

Secondary Traumatic Stress, Burnout and Self-Compassion Amongst Among Clinical Medical and Dental Students: Are We Traumatizing Future Clinicians?

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Abstract

Background

Secondary traumatic stress (STS) is an indirect trauma exposure that happens due to continuous contact with individuals who have experienced primary trauma. High rates of both STS and burnout have been reported in medical workers; however, few studies have reported STS and burnout in clinical students. This study aims to evaluate the prevalence and severity of secondary traumatic stress (STS) and burnout among medical and dental students. Additionally, it seeks to assess the protective effects of self-compassion and social support systems on these students, with the ultimate goal of identifying robust support mechanisms for them.

Methods

A quantitative, cross-sectional study using a validated survey design was performed; 109 clinical students reported measures of STS, burnout, self-compassion and interpersonal support evaluation. These factors were analysed across selected sociodemographic factors to evaluate their associations.

Results

Clinical students reported high rates of moderate–severe STS (51%, $n = 56$) and burnout (54.1%, $n = 59$). Mean STS and burnout scores were significantly higher in the female gender ($p = 0.04$), while burnout due to physical exhaustion was most commonly reported (38.5%). Male students ($p > 0.0001$) and single students ($p = 0.03$) scored significantly higher on self-compassion scales, while female students and students in the lower class scored higher on social support scales. STS and burnout are strongly positively correlated with each other (0.73) and negatively correlated with social support and self-compassion. However, social support and self-compassion are only mildly correlated (0.24). Regression analysis showed that burnout is significantly associated with higher STS scores and lower self-compassion scores.

Conclusion

Interventions that mitigate against STS and burnout, but facilitate self-compassion, and integrate social support could help ameliorate the impact of STS and burnout amongst clinical students.

INTRODUCTION

Secondary traumatic stress (STS) is an indirect form of trauma that occurs because of continuous contact with individuals who have experienced primary trauma. It has been identified in many professions, especially health care professionals, due to prolonged exposure to patients who have

experienced different phases of trauma. Symptoms of secondary traumatic stress include insomnia, irritability, anger, a lack of enjoyment and, at times, the ability to relieve the experiences of patients(1). Burnout is characterized by emotional exhaustion, depersonalization, and a sense of reduced personal accomplishment. Although burnout is also work related, burnout develops as a result of general occupational stress; the term is not used specifically to describe the effects of indirect trauma exposure(1). STS and burnout are two critical factors that may lead to reduced productivity, dissatisfaction and unpleasant experiences for healthcare workers in hospitals and health centers.

In his 2003 study(2), KD Neff defined self-compassion as caring for oneself in the face of suffering without avoidance or judgement but with kindness, understanding and acceptance of our pain and inadequacies as part of the greater human experience. He suggested that self-compassion is a cognitive imperative factor that serves to reduce levels of stress and anxiety. Self-compassion also offers individuals increased resilience and increased opportunities to combat work place anxiety and depression (3,4). Self-compassion has also been described to augment coping strategies to regulate heightened reactions to emotional distress (5).

Studies involving health care personnel have reported the beneficial impact of self-compassion on burnout and work exhaustion (6,7). Independent of self-compassion, social support and its perceived availability have also been reported to improve resilience to high stress in college and university students(8). A lack of social health has also been identified as a precursor to a plethora of psychological disorders(9).

Global studies have revealed varying levels of STS and burnout among healthcare professionals, ranging as high as 82% of the workforce, with personnel in emergency services reporting the highest prevalence(10–12). Duffy et al.(10) reported a high prevalence of STS among nursing professionals and outlined reasons that nurses may be subjected to high levels of STS. Varying STSs were also observed in doctors, with an Australian systematic study reporting a rate of 54%(13).

STS and burnout prevalence were also observed to be especially high during the COVID-19 outbreak, with Orru et al(14) reporting a prevalence between 47.5% and 67.1% for frontline healthcare workers. Compassionate mind intervention exercises have been shown to be effective therapies for combating anxiety and work-related distress(15,16). Compassion-focused therapies also significantly improve work distress and ameliorate burnout symptoms in healthcare workers(17,18).

Clinical students start interacting with patients during their clinical training. Numerous studies have attempted to clarify the reasons why students choose to study medicine and dentistry at some universities, including presumptive reasons in admission interviews. Common responses include the desire to cure human suffering, saving lives, and understanding the complexities of the human body, whereas others include the attendant prestige, money and success that accompany the profession(19–21). McManus et al(20). concluded that persons who chose medicine to help others were more agreeable and had higher scores in empathy, whereas those who studied medicine to gain the respect of others were less neurotic, less open to experiences, less agreeable and conscientious(22). Difficulty

dealing with the stresses of medical education and residency training may lead to reconsideration of the chosen occupation. In one study, more than 50% of interns who reported feeling overwhelmed with no apparent source of help had "seriously considered leaving their training program"(23,24). The important reasons cited include unhappiness with medicine, their program, and other personal stressors. Owing to occupational stress and emerging burnout, medical students and residents are at risk for clinical signs of depression, professional impairment, drop out, alcohol and drug abuse, and suicide during their training years and thereafter(25). To combat this immense stress, self-compassion cultivation training has been proposed to counteract STS and burnout(26). Mindfulness mobile apps(27) and self-compassion intervention programs(28) have also been reported to increase self-coping strategies with significant increases in stress levels. Social support becomes a germane consideration for medical students, as many usually travel outside their abode and comfort zones to study medicine in cosmopolitan institutions with varying degrees of cultural and social shock. Therefore, the availability of social support may help combat highly stressful situations inherent in medical education. Cohen et al. reported that social support buffers high-stress conditions(8)

In sub-Saharan Africa, studies reporting STS and burnout in healthcare workers are very rare; however, Dubale et al. reported that burnout was common among physicians, nurses, and other healthcare providers in sub-Saharan Africa, with prevalence estimates ranging from 40% to 80%(29). Konlan et al(30) and Mengist et al(31) reported similar findings. However, studies reporting similar observations in clinical students who are also equally exposed to patients and individuals experiencing varying degrees of trauma have rarely been reported. In Nigeria, there is little or no documented research on this topic.

