SAGE Open Nursing
Volume 7: 1–12
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DOI: 10.1177/23779608211064374
journals.sagepub.com/home/son
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Mental Health Disorders During COVID-19 Pandemic Among Southwest Ethiopia University Students: An Institutional-Based Cross-Sectional Study

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Abstract

Introduction: Coronavirus disease 2019 (COVID-19) outbreak originated in Wuhan, Hubei Province, China, at the end of 2019. The COVID-19 incidence of new cases and fatality has continued to fast-track. The mental state and well-being of entire societies are severely suffering from this crisis and are a precedence to be immediately addressed.

Objective: To assess mental health disorders during the COVID-19 pandemic among university students, Southwest, Ethiopia, 2020/2021.

Method: Institutional-based cross-sectional study was conducted. Pretested self-administered a structured questionnaire was used. Depression, anxiety, and stress were measured by depression, anxiety, stress Scale-21 (DASS-21). Data were arrived by Epi Data version 3.1 and exported to SPSS version 25 for analysis. Bivariate and multivariate analyses were applied. In multivariate logistic regression; *p*-value < .05 at 95% CI was declared as significant.

Results: Seven hundred ten university students with 95.6% of the response rate participated in the study. Of the participants, 91.3% were between the ages of 18 and 24 years, and 57.2% were male. The magnitude of anxiety, depression, and stress was 35.1%, 30.0%, and 38.2%, respectively.

In this study, age $\geq$ 25years, easy access to handwashing facilities, relative death due to COVID-19, wearing a face mask, a program of education, marital status, worried about academic activities, and family psychiatric history were predictors for mental health disorders and insomnia was a predictor of both anxiety and depression during COVID-19 pandemic.

Conclusion: In this study, the prevalence of depression, anxiety, and stress was above one-third, which was higher than the previous studies done in the country. Therefore, the continuing increase in new cases of disease infectivity and fatality throughout the country, providing psychological counseling, and developing coping strategies to predictors are important to prevent mental health impacts of the COVID-19 pandemic.

Keywords

COVID-19, pandemic, mental health, anxiety, depression, and stress, Ethiopia

Received 29 June 2021; accepted 13 November 2021

Introduction

Background

Coronavirus disease 2019 (COVID-19), an outbreak that originated in Wuhan, Hubei Province, China, at the end of 2019 is of unknown cause, which raised intense attention nationwide and globally (Wang et al., 2020a; Xiang et al., 2020; Zhu et al., 2020). Fever, cough, myalgia headache, respiratory failure, sepsis, septic shock, and multiple organ

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dysfunction syndromes are clinical manifestations of COVID-19 (Cascella et al., 2020; Huang et al., 2020).

Although the COVID-19 is a physical health crisis, it is the source of major mental health impact on the mental health of the public (Huang & Zhao, 2020; United Nations, 2020). The pandemic has not only impacted all ongoing activities but has led to a tremendous negative effect on the mental health and wellbeing of entire societies and is a primacy to be addressed urgently (Lakhan et al., 2020; Sher, 2020; United Nations, 2020). Mental health is a fundamental part of health and well-being, as revealed within the health definitions: "Health is a complete state of physical, mental, and social well-being and not merely the absence of disease or infirmity" (World Health Organization, 2013). Mental health is essential to the functioning of society at the best of times, enabling them to realize their potential, deal with normal stress, work productively and contribute to societies (United Nations, 2020).

Social loneliness, fear of infection, hesitation, financial loss, prolonged stress, uncertain case fatality rate, and explosive spread may cause problems or worsen depressive anxiety, substance use, and other psychiatric disorders during the pandemic of COVID-19 (Lei et al., 2020; Sher, 2020).

Higher education is not an exception; anecdotal evidence paints a bleak picture for students and academia. After a long period of confinement and reopening, the environment becomes more uncertain, fear of serious illness, and social isolation may affect the mental health and academic status of the student (Aucejo et al., 2020).

On October 18, 2020, the incidence of COVID-19 was more than 40 million cases, 1.1 million deaths, and more than 2.4 million new cases (World Health Organization, 2020) and accelerated to more than 140 million cases, 3 million dead, and 5 million new cases worldwide as of May 4, 2021 report (World Health Organization, 2021). October 18, 2020, Ethiopia had 89,960 cases, 1365 death, and 5005 new cases, and morbidity and mortality of COVID-19 more than doubled in the past 7 months (World Health Organization, 2020, 2021).

Studies done in France among University students revealed that 24.7% had a high level of perceived stress, 16.1% had severe depression, 27.5% had a high level of anxiety (Wathelet et al., 2020), and in other studies 43% had depression (6.96% of a severe level), and 39.19% had anxiety (20.7% of a severe level) (Rabeyron & Essadek, 2020).

Among Chinese College students,15.5% had anxiety, and 23.3% had depression (Chi et al., 2020).

