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Abstract

Background: The mental health of students plays a crucial role in their learning and performance. The COVID-19 pandemic, the political turmoil and a coup in Sudan has exacerbated stress and anxiety among university students in Sudan due to uncertainty about their academic activities.

Aim: To assess post-traumatic stress disorder (PTSD) occurrence and coping strategies adopted by university students in Sudan.

Methods: This cross-sectional survey was conducted from March to June 2022. It used the

Coping Orientation to Problems Experienced (Brief-COPE) and Impact of Event Scale-Revised (IES-R) questionnaires to assess the occurrence of PTSD and coping strategies among 596 university students in Sudan. Descriptive statistics were used to determine the frequency and percentage, Student's t test was used to compare the means of 2 groups and one-way analysis of variance to compare the means of ≥ 3 groups.

Results: There was a high prevalence of PTSD among the students, with a score of 31.2 (SD 16.4). The total score of PTSD was higher among female students. Around 36% of the students had a PTSD score > 37, which is considered high enough to suppress immune function. The most widely adopted coping strategies were religion and acceptance of the situation, while substance use was the least. Students who had COVID-19 infection during the pandemic differed significantly from uninfected students in the application of coping strategies. In contrast, students whose family members or friends had COVID-19 were not significantly different from students with uninfected family members or friends in the application of the coping strategies, such as self-blame, denial, substance use, and behavioural disengagement.

Conclusion: We recommend the initiation and implementation of psychological counselling programmes for university students in Sudan onsite or remotely. Further research should be carried out to assess the long-term effects of the pandemic and the political conflicts so as to design and implement appropriate and efficient interventions.

Keywords: COVID-19, post-traumatic stress disorder, political unrest, Brief-COPE, mental health

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Introduction

Good mental health is the basis for effective student learning and performance. Students may experience stress from a variety of causes, including poor academic achievement, exam failure, intensive study plans, disease outbreaks and economic or political unrest (1). Stress and anxiety have a negative effect on the quality of life of students and can interfere with their education. There have been reports of poor retention and concentration among students, badly affecting their learning and preparation for upcoming exams and academic achievements (2). A series of world mental health surveys carried out by WHO found that 20–35% (3, 4) of university students experienced mental disorders, along with the risk of persistent mental health problems (5), with unique stressors related to developmental stage (1).

The COVID-19 pandemic has caused significant and long-lasting traumatic stress, such as depression and anxiety, resulting in severe social and economic issues. The spread of a lethal and virulent virus put students under stress, impairing their cognition, emotions and behaviour because of the sudden change in their social and academic patterns (6). The COVID-19 crisis has resulted in stubborn thinking, altered eating and sleeping habits, and exacerbation of stress, anxiety, loneliness and depressive symptoms. Lockdowns and social restrictions increased mental disorders and smartphone addiction and affected physical health. Globally, a meta-analysis found that > 50% of 90 879 university students experienced impaired sleep quality and 39.4% suffered from anxiety during the COVID-19 pandemic (7).

The mental health and coping strategies among university students in Arabic and African countries close to Sudan have been evaluated. Up to 32% of students reported having suicidal thoughts. Most students relied on religion as a coping strategy in Saudi Arabia (8), and 38.5% of students said their studies were affected by the pandemic and they felt nervous or anxious (9). The majority of Moroccan students (62.3%) suffered from anxiety during the early stage of the pandemic and female gender was identified as a risk factor (10). The prevalence of stress and anxiety among Ethiopian and Libyan university students was 32.5% and 64.5%, respectively (11, 12), and the latter group was affected by both the civil war and COVID-19.