The purpose of the present study is thus to assess the impact that working with traumatized people has on medical and dental students. We also aimed to identify associations between self-compassion and social support to ameliorate STS and burnout.

METHODS

Study design and participants

The study was carried out at Aminu Kano Teaching Hospital (AKTH), which is located in the Kano metropolis. AKTH is the teaching hospital arm of Bayero University, Kano, and it has a quota of 150 medical students and 20 dental students. The study is a cross-sectional study utilizing an online questionnaire that was shared with clinical students

Inclusion criteria

All interested medical and dental students who consented to be included in this study

Exclusion criteria

a. Students who have been diagnosed with mental health conditions.

- b. Students who have repeated any preclinical or clinical class.
- c. Each class representative and their assistants
- d. Students whose parents and/or siblings are clinical instructors and attending physicians at AKTH

Survey instruments

The self-reported online questionnaire was completed by all consenting clinical students. The data collected included (1) demographic information; (2) present clinical level; (3) a measure of secondary traumatic stress (STSS)(32); (4) a measure of burnout (BM)(33); (5) a measure of self-compassion (SCS-SF)(34); and (6) a measure of the interpersonal support evaluation list (shortened version)(35).

The secondary traumatic stress scale (STSS) is a 17-item self-report measure of STS consisting of three subscales: intrusion, avoidance and arousal(36,37). The STSS items and subscales are equivalent to criteria B (re-experiencing), C (avoidance) and D (hyperarousal) in the Diagnostic and Statistical Manual of Mental Disorders necessary for the diagnosis of posttraumatic stress disorder (PTSD)(38). Clinical students self-reported symptoms on the STSS, ranging from never (1) to very often (5). The scores were summed to form a point score to assess STS. A score equal to or greater than 38 serves as the cut-off for the STS score(37).

The burnout measure (BM) is a 21-item self-report measure of burnout in which 7 items each measure the components of burnout, namely, physical, emotional and mental exhaustion. A 7-point scale ranging from 1-never to 7-daily is used for measuring the BM. An average score of four on any of the subscales indicates burnout.

The self-compassion scale, short form (SCS-SF), is a 12-item short version of Neff's (2003) self-report measure of self-compassion. Scores on the SCS-SF are related to measures of "psychological distress, social support, perfectionism, suicide and self-harm"(39). It comprises two subscales, namely, self-disparagement and self-care.

Self-disparagement includes items 1, 4, 8, 9, 11, and 12 and is summed to indicate the level of self-criticism by a respondent, whereas self-care includes items 2, 3, 5, 6, 7, and 10, the sums of which indicate self-compassion and care. The SCS-SF ranges from "almost never = 1" to "almost always = 5". The total self-compassion score equals the sum of the self-disparagement items with the reverse scores of the self-care items.

The shortened version of the interpersonal support evaluation list (ISEL) is a 12-item measure of perceptions of social support that is a shortened version of its 40-item original measure(8). It comprises three subscales, namely, appraisal, belonging and tangible support. Each subscale corresponds to 4 items each on the measure. It is scored on a 4-point Likert scale ranging from "0 - Definitely True" to "4- Definitely False" for items #1, 2, 7, 8, 11, and 12 and 0 - Definitely False" to "4- Definitely True" for the

remaining items. The scores are then summed, and a lower score implies less perception of social support by an individual respondent.

The STSS has been found to have strong internal consistency (Cronbach's $\alpha = 0.93$) and good construct validity (goodness of fit = 0.90, comparative fit = 0.94). Similarly, the BM has been found to have strong internal consistency (Cronbach's $\alpha = 0.90$) and adequate test–retest reliability ($r \geq 0.66$). The SCS-SF has been found to be valid and demonstrates adequate internal consistency (Cronbach's $\alpha \geq 0.87$), whereas the psychometric properties of the ITEL are satisfactory.

Data analysis

Data analysis was performed via R and R Studio (Version 2023.06.1+524). Sociodemographic variables are summarized as the means, medians, frequencies and percentages. Assumption testing for each statistical analysis technique was conducted after assumptions had been made via Shapiro–Wilk's method for normality and Levene's test for homogeneity of variance. Type 3 ANOVA tests were utilized for mean differences due to imbalance of observations across variables, and Welch's *t* test was used where variances were unequal between groups. Where any of these laws were breached, relevant nonparametric alternatives were utilized. Descriptive statistics were also used to analyse the prevalence of secondary traumatic stress (STS) and burnout among the study participants, as were self-compassion and interpersonal support evaluations. Analysis of variance and Student's *t* test were used to compare the differences in the incidence of secondary traumatic stress and burnout between the three arms of the clinical students and gender, respectively. Additional associations between these variables and ethnicity and marital status were also analysed. Associations were also computed between the ISEL and the aggregates of STS, burnout and self-compassion. Pearson (*r*) and Spearman (*rs*) correlations were conducted to assess correlations among STS, burnout, self-compassion and social support. A multivariable bootstrapped stepwise regression analysis was used to find a dependent variable (STS) predictor among selected independent variables (class, social support, ethnicity, gender and age). A similar regression was also performed with burnout as the dependent variable and other factors as independent variables. To assess model fit, *R*² was used, and multicollinearity was confirmed by using a variance inflation factor of < 5 .

