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# IMPACT OF THE COVID-19 PANDEMIC ON HIGHER EDUCATION STUDENTS IN BOTSWANA AND MAURITIUS

*IMPACTO DA PANDEMIA DE COVID-19 EM ESTUDANTES DO ENSINO SUPERIOR EM BOTSUANA E MAURÍCIO*

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**Abstract**

The COVID-19 pandemic caused globally disruptions, greatly impacting higher education students through lockdowns and the transition to online learning. This study analyzed the impact that COVID-19 has had on mental health status (anxiety and perceived stress), changes in teaching and academic performance, individual experiences and coping strategies; as well as students' views on the support measures introduced since the beginning of the pandemic in Botswana and Mauritius. Quantitative data were collected through an online survey administered to students in both countries, with statistical analysis conducted to examine differences by gender and academic level. The findings revealed that female students reported significantly higher anxiety and stress levels compared to their male counterparts. Similarly, undergraduate students experienced higher levels of anxiety and stress than postgraduate students. Policymakers and higher education institutions can use these insights to develop targeted support strategies for students as part of their preparedness plans for future crises.

**Keywords:** COVID-19; higher education; university student; mental health; online learning

**Resumo**

A pandemia de COVID-19 causou perturbações globais, impactando significativamente os estudantes do ensino superior por meio de lockdowns e da transição para o ensino online. Este estudo analisou o impacto da COVID-19 no estado de saúde mental (ansiedade e estresse percebido), nas mudanças no ensino e no desempenho acadêmico, nas experiências individuais e nas estratégias de enfrentamento, bem como as percepções dos estudantes sobre as medidas de apoio introduzidas desde o início da pandemia em Botsuana e Maurício. Dados quantitativos foram coletados por meio de um questionário online aplicado a estudantes de ambos os países, sendo

realizada análise estatística para examinar diferenças por gênero e nível acadêmico. Os resultados revelaram que estudantes do sexo feminino relataram níveis significativamente mais altos de ansiedade e estresse em comparação com seus colegas do sexo masculino. De modo semelhante, estudantes de graduação apresentaram níveis mais elevados de ansiedade e estresse do que estudantes de pós-graduação. Formuladores de políticas públicas e instituições de ensino superior podem utilizar esses achados para desenvolver estratégias de apoio direcionadas aos estudantes, como parte de seus planos de preparação para futuras crises.

**Palavras-chave:** COVID-19; ensino superior; estudante universitário; saúde mental; ensino online

# 1. Introduction

The April 2020 UNESCO report states that COVID-19 affected about 1.57 billion students globally, with countries enforcing school closure at all educational levels (Hosen et al., 2022). Universities were required to cease on-campus activities and in person operations, prompting a sudden shift from face-to-face to online learning (Almahasees et al., 2021). The pandemic had a profound impact on the academic practices of higher education students, leading to significant changes, including the shift to online lectures and tutorials, closure of libraries, adjustments in communication channels with lecturers and execution of new assessment methods (Aristovnik et al., 2020).

During the covid-19 pandemic, universities primarily relied on transitioning to online learning formats to ensure continuity in instruction (Delgado, 2023). The sudden shift to online teaching and learning required both faculty and students to speedily adapt to new and unfamiliar virtual learning methods (Mok and Montgomery, 2021). The unexpected transition drastically impacted all aspects of higher education, causing both benefits and challenges (Abdrasheva et al., 2022). A key challenge encountered by education systems was the existing infrastructure gap which highlighted the need to improve the learning experience (Delgado, 2023). For a smooth transition to online learning, students needed prior knowledge of technical and software usage. During the COVID-19 pandemic, interactive videoconferencing tools became vital for education, creating an added challenge for many students. They were under growing pressure to first get comfortable with using technology before engaging with their actual coursework (Somani, 2021). At the same time, educators and Higher Education Institutions (HEIs) had to gear up for online teaching, which demanded better preparation, enhanced skills and access to the right resources (Abdrasheva et al., 2022). Although the transition to online teaching and learning came with its share of challenges, it also opened doors for greater adoption and integration of technology (Delgado, 2023). This change created a space that encouraged innovation and experimentation, placing stronger focus on student-centered learning methods (Abdrasheva et al., 2022).

Students' academic performance during the COVID-19 pandemic showed notable differences depending on their access to crucial learning resources, most importantly reliable internet, digital devices, and a conducive study environment. For instance, a study in Ghana, highlighted how the lockdown affected students' academic outcomes, pointing to challenges such as diminished interest, expensive or limited internet access, a shortage of learning devices, restricted access to online

materials, reduced engagement, and feelings of isolation (Acheampong, 2023). On the contrary, a study from Italy reported an increased pass rate in online assessments during the pandemic, suggesting that remote learning and the use of digital platforms can support strong academic performance when effectively implemented (Vicario et al., 2024). However, the study has also pointed out that the likelihood of cheating tends to be higher in online exams, especially when there are no effective invigilation methods in place.

Despite being primarily a physical health concern, COVID-19 led to significant mental health challenges (Assefa et al., 2021). For instance, in China, where the COVID-19 outbreak first emerged, 21.1% of students reported anxiety symptoms. In Saudi Arabia, 71.9% of students experienced mental health distress, while similar concerns were reported by 70% in Tanzania. In Norway and Australia, the reported rates were 22.9% and 19.2% respectively. In Ethiopia, mental health concerns were also evident, with reported cases at Adama University reaching 40%, 50% at Gondar and 52% at Hawassa University. (Mutinta, 2022). These findings highlight the significant levels of distress experienced by tertiary students across different parts of the world. Additionally, female students faced greater mental health challenges during the pandemic as compared to their male peers. Women are generally more expressive with emotions than men, and this trait may have been amplified during the pandemic. Their lower tolerance for uncertainty makes them more vulnerable to increased levels of stress and anxiety (Sundarasen et al., 2020).

Botswana and Mauritius were not spared from the effects of the pandemic. In response, both nations effected various health prevention and control measures. These included nationwide lockdowns, closing borders, flight restrictions, shutting down academic establishments, and the enforcement of physical distancing or stay-at- home guidelines. Additional efforts involved promoting social distancing, carrying out contact tracing, issuing work-from-home directives, and ordering the closure of businesses and industries (Masiya et al., 2021; Musango et al., 2021). Botswana's population is estimated at 2,346,179 (Statistics Botswana, 2022), while Mauritius has a population of 1,262,523 (Statistics Mauritius, 2022). In terms of COVID-19 cases, Botswana reported 328,541 cases (Worldometer, 2023a), whereas Mauritius recorded 41,584 cases at the time this study was conducted (Worldometer, 2023b).

Located in Southern Africa, Botswana is a landlocked nation that is made up mostly of desert and sparsely populated. Since attaining independence in 1966, Botswana has made incredible progress in strengthening its healthcare system. Initially, the country operated under a hospital-centered healthcare model inherited from British rule, which limited access to healthcare for many communities. To

address this gap, the government shifted its focus toward the development of basic health facilities across the country (Seloilwe et al., 2023). Botswana's healthcare system is sustained by a well-developed network of medical facilities, comprising hospitals, clinics, health posts, and mobile stops, distributed across 27 health districts (Tapera et al., 2018). Private healthcare services are available in Botswana, though they are largely accessible only to those with the financial means to afford them, (Seloilwe et al., 2023).

