


**Research Article**

## Psychological Impacts of COVID-19 Pandemic on Students of the School of Medicine University for Development Studies (UDS), Tamale, Ghana

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### Abstract

**Background:** COVID-19 pandemic is a severe acute respiratory infection caused by severe acute respiratory syndrome virus and has psychological impact on many people with COVID-19, including students. Mental health and psychological well-being have been a concern of the World Health Organization since the outbreak of the COVID-19 pandemic in early 2020.

**Objective:** This study sort to assess the impact of COVID-19 pandemic on students of the School of Medicine (SoM), University for Development Studies (UDS), Tamale Dungu Campus.

**Method:** An online survey was sent to the medical students of the University for Development Studies through online communication during the first week of June 2022 by using a non-probability snowball sampling. The survey included a short version of Depression, Anxiety Stress Scale-21 (DASS-21) and socio-demographic data. These completed questionnaires were analysed based on the objectives of the study using the STATA 13 software.

**Results:** The results revealed that students experienced stress, anxiety and depression. About 10 % to 8.0% experienced mild to moderate levels of stress. In respect of anxiety, about 5.3% and 9% respectively, experienced severe to extremely severe forms of anxiety. The proportion of students who experienced depression, mild to severe forms, ranged between 8% to 9 %.

The results of the bivariate and multiple binary logistic regression test show that being in Problem Based Learning 6 (PBL 6) and sleeping less than 6hours increased the risk of stress among UDS medical students that produced p-values of 0.001 and 0.007 respectively for anxiety. Being in PBL 4 & 6 and sleeping less than 6 hours increase the risk of anxiety with a p-value of 0.007and 0.001 respectively. The results further reveal that students in PBL 6 had significant p-value of 0.001 for stress and those with sources of support from benefactors had a significant p-value of 0.02.

**Conclusion:** The study revealed that COVID-19 had a psychological impact on medical students in the clinical years whereby some of the students experienced extremely severe form of anxiety, severe form of depression and moderate level of stress. Efforts should be made to provide, encourage and support students of the UDS School of Medicine to adopt proper coping mechanisms to reduce the negative impact of COVID-19 pandemic on their psychological wellbeing.

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## Background

The novel corona virus disease 2019 (COVID-19) has become a global public health concern [1]. By late December 2019, it became clear that a novel coronavirus was spreading through Wuhan, the capital of Hubei province in China [2]. The psychological issues which accompany this pandemic have rapidly compounded its public health burden. COVID-19 was declared a Public Health Emergency of International Concern (PHEIC) by the World Health Organisation (WHO) on 30th January, 2020 and about six weeks later on March 11, 2020, the WHO declared it a pandemic (i.e. a global epidemic, an epidemic that spreads to more than one continent), as a result of the large number of people infected, coupled with its impact on the world [1].

The Coronavirus disease (COVID-19) is a disease caused by the new coronavirus that emerged in China in December 2019. COVID-19 symptoms include cough, fever, shortness of breath, muscle aches, sore throat, unexplained loss of taste or smell, diarrhoea and headache. COVID-19 can be severe, and some cases have caused death. The new coronavirus can spread from person-to-person contacts. It is diagnosed with a laboratory test.

All continents of the world reported confirmed cases of COVID-19 in the year 2020. Africa confirmed its first case in Egypt on Feb 14, 2020 [3] and it started spreading into other countries leading to various levels of lockdowns. Ghana had its fair share of the pandemic when it registered its first case on the 12 of March, 2020 and since then the country has added on more positively diagnosed individuals following various pragmatic steps taken as a country and with support from various organisations and collaborators. The first two confirmed cases identified as people who had returned to the country from Norway and Turkey. These imported cases initiated the first contact tracing process in Ghana, helping detect several dozens of cases in a short period of time.

Two institutions, namely the Kumasi Centre for Collaborative Research into Tropical Medicine (KCCR) in Kumasi and the Noguchi Memorial Institute for Medical Research (NMIMR) in Accra, served as initial testing centres for all suspected cases. Samples from the northern part of the country were taken to the KCCR whilst those from the southern part were taken to NMIMR. The Government of the day later equipped other regional laboratory facilities to augment their effort and to help with rapid turnover of results to deal with the anxiety, uncertainty and worry related to the initial testing process following some delays.