Studies conducted in Bangladesh among University students revealed a prevalence of mental health disorders:15% experienced moderately severe depression, 18.1% severe anxiety (Islam et al., 2020), 31.1% mild, 26.3% moderate, and 20.8% severe level of anxiety (Patwary et al., 2020), and 28.5% had stress, 33.3% had anxiety, and 46.92% mild to extremely severe depression (Hasan et al., 2020).

A community-based study done on home quarantine students in Benchi Shako Zone, southwest Ethiopia, revealed the prevalence of depression, anxiety, and stress among university students was 21.3%, 27.1%, and 32.5% correspondingly (Mekonen et al., 2020).

The overall psychological impact among college students was 16.2%, and the prevalence of depression was 77.2%, anxiety 71.8%, and stress 48.5% in Dessie Town, northern, Ethiopia (Tadesse et al., 2020), and the prevalence of anxiety, depression, and stress-related to home quarantine was 51.6%, 51.0%, and 11.1%, respectively, in Addis Ababa, Ethiopia (Sahile et al., 2020).

Female gender, social isolation, loss of income, low-quality housing, psychiatric history, education (GPA ranking), psychosocial stressors, and health-related stressors were predictors of mental health disorders during the COVID-19 pandemic (Wathelet et al., 2020; Essangri et al., 2021; Hossain et al., 2020; J. Wang et al., 2021).

Students were experiencing high levels of mental health symptoms during the COVID-19 pandemic (Essangri et al., 2021).

Literature Review

Prevalence of Mental Health Disorders During COVID-19 Pandemic

In a study conducted in southwestern China to evaluate mental health status among 15,93 respondents age 18 years and older prevalence of anxiety and depression were 8.3% and 14.6% correspondingly (Lei et al., 2020). In a study done among 8,079 Chinese students, the prevalence of depression and anxiety was 43.7% and 37.4%, respectively (Jiang et al., 2020).

The prevalence of depressive symptoms among home-quarantined Chinese Universities students was 9.0% (Tang et al., 2020) and a community-based survey among adults the prevalence of anxiety and depression was 23.84% and 19.21%, respectively, in Wuhan, China (Ni et al., 2020).

In a study conducted in China, the prevalence level of anxiety among college students was 0.9% severe, 2.7% moderate, and 21.3% mild (Cao et al., 2020). In a study conducted at the University of Hong Kong, 84.7% had moderate-to-high perceived stress, 12.1% had moderate-to-severe symptoms of anxiety and depression (Lai et al., 2020).

In a web-based cross-sectional survey among Bangladesh university students, 72% had depressive symptoms, 15% had moderately severe depression, 40% had moderate-to-severe anxiety and 18.1% had severe anxiety (Faisal et al., 2021; Islam et al., 2020).

A study done in Malaysia University students, 20.4%, 6.6%, and 2.8% experienced minimal to moderate, marked to severe, and most extreme levels of anxiety (Sundarasen et al., 2020).

In a community-based study conducted in Bench Sheko Zone, southwest Ethiopia, the prevalence of depression, anxiety, and stress were 21.3%, 27.1%, and 32.5% correspondingly (Mekonen et al., 2020).

Factors Associated With Mental Health Disorders During COVID-19 Pandemic

A study done among college students in China found that living in urban areas, family income constancy, and living with families were protective factors against anxiety. It also found that having families or colleagues diseased with COVID-19 was a risk factor for increasing anxiety (Cao et al., 2020).

A web-based cross-sectional survey was done in Bangladesh University students, who supposed that s/he was lagging behind others in academic activities and living with families were predictors of depression. Providing supplementary classes before lockdown, worried about their academic activities, and living with families were predictors of anxiety (Islam et al., 2020).

In a study was done on home-quarantined Bangladeshi students, fear of infection, financial uncertainty, inadequate food supply, absence of physical exercise, and limited or no recreational activity had a significant association with stress, anxiety, and depression (Hasan et al., 2020). In a study done in Malaysia, female gender, age below 18 years, age 19–25 years, management field studies, and staying alone, were significantly associated with higher levels of anxiety (Sundarasen et al., 2020).

In a community-based study was done among University Students in Benchi Shako Zone, Ethiopia, female students, remained in the home and had a history of medical illness had higher risks of developing depression. Not living with their families, relatives who got COVID-19, and family incomes < 2,500, had a higher risk for developing anxiety. Similarly, students who had depression used any substance, and develop anxiety had a higher risk of developing stress (Mekonen et al., 2020).

In the presence of such contagion and pandemic diseases, the prevalence of mental health disorders like depression, anxiety, and stress among students was high. The high burden of mental health disorders, low service delivery, and low health-seeking behavior of the community still exist in Ethiopia.

In Ethiopia, the lockdown of educational institutions for ~8 months. The reopening of educational institutions (universities) and the continued increase in cases of morbidity and mortality of COVID-19 throughout the region affect the teaching–learning process and mental health of students. Therefore, this study was conducted to assess mental health disorders during the COVID-19 pandemic among university students, Southwest, Ethiopia.

