

SCHOOL OF MEDICINE AND PHARMACY:

COLLEGE OF MEDICINE AND HEALTH SCIENCES,

DEPARTMENT OF INTERNAL MEDICINE

PREVALENCE AND ASSOCIATED RISK FACTORS OF DEPRESSION AND ANXIETY DISORDER AMONG RESIDENTS AND MEDICAL STUDENTS IN COLLEGE OF MEDICINE AND HEALTH SCIENCES, RWANDA

A Post Graduate Research Dissertation submitted for the Requirements for the Award of a Masters of Medicine in Internal Medicine at the University of Rwanda.

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DECLARATION

I, **Dr. KUBWAYO Alain Prince**, declare that this Dissertation entitled "Prevalence and associated risk factors of depression and anxiety disorder among medical students in the college of medicine and health sciences, Rwanda" is my work. It is being submitted for a master's degree in internal medicine at the University of Rwanda, School of Medicine and Pharmacy, College of Medicine and Health Sciences; Department of Internal Medicine. As a result, I declare that it has never been submitted for any degree or examination at any other university.

Dr. Prince Alain KUBWAYO

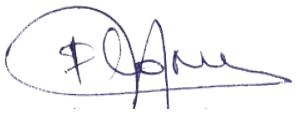
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I am thankful to God for protecting, guiding, and supporting me in every step of my life.

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Finally, and most importantly, I would like to give a special thanks to my mother, **SAUDA Febronie**, for her support in this work and throughout my career.

May God bless you all.

DEDICATION

To the almighty God

To my Mother

To my Sister Joseline UWINEZA and Emmanuel MBERABAHIZI

To my Brother Willy Leandre

To my Supervisors

I dedicate this work.

ABSTRACT

Background: Globally, mental health is a concern, especially among health care providers. Various studies conducted in medical schools have demonstrated that medical students suffer from depression, anxiety, and stress. However, there were no such studies in Rwanda addressing and exploring those entities. Our study intended to evaluate the prevalence of depression, anxiety, and their related risk factors in a sample of undergraduate and postgraduate students at the University of Rwanda, School of Medicine and Pharmacy.

Method: This was a cross-sectional online survey with 544 participants (postgraduate and undergraduate) conducted between March and April 2022. We used the validated Patient Health Questionnaire (PHQ-9) scale and The General Anxiety disorder scale (GAD-7) to assess the prevalence of depression and anxiety. Additionally, to assess risk factors for these disorders, we asked a series of closed-ended questions. The collected data were entered into Epidata version 3.1 for database creation and then exported to SPSS version 25 for analysis.

Results: The overall prevalence of depression was higher in postgraduate medical students at 37.3%, while the undergraduate in clinical and preclinical years was 24.5% and 17.6%, respectively. Anxiety was higher in postgraduate medical students at 20.3%, in clinical years at 12.7%, and in preclinical years at 9.9%. We found that 11.2% of all participants had both depression and anxiety. The predictors of depression were: being a female (OR=1.66, p=0.021), being above 30 years old (OR=1.88, p=0.008), being married (OR=2.19P, p=0.003), being a postgraduate student (OR=2.79, p=0.002), renting accommodation outside the school hostel (OR=1.97, p=0.011), nocturnal shift work (OR:2.65, p=0.008), absence of mentorship (OR:3.31, p=0.003), being worried about academic school performance (OR:2.44, p=0.001) regret of attending medical school (OR:2.57, p=0.002) and stress from next of kin and patients (OR=2.17, p=0.001).

On the other hand, the predictors associated with anxiety were: being a female (OR=2.02, p=0.01), being a postgraduate student (OR=2.33, p=0.044), nocturnal shift work (OR:2.65, p=0.008), absence of mentorship (OR:2.65, p=0.001), being worried about academic school performance (OR:2.33, p=0.001), regret of attending medical school (OR:2.31, p=0.002), and stress from next of kin and patients (OR:3.36, p=0.001).

Conclusion: This study showed that depression and anxiety were very prevalent in medical students, similar to study findings from other medical schools. These results show that initiatives

should be created to address mental health disorders for medical students. Depression, anxiety, and their consequences could be tackled by continuous screening throughout the program.