A partial lockdown was placed on the two biggest cities, Accra and Kumasi, which were the epicentres for the pandemic in Ghana, from the end of March 2020 for three weeks. There were restrictions on the movement of people, with the police and military mounting road blocks to carry out checks. Only workers of essential services (in sectors

like healthcare, media, food vendors/restaurants, security agencies) were allowed to move around in these cities. People in the rest of the country could move around since no cases had been reported at the time, but with the observation of the protocols outlined to contain the pandemic.

The lockdowns and other restrictions put in place affected many businesses since they were not able to operate. A good number of people lost their jobs and livelihoods as many organisations asked their skilled workforce to work from home while others were made redundant.

During the months that followed the lockdown (May to September 2020), people's health-seeking behaviours changed. The number of people reporting to the health facilities with other ailments reduced drastically. People were afraid to visit health facilities, with the fear that they could catch the infection in such places.

Understanding the health space and the genesis of the virus, the areas of care needed to sustain life in this challenging moment and ways to assist individuals cope with the pandemic situation and its accompanying stressors are of greater concern for scholars in the field of mental health. The student population seemed to be the most vulnerable group following the restriction and its implications for their academic, socioeconomic, relational, developmental, mental health and other domains of their life.

According to the United Nations secretary general, Antonio Guterres, globally 1.5 billion students were affected by the school closure and 214 million remained out of school [4]. In Ghana, a number of students suffered the same fate, while dropping out of school resulted in some girls becoming pregnant and dealing with its consequences, including psychological traumas. University students are increasingly recognized as a vulnerable population, suffering from higher levels of anxiety, depression, substance abuse, and disordered eating compared to the general population. The nature of their educational experiences has radically changed thereby amplifying the burden on the mental health of this vulnerable population [32]. Given the vulnerability of students in general but medical students in particular, especially during the clinical years, we sort to determine the prevalence/level of common psychological disorders in this population by assessing anxiety, depression and stress using a standardized measuring scale (DASS-21).

## Methodology

### Study population

By the end of July 2022, all students of the School of Medicine were invited to participate in the cross-sectional study.

A Google survey was created and the link to the survey was sent to the participants by e-mails, WhatsApp and

Telegram. Students' contact information were obtained from the Dean of the School of Medicine.

### Sample and sampling procedure

To ensure a well-spread pool of respondents, the participants were sampled from Problem Based Learning Level 1 -PBL 1-PBL 6 in the School of Medicine University for Development Studies. A survey invitation through Google Forms was sent to each student via WhatsApp and Telegram messages, as well as e-mails, with periodic reminders. Participation in the survey was voluntary and each student's consent was obtained prior to the start of the survey. The participants were assured of the confidentiality of their responses and their identity.

### Data collection

The questionnaire was designed composing of two parts to collect the data. The parts included the demographics as part A and Depression, Anxiety and Stress Scale (DASS) as part B, made of a 21 items.

Part A included a detailed explanation of the steps, aims and eligibility criteria of the study. The demographic data of the students included sex, age, ethnicity, religion, academic year, source of support, sleep pattern. COVID-19 infection and or death of a relative or acquaintance and source of psychological support.

Part B included the Depression, Anxiety and Stress Scale-21 (DASS-21). The DASS-21 is a quantitative measure of depression, anxiety and stress symptomatology (seven statements each) during the past week.

The depression statements evaluate hopelessness, dysphoria, self-deprecation, devaluation of life, lack of interest and involvement, anhedonia and inertia. The anxiety statements evaluate skeletal muscle effects, autonomic arousal, situational anxiety and subjective experience of anxious affect. The stress scale evaluates nervous arousal, difficulties in relaxation and being easily upset or over-reactive. Student was required to decide how much the statements apply for him/her using a scale from 0 to 3 where 0 means 'did not apply to me at all', 1 means 'applied to me to some degree or some of the time', 2 means 'applied to me to a considerable degree or a good part of the time' and 3 means 'applied to me very much or most of the time'.