In contrast, Mauritius is a small yet densely populated island in the Indian Ocean (Silve, 2012). It operates a universal healthcare system grounded in the Beveridge model, which is funded primarily through taxpayer contributions. This model enables the government to mobilize revenue from taxes and other sources to finance the key social services, including healthcare (Jeetoo and Jaunky, 2021). Mauritius' healthcare system encompasses 124 public medical facilities, including health posts, health centers, district hospitals, provincial hospitals, and regional hospitals (Musango et al., 2020). Though the government invest significantly in healthcare, the system continues to face rising pressure from challenges typical of publicly funded models. Rising demand and escalating costs continue to strain available resources, which remain limited (Jeetoo and Jaunky, 2021). Mauritius is no stranger to environmental risks, and its population has established resilience in managing extreme climatic events (Goorah, 2020). Leveraging decades of experience in fighting communicable diseases, the country's public health initiatives played a key role in its successful response to the COVID-19 pandemic (Musango et al., 2020). The data provided further endorses the need to examine the impact of COVID-19 on students in this region.

During the COVID-19 pandemic, both Mauritius and Botswana implemented policy measures that significantly shaped the transition to online education. In Mauritius, the COVID-19 (Miscellaneous Provisions) Act 2020 and related legislative amendments explicitly empowered the Minister of Education to mandate the delivery of distance and online learning programmes during periods of institutional closure. Educational institutions were legally required to adopt remote teaching modalities, including digital platforms and broadcast lessons, to ensure continuity of learning. In addition, policy directives and communiqués from the Ministry of Education, as well as guidance from the Higher Education Commission, supported the large-scale implementation of online learning across the education sector. In Botswana, while no single legislative instrument explicitly mandated online learning, government directives encouraged higher education institutions to transition to remote teaching as a public health measure to limit the spread of COVID-19, (Ma-

gogwe et al., 2022). Consequently, universities adopted online and blended learning approaches to maintain academic continuity. These legal and policy responses provide an important socio-political context for understanding students' experiences of online learning during the pandemic in both countries.

To gain deeper insights into how students in Botswana and Mauritius coped with the pandemic, this study uses Lazarus and Folkman's Transactional Model of Stress and Coping as a guiding framework. "Psychological stress is a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being" (Lazarus and Folkman, 1984, p. 19) (Lazarus and Folkman, 1984). This model, suggests that coping is a dynamic process that involves two fundamental cognitive appraisals: the first, primary appraisal, where an individual evaluates whether an event is perceived as stressful, and the second, secondary appraisal, where they appraise available resources and decide on appropriate coping responses, (Lazarus and Folkman, 1984).

An individual asks themselves these questions: "Am I in trouble or being benefited, now or in the future, and in what ways?" (Primary appraisal) (Berjot and Gillet, 2011). For example, students who faced disruptions in their academic schedules, financial challenges, or social isolation may have viewed the pandemic as a serious threat to their well-being and academic progress. On the other hand, some students might have found potential benefits, such as improved flexibility through online learning. The second question is, "Can I cope with this situation?" (Secondary appraisal) (Berjot and Gillet, 2011). For example, students with stable internet access, strong social connections, and financial security were likely in a better position to manage remote learning and pandemic-related stress. Meanwhile, students dealing with poor access to technology, financial difficulties, or inadequate mental health support may have found it harder to cope effectively. Given the distinct infrastructure and health care systems of Botswana and Mauritius, students' coping responses likely varied based on their perceived stress levels and resources available to them. In the context of online learning and institutional measures, disruptions to teaching and learning, including the rapid transition to online education, may be appraised by students as significant academic and psychological stressors. For instance, challenges such as limited access to resources, changes in teaching methods, and reduced academic interaction may influence students' primary appraisal of academic stress. At the same time, the availability of institutional support, as well as personal and social coping strategies, contributes to secondary appraisal, shaping how students manage stress and maintain academic engagement.

By integrating the Transactional Model of Stress and Coping, the study aims to contextualize these coping strategies within a well-established psychological framework, offering a deeper understanding of how students responded to pandemic-related stressors. The significance of this research lies in its potential to guide interventions intended to improving student mental health and well-being beyond the pandemic.

The general objective of this study is to examine the impact of the COVID-19 pandemic on higher education students in Botswana and Mauritius. The specific objectives are to:

- Assess students' anxiety and perceived stress during the COVID-19 pandemic.
- Examine changes in teaching, learning experiences, and academic performance during this period.
- Explore students' coping strategies during the pandemic.
- Analyze students' perceptions of institutional support measures.

Based on the study objectives, the following hypotheses were formulated:

H1: There are significant differences in anxiety and perceived stress levels between male and female students.

H2: There are significant differences in anxiety and perceived stress levels between undergraduate and postgraduate students.

H3: Students' academic experiences and perceptions of online learning differ significantly by country.

H4: Students employ a range of coping strategies during the pandemic, which are associated with their perceived stress levels.

# 2. Materials and Methods

## 2.1. Selection and Description of Participants

The target population for this study comprised university students in Mauritius and Botswana. Eligible participants were those enrolled in undergraduate and postgraduate programs during the COVID-19 pandemic. Students who enrolled after the pandemic period were excluded from the study. A total population of 98,240 students from public and private tertiary institutions in both Botswana and

Mauritius was recorded at the time of conducting the study (Higher Education Commission, 2019; Statistics Botswana, 2020). Botswana accounting for 56,666 students and Mauritius for 41,574 (Table 1). With a confidence level of 95%, and margin error of 5%, the sample size identified was 383 students and a 94.3% response rate recorded. Convenience sampling was employed for the quantitative study.

A total of 361 students took part in the study including 100 respondents from Botswana and 261 from Mauritius. In Botswana, 74 participants were undergraduate students and 26 were postgraduate students. In Mauritius, 194 were undergraduates, and 67 were postgraduates. The lower response rate from Botswana was largely due to difficulties in securing institutional cooperation for survey distribution. Some institutions were reluctant to circulate the questionnaire among their students, resulting in delays and a smaller sample size compared to Mauritius.

***Table 1***. *Country-wise enrolment status at tertiary level across public and private sectors.*

| ***Country*** | ***Public*** | ***Private*** | ***Total*** |
|---|---|---|---|
| Botswana | 37,061 | 19,605 | 56,666 |
| Mauritius | 23,859 | 17,715 | 41,574 |
| **Total** | **60,920** | **37,320** | **98,240** |

*Source: (Higher Education Commission, 2019; Statistics Botswana, 2020)*

## 2.2. Data Collection and Measurements

***Table 2.*** *Instrument variables and scales.*

| ***Section*** | ***Description*** |
|---|---|
| **Demographics** | The first section covered the sociodemographic and academic characteristics of the students, including age, level of study, university/college, country of study, field of study, enrolment year and program status. |
| **Anxiety** | The Generalised Anxiety Disorder-7 (GAD-7) was used as a self-report measure of anxiety. This scale measures occurrences using a four-point frequency scale: from "not at all" to "nearly every day," on items such as "becoming easily annoyed or irritable". Casares et al. (Casares et al., 2024) states that, the GAD-7 is designed to assess generalized anxiety for epidemiological, preventive, and screening purposes. Example, feeling nervous, anxious, or on edge |
| **Perceived Stress** | Students' stress levels were assessed using the Perceived Stress Scale (PSS). Son et al (Son et al., 2020) states that, the scale assesses the extent to which an individual has perceived life as unpredictable, uncontrollable and overloading over the previous month. Respondents indicated their responses from 0 ("Never") to 4 ("Very often") about thoughts and feelings in the past month. Example, in the last month, how often have you been upset because of something that happened unexpectedly? |
| **Academic Life** | This section assessed how COVID-19 affected students' experiences with online learning and teaching. The questions have been adopted from the Global Student Survey titled, "Impacts of the covid-19 pandemic on life of higher education students."(Aristovnik et al., 2021) Example, Which of these forms of online lectures has been the most dominant? Please select only one. |

| *Section* | *Description* |
|---|---|
| **Impact on Individual** | This section covered the impact of COVID 19 on an individual. The questions have also been adopted from the Global Student Survey, (Aristovnik et al., 2021). Example, How has COVID-19 impacted your mental health? |
| **Opinions regarding the support measures** | The last section of the questionnaire assessed students' satisfaction with how different institutions dealt with the COVID-19 pandemic. The questions have also been adopted from the Global Student Survey, (Aristovnik et al., 2021). Example, Overall, how would you assess your university's approach to addressing the impact of the COVID-19 pandemic on students? |