In addition to COVID-19, Sudan has experienced a lot of political unrest from revolutionary movements, political divisions and a military coup (13). Academic instability in Sudanese universities began with the revolution on 19 December 2018. During that time, the universities were closed for ~9 months because of the initial uprising, protests and general strike, until the

end of August 2019, when a new transitional government was established (14). Following that, Sudanese universities and education system in general were affected by 3 waves of COVID-19 and continued sporadic protests. However, declaration of the state of emergency on 25 October 2021 by the Sudanese military resulted in further closure of the universities for a few months. Universities experienced irregularities in their academic years because of several cycles of openings and closures that led to uncertainty among students.

Adoption of cognitive and psychological coping strategies is imperative to handle stressful situations and these vary among individuals. Coping strategies are purely situational; some aim to develop positivity while others aim to reduce stress (15). There were several coping strategies adopted by students globally during the COVID-19 pandemic, including confrontation, self-control, escape and avoidance, use of smartphones, positive family cohesion, and substance use (8, 16, 17). Most Arab students relied on acceptance and religion (8, 18). Previous Sudanese studies have been limited to assessment of anxiety, depression and stress among medical (19–21) and high school (22) students. There are no reports on mental health and coping strategies among Sudanese students who were enduring academic uncertainty associated with the pandemic and political unrest. This study aimed to quantify the extent of post-traumatic stress disorder (PTSD) and coping strategies among university students in Sudan. Our findings will aid the development of psychological interventions and focused policies for education of students during such crises.

Methods

Ethical approval

Prior ethical approval was obtained from the Human Ethics Committee of the International University of Africa. Before administering the questionnaire, participants were informed about the purpose of the study and were given consent forms to fill and sign. They were assured of confidentiality, as there was no personal identification information on the questionnaire. Participants had the right to continue or withdraw from the survey at any time, and participation was voluntary.

Study site and population

A cross-sectional web-based study was conducted among the university students of Khartoum State, Sudan between March and June 2022. The survey was sent to 7 public and 4 private universities in the state, including the health and non-health colleges. The university students were included in the study irrespective of gender, age and course of study. Students who responded with incomplete information or who had left the university and were not currently enrolled were excluded. The study flow diagram is shown in Figure 1 .

Study instrument

The study questionnaire had 3 sections. Section I comprised demographics. Section II consisted of 22 questions from IES-R (Impact of Events Scale-Revised) to evaluate PTSD among study participants. Each item of IES-R was rated from 0 to 4, where 0 indicated “not at all” and 4 “extremely”. The total score ranged from 0 to 88. Items 1, 2, 3, 6, 9, 14, 16 and 20 were used to assess the intrusions domain of IES-R. Items 5, 7, 8, 11, 12,13, 17 and 22, and 4, 10, 15, 18, 19 and 21 were used to assess avoidance and arousal. Section III had the Brief-COPE scale (Coping Orientation to Problems Experienced) with 28 items. This scale was used to assess the coping methods for stressful life events. Each item had a score of 1–4, yielding a minimum score of 28 and a maximum of 112. Higher scores indicated a higher tendency to implement the corresponding coping strategy. The Brief-COPE scale consisted of 14 different coping strategies or facets: self-distraction, active coping, denial, substance use, use of emotional support, use of informational support, behavioural disengagement, venting, positive reframing, planning, humour, acceptance, religion and self-blame. The IES-R and Brief-COPE scales were both available in Arabic, and the linguistic accuracy was assessed by native Arabic speakers through forward and backward translation. No changes were made to the translated version of both scales. The questionnaire was validated by experts in pharmacology, clinical pharmacy, psychology and sociology. Before conducting the survey, reliability of the study instrument was determined from the response of 50 participants and the lowest Cronbach α value obtained was 0.781 for IES-R.

Sampling technique and data collection

We used an exponential, nondiscriminate snowball sampling method. The questionnaire was sent to student groups (first wave) with a request to share it further to their contacts in the university. This method was used because it was not possible to access all participants individually as a result of lockdown and university closures. This sampling method was used in a previous cross-sectional study (23). The first wave of students for the purpose of snowball sampling were selected by the investigators. These students forwarded the link to the online questionnaire to other students who formed the second wave, and this second wave forwarded it to other students, constituting further waves.