RESULTS

Sample characteristics

A total of 109 clinical medical and dental students completed the questionnaires and the study across the hospital dental center and medical wards of Aminu Kano Teaching Hospital. Among these individuals, females accounted for only 23.9% (*n*=26), with 76.2% being males (*n*=83). The final-year clinical students comprised 61.5% (*n*=67) of the study population, whereas the 500 L second-year clinical students comprised the smallest population at 15.6% (17).

Other demographic analyses revealed that 14.6% were married, whereas students of Hausa ethnicity represented 56.8% of the population (n=62). The percentage of students with Fulani ethnicity was 14.9% (n=16), whereas the other ethnic groups made up 28.4% (n=31) of the respondents. The mean age of the participants was 26.3 years $\pm$ 3.0 years, and 86.2% of the respondents were Muslims (n=94). The full details of the sample characteristics can be found in Table 1.

Table 1. Sociodemographic characteristics of the study participants (N = 109)

Characteristic	Category	n (%) / Mean (SD)
Gender	Female	26 (23.9%)
	Male	83 (76.1%)
Ethnicity	Fulani	16 (14.7%)
	Hausa	62 (56.9%)
	Others	31 (28.4%)
Age (years)	—	26.3 (3.0)
Religion	Christianity	15 (13.8%)
	Islam	94 (86.2%)
Level of Study	400 Level	25 (22.9%)
	500 Level	17 (15.6%)
	600 Level	67 (61.5%)
Marital Status	Currently married	16 (14.7%)
	Not married	93 (85.3%)

The values are presented as n (%) unless otherwise stated; SD = standard deviation

Prevalence and severity of STS and burnout

The total mean score on the STSS was 37.7 ± 11.2 , with minimum and maximum scores of 16 and 68, respectively. Fifty-one percent of the clinical students (n= 56) reported moderate to severe levels of secondary traumatic stress, with more than 10% of the respondents reporting high STS. In contrast, 30% (n=33) reported mild STS, whereas only twenty students (18.3%) reported little or no STS. The severity of STS across gender, level, marital status and religion is not statistically significant.

The total STS score varied across genders, with females having an average value of 41.8 ± 11.8 , whereas males had an average value of 36.4 ± 10.9 and a p value of 0.04 (Figure 1). However, gender has a small effect size on STS values (0.48). Students from other ethnic tribes have greater STS than do students of Hausa and Fulani ethnicity, and married clinical students also reported higher mean scores. However, the

differences in STS values across both ethnicities and marital statuses were not statistically significant. Despite the gradual increase in the STS values from 400 to 600 L, the STS values were not significantly different across the clinical levels.

The burnout scores ranged from 26 points to 116 points, with a mean score of 71.6 ± 17.1 . Fifty-nine clinical students (54.1%) self-reported values above the burnout cut-off. Among the subscales of the BM, physical exhaustion accounted for the highest proportion, with 38.5% (n=42) of the respondents reporting scores equal to or greater than 4 on the PE subscale. Burnout due to emotional and mental exhaustion was observed in 35.8% (n=39) and 19.3% (n=21) of the participants, respectively. However, 13 of the respondents reported a score equal to or greater than 4 on all the subscales, accounting for 22% of the respondents who reported burnout and 11.9% of all the respondents. This is shown in Figure 2. The correlation between the subscales is moderate to strong, with mental and emotional exhaustion exhibiting a strong correlation at $r_s = 0.73$, followed by a moderate correlation between physical and mental exhaustion ($r_s = 0.59$), as shown in Figure 3.

In tandem with STS, female students also recorded significantly higher mean values, at 77.7 ± 16.8 , than the average score of 69.7 ± 16.8 for males (p value = 0.04) Figure 4. Similarly, the effect size was small at 0.47. Similarly to STS, there was no significant difference in the mean burnout score across levels, ethnicity and marital status despite higher mean values in students of other ethnicities and married students.

Self-compassion and Social Support

The average value for self-compassion for clinical students is 3.41 ± 0.55 , with male students recording significantly higher average values (3.48 ± 0.52) than their female colleagues did (3.17 ± 0.61), with $p > 0.0001$. Single students also reported average self-compassion values (3.44 ± 0.57) higher than those of married students (3.22 ± 0.43), with a significant p value of 0.03. Additionally, the age of the students had only a small correlation with self-compassion scores (0.14).

There were no significant differences in self-compassion across the variables of religion and level of clinical students; however, clinical students of Fulani ethnicity presented with more significant average self-compassion scores (3.67) than did the students of Hausa origin (3.46). Students from other ethnic tribes reported the lowest self-compassion mean of 3.16. However, Tukey's post hoc analysis revealed no significant differences between students of Hausa and Fulani origin ($p = 0.35$), whereas there were significant differences between Hausa students and other tribes ($p = 0.03$) and between Fulani students and other tribes ($p = 0.007$).

Perceptions of social support based on the ISEL questionnaire ranged from 5–32, with a mean score of 17.2 ± 3.88 . In contrast, female students reported higher mean values of social support; likewise, students at 400 L reported higher values than did students at 500 and 600 L. However, social support perception was not significant across both gender and level, nor were any significant differences observed across marital status and ethnicity.

Bivariate Associations

The computed analysis revealed that STS and burnout are strongly positively correlated with each other at 0.71, whereas both are moderately negatively correlated with self-compassion at -0.54 and -0.53, respectively. These correlations suggest that higher levels of STS are associated with higher levels of BM, whereas both are correlated with lower levels of self-compassion. Social support revealed a low positive correlation with self-compassion (0.24) and a negative correlation with both STS and burnout; the values were also low, at -0.12 and -0.19, respectively (Figure 5).

