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AWARD WINNING ORIGINAL ARTICLE

Perceived stress and burnout syndrome in chiropractic students at a South African university during the COVID-19 pandemic: A cross-sectional study

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ABSTRACT

Objective: Higher stress levels may be associated with decreased academic success and physical and psychological well-being in chiropractic students. This study aimed to determine the perceived stress and burnout of chiropractic students at the University of Johannesburg during the COVID-19 pandemic.

Methods: This was a quantitative, exploratory study utilizing a self-administered online questionnaire distributed to chiropractic students ($n = 246$) at the university. The questionnaire consisted of 3 main components: demographics, the Perceived Stress Scale (PSS-10), and the Maslach Burnout Inventory–Student Survey (MBI-SS). Data were analyzed utilizing exploratory factor analysis, Cronbach alpha for reliabilities, and descriptive statistics for mean scores being interpreted using subscales pertaining to the 2 survey tools.

Results: The response rate was 63.82% ($n = 157$) with the PSS-10 indicating participants obtained a total mean score of 25.08 (average stress). For the MBI-SS categories, participants scored 18.96 out of 30 for exhaustion, 10.31 out of 30 for cynicism, and 22.46 out of 36 for professional efficiency; higher scores of exhaustion and cynicism and lower scores of professional efficiency are indicative of higher degrees of burnout. Statistically significant differences for both tools were noted in relation to age and academic year with higher values indicated with increased age and progression in the program.

Conclusion: The results indicate that chiropractic students experienced moderate levels of stress but higher burnout than other health sciences student populations when compared to current literature. Age and progression in the program appear to have a negative influence on both these factors.

Key Indexing Terms: Chiropractic; Education; Academic Success; Burnout; Stress; Psychological

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INTRODUCTION

Stress is a multifaceted phenomenon that reflects and conditions individual and organizational quality of life.[1] It is a response to work-related pressure and can lead to a negative mental experience.[2] Burnout has been defined as a prolonged response to chronic emotional and interpersonal stressors on the job, characterized by exhaustion, cynicism, and professional inefficacy.[3,4] It is a condition in which individuals are left exhausted by long-term confrontations with unmanageable job stressors.[5] The relationship between stress and burnout is evident in various occupational settings, including health care and education.[2,6,7] Stress is a significant factor contributing to burnout, particularly in high-pressure work environments such as health care and education.

Health science students are likely to develop higher levels of stress and burnout as a result of the demands of their academic studies,[8–10] and higher stress levels are associated with decreased academic success and decreased physical and psychological well-being.[11] The bachelor of health sciences (BHSc) chiropractic in South Africa is a 4-year professional bachelor's degree with a further 2 years required to complete the master of health sciences (MHSc) in chiropractic, which is the minimum requirement for registration to practice with the Allied Health Professions Council of South Africa.[12,13] The workload for chiropractic students is often considered high and physically demanding and may result in feelings of burnout and stress.[14]

COVID-19 was classified as a pandemic on March 11, 2020.[15] Consequently, various changes in the presentation of

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chiropractic programs occurred globally, impacting students in various aspects of their academic and clinical curriculum.[16–18] Within programs accredited by the European Council on Chiropractic Education, it was reported that outpatient teaching clinics and chiropractic technique courses were the most affected during this period with extreme stress being an identified theme.[17] Within the South African context, students appeared to have a positive attitude toward returning to clinical training, but an additional contributor to stress was the fear of contraction and transmission of COVID-19 to families.[18] Students, therefore, had to adapt to these changes within a short period of time with the consequence of additional stress and burnout.[19] Various factors have been identified that play a role in the mental health and well-being of health care students across the globe, and understanding their perceptions, particularly during a global pandemic, may assist chiropractic programs and students in relation to their management.

This study aimed to determine the perceived stress and burnout that chiropractic students at the University of Johannesburg (UJ) experienced during the COVID-19 pandemic. Although discussed in relation to students from other health care professions, limited research exists on the impact specifically on chiropractic students.

METHODS

Design

A quantitative, exploratory study design was utilized with a self-administered online English questionnaire.

