| Sociodemographic characteristics | Mean (SD)/n (%) |
|----------------------------------|----------------|
| Age (years)                      | 20.35 (1.50)   |
| Gender                           |                |
| Male                             | 133 (67.86)    |
| Female                           | 63 (32.14)     |
| Semester                         |                |
| Second                           | 48 (24.49)     |
| Fifth                            | 50 (25.51)     |
| Seventh                          | 50 (25.51)     |
| Ninth                            | 48 (24.49)     |
| Choice of medicine               |                |
| Self                             | 162 (82.65)    |
| Externally influenced            | 34 (17.35)     |
| Future career options            |                |
| Continue with medicine           | 181 (92.35)    |
| Discontinue from medicine        | 15 (7.65)      |

SD – Standard deviation

| MBI (Maslach Burnout Inventory) domains | n (%) |
|----------------------------------------|-------|
| Emotional exhaustion (EE)              |       |
| Low                                    | 163 (83.16) |
| Moderate                               | 30 (15.30) |
| High                                   | 3 (1.54) |
| Depersonalization (DP)                 |       |
| Low                                    | 31 (15.82) |
| Moderate                               | 71 (36.22) |
| High                                   | 94 (47.96) |
| Personal accomplishment (PA)           |       |
| Low                                    | 165 (84.18) |
| Moderate                               | 26 (13.27) |
| High                                   | 5 (2.55) |
| Two-dimensional burnout (high scores on EE and DP) | |
| No                                     | 163 (83.16) |
| Yes                                    | 33 (16.84) |
| Three-dimensional burnout (high scores on EE and DP and low scores on PA) | |
| No                                     | 166 (84.69) |
| Yes                                    | 30 (15.31) |

MBI – Maslach Burnout Inventory; EE – Emotional exhaustion; DP – Depersonalization; PA – Personal accomplishment

Figure 1: Resilience scale for Adults: Subscales and Total scores

Table 1: Sociodemographic characteristics of study participants n=196

Table 2: Prevalence of burnout in Maslach Burnout Inventory domains
RSA subscale scores showed a statistically significant negative correlation with EE and DP. PA scores showed a positive correlation with RSA subscale scores. All the correlation scores reached statistical significance. Total RSA scores showed the highest correlation with EE and PA which were highly significant [Table 3].

We carried out binary logistic regression to assess the association of the presence/absence of burnout in different MBI domains with total RSA scores. We kept cutoff scores of EE, DP, and PA as per MBI scoring criteria. Higher total RSA scores were significantly associated with decreased likelihood of burnout in each of three domains of EE, DP, and PA. The odds ratio with 95% confidence interval keeping \( P = 0.05 \) is shown in Table 4.

DISCUSSION

The prevalence of burnout as per two-dimensional definition in our sample population was 16.84%, whereas as per three-dimensional conceptualization, it was 15.31%. These prevalence rates are lower as compared to global data. A recent meta-analysis of burnout in medical students reported prevalence varying from 7% to 75.2%. This wide variation in prevalence is because of a variety of instruments used for assessment and varying scoring criteria utilized for diagnosing burnout.

Our burnout prevalence is similar to Brazilian, British, Pakistani, Romanian, and Saudi Arabian medical students. Burnout rates reported in Brazilian medical students varied from 10.3% to 12%, of 18.2% of the medical students in Karachi reporting burnout, 20.7% of the students reported high burnout rates in EE, 19.8% low in PA, and 17.8% high in DP. The burnout prevalence was 13.4% in medical students of Riyadh. Burnout rates reported from Chinese and US medical schools were 50%, which is much higher than our population.

Forty-eight percent of our participants reported high DP which is even higher than that reported from US medical schools. High rates of DP are a cause of concern as DP is often associated with callous and negative attitudes toward patients, often resulting in poor patient care and poor patient outcomes. It may also manifest as poor professionalism leading to cheating and other forms of unethical academic behavior. Furthermore, DP is related to establishing unethical relationships with industry in the form of attending industry-sponsored events and accepting gifts from industry with obvious perilous consequences in the future.