Regression Analysis

With overall STS as the predictor and dependent variable, bootstrapped stepwise regression was used to compute the most significant model to include only BMs, self-compassion and the levels of clinical students. The model was significant ($p < 0.001$), explaining 57.7% of the variance in STS ($r^2 = 0.577$). The results presented in Table 2 revealed that STS scores significantly predict BM scores ($b = 0.38$, $p < 0.001$) and self-compassion ($b = 5.1$, $p = 0.001$), whereas the level of clinical students is not significant (0.058). Self-compassion is protective against STS and students in lower classes

When burnout was used as the dependent variable and the factors were used as predictors, bootstrapped stepwise regression revealed the best model to include only STS scores and self-compassion scores. The model was significant at $p < 0.001$; the variance explained (r^2) by the predictors was 53.5%. STS and self-compassion were significant in the model at $p < 0.001$ and 0.021, respectively. None of the demographic variables contributed to the prediction of burnout.

Table 2A. Contribution of predictors to secondary trauma scores.

Characteristic	Beta (β)	95% CI	p value
Intercept	26.0	10.0 to 41.0	0.001
BM	0.38	0.28 to 0.48	<0.001
SCS	-5.10	-8.10 to -2.10	0.001
Level	1.60	-0.06 to 3.30	0.058

Abbreviations: CI, confidence interval; β , regression coefficient

Table 2B. Contribution of predictors to burnout.

Characteristic	Beta (β)	95% CI	p value
Intercept	55.0	33.0 to 78.0	<0.001
STS	0.94	0.70 to 1.20	<0.001
Self-compassion	-5.70	-10.00 to -0.87	0.021

Abbreviations: CI, confidence interval; β , regression coefficient.

Discussion

This study evaluated the prevalence of secondary traumatic stress (STS) and burnout among clinical medical and dental students at a teaching hospital in northern Nigeria, as well as the associations between these constructs, self-compassion, and social support. The findings indicate rates of both STS and burnout among clinical students, with over half of the participants meeting the criteria for clinically significant levels of each. These results contribute to the expanding literature on the mental burden of clinical training and extend this knowledge to the Sub-Saharan African context, where such research remains limited.

Prevalence of STS and Burnout

The finding that 51% of clinical students reported moderate to severe levels of STS aligns with rates documented among medical professionals globally. Studies have reported STS percentages ranging from 47.5% to 67.1% among front-line healthcare workers during the COVID-19 pandemic (14), and these results suggest that medical and dental students experience comparable levels of indirect trauma exposure despite their trainee status. This is particularly concerning given that students in their formative clinical years may lack the experience and coping mechanisms that develop with professional maturity. The mean STS score of 37.7 ± 11.2 falls just below the clinical cut-off of 38 (37), indicating that the average student score is near the threshold for clinically significant STS symptoms.

Similarly, the burnout rate of 54.1% observed in this sample is consistent with prevalence estimates reported among health care providers in sub-Saharan Africa, which range from 40% to 80% (29). Physical exhaustion was the most frequently reported burnout component, affecting 38.5% of the respondents, followed by emotional exhaustion (35.8%) and mental exhaustion (19.3%). This hierarchy of exhaustion types may reflect the physically demanding nature of clinical rotations in resource-limited settings, where long hours, high patient volumes, and limited infrastructure may disproportionately affect students' physical reserves. The strong correlation observed between emotional and mental exhaustion ($r = 0.73$) suggests that these two dimensions of burnout may be particularly intertwined in student populations, possibly reflecting the cognitive and affective demands of learning while providing patient care.

Gender Differences

A notable gender difference was observed in both STS and burnout, with female students reporting higher mean scores on both measures. This pattern persisted despite a relatively small effect size and has been documented in previous studies of medical practitioners (10, 11). Several explanations may account for this finding. Female students may experience differential socialization that increases emotional responsiveness to patient suffering, or they may encounter additional stressors related to gender-based expectations and potential discrimination in academic medical environments. Alternatively, the

observed differences could reflect gender-based variations in willingness to report psychological distress rather than true differences in symptom experience. Notably, female students also reported significantly lower self-compassion scores than their male counterparts did, suggesting that self-compassion may mediate the relationship between gender and STS or burnout. This possibility warrants investigation in longitudinal studies.

Protective Role of Self-Compassion

A key clinically significant finding of this study is the robust inverse relationship between self-compassion and both STS ($r = -0.54$) and burnout ($r = -0.53$). These moderate-to-strong correlations indicate that students who treat themselves with care and empathy when facing difficulties are substantially less likely to develop symptoms of indirect trauma and occupational exhaustion. Regression analyses demonstrated that self-compassion independently predicted both outcomes, even after accounting for other variables. For each one-point increase in the self-compassion scale, the STS score decreased by 5.1 points, and the burnout score decreased by 5.7 points, representing a clinically meaningful reduction given the range of these measures.

These findings are consistent with previous research demonstrating that self-compassion buffers against workplace distress in healthcare settings (6, 7) and extends this protective effect to medical and dental students in training. Self-compassion may function through multiple mechanisms: reducing self-critical rumination, which amplifies stress responses; promoting adaptive coping strategies when faced with patient suffering; and fostering emotional equanimity, which prevents empathic engagement from escalating into traumatic stress (5). The moderate correlation between self-compassion and social support ($r = 0.24$) further suggests that self-compassionate individuals may be better positioned to mobilize social resources, although this relationship is weaker than anticipated and requires further investigation.