Methods and Materials

Study Area and Study Period

The study was conducted at Wolkite University, southwest Ethiopia. Wolkite University; found in Gubre sub-city, Gurage Zone, SNNPR, in a Southwest direction, 158 km from Addis Ababa, the capital city of Ethiopia, and is situated at Gubreye sub-city, 10 km away from Wolkite town toward Gubreye Butajira road. It educates undergraduates and graduates for a total of above 10,000 students.

Study Design

An institutional-based cross-sectional study was conducted at Wolkite University.

Population

Source of Population. All students who registered at Wolkite University in the academic year of 2020/2021 were the source of the population.

Study Population. All sampled students who registered at Wolkite University were the study population.

Inclusion and Exclusion Criteria

Inclusion Criteria. All students who started the class and at least 1 month of the period were eligible.

Exclusion Criteria. Those students, who were too ill, unable to read and write during the data collection period were excluded.

Sample Size Determination and Sampling Technique

Sample Size Determination. The sample size was calculated using a single population proportion formula, with the assumption of 95% confidence interval, marginal error (d) of 5%, and taking the prevalence (p) of 21.3% depression, 27.5% anxiety, and 32.5% stress (Mekonen et al., 2020). The highest prevalence was calculated for the calculation of the sample size. Design effect times 2 ($\times 2$) and 10% of non-response rates were doing

$$n_i = \frac{(Za/2)^2 p(1-p)}{d^2}$$

where n_i = initial sample size; d = margin of error; z = confidence

interval; p = prevalence stress

$$n_i = \frac{(1.96)^2(0.325)(1-0.325)}{(0.05)^2}$$

$$n_i = 337$$

For non-respondents = 10%, 337 + 34 = 371.

Design effects = 371 × 2 = 742.

As such, the final sample size was = 742.

Sampling Techniques and Procedures. First, stratified sampling and proportional allocation were performed for eight colleges by $n_i = \frac{n}{N} * N_j$ equation. Then, simple random and stratified sampling was used to select and proportionally allocate for each department. Finally, simple random sampling was done to get the total calculated sample for the study.

Data Collection Procedures (Instrument, Personnel, Data Quality Control)

Data Collection Instruments. Data were collected using pretested structured self-administered questionnaire. The questionnaire was composed of five parts, these were (1) socio-demographic variables, (2) institutional and education-related variables, (3) medical and psychiatric illness-related variables, (4) COVID-19 related variables, and (5) assessment tools for mental health problems, depression, anxiety, and stress scale-21 (DASS-21).

DASS-21 items were also a group of three self-report scales designed to measure the emotional states of depression, anxiety, and stress.

Each of the three DASS-21 scales contains seven items and is divided into subscales. Dysphoria, hopelessness, devaluation of life, self-deprecation, lack of interest (involvement), anhedonia, and inertia was assessed by the depression scale.

Autonomic arousal, skeletal muscle effects, situational anxiety, and subjective experience of anxious affect are assessed by the anxiety scale, and difficulty of relaxing, nervous arousal, and being easily upset/agitated, irritable/over-reactive, and impatient are assessed by the stress scale. The score for DASS-21 was calculated by adding the scores for the relevant items and multiplying by two to calculate the ultimate score. The total final scores of these measurement tools interpreted as follows: Depression: normal (0–9), mild (10–13), moderate (14–20), and severe (21–27), extremely severe (28+), anxiety: normal (0–7), mild (8–9), moderate (10–14), and severe (15–19), extremely severe (20+) and stress, normal (0–14), sub-threshold (15–18), moderate (19–25), severe (26–33) and extremely severe (34+) (Coker et al., 2018; Moore et al., 2017). The validity and reliability of the DASS-21; were tested by confirmatory factor analysis, and test-retests were Cronbach alpha 0.94, test-retest reliability was 0.77 (Asghari & Foad Saed, 2008; Moore et al., 2017).

Data Collection Techniques/Process. Data were collected by a pretested self-administered structured questionnaire. The questionnaire was first prepared in English and then translated to Amharic (national language of the country) and then after being translated back to English to check the consistency. Ten BSc nurses collected data in English, and four supervisors monitored during data collection.

Data Quality Control and Data Collectors. For ensuring data quality, one-day training was given to supervisors and data collectors. The data collectors have briefly instructed on the data collection process. The prepared questionnaire was pretested on 5% (37) of the sample size at Wolkite Polytechnic College before the data collection, and adjustments were did based on the findings.

Proper categorization and coding of the data, completeness, and consistency of the collected data were checked daily during data collection by the supervisor and principal investigators. Double entry and data cleaning were deliberating.

Data Processing and Analysis. After data collection, each questionnaire was reviewed for completeness and consistency by principal investigators and supervisors. Data were cleaned, edited, coded, and entered into Epi Data Version 3.1 and exported to SPSS version 25 for further analysis. Descriptive statistics like frequency and percent were performed.