The study utilized a convenience sampling approach, which is widely used in research settings where participants are recruited based on their accessibility and willingness to participate (Elfil and Negida, 2017). The questionnaire link was disseminated through higher education institutions and student groups on Facebook. This method enabled students to voluntarily participate upon accessing the link. A self-reported questionnaire was employed to collect quantitative data, providing statistically relevant insights on the research topic (Roopa and Rani, 2012). In Botswana, the Ministry of Health announced in May 2023 that COVID-19 was no longer considered a public health emergency of international concern. Similarly, in Mauritius, most COVID-19-related measures were lifted by July 2022 (NewsGov, 2022; Reporter, 2023). Data collection took place between April 2023 and November 2023. While the data collection process proceeded smoothly in Mauritius, there were delays in Botswana due to institutional hesitancy in disseminating the questionnaire to students. These challenges extended the data collection timeline but did not compromise the integrity or representativeness of the dataset.

The questionnaire was pre-tested with a small group of participants (n=10) to assess face and content validity; No modifications were necessary, as participants reported no issues or ambiguities with the survey items. The questionnaire was administered in English, which is the primary language of instruction in both countries. The e-questionnaire was divided into six sections (Table 2). The questionnaire was administered digitally using Google forms, with prospective participants reached via social networking platforms and email. Responses were downloaded in Microsoft Excel for initial screening and filtering, then exported to IBM SPSS Statistics 21 for

further processing and analysis. Descriptive statistics were applied to examine perceived stress and anxiety levels among students from both Botswana and Mauritius. The data distribution was tested using the Shapiro-Wilk test with a cut-off set at $p < 0.05$. The results indicated a significant deviation from a normal distribution, anxiety ($W = 0.859$, $p < 0.001$) and stress ($W = 0.722$, $p < 0.001$). Consequently, non-parametric tests, including the Mann-Whitney U test (to compare differences between gender and country) and the Kruskal-Wallis H test (to assess differences in anxiety and stress levels across program of study, with results reported using mean ranks), were employed for subsequent analyses. U-scores for Mann–Whitney U and corresponding p-values were reported to indicate statistical significance. Additionally, chi-square tests were conducted to examine associations, such as the association between country of study and the perceived most dominant mode of learning.

The instrument demonstrated a moderate to good internal consistency (Table 3). The scales measuring anxiety ($\alpha = 0.876$) and stress ($\alpha = 0.844$) showed good to excellent reliability. The items assessing Academic Life, Impact on Individual, and Support Measures were adapted from the Global Student Survey conducted during the COVID-19 pandemic. The inclusion of these items ensured the use of standardized questions that captured students' experiences within a broader global context during the same period. However, it is important to note that these items were not designed as psychometric scales. Rather, they consisted primarily of standalone and opinion-based questions, including "check all that apply" formats, intended to map students' experiences and perceptions rather than to measure latent constructs. As such, internal consistency reliability was not expected to meet conventional thresholds.

***Table 3.*** *Internal consistency of study variables.*

| ***Section*** | ***Description*** | ***No. of items*** | ***Cronbach coefficient*** |
|---|---|---|---|
| *A* | Socio-Demographic Profile | *10* | **-** |
| *B* | Anxiety Assessment | *7* | *0.876* |
| | Perceived Stress | *10* | *0.844* |

### 2.3. Ethical Considerations

The researchers obtained a "No Objection" certificate from the Research and Ethics Committee (REC) of the Ministry of Education, Tertiary Education, Science and Technology to conduct this study. The reference number for the permit is MTE/CR/213 V3.

## 3. Results

### 3.1. Demographics of Participants

***Table 4***. *Demographics profile of Botswana and Mauritius participants*

| ***Demographic Characteristics*** | | ***Botswana*** | | ***Mauritius*** | |
|---|---|---|---|---|---|
| ***Identifier*** | | ***(n=)*** | ***(%)*** | ***(n=)*** | ***(%)*** |
| **Gender** | **Male** | 26 | 26 | 76 | 29.1 |
| | **Female** | 74 | 74 | 181 | 69.3 |
| | **Prefer not to say** | 0 | 0 | 4 | 1.5 |
| **Age (years)** | **18-22** | 61 | 61 | 130 | 49.8 |
| | **23-27** | 9 | 9 | 57 | 21.8 |
| | **27-30** | 7 | 7 | 13 | 5 |
| | **above 30** | 23 | 23 | 61 | 23.4 |
| **Level of Study** | **Undergrad** | 74 | 74 | 194 | 74.3 |
| | **Postgraduate** | 26 | 26 | 67 | 25.7 |

*Data presented as frequency (n=) and percentage (%) of the overall respondents. Respondents from Botswana accounted for 100 individuals hence the same distribution of frequency and percentage.

### 3.2. Covid-19 impact on mental health status during the pandemic

In Botswana, a notable percentage of students reported that their mental health worsened to some degree during the pandemic, with 10.0% stating it worsened significantly and 19.0% reporting somewhat worsening. Similarly, in Mauritius, 9.6% of students reported significant worsening of mental health, versus 21.5% reported

some level of worsening. Furthermore, 32% of students in Botswana and 31.8% in Mauritius reported no change in their mental health status, in contrast to 16% and 18.4% in Botswana and Mauritius respectively who reported improvements in their mental health. There was no statistically significant association between country (Botswana vs. Mauritius) and students' perceived changes in mental health during the pandemic, $\chi^2(6) = 3.938$, p = .685.

## 3.3. Anxiety and Stress Levels

### 3.3.1. Self-reported measures of anxiety and stress in Botswana and Mauritius

Botswana students reported statistically significantly higher anxiety levels compared to those from Mauritius (Botswana vs Mauritius: n = 100, Mean Rank = 202.11 vs n = 261, Mean Rank = 172.91; U = 10939, p = .013). Students in Mauritius generally reported lower levels of anxiety levels compared to their counterparts in Botswana such that a difference of almost 11% was observed between both countries with a benchmark of 24.0% students reporting severe anxiety in Botswana (Figure 1A). Additionally, Mauritius had higher percentages of minimal (28.0%) and mild anxiety (38.7%) compared to Botswana, which reported (19.0% and 36.0%, respectively), outlining differences across the spectrum of anxiety levels, potentially leaning towards the differences in protective factors and coping strategies in both countries. In contrast, no statistically significant difference was found in stress levels between students in Botswana and Mauritius (Botswana vs Mauritius: n = 100, Mean Rank = 186.72 vs n = 261, Mean Rank = 178.81; U = 12478, p = .423). Most students reported moderate stress in both Botswana (64.0%) and Mauritius (72.4%), and a greater proportion of students in Botswana reported high stress (22.0%) compared to Mauritius (15.3%) (Figure 1B). Students in Mauritius showed a slightly higher tendency toward moderate stress levels.