Contrary to the initial hypothesis and substantial prior literature (8, 9), perceived social support demonstrated only weak negative correlations with STS ($r = -0.12$) and burnout ($r = -0.19$) and did not emerge as a significant predictor in regression models. Several interpretations of this unexpected finding are possible. First, the measure of social support used in this study (ISEL) assesses the perceived availability of support rather than actually received support, and students may overestimate or underestimate available resources in ways that do not correspond to their protective effects. Second, the distinctive context of medical and dental training may render general social support less relevant than profession-specific support from classmates and supervisors, who understand the unique stressors of clinical education. Third, the relatively restricted range of social support scores (5–32) and the modest sample size may have limited the ability to detect existing relationships. Fourth, by the time students reach the clinical years, those with insufficient social support may have already discontinued their training, creating a selection bias that attenuates the observed associations.

Despite these null findings, social support should not be dismissed as irrelevant to student well-being. The theoretical and empirical basis for its protective effects remains strong (8, 9), and the measurement

approach used in this study may have been inadequate to capture the types of support most relevant to clinical training contexts. Future research should employ mixed methods to understand how medical and dental students mobilize social resources during times of stress and whether profession-specific support networks confer greater protection than general social support does.

Implications for training programs

The high prevalence of STS and burnout among clinical students, combined with the protective role of self-compassion, suggests that interventions targeting self-compassion may be particularly valuable in medical and dental education. Compassion-focused therapy (CFT) and compassion cultivation training (CCT) have demonstrated success in reducing work-related distress and improving psychological outcomes among medical workers (15–18). These interventions teach individuals to recognize distress without avoidance, respond to suffering with gentleness rather than self-criticism, and maintain emotional balance when exposed to others' trauma. Randomized controlled trials have shown that mindfulness-based mobile applications (27) and structured self-compassion programs (28) increase coping methods and reduce stress among medical and dental students.

Self-compassion interventions do not need to be lengthy or resource intensive to be effective. Brief training modules integrated into existing wellness curricula, peer support programs that explicitly cultivate compassionate self-talk, and faculty initiatives that model self-compassionate responses to clinical challenges could all contribute to a more supportive training environment. Given the high rates of STS observed in this study, with more than 10% of the students reporting severe symptoms, universal screening for secondary traumatic stress may also be warranted, with referral pathways for students who exceed clinical thresholds.

Study Limitations

Several limitations of this study warrant consideration. First, the cross-sectional design precludes causal conclusions about the relationships among STS, burnout, and self-compassion. While our conceptual model positions self-compassion as a protective factor, bidirectional relationships are plausible: experiencing STS symptoms may erode self-compassion over time, creating a downwards spiral of distress and self-criticism. Longitudinal studies following students throughout their clinical training are needed to establish temporal precedence and identify critical intervention windows.

Second, the sample was drawn from a single teaching hospital in northern Nigeria, which may limit its generalizability to other contexts. The predominance of Hausa ethnicity (56.9%) and Islam (86.2%) in our sample reflects the demographic characteristics of Kano State but may not represent the diversity of medical and dental students across Nigeria or Sub-Saharan Africa. The small proportion of female students (23.9%) also elicits questions about gender equity in access to clinical training at this institution, although this ratio is consistent with some reports from other Nigerian medical schools.

Third, the exclusion criteria may have introduced selection bias. By excluding students with diagnosed mental health conditions, those who repeated classes, class representatives and their assistants, and students whose parents or siblings were clinical instructors, we may have systematically removed students at both higher and lower risk for STS and burnout. Class representatives and students with physician family members, for example, might have access to greater institutional support or, alternatively, experience unique stressors related to role expectations or family pressure. The exclusion of these groups, while methodologically defensible for reducing confounding, limits the generalizability of our findings to the full population of clinical students.

Fourth, our use of self-report measures introduces the possibility of common method variance and recall bias. While the instruments used have well-established psychometric properties (32–35), self-reported symptoms do not necessarily correspond to clinical diagnoses. The absence of a structured clinical interview means that the prevalence rates reported here should be interpreted as estimates of symptom burden rather than the true prevalence of STS or burnout disorders.

Fifth, the relatively modest sample size ($N = 109$) may have limited statistical power to detect small effects or interactions, particularly in subgroup analyses stratified by ethnicity, marital status, or clinical level. The wide confidence intervals observed in the regression analyses reflect this imprecision and suggest the need for replication in larger samples.

Future research directions

In addition to the need for larger, longitudinal, and multisite studies, several specific research directions emerge from this investigation. First, qualitative research exploring the lived experiences of medical and dental students with STS may reveal the specific clinical encounters, institutional practices, and personal accounts that contribute to—or protect against—indirect trauma. Such studies might identify modifiable aspects of the training environment that are not captured by quantitative measures.

Second, intervention studies examining the effectiveness of self-compassion training specifically for reducing STS in student populations are needed. While compassion-focused interventions have demonstrated potential in healthcare workers (17, 18), their success in treating secondary traumatic stress—as opposed to general burnout or anxiety—has not been adequately tested. Randomized controlled trials with active control conditions and follow-up assessments could establish whether self-compassion training produces lasting reductions in STS symptoms.

Third, future research should examine potential moderators of the self-compassion–STS relationship. Personality traits such as neuroticism and agreeableness (22), prior trauma exposure, and year of training may influence how effectively students can deploy self-compassion strategies when faced with distressing clinical situations. Knowing these moderators could help customize interventions to students most at risk.

Fourth, given the weak associations observed for social support, finer-grained measurement approaches are warranted. Experience sampling methods can record real-time fluctuations in support availability and utilization, whereas social network analysis can map the structure of students' support networks and identify which types of connections (e.g., peers, supervisors, family, and mentors) provide the greatest protection against STS and burnout.