LIST OF ABBREVIATION

CHUK: University Teaching Hospital of Kigali

CMHS: College of Medicine and Health Science

DASS: Depression Anxiety Stress Scale

DSM5: Diagnostic and Statistical Manual of Mental Disorders, 5th Edition

GAD: General Anxiety Disorders

HAD: Hospital Anxiety depression score

IM: Internal Medicine

IRB: Institutional Review Board

MBChB: Bachelor of Medicine and Bachelor of Surgery (MBChB)

PHQ: Patients Health Questionnaire

PTSD: Post Traumatic Stress Disease

UR: University of Rwanda

WHO: World Health Organization

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Chapter I. INTRODUCTION

I.1 Background

Medical students are exposed to various stressful events in their daily lives regardless of their age, gender, or academic year (1,2). Such exposures, in addition to personal hardship, increase stress and mood disorders such as depression and anxiety. Consequently, these seriously impact their personal and professional lives, leading to poor school performance, decreased concentration on tasks resulting in poor delivery of health care services, and conflict provocation with colleagues, patients, and their families(3).

Mental health disorders are among health-related burdens worldwide (4). Depression and anxiety are ranked among the 25 most common disabling mental health disorders by the global burden of diseases, injuries, and risk factor study (5,6). Depression is a mood disorder characterized by low mood, change in appetite, poor concentration, thoughts of worthlessness or guilt, loss of interest or pleasure in most or all activities, and sometimes suicidal ideation, nearly all day for at least two weeks (7). Anxiety disorder is characterized by excessive and persistent worrying that is hard to control, causes significant distress or impairment, and affects daily activities(8).

A systemic review has shown that medical students have a higher burden of depression (27.2%) compared to their peers (9). About 1/3 of medical students worldwide suffer from depression, and studies have found a higher level of depression among first-year postgraduate students (10,11). In South Africa, the stress and mental health survey estimated the prevalence of major depression and anxiety-related disorders amongst training students to be 8.9% and 14.6%, respectively (9). In a study done in Rwanda during the academic year of 2019/2021, the prevalence of depression and anxiety was found to be 9% and 29%, respectively (12).

Medical students' mental health is highly affected by their training. Globally, anxiety was 33.8% among undergraduate medical students, and depression was also prevalent among postgraduate medical students (1,13). Among African universities with medical schools, Ebonyi State University in Nigeria accounts for 17% of students with depression, Aris University in Ethiopia, 52.3% for depression, 60% for anxiety, and 40.4% for stress. Makerere University in Uganda had a depression rate of 21.5%, while Nairobi, Kenya, had a depression rate of 13.3% (14–16).

A study done in Tunisia showed that 43.6% of postgraduate students had anxiety symptoms while 30.5% had depression symptoms (2).

There are stressful events that postgraduate and undergraduate medical students meet in their training which may lead to depression and anxiety. It may be caused by rigorous academic curriculums, academic frustrations, academic performance, parental expectation, absence of mentorship, lack of time for leisure, long walk to school, workload, sleep deprivation, death and suffering of patients, or financial problems, among others (17,18). With that kind of stress, life in medical school could lead to depression, lower academic performance, or even suicidal thoughts (2).

As far as we know, there is no study addressing the prevalence of mental health disorders in Rwanda, specifically in undergraduate and postgraduate medical students, with actionable intervention points to alleviate the burden of this problem. Our aim in this research was to determine the prevalence and related risk factors of depression and anxiety among undergraduate students and postgraduate Doctors at the University of Rwanda, College of Medicine and Health Science (CMHS), School of Medicine and Pharmacy at the Department of General Medicine and Surgery for undergraduate and postgraduate medical programs. This study will gather data that will help to build a baseline assessment of the magnitude of anxiety and depression among undergraduate medical students and postgraduate at the University of Rwanda College of Medicine. Additionally, this study will help raise awareness and advocacy for well-being among medical students by addressing the identified actionable intervention points.

I.2 Objectives of the study

I.2.1 Main objective

To determine the prevalence and variables that contribute to depression and anxiety among postgraduate and undergraduate medical students at the University of Rwanda, CMHS.

I.2.2 *Specific objectives*

To establish a baseline profile on demographics, bio-social, and economic characteristics of medical students and postgraduates at CMHS.

To determine the association of the factors associated with anxiety and depression among postgraduate and undergraduate medical students.

To propose intervention(s) to address the health problem of anxiety and depression in postgraduate and undergraduate medical students.

I.3 Significance of the study

The world bank reported the number of physicians per 1,000 people in Rwanda to be 0.1182, with a population of 13 million in 2019 (19)(20). During the study period from March to April 2022, the Department of General Medicine and Surgery accounted for around 1000 undergraduate students and approximately 200 postgraduate medical students.

Medical schools and residency programs are demanding environments that often exert adverse effects on academic performance, physical health, and psychological well-being. This can result in a high frequency of depression, anxiety, stress, and even attrition from medical courses.