Participants

All chiropractic students registered for the BHSc and MHSc chiropractic programs in 2021 at the UJ Doornfontein campus were invited to participate in the study. A total of 246 participants (182 from BHSc and 64 from the MHSc) were, therefore, eligible to participate in the study.

Recruitment and Data Collection

Students received a link via WhatsApp messenger (WhatsApp, Facebook, Inc.) from their respective class representatives, which included an invitation to participate in the study and an information letter. It was explained in the link that the survey was voluntary and that, by clicking "continue," the student was signifying consent to complete the survey anonymously as no identifying data were collected.

Measures

The questionnaires utilized in this study comprised 3 sections, namely, demographic data, the Perceived Stress Scale (PSS-10), and the Maslach Burnout Inventory–Student Scale (MBI-SS).

The Perceived Stress Scale

Cohen et al[20] indicate that the PSS aims to assess the degree to which people perceive their lives as stressful. High levels of stress are associated with poor self-reported health, elevated blood pressure, depression, and susceptibility to infection. This tool is widely utilized to analyze the levels of stress in adults and teens older than 12. The PSS-10 focuses on feelings and thoughts during the past month, and in each case, the respondent is required to answer questions based on how often they felt a certain way utilizing a 5-point scale (*never* to *very often*)[20] in which the total scores are calculated by adding the values of each question. The scores for questions 4, 5, 7, and 8 are reversed. Higher scores, therefore, indicate higher levels of perceived stress.[21]

The PSS-10 is considered a reliable tool (Cronbach alpha calculated as $\alpha = .78$)[19] and has been accepted as reliable in multiple studies in health care students across the globe.[9,11,21–24] Mean scores vary according to age, income, education, and gender,[25] but the general interpretation scores range between 0 and 13 indicating low stress, scores ranging from 14 to 26 are moderate stress, and scores ranging from 27 to 40 are considered high perceived stress.[25] In this study, the value of Cronbach alpha was $\alpha = .86$ and was, therefore, considered reliable.

The Maslach Burnout Inventory–Student Survey

The MBI-SS is a 16-item survey that is used to measure burnout in student populations. This tool measures 3 dimensions of burnout, namely, cynicism, exhaustion, and professional efficiency and makes use of a 7-point Likert scale ranging from *never* = 0 to *every day* = 6. Cynicism and exhaustion are evaluated with 5 specific questions (maximum total of 30) and professionalism with 6 (maximum total of 36).

The MBI-SS was utilized in this study to determine the degree of burnout the chiropractic students were experiencing and consisted of measuring 3 components. Exhaustion is a condition described as a decreased capacity for work and a diminished efficiency for accomplishment and can be accompanied by feelings of lethargy.[3,26] The cynicism scale measures the feelings of detachment toward one's work, whereas the professional efficiency scale refers to an individual's feelings of being effective in the workplace.[26] Each category of burnout was calculated and interpreted separately with higher scores indicating a higher degree of burnout with the exception of professional efficiency, for which scores were reversed with lower scores indicating a higher degree of burnout.

Cronbach alpha was calculated for all 3 dimensions with values above $\alpha = .7$, indicating reliable results.

Data Analysis

The data were obtained through a self-administered online survey. Data analysis was performed with the advice and assistance of a statistician from STATKON from the UJ. Data were captured in a Microsoft Excel document, and the analysis included frequencies and descriptive statistics (such as counts, percentages, means, standard deviations, and minimum and maximum values). Exploratory factor analysis on the Likert-scale questions was performed for each section in the questionnaires, and reliabilities (Cronbach alpha) were used on the factors determined in the exploratory factor analysis and on the theoretical factors.

Descriptive statistics (means and standard deviations) were used on the scores of the scales/factors with correlations between the year of chiropractic study and the scales/factor scores for each of the Likert-scale sections to explore students' perceived stress and students who experience burnout syndrome.

Parametric and nonparametric tests were performed to assess statistical significance of the data using results from parametric *t* tests.