Bivariate analysis was done to identify associations between dependent and independent variables. The 95% bivariate analysis of CI and p-value < .25 and statistically significant in previous studies were eligible for multivariable logistic regression analysis. Statistical significance was reported at p-value < .05. Finally, the findings of the study are presented in graphs and tables as appropriate.

Results

Socio-Demographic Characteristics of the Participants

Overall, a total of 710 students participated in the study with a response rate of 95.6%. Most of the participants, 648 (91.3%), were between the age of 18 and 24 years, 406 (57.2%) were male sex, 456 (64.2%) were from urban areas, 630 (88.7%) of the students were living together with four and above in one dormitory, 563 (79.3%) were single marital status, 382 (53.8%) were orthodox religion followers, and 546 (76.9%) had < 2,500 Ethiopian Birr, as shown in Table 1.

Table 1. Socio-Demographic Characteristics of Wolkite University Students, Southwest, Ethiopia, 2021 ($n = 710$).

S. no.	Variables	Category	Frequency (n)	Percentage (%)
1.	Age of the participants	18–24 years	648	91.3
		≥25 years	62	8.7
2.	Sex of the participants	Male	406	57.2
		Female	304	42.8
3.	Residence/comes from	Urban	456	64.2
		Rural	254	35.8
4.	Living with	Family	521	73.4
		Alone	189	26.6
5.	No. of families/ students/ collagenous living with	<4 students	80	11.3
		≥4 students	630	88.7
6.	Marital status	Single	563	79.3
		Married	147	20.7
7.	Religion	Orthodox	382	53.8
		Catholic	23	3.2
		Protestant	153	21.5
		Muslim	134	18.9
		Others (specify)	18	2.5
8.	Estimated family monthly income of any source (ETB)	<2,500 ETB	546	76.9
		≥2,500 ETB	164	23.1

Institutional and Educational Related Variables

The majority of the participants; 504 (71.0%) had no supply of face masks and hand sanitizer, 388 (54.6%) responded that the handwashing materials were not adequately available at the classroom, cafeteria, and library, 471 (66.3%) responded that no keeping social distance at cafeteria and library, as shown in Table 2.

Medical Illness, Psychiatric History, and COVID-19 Related Variables of the Participants

From the study participants, 16 (2.3%) had known heart disease, 45 (6.3%) had a known family history of hypertension, and 407 (57.3%) did not fully implement the COVID-19 infection prevention and control methods, as shown in Table 3.

Level of Mental Health Disorders During COVID-19 Pandemic

In this study, the levels of a common anxiety, depression, and stress associated with mental health disorders during the COVID-19 pandemic among university students are shown in Figure 1.

The Magnitude of Mental Health Disorders During the COVID-19 Pandemic

The magnitude of mental health disorders (anxiety, depression, and stress symptoms) following the reopening of educational institutions among university students during the COVID-19 pandemic are shown in Figure 2.

Factors Associated With Mental Health Disorders During COVID-19 Pandemic

Binary and multivariate logistic regressions were employed to identify factors associated with mental health disorders (anxiety, depression, and stress symptoms) during the COVID-19 pandemic among university students.

Table 2. Institutional and Educational Related Variables among Wolkite University Students During COVID-19 Pandemic, Southwest, Ethiopia, 2021 ($n = 710$).

S. no.	Variables	Category	Frequency (n)	Percentage (%)
1.	Supply of face mask and hand sanitizer	No	504	71.0
		Yes	206	29.0
2.	Adequate availability of handwashing facility in the institution	No	388	54.6
		Yes	322	45.4
3.	Good distancing at launch, class, and library	No	471	66.3
		Yes	239	33.7
4.	Student category	Health sciences students	103	14.5
		Non-health science students	607	85.5
5.	Program	Regular	617	86.9
		Extension	93	13.1
6.	Academic year	≤2nd year	195	27.5
		3rd year	290	40.8
		4th year	135	19.0
		≥5th year	90	12.7
7.	Course load per day (h/day?)	≤6 h/day	446	62.8
		>6 h/day	264	37.2
8.	Way of course delivery	Block	61	8.6
		Parallel	649	91.4
9.	Lagging/ withdraw of course/s	Yes	84	11.8
		No	626	88.2
10.	Worried about their academic activities	Yes	417	58.7
		No	293	41.3

Factors Associated With Anxiety

Hence; in this study, factors that were significantly associated with anxiety include students age ≥ 25 years was 1.76 times (AOR = 1.76 [95% CI: 1.01 – 3.04]) at higher risk to develop anxiety in contrast with younger age (18–24 years), who get adequate availability of handwashing at the cafeteria, library, and classes were 42% (AOR = 0.58 [95% CI: 0.43–.81]) less likely to develop anxiety, students' relative death due to COVID-19 had 2.6 times (AOR = 2.60 [95% CI: 1.33–5.07]) higher risk to develop anxiety in contrast with those who had not, and students who had insomnia had 1.8 times (AOR = 1.81 [95% CI: 1.31–2.51]) higher risk to develop anxiety in contrast with no insomnia, as shown in Table 4.