Doing this study lead to the scientific documentation of the prevalence and related risk factors of depression and anxiety disorder among undergraduate and postgraduate students, which may eventually help with recommendations to the Ministry of Health about the implementation of a strategic plan for the mental well-being of future doctors. The study raised awareness among the participants about the presence of the problem and encourage them to seek help. Overall, this study was intended to improve the working environment that favors good school performance outcomes and provides patients high-quality care.

Chapter II: LITERATURE REVIEW

II.1 Definition

Depression is a mood disorder characterized by low mood, change in appetite, poor concentration, thoughts of worthlessness or guilt, loss of interest or pleasure in most or all activities, and sometimes suicidal ideation, nearly all day for at least two weeks (21).

Depression has two main categories:

Major depression disorder: is characterized by symptoms such as depressed mood, loss of enjoyment, loss of interest, and decreased energy; depending on the severity of symptoms, it can be classified as mild, moderate, and severe (22).

Dysthymia: is defined as persistent or chronic mild depression symptoms.

Anxiety disorder: Anxiety disorder is characterized by excessive and persistent worrying that is hard to control, causes significant distress or impairment, and affects daily life activities(22).

II.2 Screen tool for depression and anxiety

The PHQ-9 (Patients health Questionnaire) is a validated tool composed of nine questions to determine the level of depression present in a person (23). In this questionnaire, students were asked: How often have you been bothered by the following over the past two weeks?

1: Little interest or pleasure in doing the thing

2: Feeling down, depressed or hopeless

3: Trouble falling or staying asleep or sleeping too much

4: Feeling tired or having little energy

5: Poor appetite or overeating

6: Feeling bad about yourself or that you are a failure or have let yourself or your family down?

7: Trouble concentrating on things such as reading the newspaper or watching television

8: Moving or speaking so slowly that other people could have noticed? Or feeling so fidgety or restless that you have been moving a lot more than usual

9: Thoughts that you would be better off dead or thoughts of hurting yourself in some way.

The last question was asked to assess the impact of those symptoms on the patient's life.

Each question had four components graded from 0 to 3, which are; Not at all (0), Several days (1), More than half the days (2), and Nearly every day (3), where the sum of points determines the degree of severity.

Studies found the PHQ-9 score equal to or greater than 10 to have 88% sensitivity and 88% specificity in detecting major depression disorder and classified anxiety as mild (5 up to 9), moderate (10 up to 14), then severe (greater than 15) depending on points obtained (24).

Table A. depression severity

0 to 5 point	No Depression
5 to 9 points	Minimal
10-14points	Moderate
15-19 points	Moderately severe
20-27points	Severe

GAD-7 (General Anxiety Disorder), This is a validate tool for anxiety with a cutoff point equal or greater than ten. It had a sensitivity of 89% and specificity of 82% (23).

We asked participants: how often have you been bothered by the following over the past two weeks:

1: Feeling nervous, anxious, or on edge

2: Not being able to stop controlling worrying

3: Worrying too much about different things

4: Trouble relaxing

5: Being so restless that it is hard to sit still

6: Becoming easily annoyed or irritable

7: Feeling afraid as if something awful might happen

The last question indicated if the participant's global impairments were due to anxiety.

For each of the questions, the patient answered: Never at all (0), A few days (1), More than half (2) the days, Almost daily (3)

Table B. anxiety severity

0 to 4 points	Minimal or no anxiety
5 up to 9 points	Mild anxiety

10 up to 14 points	Moderate anxiety
15 up to 21 points	Severe anxiety

II.3 Factors associated with depression

Study reference	**Study and number of patients**	**Findings**
Kubwimana. at al. 2021. Rwanda	A survey study was done in 2 medical schools in Rwanda, composed of 137 participants.	They included 137 medical students, and 54% had moderately severe stress levels. The higher stress level was associated with academic curriculum and teaching, lack of financial support, support from instructors, and disorganized academic activity (25).
D.Ngwino Sengesho, J.Niyonsenga, A.Muhayisa et al. 2021 Rwanda	A cross-section study assessing mental disorders and substance abuse among Rwanda university students: Participants: 143 undergraduate students	The participants had PTSD 28%, anxiety 29%, depression of 9% with substance abuse 28%. This study concluded that PTSD, Depression, and anxiety were associated with substance abuse (12).
Olum, Ronald Nakwagala, Frederick Nelson Odokonyero, Raymond,2020 S,amanya et al 2018	A cross-section study was done at Makere University on undergraduate students pursuing MBChB at the school of medicine. Number of participants:331 Another study assesses the stress and its source among students pursuing careers in	Among the participants, 21.5% had depression, of which 64.1 had moderate depression. The factors associated with depression were class level, worrying about academic performance, and lectures, among others (16). They found the stress in 57.4%, and the stressors were academic curriculum, class lectures dissatisfaction, lack of free time for recreation, performance in the examination,