Statistical analysis

All data were analysed using SPSS version 25. For categorical variables, descriptive statistics were used to determine the numbers and percentages, while mean and standard deviation were calculated for continuous data. Student's t test was used to compare the means of 2 groups. One-way analysis of variance (ANOVA) was used to compare the means of ≥ 3 groups. The significant results from one-way ANOVA were subjected to Tukey's post hoc test to determine which groups differed significantly. Bonferroni corrections were applied to control family-wise error rate. Effect size was determined by Hedge's g and $\chi 2$, where appropriate. Correlation between stress level and coping mechanisms was ascertained by Pearson's correlation. The relationship was measured using r values and the strength of the relationship was classified as weak (r = 0–0.3), moderate (r = 0.3–0.5) or strong (0.5–1). $P \leq 0.05$ (2-tailed) was considered significant.

Results

Students' demographics

Among the 596 students, 445 (74.7%) were female, and the same number were aged 18–22 years (Table 1). More than half of the students (415; 69.6%) were from health colleges. Most of the students were enrolled for bachelor degrees (567; 95.1%). Students were residents of Khartoum (54.9%), Omdurman (30.9%) and Bahri (14.3%). Around a quarter of participants (147; 24.7%) had a history of COVID-19, and 479 (80.4%) reported that their family members or friends had contracted COVID-19 during the pandemic.

Post-traumatic stress disorder

The mean PTSD score was 31.2 ± 16.4, and the subscale avoidance scored highest compared with intrusion and hyperarousal (Table 2). Scores for PTSD and its subscales were significantly higher among females than males (Table 2). An IES-R score > 33 was observed in 276 (46.3%) students, indicating a probable diagnosis of PTSD, whereas 197 (33.1%) had a score
Figure 2
). Approximately, one-third (36.2%) of participants had a score ≥ 37, which is high enough to suppress immune function, even 10 years after an impact event. There were no significant differences detected between students' PTSD scores across age categories, colleges, educational levels and history of COVID-19 (
Table 2
). However, participants enrolled in the third academic year had higher scores than those in the first year (P = 0.004), particularly for the intrusion domain. Students who were infected by COVID-19 (P = 0.013) and those whose family members or friends were infected with COVID-19 (P = 0.006) had greater hyperarousal scores. Likewise, students whose families or friends were infected with COVID-19 had higher overall PTSD total score (P = 0.003), particularly for the intrusion domain (P = 0.002).

Coping strategies

Overall coping mechanism score was 62.9 ± 14.1. Fourteen coping facets comprising 28 mechanisms are indicated in Table 3 . The most common coping mechanisms were religion (5.85 ± 1.9), acceptance (5.77 ± 1.8), planning (5.24 ± 1.9) and positive reframing (5.09 ± 1.9). In contrast, behavioural disengagement (3.87 ± 1.7), self-blame (3.79 ± 2.0), denial (3.34 ± 1.8) and substance use (2.39 ± 1.1) were the least reported coping strategies. Gender was significantly associated with emotional support (P = 0.02) and humour (P = 0.01). Emotional support (P = 0.007) and behavioural disengagement (P = 0.02) significantly differed among the age groups. Type of college was significantly associated with humour and self-blame. Emotional support (P = 0.03) and behavioural disengagement (P = 0.01) significantly differed across education levels and academic years, respectively. Students who were infected with COVID-19 during the pandemic had significantly higher coping scores for informational support, planning,

emotional support, venting, humour, acceptance and substance use.

Correlation between PTSD scores and coping scores

Correlation between PTSD and coping scores was estimated using Pearson's correlation. We found a positive correlation between PTSD and coping scores (r = 0.462, P

Discussion

Earlier reports indicate that the COVID-19 pandemic had detrimental effects on the mental health of students, resulting in anxiety and depression (12). However, the situation in Sudan was complicated because of the coexistence of the COVID-19 pandemic and political instability. To our knowledge, this study is the first to assess the stress caused by academic instability resulting from both COVID-19 and political turmoil. We did not find any study evaluating stress levels among students during political instability and the COVID-19 pandemic. There were no reports about coping strategies adopted by university students during the pandemic and political coup, and no research into PTSD among university students in Sudan.