Factors Associated With Depression

After using binary and multivariable logistic regression, the factor associated with depression during the COVID-19 pandemic among students were; students who always wear a face mask were 36% (AOR = 0.64 [95% CI: 0.45–0.91]) less likely to develop depression compared with bare ones, those who took a course in extension program had 2 times (AOR = 2.05 [95% CI: 1.29–3.24]) higher risk of developing depression in contrast with a regular program, and students who had insomnia had 1.74 times (AOR = 1.74 [95% CI: 1.24–2.44]) more risk to develop depression during COVID-19 pandemic, as shown in Table 5.

Factors Associated With Stress

In this study; students who were married 1.49 times (AOR = 1.49 [95% CI: 1.02–2.18]) higher risk to developing stress in contrast to single students, who worried about their academic activities were at 1.5 times (AOR = 1.54 [95% CI: 1.11–2.12]) higher risk to develop stress, and those who had family psychiatric history were 51% (AOR = 0.49 [95% CI: 0.25–0.97]) less likely to develop stress in contrast with those who had no family psychiatric history, as shown in Table 6.

Table 3. Medical Illness, Psychiatric and COVID-19 Problems of Wolkite University Students During COVID-19 Pandemic, Southwest, Ethiopia, 2021 ($n = 710$).

S. no.	Variables	Category	Frequency (n)	Percentage (%)
1.	Having known chronic medical illness	Yes	57	8.0
		No	653	92.0
2.	Family history of known chronic medical illness	Yes	110	15.5
		No	600	84.5
3.	Having a past psychiatric history	Yes	97	13.7
		No	613	86.3
4.	Having a family psychiatric history	Yes	49	6.9
		No	661	93.1
5.	Use of any substance at least once for the past 2 months	Yes	76	10.7
		No	634	89.3
6.	Apply face mask regularly	No	489	68.9
		Yes	221	31.1
7.	Fully implementing COVID-19 protection protocol always	No	303	42.7
		Yes	407	57.3
8.	Have contact history with confirmed or suspected COVID-19	Yes	72	10.1
		No	638	89.9
9.	Having relative or acquaintances infected with COVID-19	Yes	69	9.7
		No	641	90.3
10.	Having relative death due to COVID-19	Yes	40	5.6
		No	670	94.4
11.	Had fear of infection	Yes	298	42.0
		No	412	58.0
12.	Doing physical exercise regularly	No	437	61.5
		Yes	273	38.5

Discussion

Acceleration of new COVID-19 cases and deaths is impacting students' mental health, fear of contagion, and death. In this study, the magnitude of anxiety, depression, and stress during the COVID-19 pandemic among university students was 35.1%, 30.0%, and 38.2%, respectively.

This study shows that the prevalence of anxiety was in line with the study done in the United States of America (39.4%) (Batra et al., 2021), Italy (35.33%) (Villani et al., 2021), another study done in Italy (34.3%) (Marelli et al., 2020), Bangladesh (33.3%) (Hasan et al., 2020), and Gonder, Ethiopia (39.6%) (Ali & Muluneh, 2021). This level in this study was higher than studies done in North Carolina; Taiwan (25.3%) (Fruehwirth et al., 2021), and Bench Sheko Zone, Southwest, Ethiopia (27.7%) (Mekonen et al., 2020).

However, the prevalence of anxiety in this study was lower than studies done in Turkey (48.6%) (Ayyildiz et al., 2021), Bangladeshi (40% moderate to severe) (Faisal et al., 2021), Egypt (70.5%) (Ghazawy et al., 2020), and Addis Ababa Ethiopia (51.6%) (Sahile et al., 2020).

Mild level of anxiety (17.3%) was higher than a study done in Addis Ababa, Ethiopia 11.1% (Sahile et al., 2020), Turkey11.1% (Ayyildiz et al., 2021), and Malaysia 20.4% (Sundarasen et al., 2020) and moderate (14.6%), severe (2.8%), and extremely severe (0.3%) level of anxiety was lower than the study done Ethiopia; 20.9% moderate, 6.5% severe, and 13.1% extremely severe (Sahile et al., 2020), Turkey; 20.3% moderate, 6.8% severe 10.4%, and extremely severe 10.4% (Ayyildiz et al., 2021), Malaysia; 6.6% severe,