Conclusion

This study presents the first evidence of substantial secondary traumatic stress and burnout among medical and dental students in Nigeria. Over half of the clinical students met the criteria for clinically significant symptoms of each condition, with female students at particular risk. Self-compassion emerged as a strong protective factor, accounting for substantial variance in both STS and burnout scores even after controlling for other variables. In contrast, social support showed unexpectedly weak associations with outcomes, suggesting that general social support may be less protective in the specific context of clinical training than previously assumed.

These outcomes have significant implications for medical and dental education in Sub-Saharan Africa and beyond. The high prevalence of STS and burnout among trainees who have not yet entered independent practice raises important questions about the sustainability of current training models. The findings underscore an ethical imperative for intervention. Self-compassion training represents a promising, feasible, and potentially scalable approach to mitigate this harm. However, institutional changes, including reasonable work hours, accessible mental health services, supportive supervision, and a culture that normalizes psychological distress, are equally essential. The well-being of future clinicians depends not only on their individual capacity for self-compassion but also on the compassion embedded within the systems that train them.

Declarations

Ethics approval and consent to participate

The study was conducted in accordance with the Declaration of Helsinki and approved by the Health Research Ethics Committee of Bayero University, Kano (Approval number: BUK/HREC/329, NHREC/06/12/19/206). Informed consent to participate in the study was obtained from all of the study participants.

Human Ethics and Consent to Participate declarations

Not applicable.

Consent for Publication

Not applicable.

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request

Competing interests

The authors declare that they have no competing interests

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Authors' contributions

Conceptualization, A.A. and I.A; methodology, A.A., I.A. and A.M; software, A.M. and A.A; validation, A.N and R.M. formal analysis, A.A and I.A. investigation, I.A and R.M.; resources, A.A.; data curation, R.M & O.G.; writing—original draft preparation, A.A., I.A. and A.N.; writing—review and editing., R.M, O.G & A.M visualization, A.A.; supervision, O.G & R.M.; project administration, A.M.; All authors have read and agreed to the published version of the manuscript.

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Not Applicable

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Figures

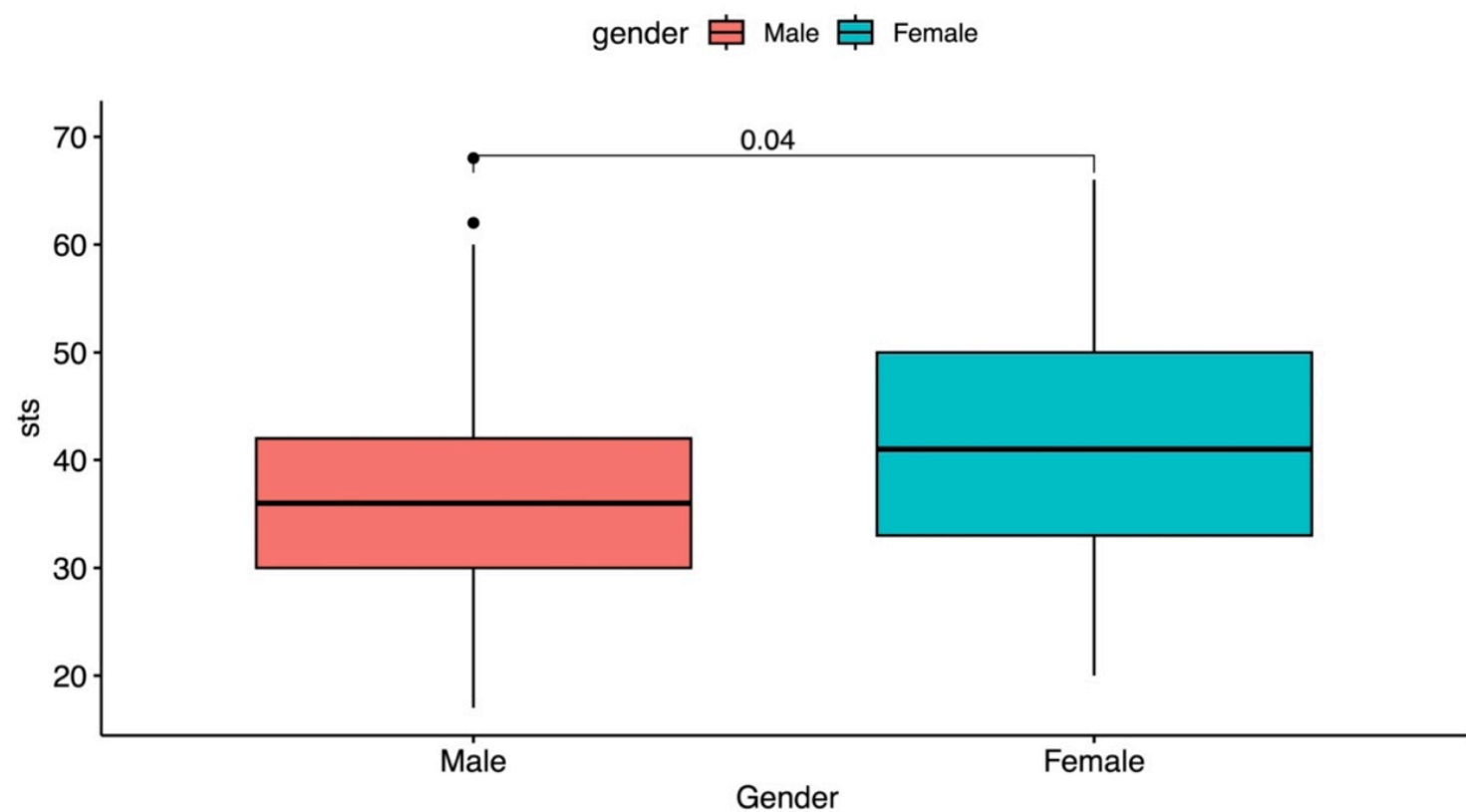


Figure 1

A boxplot showing the distributions of secondary traumatic stress values across sexes. Figure shows statistically significant higher female STS scores compared to males (p=0.04)