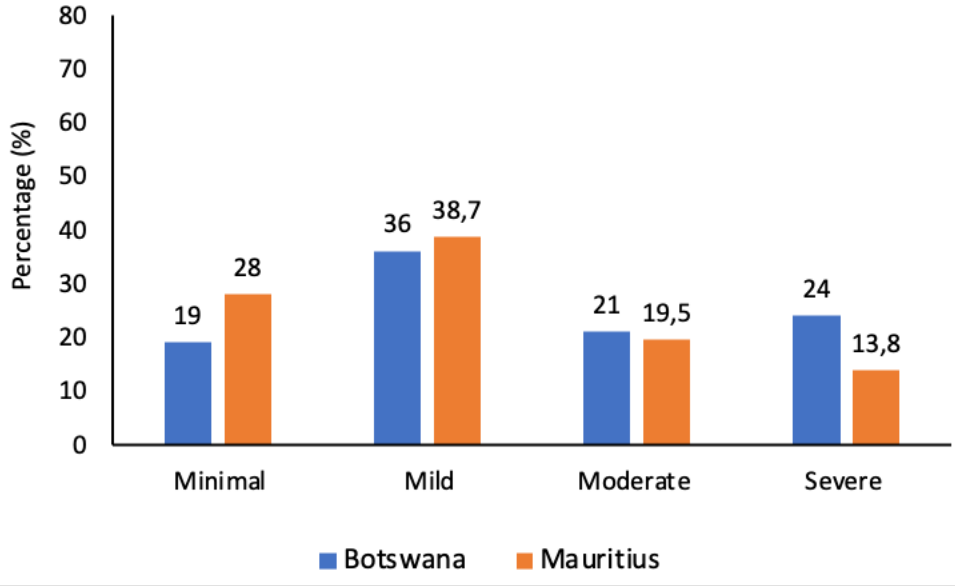


**Figure 1.** Self-reported **(A)** Anxiety and **(B)** Stress levels among tertiary education students in Botswana and Mauritius. *Data presented as computed percentage of the total number of participants. Cut-off scores for anxiety and stress categories were as follows: Minimal (0–4), Mild (5–9), Moderate (10–14), and Severe (15–21) for anxiety; and Low (0–13), Moderate (14–26), and High (27–40) for stress.*

### 3.3.2. Gender-based differences in adverse mental health effects

Female students reported statistically significantly higher anxiety levels compared to male students (female vs male: n = 255, Mean Rank = 187.41 vs n = 102, Mean Rank = 157.97; U = 10860, p = .011). Similarly, for perceived stress, female students had significantly higher stress levels than male students (female vs male: n = 255, Mean Rank = 187.09 vs n = 102, Mean Rank = 158.77; U = 10941.5, p = .004), confirming that female students were more vulnerable to adverse mental health effects as compared to their male counterparts.

### 3.3.3. Comparing adverse mental health effects across different levels of study

Undergraduate students reported higher anxiety levels than postgraduate students (undergrad vs postgrad: (n = 268, Mean Rank = 187.30 vs n = 93, Mean Rank = 162.84; U = 10773, p = .042) (Figure 2A). Similarly, for perceived stress, undergraduate students reported higher stress levels compared to postgraduate students (undergrad vs postgrad: (n = 268, Mean Rank = 190.14 vs n = 93, Mean Rank = 154.66; U = 10012, p < .001) (Figure 2B). These results suggest undergraduate

students as a more vulnerable strata within the higher education landscape.

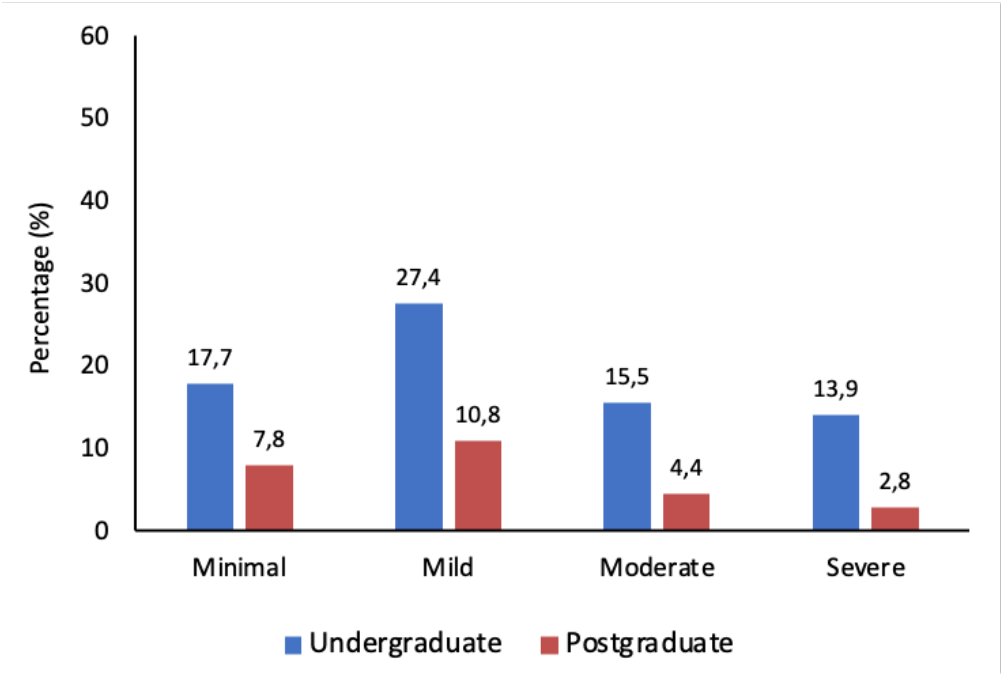


**Figure 2.** Delineating **(A)** Anxiety and **(B)** Stress levels according to the study level of students in tertiary institutions. *Data presented as computed percentage of the total number of participants. Cut-off scores for anxiety and stress categories were as follows: Minimal (0–4), Mild (5–9), Moderate (10–14), and Severe (15–21) for anxiety; and Low (0–13), Moderate (14–26), and High (27–40) for stress.*

## 3.4. Teaching and academic performance during COVID-19 period

Both Botswana and Mauritius primarily relied on real-time online lectures (videoconference) as the dominant mode of teaching during the pandemic, with 63.0% of students in Botswana and 77.8% in Mauritius utilizing this approach. Notably, responses to video conferencing were relatively balanced, with 29.0% of students remaining neutral, 20.0% satisfied, and 8.0% very satisfied. However, 13.0% of students were dissatisfied or very dissatisfied with this mode of teaching. In Mauritius, similar patterns emerged, though satisfaction levels were generally higher overall. A significant proportion of students reported being satisfied (43.3%) or very satisfied (14.2%) with the video conferencing approach with only 12.3% expressing dissatisfaction. Video recordings, audio recordings, and materials-based teaching also garnered positive feedback, with substantial satisfaction percentages

across these methods.

Students from Botswana reported statistically significantly higher perceptions of academic improvement since on-site classes were cancelled compared to students from Mauritius (Botswana vs Mauritius: n = 100, Mean Rank = 204.49 vs n = 261, Mean Rank = 172.00; U = 10701, p = .006). Similarly, Botswana students reported significantly higher perceptions of worsened academic performance than their Mauritius counterparts (Botswana vs Mauritius: n = 100, Mean Rank = 207.07 vs n = 261, Mean Rank = 171.01; U = 10443.5, p = .003). This dual finding suggests a polarized academic experience among students in Botswana, where some perceived notable academic gains while others reported marked academic decline. These results highlight significant cross-country differences in students' academic experiences during the pandemic.

## 3.5 COVID-19 Stressors and coping mechanisms among university students

Uncertainty about the future emerged as the most frequently reported stressor among university students in both Botswana and Mauritius during the COVID-19 pandemic, with over half of the respondents in each country indicating concern (Botswana: 56.0%, Mauritius: 56.7%; $\chi^2(1) = 0.015$, p = .904), figure 3. Despite the lack of statistical significance, this widespread anxiety reflects shared apprehensions around career prospects, financial stability, and life direction. Other prominent stressors included difficulty focusing on academic work (Botswana: 31.0%, Mauritius: 39.1%; $\chi^2(1) = 2.029$, p = .154) and academic uncertainty (Botswana: 30.0%, Mauritius: 37.5%; $\chi^2(1) = 1.800$, p = .180), suggesting that disruptions to learning and institutional operations were a source of notable distress.