Table 1 - Demographic Data of the Respondents

	Number of valid responses (*n*)	Percentage
Sex		
Female	124	79.0
Male	33	21.0
Total	157	100.0
Age group		
18–21	67	42.7
Older than 21	90	57.3
Total	157	100.0
Academic year of study		
1st–3rd year BHSc chiropractic	90	57.3
4th year BHSc–2nd year MHSc	67	42.7
Total	157	100.0

Ethical Considerations

The research was approved by the Faculty of Health Sciences Research Ethics Committee, UJ (REC-1277-2021). The research participants remained anonymous, no identifying data was collected, and there was no ability to trace back determined responses from individual participants. There were no direct benefits to the participant. Participants were informed of the availability of the UJ Psychological and Career Development Centre should they experience stress or burnout. No conflict of interest was held by anyone involved in this study. The extracted data were labeled using identification numbers and stored on the UJ's password-protected server.

RESULTS

Demographic Data

A total of 157 valid responses were received from the total sample of 246, indicating a 59.76% response rate. The sample consisted of 79% ($n = 124$) female and 21% ($n = 33$) male respondents (Table 1).

The majority of participants were in 2nd year BHSc chiropractic (21%; $n = 33$), 19.1% ($n = 30$) in 3rd year BHSc chiropractic, 17.2% ($n = 27$) in 1st year BHSc chiropractic, 15.9% ($n = 25$) in 4th year BHSc chiropractic, 14% ($n = 22$) in 2nd year MHSc chiropractic, and 12.7% ($n = 20$) in 1st year MHSc chiropractic. Academic years were further divided into 2 comparable groups with 1st–3rd year BHSc in the junior category (57.3%; $n = 89.96$) and 4th year BHSc–2nd Year MHSc in the senior category (42.7%; $n = 67.04$).

Out of the total 157 responses, 45.9% ($n = 72$) were in the age group of 22–25, and 42.7% ($n = 67$) were in the age group of 18–21 with the remaining 11.4% ($n = 18$) collectively 26 and older. For the purposes of analysis, the participants were split into 2 groups based on age, namely, 18–21 years, which was 42.7% ($n = 67$) and 57.3% ($n = 90$) as older than 21.

Mean Score Values for PSS-10 and MBI-SS

Participants older than 21 experienced higher levels of stress, exhaustion, and cynicism, and those 18–21 indicated lower professional efficiency (Table 2). The senior academic year group experienced higher levels of stress, exhaustion, and cynicism and lower levels of professional efficiency than the junior group.

For the PSS-10, increased age ($p = .02$, 95% CI, −.48 to −.04) and senior year group ($p = .04$, 95% CI, −.44 to −.01) demonstrated statistically significant differences.

The MBI-SS demonstrated statistically significant differences in relation to age for exhaustion ($p = .01$, 95% CI, −1.33 to −.34); cynicism ($p = .03$, 95% CI, −1.02 to −.06), and professional efficiency ($p = .01$, 95% CI, −1.09 to −.3) and year group for exhaustion ($p = .02$, 95% CI, −1.11 to −.11), cynicism ($p = .05$, 95% CI, −.98 to −.01), and professional efficiency ($p = .04$, 95% CI, −.84 to −.03).

Both the academic year and age groups, therefore, demonstrated statistically significant differences ($p \leq .05$).

DISCUSSION

Limited studies have been conducted on chiropractic students' perception of stress and burnout and the effects of the COVID-19 pandemic on their mental health. The current study has, therefore, contributed to additional insight into South African students' responses during this period.

So as not to view the information obtained in isolation, a comparison of the current research results to previous research that included chiropractic and other health disciplines was performed. Comparison of the PSS-10 (Table 3) indicates that chiropractic students at UJ appear to experience higher levels of perceived stress than various other students, including in medicine,[27] physiotherapy,[28] nursing,[29] and general student populations,[23,24,30–32] whereas the MBI-SS (Table 4) indicates that UJ students had an increased level of burnout on all 3 burnout scales when compared with other students. Exceptions to this were chiropractic students in Europe,[14] who were slightly more cynical, and medical