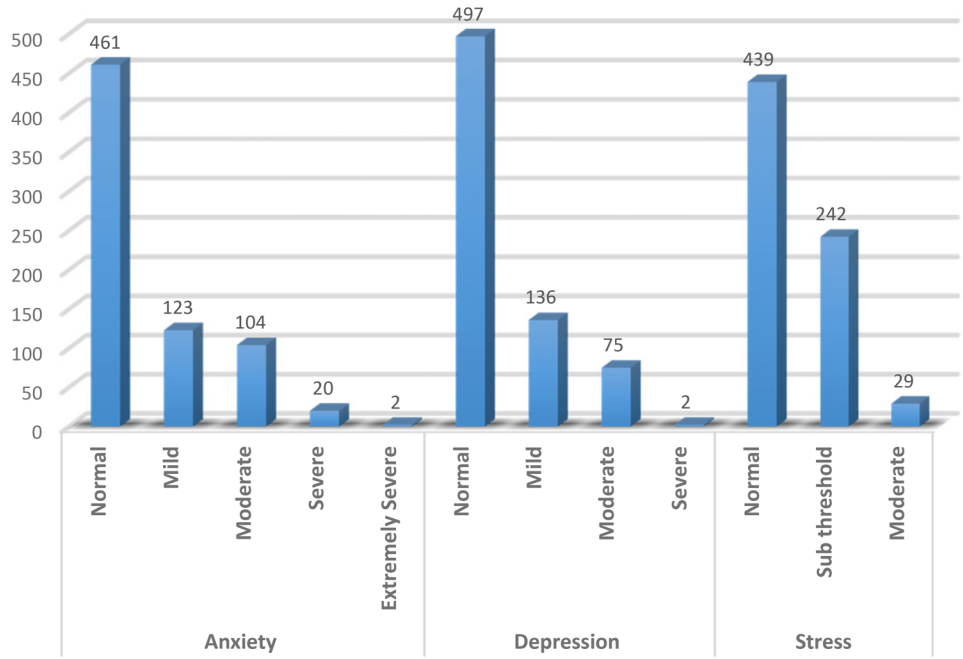

Figure 1. Level of mental health disorders during COVID-19 pandemic among Wolkite University students southwest, Ethiopia, 2021.

and 2.8% extremely severe (Sundarasen et al., 2020) and China, 21.3% mild anxiety (Cao et al., 2020).

In this study, age ≥ 25years, availability of handwashing, relative death due to COVID-19, and insomnia were significantly associated with anxiety and were consistent with a study done in China (X. Wang et al., 2020b). Insomnia, age ≥ 25 years, relative death from COVID-19, and failure to implement the COVID-19 infection prevention and control protocol led students to develop symptoms of anxiety. The difference may be due to other studies using different tools like GAD-7, Zung's self-rating anxiety ladder (SAS), and Beck's anxiety inventory.

This study reveals that the prevalence of depression was consistent with a study done in Italy (27.8%) (Marelli et al., 2020), North Carolina, Taiwan (31.7%) (Fruehwirth et al., 2021), and the United States of America (31.2%) (Batra et al., 2021); but higher than the study done in Bench Sheko zone, Southwest, Ethiopia (21.1%) (Mekonen et al., 2020), and lower than the study done in Italy (72.93%), Turkey (64.6%) (Ayyildiz et al., 2021), Bangladesh (46.9%) (Hasan et al., 2020), Bangladeshi (72%) (Faisal et al., 2021), the United States of America (44%) (Son et al., 2020), Egypt (53.6%) (Ghazawy et al., 2020), Hong Kong (84.7%) (Lai et al., 2020), Gonder, Ethiopia (40.2%) (Ali & Muluneh, 2021) and Addis Ababa, Ethiopia (51%) (Sahile et al., 2020). The mild levels of depression were 19.2%, which were similar to studies done in Addis Ababa, Ethiopia (18.1%) (Sahile et al., 2020), and Turkey (16.0%) (Ayyildiz et al., 2021). The moderate and severe levels of depression were 10.6% and 0.3%, respectively, which was lower than the study done in Addis Ababa, Ethiopia, 20.9% moderate, 7.2% severe, and 4.6% extremely severe (Sahile et al., 2020) and Turkey, which revealed 26.8% moderate and 10.7% severe (Ayyildiz et al., 2021).

In this study, those who wore a face mask were in an extension program of education and had insomnia had a significant association with depression. Students who took a course as part of the extension program paid for these courses, and their financial sources were affected due to COVID-19, and there were no similar findings regarding these results. The difference may be due to using different assessment tools used for depression in other studies like PHQ-8, Zung Self-Rating Depression Scale (SDS), and Beck Depression Inventory.

Furthermore, in this study, the prevalence of stress was higher than the study done in the United States of America (26.0%) (Batra et al., 2021), Bangladesh (28.5%) (Hasan et al., 2020), Bench Sheko Zone, Southwest, Ethiopia (32.5%) (Mekonen et al., 2020), Addis Ababa, Ethiopia (11.1%) (Sahile et al., 2020), and Gonder, Ethiopia (22.2%) (Ali & Muluneh, 2021). However, this study was lower than the study done in Turkey (45.2%) (Ayyildiz et al., 2021) and Egypt (47.8%) (Ghazawy et al., 2020). The prevalence of mild (sub-threshold) and moderate stress in this study among university students was 34.1% and 4.1%, respectively; which was higher than the study done in Addis Ababa; 7.8% mild and 2.6% moderate (Sahile et al., 2020) and Turkey, 14.8% mild (Ayyildiz et al., 2021), and lower than moderate(14.9%), and severe level of stress (11.1%) among Turkey University students (Ayyildiz et al., 2021). This study also shows that; marital status, those who worried about academic activities, and had a