Our findings indicated a high score for PTSD among students in Sudan. PTSD score was higher among females than males, and ~36% of students had a score > 37. Such a high score tends to suppress immune function, even 10 years following the impact event. These findings are consistent with a previous study of Saudi students, in which 23.8% of the population had severe PTSD scores (24). A meta-analysis showed similar findings among university students in China, United States of America, and France, where PTSD was shown to interfere with overall quality of health and education (25). Among the components of the PTSD scale, avoidance ranked first followed by intrusion and hyperarousal. Avoidance reflects psychological symptoms resulting from the intention to avoid memories of grief or discussions that could revive memories of the traumatic event. These results indicate that the students were trying to avoid any event that could remind them of the COVID-19 pandemic or military coup. Intrusion refers to unwanted memories, flashbacks and nightmares about the traumatic event. A study from the Middle East and North Africa Region found similar high IES-R scores among the public (26).

There are few reports on the effect of traumatic events on the mental health of students; therefore, our study may fill the void and provide the information that authorities need to support the mental health of students during similar events. Around 50% of students had an IES-R score ≥ 33, which may be attributed to the combined presence of the COVID-19 pandemic and the political coup. Our findings show that students' mental health had deteriorated significantly, necessitating immediate remediation through counselling. Psychosocial support and improvement of cognitive skills is strongly advised to remedy such situations.

Steps should be taken at the community level to raise awareness about self-care and relaxation, positive thinking and active coping among students. The majority of students adopted religion as a coping strategy, as did the majority of females, whereas the majority of males adopted acceptance. Most of the students from health colleges adopted religion as the coping strategy, whereas those from non-health colleges adopted acceptance. Similarly, diploma and doctoral students widely adopted a religious coping strategy, while bachelors and masters students adopted acceptance. Students in 1st, 2nd and 5th years adopted religion as a coping strategy, whereas students from other years adopted acceptance. The widely adopted coping strategy for students residing in Khartoum and Omdurman was religion, whereas most residents of Bahiri adopted acceptance. Religion was the most prevalent coping strategy among students who had COVID-19 or whose relatives or friends had the disease. In accordance with the meta-analyses reported by Pankosky et al., religion is the most commonly used coping strategy during stressful events (27, 28). Religion was most commonly adopted by university students and staff from Saudi Arabia (8, 29) and Pakistan (30), and by teachers in Ecuador, Malaysia and Ghana (31–33). Acceptance is a frequently adopted coping strategy in academia, as indicated by studies from Saudi Arabia (8, 29) and Malaysia (31). Religion and acceptance are linked with each other, and may be associated with widely practiced religious activities.

It is important to note that stress levels among students were positively correlated with coping scores, indicating that increased severity of stress resulted in adaptation of more coping mechanisms. These findings agree with other studies evaluating the relationship between stress and coping mechanisms (29, 34). Our findings showed a moderate relationship between stress levels and use of self-blame, self-distraction, denial and behavioural disengagement as coping mechanisms. It is pertinent to mention that these coping strategies are classified as avoidant methods. Avoidant coping is associated with distress and negative affectivity, which can cause further deterioration in mental health. Our findings showed that higher levels of stress among students may result in adoption of various avoidant or negative coping mechanisms, which may inversely interfere with psychological well-being rather than handling the unwanted events. In this context, it is crucial to evaluate the coping mechanisms among students and encourage them to adopt positive coping methods to deal with stressful events.