The score of each axis was multiplied by 2 to lie within a 0-42 range where higher scores indicate worse outcomes.

The subscales were scored as follows: for depression: normal (0-9), mild (10-13), moderate (14-20) and severe (21-27) and extremely severe (28+). The anxiety subscale: normal (0-7), mild (8-9), moderate (10-14) and severe (15-19) and extremely severe (20+) and for stress: normal (0-14), mild (15-18), moderate (19-25) and severe (26-33) and extremely severe (34+) [5].

### Ethical consideration

The study protocol adhered to the ethical review committee guidelines of the University for Development Studies and other affiliated institutions. The conditions and eligibility criteria of the study were described in the part A of the questionnaire and students had to agree to proceed to fill in the questionnaire. They had the full will to determine to participate or not in the survey. Choosing to proceed, filling out and submitting the questionnaire was considered as an approval and informed consent of participation.

### Statistical Analysis/Processing

The analyses of data were done using STATA 13. Multivariate binary logistic regression was used to identify the significant factors that affect the presence of depression, anxiety and stress among the students. p values <0.05 was considered statistically significant.

## Results

### Demographic Information

A total of 334 University for Development Studies students from the School of Medicine participated in the study. The 18-24-year age group constituted 65.8% of the sample. Approximately 39.4% of the students were females and 60.6% were males. The majority of the students were Christians (68.9%), followed by Muslim (29.6%), and others (1.5%). The majority (95.8%) of the students had no relatives/acquaintance infected with the virus. While about 4% of the students had relatives/acquaintances who were infected or died of COVID-19, respectively. Also, with regards to source of support, more than half of the students (67.8%) received support from parents, 15.3% from guardians, 10.5% from scholarship, and 6.8% from benefactors. While some students did not receive any psychological support (10.8%), other students received psychological support from family members (4.2%) and from the university (5.1%). The majority of the students (77.3%) received professional support within the period of the pandemic which may have impacted positively on the stress management which has implication on depression and anxiety.

A total of 183 (54.8%) of the students slept less than 6 hours and 151 (45.2%) slept 6 or more hours. Out of the 334 students that participated in the study, 26.7%, 15.9%, 16.5%, 16.8%, 8.7% and 15.6% were from PBL1 to PBL 6, respectively.

As presented in Table 2, proportions of the students experienced symptoms of stress, anxiety, and depression, respectively. Using the DASS-stress subscale, indicates proportions of the students had mild (8.4%), moderate (10.2%) symptoms, respectively. With regards to anxiety, the proportion of students experiencing mild, moderate, severe, and extremely severe symptoms were 4.9%, 7.4%, 5.30%, and 8.7%, respectively. In respect to depression, 8.7% of the

**Table 1:** Demographic characteristic of University Students

Variables	Frequency n; (%)
<b>Sex</b>	
Male	200 (60.6)
Female	130 (39.4)
<b>Mean age (mean ±SD)</b>	27.4±5.1
18-24	219 (65.8)
25 and above	114 (34.2)
<b>Ethnicity</b>	
Mole Dagbani	88 (29.7)
Akan	96 (32.4)
Ewe	19 (6.4)
Gurni/Kasena	26 8.8
Guans	30 (10.1)
Ga	7 (2.3)
Others	30 (10.0)
<b>Religion</b>	
Christians	230 (68.9)
Muslims	99 (29.6)
Others	5 (1.5)
<b>Academic Year</b>	
PLB 1	89 (26.7)
PLB 2	53 (15.9)
PLB 3	55 (16.5)
PLB 4	56 (16.8)
PLB 5	29 (8.7)
PLB 6	52 (15.6)
<b>Source of support</b>	
Parent	221 (67.8)
Benefactor	22 (6.8)
Guardian	50 (15.3)
Scholarship	33 (10.1)
<b>Sleep hours days</b>	

<6 hours	183 (54.8)
6 or more hours	151 (45.2)
<b>Relative Infected</b>	
No	320 (95.8)
Yes	14 (4.19)
<b>Acquaintance Infected</b>	
No	320 (95.8)
Yes	14 (4.2)
<b>Receive psychological support</b>	
None	36 (10.8)
From Family	14 (4.2)
From Professional	258 (77.3)
From University	17 (5.1)