Social isolation, captured through the stressor "feeling disconnected from friends and loved ones," affected 38.0% of students in Botswana and 42.9% in Mauritius ($\chi^2(1) = 0.718$, p = .397), while job-related concerns (Botswana: 13.0%, Mauritius: 20.7%; $\chi^2(1) = 2.828$, p = .093) appeared more pronounced among Mauritian students. Although none of the inter-country differences reached statistical significance (p > .05), the consistently higher percentages reported by Mauritian students across most domains may indicate relatively elevated stress levels, potentially linked to differing national contexts, resource availability, or institutional responses. These findings underscore the shared and context-specific challenges faced by students in both countries during the pandemic.

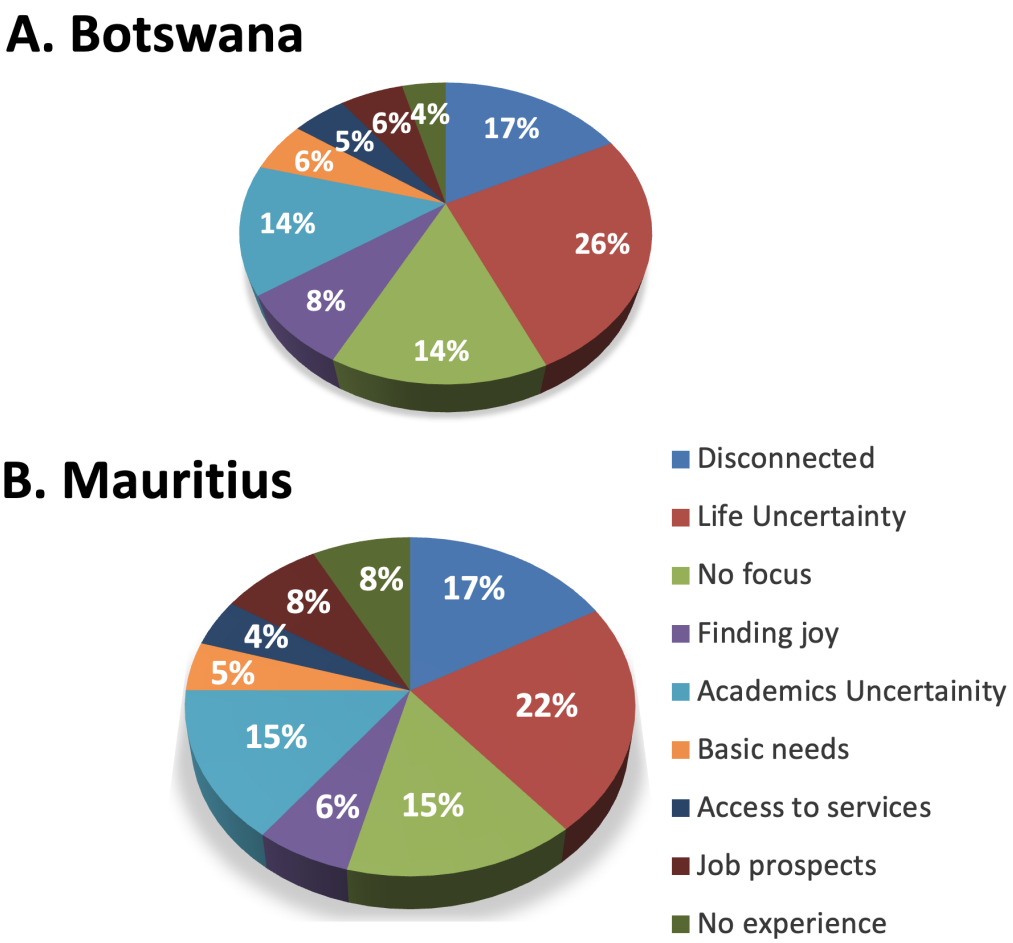


***Figure 3.*** *COVID-19-Related Stressors Among University Students in* ***(A)*** *Botswana and* ***(B)*** *Mauritius during the pandemic. Both panels use the same color legend, with percentages varying by country.*

During the pandemic, students in both Botswana and Mauritius primarily relied on virtual interaction with friends and family support as their main coping mechanisms (figure 4). Although virtual interaction emerged as the most commonly reported strategy across both contexts, significant cross-national differences were observed in more home-based coping strategies. Mauritian students showed significant differences with respect to methods such as being around pets ($\chi^2(1) = 23.38$, $p < .001$), familial support while living at home ($\chi^2(1) = 5.59$, $p = .018$), and increased privacy ($\chi^2(1) = 5.41$, $p = .020$), indicating a stronger reliance on personal and domestic environments during the pandemic as opposed to students from Botswana. In contrast, in-person interaction with friends, engagement with campus student groups, use of virtual mental health services, and institutional financial support were not significantly associated to students from the two countries ($p > .05$),

suggesting relatively uniform access to or utilization of these social and institutional supports. These findings highlight the differentiated role of home-based versus externally structured coping strategies and underscore the influence of domestic and cultural contexts in shaping students' adaptive responses to pandemic-related stress.

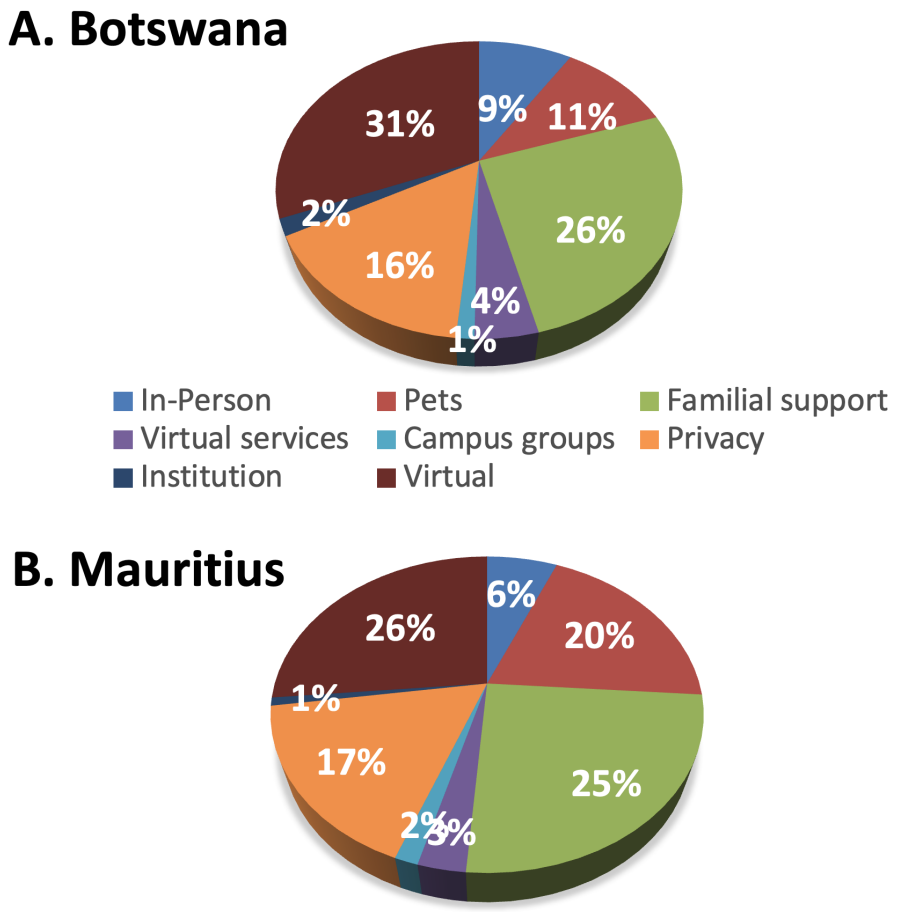


***Figure 4.*** *University students coping mechanisms in* ***(A)*** *Botswana and* ***(B)*** *Mauritius during the pandemic. Both panels present the same legend, with percentages varying by country.*