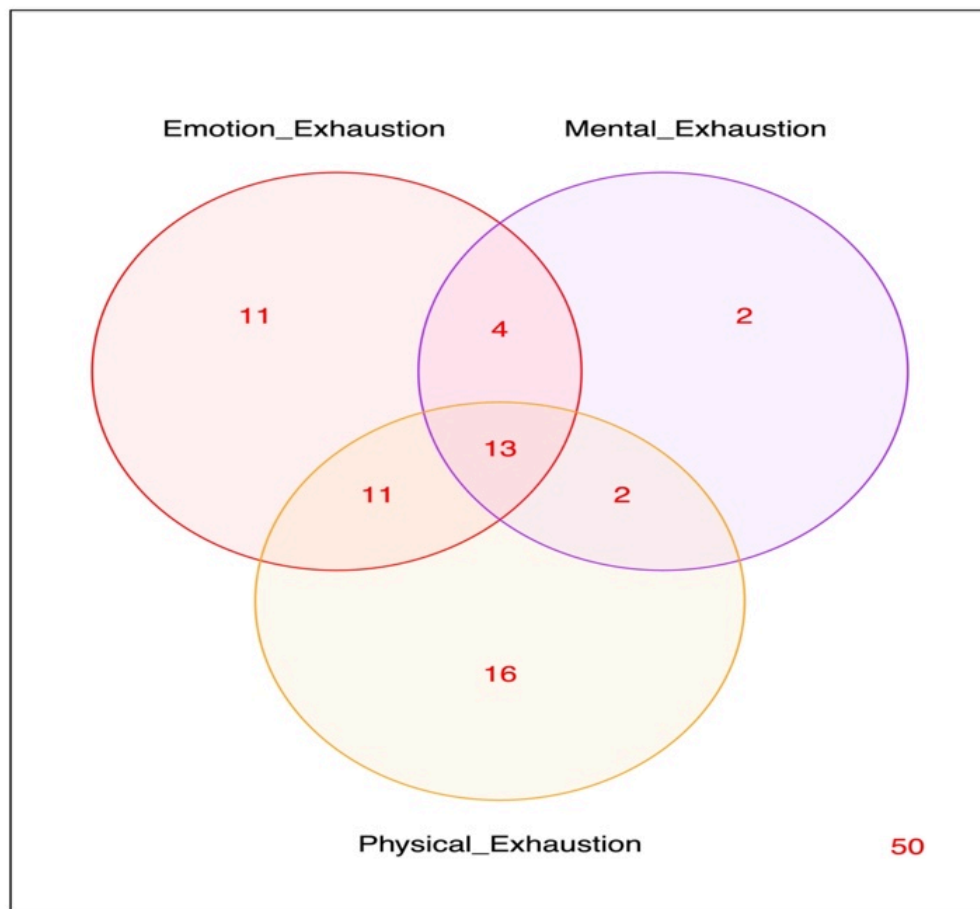


Figure 2

Venn diagram showing the intersection between the Burnout Measurement subscales. The figure shows the number of students showing all the subscales of BM (n=13) and the numbers of students overlapping between the subscales of Mental Exhaustion, Emotion Exhaustion and Physical Exhaustion.