WHO has proposed a course of action to improve

mental health. Its implementation requires the collaboration of all sectors, from households to governments, and it is tailored toward specific groups, individuals or whole populations (35). The plan encompasses various initiatives, such as school-based social and emotional learning programmes, community mental health and social services, support for caregivers and living services, mental health promotion and prevention among children and adolescents, mental health protection in the workplace, and suicide prevention.

This study had a few limitations.It is possible that some students had pre-existing psychiatric

disorders. The snowball sampling method had the limitation of not reaching students who were not active on social media, resulting in their under-representation. The nonprobability sampling technique may limit our ability to generalize our findings to the whole country. The initial sampling may have recruited students with similar traits; therefore, the propensity for selection bias and the margin of error cannot be disregarded when interpreting the results. Despite these limitations, this study offers new insights into the understanding of mental health of students in Sudan and provides a basis for future research and public health interventions. The large sample size ensures the power of the inferential analysis. Our findings can be used to design future studies and mental health improvement campaigns.

Conclusion

Our study indicated high IES-R scores among students in Sudan. The most widely adopted coping strategies were religion, followed by acceptance. Although substance use was the least adopted coping strategy, it was still adopted by an appreciable number of students. We advocate establishing telepsychotherapy and other mental health services to evaluate mental health among students in Sudan and provide appropriate measures to prevent further deterioration. There is an urgent need for further studies to assess the long-term effects of a pandemic and political coup on the mental health of students, including the challenges of the virtual classroom. We recommend a revision of the curricula and learning outcomes to also include mental health and participatory models and to address the psychological problems due to the current, as well as future, disastrous events.

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Conflict of interest: None declared.

Évaluation de l'impact de la COVID-19 et de l'instabilité politique sur la santé mentale des étudiants universitaires au Soudan

Résumé

Contexte : La santé mentale des étudiants joue un rôle crucial dans leur apprentissage et leurs performances. La pandémie de COVID-19, les troubles politiques et le coup d'État au Soudan ont exacerbé le stress et l'anxiété chez les étudiants universitaires soudanais en raison de l'incertitude qui pèse sur leurs activités académiques.

Objectif : Évaluer l'apparition du trouble de stress post-traumatique (TSPT) et les stratégies

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d'adaptation adoptées par les étudiants universitaires au Soudan.

Méthodes : La présente enquête transversale a été menée de mars à juin 2022. Elle a utilisé les questionnaires Coping Orientation to Problems Experienced (Brief-COPE) et Impact of Event Scale-Revised (IES-R) pour évaluer l'occurrence du trouble de stress post-traumatique et les stratégies d'adaptation chez 596 étudiants d'université au Soudan. Des statistiques descriptives ont été utilisées pour déterminer la fréquence et le pourcentage, le test t de Student pour comparer les moyennes de deux groupes et l'analyse de variance à un facteur pour comparer les moyennes de trois groupes ou plus.

Résultats : La prévalence du TSPT était élevée parmi les étudiants, avec un score de 31,2 (ET 16,4). Le score total de TSPT était plus élevé chez les étudiantes. Près de 36 % des étudiants avaient un score de TSPT supérieur à 37, ce qui est considéré comme suffisamment élevé pour supprimer la fonction immunitaire. Les stratégies d'adaptation les plus largement adoptées étaient la religion et l'acceptation de la situation, tandis que la consommation de substances psychoactives était la moins répandue. Les étudiants qui avaient contracté la COVID-19 pendant la pandémie différaient considérablement de ceux non infectés eu égard à l'application des stratégies d'adaptation. En revanche, les étudiants dont des membres de la famille ou des amis avaient contracté la COVID-19 n'étaient pas significativement différents de ceux dont les membres de la famille ou les amis n'avaient pas été infectés en ce qui concerne l'application des stratégies d'adaptation, telles que l'auto-accusation, le déni, la toxicomanie et le désengagement comportemental.