## 3.6. Opinions regarding the support measures since the onset of the COVID-19 pandemic

In both Botswana and Mauritius, students reported mixed levels of satisfaction with support services during the COVID-19 pandemic. In Botswana, satisfaction with teaching staff was moderate at 35.0%, while dissatisfaction with IT services (26.0%) and student counselling services (15.0%) was significant. In contrast, students in Mauritius reported higher satisfaction, especially with teaching

staff (74.8%) and IT services (64.3%). However, dissatisfaction was still a concern, particularly regarding student counselling services (23.8%) and financial support, indicating areas that require attention and improvement in both contexts.

In both countries, students expressed mixed opinions on responses to COVID-19. In Botswana, satisfaction with government and hospital responses was moderate (42.0% and 61.0%, respectively), while in Mauritius, satisfaction levels were higher (65.1% for government and 73.6% for hospitals). However, dissatisfaction with university approaches and communication were prominent in both countries, with the majority of students in Botswana (58.0% and 53.0%) and Mauritius reporting dissatisfaction. These findings underscore the urgent need for universities to improve their responsiveness and communication strategies during crises to provide better support students.

# 4. Discussion

Anxiety and stress levels were prevalent among students in both Botswana and Mauritius during the COVID-19 pandemic. The findings from similar studies highlight variations in the prevalence of anxiety and stress among university students during the COVID-19 pandemic. For instance, a related study reported considerably high levels of anxiety and stress among Bangladeshi university students, with more than 70% experiencing at least mild symptoms (Islam et al., 2020). Similarly, a study conducted in Malaysia found that, although a smaller proportion of students experienced severe anxiety, a notable percentage still reported moderate to extreme anxiety levels (Sundarasen et al., 2020). The odds of anxiety were higher among female students compared to that among male students (Sundarasen et al., 2020). A study conducted among university students in Egypt revealed that females experienced significantly higher levels of perceived stress compared to their male counterparts, (Dongol et al., 2023). A corresponding study indicated that the COVID-19 pandemic has had a significant impact on the mental health and well-being of university students in this sample, with four out of ten reporting moderate to severe anxiety, as reflected by GAD-7 scores of 10 or higher (Vajpeyi Misra et al., 2022). Female students reported experiencing these symptoms more frequently than their male peers. Women are generally more expressive of their emotions than men, a pattern that may have been amplified during the pandemic. Their lower acceptance for uncertainty could also contribute to increased vulnerability to stress and anxiety when that limit is surpassed (Sundarasen et al., 2020).

The impact of the COVID-19 pandemic on university students differed based

on their level of study, with both undergraduates and postgraduates facing unique challenges. For instance, a study among undergraduate students in Kentucky found that around 88% of students experienced moderate to severe stress, and 44% reported moderate to severe anxiety, (Lee et al., 2021). Our research supports these findings, highlighting the increased psychological weight on undergraduate students throughout the pandemic. A similar study conducted in India, which included both undergraduate and postgraduate students found that postgraduate students experienced significantly higher stress levels compared to undergraduate counterparts, (Verma et al., 2021). In contrast, our study found that undergraduate students reported higher stress levels than postgraduate students. This could be attributed to undergraduates' limited experience in handling academic pressures, financial obligations, and the transition to independent learning, particularly the sudden switch to online education.

The COVID-19 pandemic had a noticeable impact on student mental health in both Botswana and Mauritius. Students reported feelings of disappointment, sadness, isolation, and financial strain. Commonly cited stressors included uncertainty about the future, academic difficulties, and struggles in maintaining mental well-being. These findings are consistent with a related study revealing that numerous students endured overwhelming psychological strain, particularly as a result of the pandemic's disruptions to daily routines, financial challenges, and delays in academic progress. (Aristovnik et al., 2020) Students experienced a range of emotional burdens, including boredom, anxiety, frustration, anger, hopelessness, and shame.

Students often form their key social and interpersonal relationships within the campus environment. However, the COVID-19 pandemic and the isolation measures disrupted these connections, resulting in a rise in feelings of loneliness and a decline in mental health (Wu et al., 2023). In line with this, our study found that feelings of disconnection from friends and loved ones were among the commonly reported stressors across both countries, though no statistically significant differences were observed. This is consistent with global findings that shows how social isolation during the pandemic negatively impacted student well-being. A comparable study with university students in Malaysia identified financial challenges, interruption to their education, and concerns about the future as major stressors during the pandemic. The financial pressure was especially pronounced as students struggled to cover tuition fees and living costs due to a loss of family income or reduced employment opportunities, (Sundarasen et al., 2020). Comparable issues were observed in this study, financial instability and academic uncertainty were reported by students in both Botswana and Mauritius, although no statistically significant differences were

found between the two countries. This underscores the global impact of the pandemic on student well-being. These findings emphasize the need for mental health support and interventions to alleviate the adverse effects of COVID-19 on student well-being.

Patterns of social interaction during the pandemic may have shaped students' experiences of support in both Botswana and Mauritius. In both countries, many students reported relying on family members and significant others, which may reflect the cultural importance of familial bonds in coping with crisis situations. While the study findings point to the role of virtual interactions with educators and peers in maintaining academic and social continuity, the lack of statistically significant differences across these forms of interaction suggests that these experiences were relatively consistent across contexts. Students' interactions with their immediate social environment, especially their family, play a vital role in shaping their learning potential (Gao et al., 2021). Emotional support from family members positively influence academic outcomes by promoting psychological well-being and enhancing student engagement (Roksa and Kinsley, 2019). Online interactions and the use of virtual platforms became especially prominent, reflecting individuals' adaptability in preserving social connections despite physical restrictions. A related study suggests that media use as a coping strategy is not only widespread but also differs between those experiencing stress and those dealing with anxiety (Eden et al., 2020).

A study on coping strategies among university students in Serbia found that the majority (67.06%) relied primarily on support from their community, family, and friends to manage stress and anxiety (Radovanovic et al., 2023). Furthermore, 32.45% of students indicated utilizing technology-driven resources like websites, mobile applications, and digital health trackers. In contrast, only a small percentage accessed university counseling services (10.34%) or external professional support (4.38%). These findings consistent with the present study, suggest a greater reliance on informal support systems over formal institutional mental health services, mirroring global patterns in how students managed psychological distress during COVID-19.

Students in both Botswana and Mauritius reported comparable challenges with remote learning during the pandemic. The study findings suggest that difficulties in concentrating, adapting to new learning formats, and sustaining academic performance were frequently experienced. However, statistical results indicated that satisfaction with more independent forms of learning such as reading materials and written communication was significantly higher among students in Botswana, suggesting possible differences in how students engaged with asynchronous content. A

related study reported that 50% of the participants identified limited internet access as a major hindrance during remote learning (Basri et al., 2021). These findings align with prior research, highlighting the pervasive challenges linked to online learning and the complex relationship between academic demands and mental well-being amidst the pandemic.