**Table 2:** Participants Performance on Depression, Anxiety and Anxiety

Categories	Stress N (%)	Anxiety N (%)	Depression N (%)
Normal	283 (81.4)	238 (73.7)	236 (73.5)
Mild	27 (8.4)	16 (4.9)	28 (8.7)
Moderate	33 (10.2)	24 (7.4)	30 (9.4)
Severe		17 (5.3)	27 (8.4)
Extremely severe		28 (8.7)	
<b>Mean(%) ± SD</b>	<b>8.0±6.6</b>	<b>5.6±6.6</b>	<b>6.2±7.1</b>

students experienced, mild, and 9.4% had moderate symptoms of depression. Severe and extremely severe symptoms were experienced by 9.4% and 8.4%, respectively.

Table 4 shows multiple logistic regression and anxiety. Being a female yielded 1.8 times increased odds of anxiety compared to being a male. With regards to religion, Muslim students had 4.6 (2.2-9.4) times significant increased odds of anxiety compared with Christian students. Again, students in year 6 had 5.6 (2.2-14.3) times significant increased adjusted odds of anxiety compared with those in year 1. Students who slept less than 6 hours had 3.6 (1.7-7.6) significantly higher adjusted odds of anxiety compared with those who slept for 6 or more hours.

**Table 3:** Bivariate and multiple binary logistic regression of stress and demographic variables

Variable		Stress N(%)?		OR with 95% CI		OR with 95% CI	
		Yes	NO	Crude	P value	Crude	P Value
Sex	Male	65(46.9)	135 (67.5)	1		1	
	Female	61 (46.9)	69 (53.1)	1.8 (1.2-2.9)	0.009*	1.1 (0.6-1.8)	0.857
Age	18 to24	134 (61.2)	85 (38.8)	1			
	25 +	44 (38.6)	70 (61.4)	0.9 (0.62-1.6)	0.969		
Religion	Christian	79 (34.4)	151 (65.6)	1		1	
	Muslim	48 (49.5)	51 (51.5)	1.8 (1.1-2.9)	0.016*	1.7 (0.9-2.9)	0.076**
	Others	2 (40.0)	3 (60.0)	1.3 (0.2-7.8)	0.793	3.6 (0.2-57.9)	0.367
Academic year	PLB 1	36 (40.5)	53 (59.6)	1		1	
	PLB 2	15 (28.3)	38 (71.7)	0.6 (0.3-1.2)	0.146	0.6 (0.3-1.4)	0.242
	PLB 3	16 (29.1)	39 (70.7)	0.6 (0.3-1.2)	0.17	0.5 (0.2-1.2)	0.114
	PLB 4	11 (19.6)	45 (80.4)	0.4 (0.2-0.8)	0.011*	0.3 (0.1-0.7)	0.07
	PLB 5	9 (31.0)	20 68.9	0.7 (0.3-1.6)	0.366	0.6 (0.2-1.6)	0.32
	PLB 6	42 (80.8)	10 (19.2)	6.2 (2.8-13.9)	<0.001*	4.5 (1.8-10.9)	0.001**
Source of support	Parent	76 (34.4)	145 (65.6)	1		1	
	Benefactor	14 (63.6)	8 (36.4)	3.3 (1.3-8.3)	0.010*	2.1 (0.7-6.1)	0.2
	Guardian	18 (36.0)	32 (64.0)	1.1 (0.6-2.0)	0.829	1.1 (0.5-2.20)	0.877
	Scholarship	17 (51.5)	16 (48.5)	2.0 (0.9-4.2)	0.06	1.2 (0.5-2.9)	0.662
Sleeping hours daily	6hours+	45 (29.8)	106 (70.2)	1		1	
	< 6hours	84 (45.9)	99 (54.1)	1.9 (1.3-3.1)	0.003*	2.1 (1.2-3.5)	0.007**
Relative infected	No	114 (38.64)	181 (61.4)	1		-	
	Yes	15 (38.6)	24 (61.5)	0.9(0.5-1.9)	0.982	-	
Acquaintance infected	No	121 (37.8)	199 (62.2)	1		1	
	Yes	8 (57.1)	6 (42.9)	2.2 (0.7-6.5)	0.155	1.6 (0.4-6.3)	0.494
Received Psychological Support	None	13 (36.1)	23 (63.9)	1		1	
	From community	9 (64.3)	5 (35.7)	3.2 (0.9-11.5)	0.078	1.3 (0.3-5.6)	0.761
	From family	93 (36 .1)	165 (63.9)	0.9 (0.5-2.1)	0.994	0.5 (0.2-1.2)	0.127
	Professional	9 (52.9)	8 (47.1)	1.9 (0.6-6.4)	0.249	0.6 (0.1-2.7)	0.477
	University	5 (55.6)	4 (44.4)	2.2 (0.5- 9.7)	0.293	0.4 (0.07-2.8)	0.378