Table 2 - Mean Values for the MBI-SS and PSS-10 Sections

	PSS-10 Mean (SD)	Exhaustion Mean (SD)	Cynicism Mean (SD)	Professional efficiency Mean (SD)
Age group				
18–21	2.36 (0.69)	3.30 (1.63)	1.75 (1.40)	3.35 (1.30)
Older than 21	2.62 (0.67)	4.14 (1.48)	2.29 (1.62)	4.04 (1.19)
p value	.02 (95% CI, −.48 to −.04)	.01 (95% CI, −1.33 to −.34)	.03 (95% CI, −1.02 to −.06)	.01 (95% CI, −1.09 to −.3)
Academic year group				
Junior	2.41 (0.70)	3.52 (1.65)	1.85 (1.50)	3.56 (1.26)
Senior	2.64 (0.66)	4.13 (1.47)	2.34 (1.58)	3.99 (1.28)
p value	.04 (95% CI, −.44 to −.01)	.02 (95% CI, −1.11 to −.11)	.05 (95% CI, −.98 to −.01)	.04 (95% CI, −.84 to −.03)
Overall mean value	2.51	3.79	2.06	3.74

Table 3 - The Total Mean Score Values of Perceived Stress (PSS-10) in Previous Literature in Different Student Populations

Health Field	Mean (SD)
Chiropractic	
Rank and de la Ossa (2019)[14]	17.27 (7.29)
Kizhakkeveettil et al. (2016)[11]	18.80 (5.40)
Innes (2016)[32]	19.50 (6.60)
Current study value	23.90 (10.40)
Medical	
Bhavani Nivetha M et al. (2018)[27]	17.7 (5.5)
Physiotherapy	
Jacob et al. (2012)[28]	
1. Israel	13.5 (ND)
2. Australia	17.3 (ND)
3. Sweden	19.0 (ND)
Nursing	
Onieva-Zafra et al. (2020)[29]	22.78 (8.53)
General student populations	
Denovan et al. (2019)[23]	19.79 (6.37)
Khan and Shamama-Tus-Sabah (2020)[24]	21.06 (5.42)
Heinze et al. (2017)[30]	22.41 (7.28)

students in Austria,[33] who scored higher burnout levels in all 3 components.

The total mean score value for perceived stress in chiropractic students at UJ was 23.9 (±10.37) out of 40, which indicates that, overall, the students were experiencing average stress levels. When compared with European, American, and Australian chiropractic students, the UJ students demonstrated the same category of perceived stress but scored higher than all 3 other studies.[11,14,34] These findings should take into consideration that the current study was conducted during the COVID-19 pandemic toward the end of the academic year and examination period, which may be associated with increased stress and withdrawal.[34] Important factors to consider when assessing stress during the pandemic would be the effects of lockdown, social isolation, and the disruption of everyday living.[30] Another consideration is that the initial European study by Rank and de la Ossa[14] was before the pandemic, and the results may, therefore, differ substantially. Factors such as increased anxiety, adaptations to online learning, the fear of losing a loved one, and the fear of job availability after graduation need to be considered in relation to the findings.[8,16,31,35] The cohort study conducted by Etxeberria et al[34] during the pandemic indicated that there was an increase in exhaustion and cynicism but no change in work efficiency when compared with their previous study. This may be due to remote learning being accompanied by loneliness, the uncertainty of lockdown restrictions, suspension of studies, and the stress of being infected by the coronavirus.[18,34] When compared with students in the current study, they appear to experience higher levels of burnout than chiropractic students in Europe.[34] South Africa is considered a developing country and may have various additional challenges, such as cultural beliefs, language barriers, home and work environment, and familial circumstances, that are considerations for these differences between the 2 student populations.[36]

Students with medical degrees showed similarities to chiropractic, such as subject matter, clinical sciences, and years of study.[37] Although chiropractic students at UJ experience moderate stress levels, the perceived stress is higher than that of medical students mentioned previously. The onset of the pandemic was shown to have increased stress and anxiety levels in university students in general[19,31] and is a consideration for these higher stress levels. A more recent study conducted on medical students in Austria[33] demonstrated higher scores in exhaustion and cynicism and lower in professional efficiency, indicating higher levels of burnout, whereas medical students in Spain[38] scored lower in exhaustion and cynicism and higher in professional efficiency, displaying lower levels of burnout. The current study burnout levels are more aligned with the medical students in Austria, which may be due to high academic workload, increased time needed to study modules, and the increased practical hours in a clinical setting.[14,39]

Physiotherapy students internationally demonstrated lower perceived stress levels than the current students, which may be attributed to increased time spent studying chiropractic degrees and associated differences in the course content.[14,28]