Another study on online learning during the pandemic found that most university students expressed dissatisfaction with the experience, pointing to low engagement and doubts about its effectiveness (Xia et al., 2022). The study further suggests that limited participation in online learning stemmed largely from insufficient digital literacy and low learning motivation. Findings from a related study show that students faced increased distractions, struggled to maintain focus, received limited support from academic staff, and experienced a heavier workload (Nicholson et al., 2023). The transition to online learning during the pandemic elicited mixed satisfaction among students, with statistically significant differences emerging between countries in relation to specific delivery formats. These patterns, alongside elevated reports of academic uncertainty and difficulty focusing, suggest that the abrupt shift in learning modalities may have contributed to increased anxiety around educational continuity. Navigating online learning during a crisis is different from engaging in structured, pre-planned online education as it often lacks the necessary preparation (Curelaru et al., 2022). In addition, the authors suggest that the pressures of online learning contributed to psychological and physical issues, such as emotional and physical fatigue, headaches, backaches, and eye strain.

Although real-time online lectures were the predominant instructional format in both Botswana and Mauritius, students reported significantly higher satisfaction with more independent, materials-based approaches particularly lecture notes and written communication formats in Botswana. These differences highlight the importance of adaptable and context-sensitive teaching strategies during emergencies. The variation in satisfaction levels suggests that asynchronous learning may better align with students' needs in certain settings, possibly due to factors such as internet reliability, individual study preferences, or access to technology. Provision of technological infrastructure and instructional support by universities is vital for delivering top-notch virtual teaching and learning experiences (Azila-Gbettor et al., 2023). A strong, positive correlation exists between university support and students' online engagement (Azila-Gbettor et al., 2023). Therefore, it can be inferred that offering adequate support to students may greatly improve their participation and engagement in online learning environments.

Finally, students' satisfaction with support measures varied across different

areas, including government responses, healthcare services, and university initiatives. While certain aspects received moderate approval, dissatisfaction was notably high regarding university communication and support strategies. While based on self-reported perceptions, this suggests variability in how students evaluated institutional and systemic responses during the crisis. The pandemic has exposed both the strengths and shortcomings of universities' mental health support systems, highlighting areas that require improvement. Consequently, universities have redefined their priorities, emphasizing the need to better prepare students for future challenges (Lisiecka et al., 2023).

## 5. Strengths and Limitations of the study

One of the key strengths of the study is its focus on two different contexts within SSA, allowing for a comparative analysis of student experiences in countries with varying levels of pandemic impact. Additionally, the use of a structured questionnaire ensured consistency in data collection, and the inclusion of multiple aspects of student life provides a comprehensive understanding of their challenges. However, the study also has certain limitations. The reliance on self-reported data may introduce response bias, as students' perceptions and experiences are subjective. Additionally, due to challenges in obtaining institutional participation, the study utilized a sampling approach which could not be further clustered within the appropriate ratio of participants, which may limit the generalizability of findings. The sample distribution between Mauritius (n = 261) and Botswana (n = 100) is uneven, which may affect the comparability of results across the two countries. In addition, the use of non-probabilistic sampling limits the generalizability of the findings, as the sample may not be fully representative of the broader student populations in both contexts.

## 6. Conclusions

In conclusion, the COVID-19 pandemic had a profound impact on students' mental health, learning experiences, and perceptions of support systems in Botswana and Mauritius. Beyond highlighting these challenges, the findings point to the need for targeted, evidence-based institutional responses that are sensitive to students' lived realities and cultural contexts. Notably, the preference for informal support systems, particularly family-based support, suggests that existing institutional sup-

port services may not be fully accessible or aligned with students' needs. Higher education institutions should therefore adopt culturally responsive and hybrid support models that integrate formal psychological services with peer support programmes, mentorship initiatives, and community-based approaches. For example, institutions could establish peer counselling networks, strengthen student-led support groups, and incorporate family and community engagement into student well-being strategies where appropriate.

In addition, universities in both contexts should prioritise proactive mental health interventions, including regular well-being check-ins, digital mental health resources, and awareness campaigns aimed at reducing stigma associated with seeking formal support. At the policy level, these findings underscore the importance of developing inclusive and resilient higher education systems that are better prepared for future disruptions. This includes aligning institutional strategies with national education policies, strengthening crisis preparedness frameworks, and ensuring that student support systems are both accessible and contextually relevant. Collectively, these measures will not only support post-pandemic recovery but also contribute to more equitable, responsive, and student-centred higher education systems in Botswana and Mauritius.

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# References

Abdrasheva, D., Escribens, M., Sabzalieva, E., Vieira do Nascimento, D., Yerovi, C., 2022. Resuming or reforming? Tracking the global impact of the COVID-19 pandemic on higher education after two years of disruption. UNESCO.

Acheampong, J., 2023. The impact of COVID-19 on students' academic performance: The case of the university of Ghana business school. Cogent Education 10.

Almahasees, Z., Mohsen, K., Amin, M.O., 2021. Faculty's and Students' Perceptions of Online Learning During COVID-19. Frontiers in Education 6.

Aristovnik, A., Keržič, D., Ravšelj, D., Tomaževič, N., Umek, L., 2020. Impacts of the COVID-19 Pandemic on Life of Higher Education Students: A Global Perspective. Sustainability 12, 8438.

Aristovnik, A., Keržič, D., Ravšelj, D., Tomaževič, N., Umek, L., 2021. Impacts of the Covid-19 Pandemic on Life of Higher Education Students: Global Survey Dataset from the First Wave. Data in Brief 39, 107659.

Assefa, Z.M., Haile, T.G., Wazema, D.H., Tafese, W.T., Berrie, F.W., Beketie, E.D., Hailemariam, B.Z., Zewudie, B.T., Teke, N.E., Metebo, K.N., 2021. Mental Health Disorders During COVID-19 Pandemic Among Southwest Ethiopia University Students: An Institutional-Based Cross-Sectional Study. SAGE Open Nurs 7, 23779608211064374.

Azila-Gbettor, E.M., Abiemo, M.K., Glate, S.N., 2023. University support and online learning engagement during the Covid-19 period: The role of student vitality. Heliyon 9, e12832.

Basri, M., Husain, B., Modayama, W., 2021. University Students' Perceptions in Implementing Asynchronous Learning during Covid-19 Era. Metathesis: Journal of English Language, Literature, and Teaching 4, 263.

Berjot, S., Gillet, N., 2011. Stress and Coping with Discrimination and Stigmatization. Front Psychol 2, 33.

Casares, M.Á., Díez-Gómez, A., Pérez-Albéniz, A., Lucas-Molina, B., Fonseca-Pedrero, E., 2024. Screening for anxiety in adolescents: Validation of the Generalized Anxiety Disorder Assessment-7 in a representative sample of adolescents. Journal of Affective Disorders 354, 331–338.

Curelaru, M., Curelaru, V., Cristea, M., 2022. Students' Perceptions of Online Learning during COVID-19 Pandemic: A Qualitative Approach. Sustainability 14, 8138.

Delgado, P., 2023. The Impact of COVID-19: How are Universities Three

Years After the Pandemic? Observatory - Institute for the Future of Education.

Dongol, E., Shaker, K., Abbas, A., Assar, A., Abdelraoof, M., Saady, E., Hassan, A., Youssef, O., Essam, M., Mahmoud, M., Leschziner, G., 2023. Sleep quality, stress level and COVID-19 in university students; the forgotten dimension. Sleep Science 15, 347–354.

Eden, A.L., Johnson, B.K., Reinecke, L., Grady, S.M., 2020. Media for Coping During COVID-19 Social Distancing: Stress, Anxiety, and Psychological Well-Being. Front. Psychol. 11.

Elfil, M., Negida, A., 2017. Sampling methods in Clinical Research; an Educational Review. Emerg (Tehran) 5, e52.