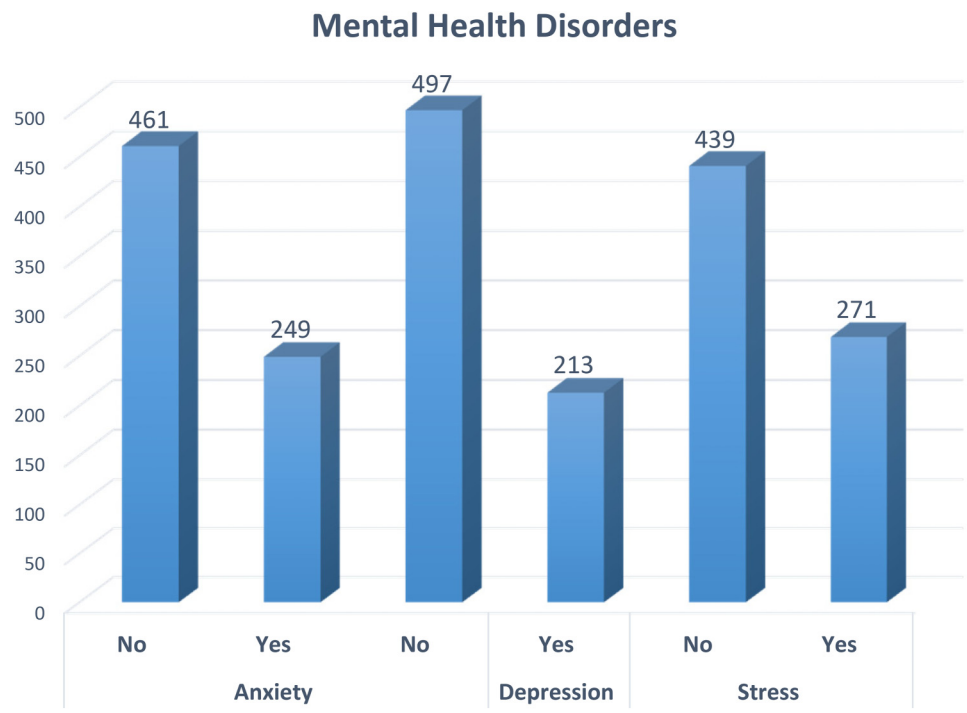

Figure 2. The magnitude of mental health disorders during COVID-19 pandemic among Wolkite University students southwest, Ethiopia, 2021.

family psychiatric history were factors associated with stress during the COVID-19 pandemic. Married students worried about losing a loved one, and concerned about completing the course. Wasting time or withdrawing from school and/or school activities, financial problems, being too busy, and complications from a family psychiatric illness were stressors that created demand and affected the student's mental health. Students who worried about academic activities were similar to study done in the United States of America (Son et al., 2020). The difference may also be due to the difference in assessment tools used for stress in other studies like Perceived Stress Scale-10 (PSS-10).

The overall variation in common mental health disorders (anxiety, depression, and stress symptoms) may be attributed

Table 4. Factors That Associated With Anxiety During COVID-19 Pandemic among Wolkite University Students, Southwest, Ethiopia, 2021.

Variables	Category	Anxiety		Crude odd ratio (COR) (95% CI)	Adjusted odds ratio (AOR) (95% CI)	*p*-value
		Yes (*n*/%)	No (*n*/%)			
Age of the participants	18–24 years	222 (34.3)	426 (65.7)	1:00	1:00	1:00
	≥ 25 years	27 (43.5)	35 (56.5)	1.48 (0.87–2.51)	1.76 (1.01–3.04)	.045*
Adequate availability of hand washing	No	116 (29.9)	272 (70.1)	0.61 (0.44–0.83)	0.58 (0.43–.81)	.001*
	Yes	133 (41.3)	189 (58.7)	1:00	1:00	1:00
Relative death by COVID-19	Yes	23 (57.5)	17 (42.5)	2.658 (1.39–5.08)	2.60 (1.33–5.07)	.001*
	No	226 (33.7)	444 (66.3)	1:00	1:00	1:00
Insomnia	Yes	108 (44.4)	135 (55.6)	1.85 (1.34–2.55)	1.81 (1.31–2.51)	<.0001*
	No	141 (30.2)	326 (69.8)	1:00	1:00	1:00

*Significant at 95% CI and *p*-value < .05.

Table 5. Factors Associated With Depression During COVID-19 Pandemic among Wolkite University Students, Southwest, Ethiopia, 2021.