Eighty-four percent of our participants reported perceiving low PA. Low PA is often associated with feelings of inadequacy and unhappiness with one’s achievements as also negative self-evaluation. The authors also suggest that low PA can be understood as independent of the experience of burnout. The prevalence of low PA in our population is almost double the rates reported by Cecil et al. in their sample of medical students of Manchester and even higher than 64.9% prevalence reported in Saudi Arabia.

In our sample, male gender is associated with higher burnout perception in the DP domain which is similar to Chinese and Australian studies. Chumnings et al. in their review on Chinese medical students’ perception of burnout reported higher burnout scores in males. Dyrbye et al., in their review, also reported male students’ experience of DP and higher experience of EE by female students. However, other studies have reported female experience of burnout to be higher; Isaac et al., 2018, reported higher burnout rates in female medical students in Australia. Asghar et al. reported high burnout rates in all three MBI domains in females. Female medical students of Riyadh, Saudi Arabia, also showed higher burnout rates in EE and DP.

Burnout has been studied in Indian medical colleges using various scales. In a final-year medical students’ sample using MBI, 46.4% reported a high reduction in PA scores, 41.4% reported high DP scores, and 5.1% experienced burnout in depressive anxiety domains. The Oldenburg Burnout Inventory was used to assess the longitudinal course of burnout in first-year medical students by Goel et al.
There were a decrease in the sense of PA during the fifth and seventh semesters and then an increase in the ninth semester in our sample. Our findings are different from Goel et al. who found an increase in disengagement domain with an increase in academic year. Many studies report that during the entire course of medical study, burnout increases with progressing years. This reported increase is particularly more in the DP domain. Higher burnout rates have been observed in the third year of graduation and are understood that this period of study is highly vulnerable due to high preoccupation with professional competence and worries about the future.

Choice of medicine whether made by self or influenced by others did not differentiate the MBI scores in various subdomains in our participants. Neither did the future decision to continue with medicine nor opt out could influence burnout rates. Choice of medicine when dictated by internal factors such as intellectual curiosity, altruism, and professional autonomy is associated with lower burnout as compared to externally induced decisions of choosing medicine. Our study could not find any association of choice of medicine with perception of burnout.

Among the internal factors influencing burnout perception, resilience is known to be protective. Resilience is the ability of psychological adaptation and mental coping to adversities and the ability to thrive and develop in adverse situations. Resilience is known to foster positive psychological well-being and reduce distress and psychological suffering. It is documented that resilience increases happiness and life-satisfaction; improves coping; and reduces distress, depression, and burnout in medical students. Resilience has also been studied in nursing students and found to provide protection from burnout. Resilience appeared to be a stable trait which did not seemed to be influenced by the level of distress in medical students.

Resilience in our population is playing a protective role against burnout perception, and this could be the reason of lower burnout prevalence in our sample. There is a need to enhance personal resilience to help medical students better manage themselves. Experts recommend resilience-building strategies to reduce burnout in medical students. In addition to individual characteristics and intervention, organizational strategies are also helpful in reducing burnout. The provision of mentorship and positive mental health training with availability of individualized mental health services for the students in our organization is working as a safety net to prevent and manage burnout. There is a need to devise individual-level strategies in keeping with unique Indian sociocultural situation to help enhance resilience and reduce medical student’s burnout.

CONCLUSIONS

Burnout prevalence in our sample lies at the lower range of global prevalence rates. Resilience in our population is conferring protection from burnout.

Limitations

Self-reported questionnaire could have limited objectivity; however, individual perceptions of resilience and burnout are best rated by the individual himself. Furthermore, there was no clinical assessment carried out; hence, burnout diagnosis could not be ascertained.

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Conflicts of interest

There are no conflicts of interest.

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