\*\*significant confounders adjusted in the multiple log binomial model

## religion, academic year, daily sleeping hours

**Table 4:** Bivariate and multiple binary logistic regression of anxiety and demographic variables

Variable		Anxiety N(%)?		OR with 95% CI		OR with 95% CI	
		Yes	No	Crude	P value	Crude	P Value
Sex	Male	31 (15.5)	169 (84.5)	1		1	
	Female	49 (37.7)	81 (62.3)	3.3 (1.9-5.6)	<0.001*	1.8 (0.9-3.6)	0.095
Age	18 to24	52 (23.7)	167 (76.3)	1		-	
	25 +	28 (24.6)	86 (75.4)	1.1 (0.6-1.8)	0.868	-	
Religion	Christian	39 (16.9)	191 (83.0)	1		1	
	Muslim	39 (39.4)	60 (60.6)	3.2 (1.9-5.4)	<0.001*	4.6 (2.2-9.4)	<0.001**
	Others	2 (40)	3 (60.0)	3.3 (0.5-20.2)	0.203	11.6 (0.4-337.3)	0.155
Academic year	PLB 1	19 (21.4)	70 (78.7)	1		1	
	PLB 2	8 (15.1)	45 (84.9)	0.7 (0.3-1.6)	0.36	0.5 (0.2-1.5)	0.239
	PLB 3	9 (16.4)	46 (83.6)	0.7 (0.3-1.7)	0.464	0.6 (0.2-1.6)	0.29
	PLB 4	3 (5.4)	53 (94.6)	0.2 (0.1-0.7)	0.015*	0.1 (0.02-0.5)	0007**
	PLB 5	3 (10.3)	26 (89.7)	0.4 (0.1-1.6)	0.197	0.3 (0.1-1.4)	0.118
	PLB 6	38 (73.1)	14 (26.9)	10 (4.5-22.2)	<0.001*	5.6 (2.2-14.3)	<0.001**
Source of support	Parent	43 (19.5)	178 (80.5)	1		1	
	Benefactor	12 (54.6)	10 (45.5)	4.9 (2.0-12.3)	0.001*	2.7 (0.8-9.7)	0.131
	Guardian	9 (18.0)	41 (82.0)	0.9 (0.4-2.0)	0.813	0.8 (0.3-2.2)	0.638
	Scholarship	13 (39.4)	20 (60.6)	2.7 (1.2-5.8)	0.012*	0.9 (0.3-2.9)	0.895
Sleeping hours daily	6hours+	25 (16.6)	126 (83.4)	1		1	
	< 6hours	55 (30.1)	128 (69.9)	2.2 (1.3-3.7) 14 (26.9))	0.004*	3.6 (1.7-7.6)	0.001**
Relative infected	No	70 (23.7)	225 (76.3)	1		-	
	Yes	10 (25.6)	29 (74.4)	1.1 (0.5-2.4)	0.793	-	
Acquaintance infected	No	73 (22.8)	247 (77.2)	1		1	
	Yes	7 (50.0)	7 (50.0)	3.4 (1.2-9.9)	0.027	3.6 (0.7-18.8)	0.125
Received Psychological Support	None	7 (19.4)	29 (80.6)	1		1	
	From community	8 (57.1)	6 (42.9)	5.5 (1.4-21.1)	0.013	2.3 (0.4-12.5)	0.323
	From family	52 (20.2)	206 (79.8)	1.1 (0.4-2.5)	0.921	0.3 (0.1-0.9)	0.048**
	Professional	8 (47.1)	9 (52.9)	3.7 (1.0-12.9)	0.043	1.4 (0.3-7.8)	0.708
	University	5 (55.6)	4 (44.4)	5.2 (1.1-24.4)	0.038	0.7 (0.1-5.9)	0.726