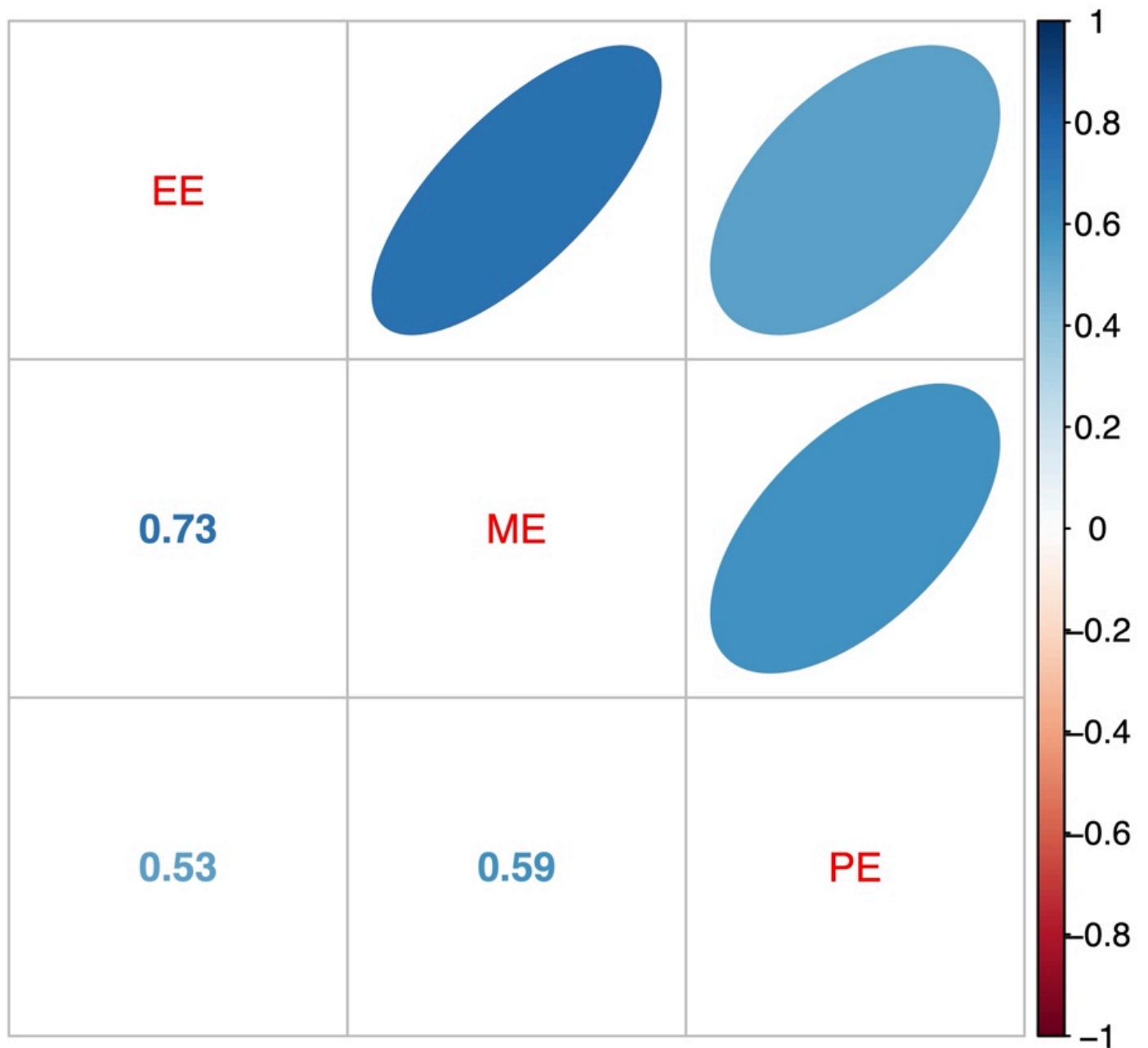


Figure 3

A correlation matrix and plot showing correlations between subscales of Burnout Measurement. The Figure shows that Emotional and Mental Exhaustion are most correlated ($r_s = 0.73$) followed by Mental and Physical Exhaustion ($r_s = 0.59$)

EE- Emotional Exhaustion, ME- Mental Exhaustion, PE – Physical exhaustion

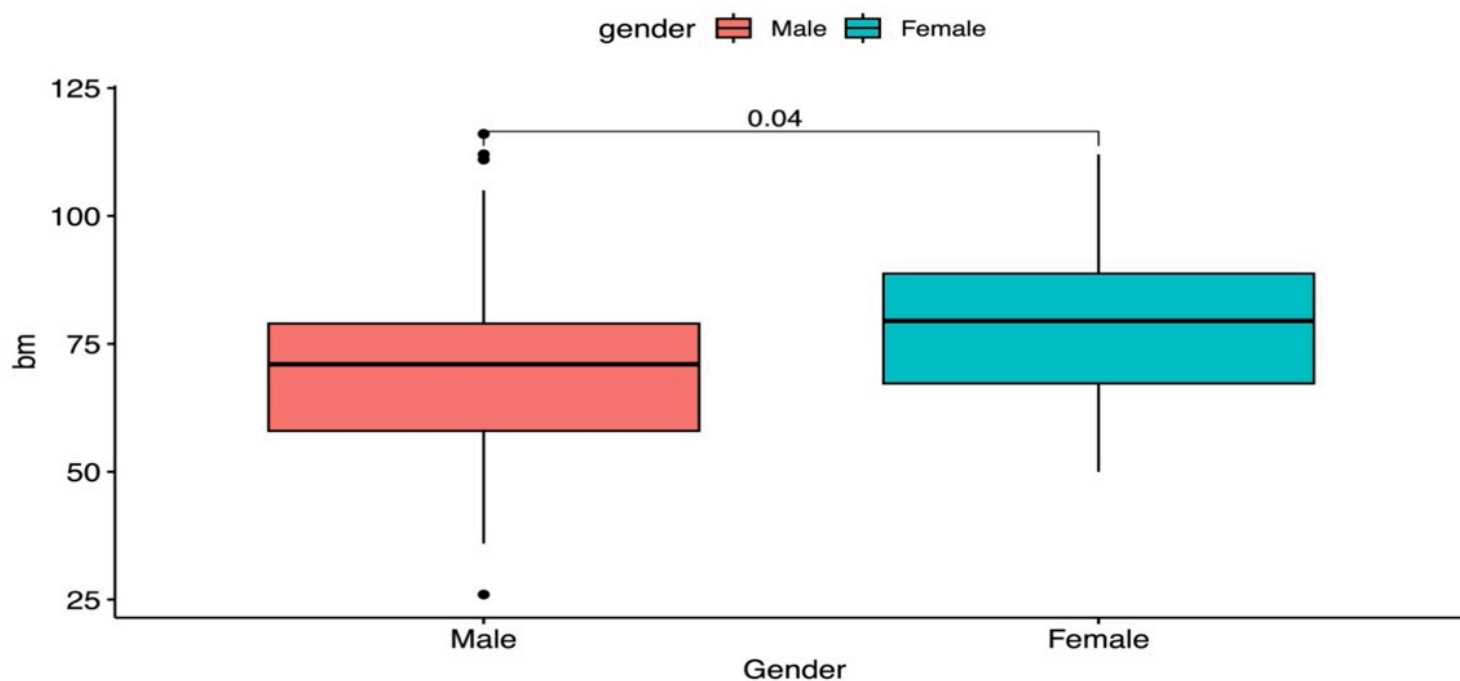


Figure 4

A boxplot showing the distributions of burnout measure values across genders. Figure shows statistically significant higher female STS scores compared to males ($p=0.04$)

Self-compassion and Social Support



Figure 5

Correlation plot of associations between self-reported questionnaires. Figures show strong correlation between STS and BM and mild correlations between SCS and ISEL. It also shows with moderate negative correlations between STS and BM to both SCS and ISEL.

STS- secondary traumatic stress, BM- burnout measure, SCS- self-compassion scale, ISEL- interpersonal support evaluation list