The high workload that nursing students experience may result in stress as a result of prolonged working hours, academic work difficulty, poor study methods, and family illness.[40] This finding is similar to that of UJ chiropractic students as they are exposed to education in a clinical setting involving patient management and care. This can overwhelm some students and exacerbate stress, potentially leaving the program entirely.[41] Nursing students in Spain demonstrated

Table 4 - General Mean Score Values in Previous Literature of Burnout (MBI-SS) in Different Student Populations

Health Field	Exhaustion Mean (SD)	Cynicism Mean (SD)	Professional Efficiency Mean (SD)
Chiropractic			
Rank and de la Ossa (2019)[14]	2.03 (1.31)	1.44 (1.15)	4.01 (1.05)
Etxeberria et al. (2022)[34]	2.44 (1.43)	2.07 (1.24)	4.01 (1.00)
Current study values	3.78 (1.60)	2.06 (1.55)	3.74 (1.28)
Medical students			
Thun-Hohenstein et al. (2020)[33]	4.19 (0.87)	2.75 (1.21)	2.44 (0.86)
Galán *et al.* (2011)[38]	2.10 (1.0)	0.95 (1.0)	4.35 (0.83)
General population			
Maslach et al. (1997)[3,26]	2.26 (1.47)	1.74 (1.36)	4.00 (1.17)

moderate levels, but when compared to other health science domains, they ranked higher than medicine and physiotherapy.[29] The chiropractic students in this study demonstrate similar stress to these nursing students.

In both age and academic year groups, statistically significant differences were evident when comparing means within the 2 groups. Academic workload, change in academic setting, physical demands, fear of failure, job security, lifestyle, sleeping patterns, and varying coping strategies are all important factors that may play a role in the perceived stress and burnout of these students.[9,11,42–44]

The COVID-19 pandemic has had unparalleled effects on the mental health and well-being of university students. Factors to consider are the effects on job security, finances, fear of contracting and spreading the virus, lifestyle changes, and the use of specific coping strategies.[16,18,38,45]

Addressing student burnout in higher education requires a multifaceted approach targeting mental health, academic support, and overall wellness. Institutions should provide accessible mental health counseling, both in person and virtually, and facilitate peer support groups.[46] Flexibility in academic policies, personalized advising, and workshops on time management and stress relief are essential. Promoting physical wellness through fitness programs and mindfulness activities such as meditation and yoga, along with creating relaxation spaces, can significantly help. Building a sense of community through clubs and social events, ensuring an inclusive environment, and integrating wellness components into the curriculum also play crucial roles.[47]

Institutions should consider training for faculty that would facilitate recognition of burnout signs and techniques or resource availability to offer support, incorporating flexibility and mental health check-ins in their teaching. Mentorship programs and the use of technology for flexible learning and online resources are beneficial.[46] Regular feedback through surveys can help institutions continuously improve support services. By integrating academic, mental health, and wellness services and fostering collaboration across departments, higher education institutions can effectively address burnout and promote student well-being and success.

LIMITATIONS

An important limitation of this study was that it measured students' perceived stress and burnout during the pandemic and may, therefore, not be an accurate representation of perception either before or after this period. Additionally, it was only conducted at the UJ, and findings may not be transferable to other institutions due to variations in the management of learning and students during COVID-19. Comparisons of mean scores to other health disciplines were compared with previously published literature and not directly with students within the same or other institution during the period indicated. An evaluation of workload requirements for different health sciences disciplines and their impact on burnout should be considered.

A general limitation is the fact that no specific consensus related to burnout has been established with varying criteria of what constitutes burnout and/or low, medium, or high burnout.[47] Interdisciplinary or multi-institutional studies should be considered in an effort to standardize the measurement.

CONCLUSION

The results indicate that chiropractic students at the UJ experienced moderate stress levels but higher burnout than other health sciences or international chiropractic student populations compared with current literature. Age and progression in the program appear to influence both these factors negatively, and institutions should be cognizant of these when implementing mental health strategies to assist students. Faculty within programs should be trained to identify burnout and provide adequate support. Programs that encompass mental health and academic support, health and wellness programs, and community and social support in a holistic manner should be developed for students.

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Author Contributions

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