\*\* significant confounders adjusted in the multiple log binomial model  
## religion, academic year, daily sleeping hours, received psychological support

Table 5 shows multiple logistic regression and anxiety. Students who were 25 years and older had about 60% reduced odds 0.4 (0.2-0.8) compared with those who are 18 to 24. For religion, Muslim students had 2.4 (1.3-4.4) times

significantly increased adjusted odds of being depressed compared with Christian students. Again, students in year 6 had 5.6 (2.2-14.3) times significantly increased adjusted odds of depression compared with those in year 1.

**Table 5:** Bivariate and multiple binary logistic regression of depression and demographic variables.

Variable		Depressed N(%)?		OR with 95% CI		OR with 95% CI	
		Yes	NO	Crude	P value	Crude	P Value
Sex	Male	43 (21.5)	157(78.5)	1		1	
	Female	54 (41.5)	76 (58.5)	2.6 (1.6-4.2)	<0.001	1.4 (0.8-2.6)	0.228
Age	18 to24	71 (32.4)	148 (67.6)	1		-	
	25 +	26 (22.8)	88 (77.2)	0.6 (0.4-1.0)	0.068	0.4 (0.2-0.8)	0.007**
Religion	Christian	49 (21.3)	181 (78.7)	1		1	
	Muslim	45 (45.5)	54 (54.5)	3.1 (1.9-5.1)	<0.001	2.4 (1.3-4.4)	0.005**
	Others	4 (80.0)	1 (20.0)	14.8 (1.6-135)	0.017	9.6 (0.5-195.8)	0.143
Academic year	PLB 1	26 (29.2)	63 (70.8)	1		1	
	PLB 2	9 (16.9)	44 (83.1)	0.5 (0.2-1.2)	0.106	0.5 (0.2-1.1)	0.09
	PLB 3	8 (14.6)	47 (85.5)	0.4 (0.2-0.9)	0.048	0.3 (0.1-0.8)	0.019
	PLB 4	9 (16.1)	47 (83.9)	0.5 (0.2-1.1)	0.076	0.3 (0.1-0.8)	0.015
	PLB 5	7 (24.1)	22 (75.9)	0.8 (0.3-2.0)	0.597	0.6 (0.2-1.9)	0.397
	PLB 6	39 (75.0)	13 (25.0)	7.3 (3.3-15.8)	<0.001	5.6 (2.2-14.3)	<0.001**
Source of support	Parent	54 (24.4)	167 (75.6)	1		1	
	Benefactor	13 (59.1)	9 (40.9)	4.5 (1.8-11.0)	0.001	4.7 (1.2-17.8)	0.023**
	Guardian	14 (28)	36 (72.0)	1.2 (0.6-2.4)	0.6	1.9 (0.8-4.4)	0.159
	Scholarship	14 (42.4)	19 (57.6)	2.3 (1.1-4.9)	0.033	1.2 (0.4-3.3)	0.772
Sleeping hours daily	6hours+	42 (27.8)	109 (72.2)	1		-	
	< 6hours	56 (30.6)	127 (69.4)	1.1 (0.7-1.8)	0.578	-	
Relative infected	No	88 (29.8)	207 (70.2)	1		-	
	Yes	10 (25.6)	29 (74.4)	1.2 (0.6-2.6)	0.59	-	
Acquaintance infected	No	91 (28.4)	229 (71.6)	1		1	
	Yes	7 (50.0)	7 (50.0)	2.5 (0.9-7.4)	0.093	1.5 (0.4-6.5)	0.567
Received Psychological Support	None	11 (30.6)	25 (69.4)	1		1	
	From community	9 (64.3)	5 (35.7)	4.1 (1.1-15.1)	0.034	2.1 (0.5-10.3)	0.338
	From family	65(25.2)	193 (74.8)	0.8 (0.4-1.6)	0.492	0.5 (0.2-1.1)	0.097
	Professional	8 (47.1)	9 (52.9)	2.0 (0.6-6.6)	0.246	0.7 (0.1-3.6)	0.647
	University	5 (55.6)	4 (44.4)	2.8 (0.6-12.7)	0.171	0.5 (0.1-3.5)	0.468