Conclusion : Nous recommandons l'initiation et la mise en œuvre de programmes de soutien psychologique pour les étudiants universitaires au Soudan, sur site ou à distance. Des recherches supplémentaires devraient être menées pour évaluer les effets à long terme de la pandémie et des conflits politiques afin de concevoir et de mettre en œuvre des interventions appropriées et efficaces.

تقييم أثر كوفيد **-19** وعدم الاستقرار السياسي على الصحة النفسية لطلاب الجامعات في السودان

مالك سليمان محمد، ديبيا سوندار باندا، فاطمة أبو بكر، عواضه عبد المجيد، منى تيمان إدريس، يسري حبيب خان، محمد أ حسين، وتوقير حسين ملهي

الخلاصة

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: للصحة النفسية للطلاب دور حاسم في تعلمهم وأدائهم . وقد أدت جائحة كوفيد -19الخلفية
والاضطرابات السياسية والانقلاب في السودان إلى تفاقم التوتر والقلق بين طلاب
الجامعات في السودان، بسبب عدم اليقين في أنشطتهم الأكاديمية .

: هدفت هذه الدراسة الى تقييم حدوث اضطرابات التوتر التالي للصدمات بين طلابالأهداف
الجامعات في السودان وما تبنَّوْه من استراتيجيات التكيُّف .

: أُجريت هذه الدراسة المقطعية في الفترة من آذار / مارس إلى حزيران / يونيوطرق البحث
2022. ووُظفت في الدراسة استبيانات التوجه التأقلُمي مع المشكلات التي جرت مواجهتها
الصدمة بعد ما اضطراب حدوث لتقييم ، (IES-R) المنقح الأحداث مقياس وتأثير (Brief-COPE)
بين 596 طالبًا جامعيًّا في السودان واستراتيجيات التأقلُم التي لجؤوا إليها .
واستُخدمت إحصاءات وصفية لتحديد التواتر والنسبة المئوية، واستُخدم اختبار الطلاب t
لمقارنة متوسطات مجموعتين وتحليل التباين الأحادي الاتجاه، من أجل مقارنة متوسطات 3
مجموعات أو أكثر .

: كان معدل انتشار " اضطراب الكَرْبِ التالي للصدمات " مرتفعًا بين الطلاب، حيثالنتائج **ج**
كانت الدرجة 31.2 (اضطراب ثانوي 16.4). وكانت الدرجة الإجمالية " لاضطراب الكَرْبِ
التالي للصدمات " أعلى بين الطالبات . وتبيَّن أن 36% من الطلاب تقريبًا مصابون " باضطراب
الكَرْبِ التالي للصدمات " بدرجة أعلى من 37 ، وهي درجة تُعد عالية بالقدر الكافي لتثبيط
وظائف المناعة . وكانت أكثر استراتيجيات التكيُّف شيوعًا هي الدين وقبول الوضع، في حين
كان تعاطي مواد الإدمان هي الاستراتيجية الأقل شيوعًا . وثمة اختلاف كبير في تطبيق
استراتيجيات التكيف بين الطلاب الذين أُصيبوا بعدوى كوفيد -19 في أثناء الجائحة،
والطلاب الذين لم يصابوا به . وبالمقابل، فليس هناك اختلاف كبير بين الطلاب الذين أُصيب
أفراد من أسرهم أو أصدقائهم بكوفيد -19 ، والطلاب الذين لم يُصب أفراد من أسرهم أو
أصدقائهم بالعدوى في تطبيق استراتيجيات التأقلم، مثل اللوم الذاتي، والإنكار، وتعاطي
المواد المخدرة، و فك الارتباط السلوكي .

: نوصي ببدء برامج لتقديم المشورة النفسية للطلاب في الموقع أو عن بُعد،الاستنتاجات
وتنفيذ هذه البرامج . ومن أجل تصميم وتنفيذ التدخلات المناسبة والفعالة، ينبغي إجراء
المزيد من البحوث لتقييم الآثار الطويلة الأجل للجائحة والنزاعات السياسية .

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