		Depression				
Variables	Category	Yes (*n*/%)	No (*n*/%)	COR (95% CI)	AOR (95% CI)	*p*-value
Worn face mask always	No	132 (27.0)	357 (73.0)	0.67 (0.47–0.93)	0.64 (0.45–0.91)	.012*
	Yes	79 (35.7)	142 (64.3)	1:00	1:00	1:00
Program of education	Regular	172 (27.9)	445 (72.1)	1:00	1:00	1:00
	Extension	39 (41.9)	54 (58.1)	1.87 (1.19–2.92)	2.05 (1.29–3.24)	.002*
Insomnia	Yes	91 (37.4)	152 (62.6)	1.73 (1.24–2.41)	1.74 (1.24–2.44)	.001*
	No	120 (25.7)	347 (74.3)	1:00	1:00	1:00

*Significant at 95% CI and *p*-value< .05.

to the study duration; most studies were completed during solitary confinement and quarantine time.

This study was carried out after the global launch of sustainable confinement, the reopening of all social services, public and private sectors, and half the period of completion of annual education activities; but, morbidity and mortality as a result of COVID-19 have more than doubled. It was also carried out when students can use various coping mechanisms to prevent stressors and implement the COVID-19 infection prevention and control protocol.

The institutions may also construct nearby infrastructure and accessibility of resources for infection prevention and control methods. It may also be due to the student category like some studies used specific study populations (graduating class, college students, postgraduate, health science students, and international students). The differences may be also due to differences in assessment tools used for anxiety, depression, and stress and as most studies were collected by online surveys, and community-based studies.

Strengths and Limitations

This study includes a high number of students from different departments in addition to health science students to assess pandemic impacts and compare with other studies.

The limitation of this study may be related to the survey types and nature of cross-sectional study which did not draw inferences and show cause and effect relations among variables.

Implication for Practice

All stakeholders the Ministry of Science and Higher Education (MOSHE) and universities will develop screening tools, prevention, and treatment strategies guidelines for the current existence pandemic diseases.

Higher educational institutions (universities) can take responsibility by encouraging students to implement long-term positive coping strategies for predictors of anxiety, depression, and stress and enhancing the student's wellbeing by reducing stress and building resilience.

Other interventions would include providing psychotherapy, access counseling videos via common social media for all students with scheduled programs and giving health education regarding lifestyle changes (exercise, social support, nutrition, and sleep), and relaxation techniques by focusing on the predictors (stressors) of each mental health problem.

Students are responsible for implementing COVID-19 infection prevention protocols and positive coping strategies to overcome anxiety, depression, and stress and improve their mental health.

Conclusion

In this study, the prevalence of depression anxiety, and stress was above one-third. Age ≥ 25 years, hand washing facilities, relative death due to COVID-19, and insomnia were predictors of anxiety; wearing face masks, an extension program of education and insomnia was predictors of depression; married marital status, worried about academic concerns,

Table 6. Factors Associated With Stress During COVID-19 Pandemic among Wolkite University Students, Southwest, Ethiopia, 2021.

		Stress				
Variables	Category	Yes (*n*/%)	No (*n*/%)	COR (95% CI)	AOR (95% CI)	*p*-value
Marital status	Single	200 (35.5)	363 (64.5)	1:00	1:00	1:00
	Married	69 (46.9)	78 (53.1)	1.61 (1.11–2.32)	1.49 (1.02–2.18)	.038*
Worried about academic activities	Yes	171 (41.0)	246 (59.0)	1.38 (1.01–1.89)	1.54 (1.11–2.12)	.009*
	No	98 (33.4)	195(66.6)	1:00	1:00	1:00
Having a family psychiatric history	Yes	12 (24.5)	37 (75.5)	0.51 (0.26–0.99)	0.49 (0.25–0.97)	.042*
	No	257 (38.9)	404 (61.1)	1:00	1:00	1:00

*Significant at 95% CI and *p*-value < .05.

and family psychiatric history were predictors of stress among university students during COVID-19 pandemic.

Acknowledgments

First of all, the authors express their deepest gratitude to Wolkite University for providing this opportunity by allocating the budget. Then, they extend our thanks to Wolkite University research and community service director and College of Medicine and Health science research and community service coordinator for their potentially enrolling in each activity in a well and planned manner. Finally, they appreciate our college staff for their constructive comments and questions to conduct this research.

Ethical Consideration

Before data collection, the Institutional Review Board (IRB) of Wolkite University College of Health Sciences Ethical committee approved the study and an ethical letter was obtained with Rff. No. of RCSUILC/082/13. The participants were informed and their oral consents were obtained. They had the right to refuse or withdraw from participating at any time, and the information provided by each participant must be kept confidential, each questionnaire was coded, and information was not shared with the third party.

Consent to Publish

The consent to publish was reached with the authors.

Availability of Data and Materials

The data that support the finding had attached to the editorial office.

Author's Contribution

The authors who contributed to this study are conducting the research and preparing the manuscript.

Declaration of Conflicting Interests

The authors declared that no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The authors received no financial support for the research, authorship and/or publication of this article.

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