\*\* significant confounders adjusted in the multiple log binomial model ## Religion, Age, Academic year, daily sleeping hours

## Discussion

This study revealed that university students are at an elevated risk for mental health problems, and many studies have documented that students report consistently higher levels of mental health problems than the general population during the peak of the COVID-19 pandemic [6].

The challenge of going through medical school and medical education in general may contribute to the development of psychological distress such as anxiety, depression and stress among medical students; medical students are recognised as an at-risk group for developing anxiety disorders, with significantly larger rates than the general population, even under normal circumstance.

Nearly, 21.4%, 17.8% and 10.5% of the University for Development Students (UDS) School of Medicine (SoM) students showed signs of psychological symptoms according to anxiety, depression and stress subscales, respectively, similar to Turkish university students [33], where the prevalence of depression, anxiety and stress were 27.1, 47.1 and 27.0%, respectively. In another study the prevalence was higher compared with this study using a similar instrument. [7], found that 70.5, 53.6 and 47.8% of the Egyptian students showed signs of psychological symptoms according to anxiety, depression and stress subscales, respectively.

For many students, commencing medical school is associated with leaving home for the first time, and increased independence, pressure, responsibility and long period of studies [8]. According to some studies, Australian students in their first year of study were at significantly greater risk of experiencing major depression [34] and [8]. Additionally, [35] and [9] reported more anxiety and depression among the first year students in a Canadian university and Suranaree University of Technology, Thailand, respectively. On the contrary, the present study on University for Development Studies, School of Medicine students found that first (1st) as well as sixth (6th) academic year students had significant levels of depression, anxiety and stress. [10] also reported a result similar to the one in this study. This situation could have been influenced by the novel COVID-19 pandemic that affected the mental health of students differently. Especially that students may be worried about delays in completing medical school and the anxieties around the cost of data and the use of online classes. Also, among the students of UDS SoM, it was observed that students do not enjoy adequate recess to allow them to recuperate before commencing next stages of their academic exercises.

The current study revealed that students experienced stress, anxiety and depression symptoms differently depending on the level of academic year. It was found that anxiety was significantly high amongst 1st, 2nd, 3rd and 6th year students of the School of Medicine program.

Many studies have compared the levels of anxiety among different academic years in medical schools. One found fluctuating rates of psychological disorders, including anxiety, among students in different years e.g. 45.86% in 1st, 52.58% in 2nd, 47.14% in 3rd, 28.75% in 4th, and 45.10% in final year of students in a Brazilian medical school [11]. In the current study it was discovered that, anxiety symptoms were found to be frequent among medical students of 6th year (73.1%) and 1st year (21.4%). On the contrary, a Brazilian study reported a higher frequency of anxiety symptoms among 1st year medical students (30.8%) than in 6th year students (9.4%) [11].

The prevalence of stress among graduating university students in the current study was 80.0%. This finding was higher than studies conducted in Bench-Sheko Zone, Southwest Ethiopia (32.5%), United States (71%), China (67.1%), Spain (28.1%), Canada (30%), and Malaysia (28.9%) [12,13,14,15].

In the present study, the prevalence of stress among students was higher accounting for about 80.0%. This high percentage of stress may be due in part to, the COVID-19 pandemic which necessitated examination and curricular restructuring as well as significant changes to clinical attachments or other factors related to the pandemic. The high student stress rate seen in the present work correlates with prior studies that have shown that medical students experience a high level of stress during their undergraduate studies [16].

The prevalence of depression in this current study was 29.2%, 16.9%, 14.6%, 16.1%, 24.1% and 75.0% from 1st to 6th in the medical school, respectively. In other related studies, the incidence of depression was found to vary across the academic years in medical school. First-year students had the highest prevalence of depression (33.5%), and the rates gradually decreased until year 5 (20.5%) [11,17]. This concurs with the present study which also found varying level of depression among medical students of different academic levels among UDS medical students.