Gao, H., Ou, Y., Zhang, Z., Ni, M., Zhou, X., Liao, L., 2021. The Relationship Between Family Support and e-Learning Engagement in College Students: The Mediating Role of e-Learning Normative Consciousness and Behaviors and Self-Efficacy. Front. Psychol. 12.

Goorah, S., 2020. Fear of COVID-19 during confinement in Mauritius. Emerald Open Research 2.

Higher Education Commission, 2019. A Snapshot of the Higher Education Participation Status in Mauritius.

Hosen, M., Uddin, M.N., Hossain, S., Islam, M.A., Ahmad, A., 2022. The impact of COVID-19 on tertiary educational institutions and students in Bangladesh. Heliyon 8, e08806.

Islam, M.S., Sujan, M.S.H., Tasnim, R., Sikder, M.T., Potenza, M.N., Os, J. van, 2020. Psychological responses during the COVID-19 outbreak among university students in Bangladesh. PLOS ONE 15, e0245083.

Jeetoo, J., Jaunky, V.C., 2021. Willingness to Pay to Improve Quality of Public Healthcare Services in Mauritius. Healthcare (Basel) 10, 43.

Lazarus, R.S., Folkman, S., 1984. Stress, Appraisal, and Coping. Springer Publishing Company.

Lee, J., Jeong, H.J., Kim, S., 2021. Stress, Anxiety, and Depression Among Undergraduate Students during the COVID-19 Pandemic and their Use of Mental Health Services. Innov High Educ 46, 519–538.

Lisiecka, A., Chimicz, D., Lewicka-Zelent, A., 2023. Mental Health Support in Higher Education during the COVID-19 Pandemic: A Case Study and Recommendations for Practice. Int J Environ Res Public Health 20, 4969.

Magogwe, J.M., Mokibelo, E.B., Karabo, L., 2022. Online Learning during COVID-19: Readiness of Communication and Academic Literacy Skills Students at the University of Botswana. Turkish Online Journal of Educational Technology -

TOJET 21, 97–105.

Masiya, T., Mandiyanike, D., Molosiwa, D., Mazenda, A., 2021. Southern African responses to the COVID-19 pandemic: A study of Botswana and South Africa. Africa's Public Service Delivery & Performance Review 9.

Mok, K.H., Montgomery, C., 2021. Remaking higher education for the post-COVID-19 era: Critical reflections on marketization, internationalization and graduate employment. Higher Education Quarterly 75, 373–380.

Musango, L., Timol, M., Premduth, B., Shaikh, F., Donnen, P., Kirigia, J., 2020. Assessing health system challenges and opportunities for better noncommunicable disease outcomes: the case of Mauritius. BMC Health Services Research 20.

Musango, L., Veerapa-Mangroo, L., Joomaye, Z., Ghurbhurrun, A., Vythelingam, V., Paul, E., 2021. Key success factors of Mauritius in the fight against COVID-19. BMJ Global Health 6, e005372.

Mutinta, G., 2022. Mental distress among university students in the Eastern Cape Province, South Africa. BMC Psychology 10, 204.

NewsGov, 2022. Mauritius to ease COVID-19 restrictions as from 1st July 2022 [WWW Document]. URL https://govmu.org/EN/newsgov/SitePages/Mauritius-to-ease-COVID-19-restrictions-as-from-1st-July-2022.aspx (accessed 4.3.25).

Nicholson, M., Bennett, J.M., Modesto, O., Gould, R., 2023. Understanding University Students during COVID-19: A Longitudinal Mixed-Methods Analysis of Their Experiences of Online Learning, Mental Health, Academic Engagement, and Academic Self-Efficacy. Psychopathology 1–17.

Radovanovic, J., Selakovic, V., Mihaljevic, O., Djordjevic, J., Čolović, S., Djordjevic, J.R., Janjic, V., Jovicic, M., Veselinovic, S., Vukomanovic, I.S., Janicijevic, K., Slovic, Z., Radovanovic, S., Djordjevic, O., Djordjic, M., 2023. Mental health status and coping strategies during COVID-19 pandemic among university students in Central Serbia. Front Psychiatry 14, 1226836.

Reporter, S.S., 2023. Covid-19 no longer health emergency | Sunday Standard.

Roksa, J., Kinsley, P., 2019. The Role of Family Support in Facilitating Academic Success of Low-Income Students. Research in Higher Education 60, 415–436.

Roopa, S., Rani, M., 2012. Questionnaire Designing for a Survey. JIOS 46, 273–277.

Seloilwe, E.S., Kealeboga, K.M., Khutjwe, J.V., Mosebetsi, L., Mamalelala,

T.T., Seloilwe, E.S., Kealeboga, K.M., Khutjwe, J.V., Mosebetsi, L., Mamalelala, T.T., 2023. Health Promotion and Disease Prevention in Botswana. In: Health Promotion - Principles and Approaches. IntechOpen.

Silve, A., 2012. Botswana and Mauritius: Two African Success Stories:Capitalizing on Rents without Mortgaging Development. Afrique contemporaine 242, 29–45.

Somani, Dr.P., 2021. Post Covid-19 Effects on the Future of Students in Higher Education. ijsshr 04.

Son, C., Hegde, S., Smith, A., Wang, X., Sasangohar, F., 2020. Effects of COVID-19 on College Students' Mental Health in the United States: Interview Survey Study. J Med Internet Res 22, e21279.

Statistics Botswana, 2020. Tertiary Education Statistics.

Statistics Botswana, 2022. 2022 Population and Housing Census Preliminary Results V2.

Statistics Mauritius, 2022. Population and Vital Statistics - Republic of Mauritius January – June 2022.

Sundarasen, S., Chinna, K., Kamaludin, K., Nurunnabi, M., Baloch, G.M., Khoshaim, H.B., Hossain, S.F.A., Sukayt, A., 2020. Psychological Impact of COVID-19 and Lockdown among University Students in Malaysia: Implications and Policy Recommendations. International Journal of Environmental Research and Public Health 17, 6206.

Tapera, R., Moseki, S., January, J., 2018. The status of health promotion in Botswana. J Public Health Afr 9, 699.

Vajpeyi Misra, A., Mamdouh, H.M., Dani, A., Mitchell, V., Hussain, H.Y., Ibrahim, G.M., Alnakhi, W.K., 2022. Impact of COVID-19 pandemic on the mental health of university students in the United Arab Emirates: a cross-sectional study. BMC Psychol 10, 312.

Verma, S.K., Kumar, B.D., Chandra, S., Singh, N., Kumari, P., Verma, A., 2021. Knowledge, Attitude, and Psychological Effect on Undergraduate/ Postgraduate Students in Lockdown COVID-19 Situation. J Pharm Bioallied Sci 13, S696–S698.

Vicario, C.M., Mucciardi, M., Perconti, P., Lucifora, C., Nitsche, M.A., Avenanti, A., 2024. The impact of the COVID-19 pandemic on academic performance: a comparative analysis of face-to face and online assessment. Front Psychol 14, 1299136.

Worldometer, 2023a. Botswana COVID - Coronavirus Statistics - Worldometer [WWW Document]. URL

https://www.worldometers.info/coronavirus/country/botswana/ (accessed 1.17.23).

Worldometer, 2023b. Mauritius COVID - Coronavirus Statistics - Worldometer [WWW Document]. URL https://www.worldometers.info/coronavirus/country/mauritius/ (accessed 1.17.23).

Wu, J., Kuan, G., Lou, H., Hu, X., Masri, M.N., Sabo, A., Kueh, Y.C., 2023. The impact of COVID-19 on students' anxiety and its clarification: a systematic review. Front Psychol 14, 1134703.

Xia, Y., Hu, Y., Wu, C., Yang, L., Lei, M., 2022. Challenges of online learning amid the COVID-19: College students' perspective. Front. Psychol. 13.