According to a study, the highest rate of depression was diagnosed in medical students of the second year (Wu et al. 2009). A Pakistani study stated a high prevalence of depression among newly admitted students (1st and 2nd year students) compared to senior students [14]. In contrast, in this study, the risk of depression was significantly higher in sixth-year students (75.0%) compared to first-year students (29.2%)

Sleep is a vital component for overall health and well-being, and it plays an essential role in social, physical, psychological, and cognitive health. During sleep, the body is working to support healthy brain function and maintain physical health. Not getting adequate sleep over time can raise the risk for long-term health challenges and impact academic activities negatively



The prevalence of sleep deprivation is increasing among people in both developing and modern societies. [18]. The quantity and quality of sleep play an essential part in individuals' social, physical, and mental well-being. [19]. Sleep is a necessary and energizing body behavior that contributes to normal physiological and psychological functions, and it is difficult to change once compromised [20].

High prevalence of psychological distress and its strong association with poor sleep quality amongst students was reported in previous studies in Ethiopian [36], Malaysian [37], Saudi Arabian [38] and Nigerian students [39] [21].

The current study found that sleeping adequate hours (6-9hrs) per day was associated with lower depression, anxiety and stress scores. On the contrary, sleep quality of medical students appeared to have deteriorated during the pandemic, with insomnia, difficulties falling asleep and frequent awakening during the night being commonly reported by 54.8% of the students of this study who reported sleeping less than 6hrs per day.

Finally, lack of support from family, community and university was associated with the depression, anxiety and stress [22] which is consistent with the findings of [2]. This result suggests that effective and robust social support is necessary during public health emergencies.

Similar to this current finding, a study conducted at King Saud Bin Abdul Aziz University, medical students suffered from poor sleep quality due to the extensive academic workload, clinical responsibilities, stressful work environment, and an extremely challenging lifestyle [23]. The poor quality of sleep found in this study may be due to the COVID-19 online teaching situation which may have contributed to more than 50% of students having poor sleep quality[24-31].

## Significance and Recommendation

The present study showed that the prevalence of depression and anxiety are significant among medical students of the University for Development Studies. The incidence of depression ranged from 8.4% to 9.4%, while anxiety ranged from 5.3% to 8.7% among medical students. Furthermore, the rate of depression and anxiety among medical students fluctuated across the academic years. This is probably due to the anticipation of the final year exam. Future research to estimate the burden of psychological morbidity in medical students is of vital importance. Depression and anxiety could cause hindrance to medical students' academic career and later to their social life. It is suggested that these factors should be considered among medical students, and students should be provided progressive psychological interventions in both their early and final academic years. Students' support unit should help them to alleviate their associated factors that may jeopardize their bright career.

Training faculty members and academic coaches to provide educational and emotional support in times of crises offers a potential to boost academic achievements and improve students' sense of security when asking for support. Therefore, a counselling unit for medical school is very vital and strongly recommended.

## Limitation

This sufficient sample size study surveyed the psychological impact of COVID-19 pandemic among students of school of medicine, University for Development Studies Tamale. This study reported some interesting findings. However, this study has some limitations. First, the cross-sectional design limited the causality relationship interpretation. Second, our sample was restricted to the students of the School of Medicine UDS only. It would have been more appropriate to collect the data from the entire university or to other medical school in Ghana to extend our findings to the general population.

## Conclusion

This study sort to understand the consequences of the pandemic on student psychological wellbeing. Since the evolution of the pandemic is uncertain and its effects on mental health may be long term, it is crucial to study the most effective interventions at school level, identifying the most vulnerable subgroups and planning for acute and long-term psychological services to control and reduce fear, and consequently the burden of psychological problems.

Based on the findings of this study, the department of clinical psychology or mental health department will initiate clinical psychological services for the benefit of students in the medical school to assist them deal with challenges related to the pandemic and its associated mental health problems going forward.

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## Competing Interest

The authors declare that they have no competing interests.

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