Uganda	health at Makerere, conducted on 258 undergraduates.	lack of guidelines from faculty, and long distances to walk (18).
Melaku, Leta Bulcha, Work Worku, Deresa 2021 Ethiopia	A cross-section study was done in January 2019, Participants: Two hundred sixty-five undergraduate medical students at Arsi University. They assessed the prevalence of depression, anxiety, and stress.	They found depression at 52.2%, Anxiety at 60.8%, and stress at 40.4%. Depression was associated with financial status, residency, and alcohol drinking, while anxiety was associated with gender, marital status, class level, residency, and smoking (15).
Ouanes-Besbes L, Ouanes I, al 2018 Tunisia	Cross section survey, including to assess the prevalence of depression and anxiety in medical residents in Tunisia Participants:1700 medical residents.	Among participants with HAD, with scores at cut-off points of eleven and above, 30.5% had depression, while 43.6% had an anxiety state. The older age, being married, and type of specialty was associated with depression, while older age, female gender, level of study, and type of specialty were associated with anxiety, Many working hours and the number of shifts were associated with anxiety and depression (2).
Ossai Edmund Ndudi Eze Irene Ifeyinwa	The burden of depression in medical students at Medical School of Ebonyi State, University Abakaliki It was a cross sections study	They found the rate of depression to be 17.4%. They found a high rate of depression in the third year at 24.4%. The factors that were associated with depression were older than 25 years, being

Onyenakazi, Rejoice Chinecherem Ugebe, Elias Eze, Basil, et al 2021 Nigeria	They use: Beck's depression inventory; Participants:522 medical students	in pre-clinical school, and fear that they might not graduate from medical school(14)
Sayed Shah Nur Hussein Shah1 et al 2021 Nairobi, Kenya	Depression and associated factors in medical school residents in Nairobi It was a cross-section study Participants: 338 residents	Among residents who participated, 12.7 % had moderate depression, 16.9% had severe depression, stress levels were moderate in 61.6% of cases, and high in 12.8%. The result showed an association between depression, perceived stress, substance use, and education environments. It was also significantly associated with being a woman, with less than one hour per week of exercise as bivariant. In contrast, in multivariate association, financial income, type of specialty mostly, pediatric, obstetrics, and gynecology, having other illnesses, fewer hours of sleep, and perceived social support, were risk factors for depression (25).
Sadiq, Mohammad Shibli et al 2019 Bangladesh	Depression and anxiety among postgraduate medical resident It was a cross-sectional study involving 200 residents in the department of surgery and medicine	According to the DASS-21 score used, 11.5% had depression, 11% had anxiety, and 10.5% had stress. It was also found that 14.5% of the participants had one of the three conditions. The study concluded that 1 out of 7 residents was suffering from either anxiety, depression, or stress disorders (26).

Sarthak Dave, Minakshi Parikh, Ganpat Vankar, Srinivasa Kartik Valipay 2018 India	Depression, anxiety, and stress among residents of teaching hospitals. It was a cross-section study done at tertiary care in Ahmedabad on 462 residents.	The result showed that 27.7% had depression, 36.6 % had Anxiety, and 24.2% had stress. The factors associated with depression and stress were age above 30 years, working more than 12 hours a day, lack of job satisfaction, strict department, having no hobbies, but living in a hostel had a higher stress level (27).
Yadav, Rashmi Gupta, Shubhanshu Malhotra, Anil 2016 India	It was a cross-sectional analysis among students of medicine in Jhansi, Uttar Pradesh. Participants: 330 undergraduate medical students	The finding of this study revealed that 57% had depression. In comparison, anxiety was 71%, mild to moderate depression was more prominent in females at 63% compared to males at 54%, the male had severe depression at 17%, while the male had more anxiety at 72% and females at 68%. Both had severe anxiety at 23%. This study showed that depression was associated with substance abuse, family problems, staying in the hostel, and a family history of depression (3).

Chapter III: METHODOLOGY

III.1. Study design, period, and settings

This was a descriptive cross-sectional research conducted at the University of Rwanda, College of Medicine and Health Sciences, School of Medicine and Pharmacy, in the Department of General Medicine and Surgery for undergraduates. The curriculum comprises two years of preclinical studies and three years of clinical rotation.

The postgraduate program for medical students in Rwanda consists of qualified doctors who did at least one year of internship in District hospitals, depending on the specialty they want to pursue. After that, they are eligible to pass an entrance exam to continue postgraduate medical program 'in a chosen specialty, either in internal medicine, surgery, pediatrics, obstetrics, and gynecology. The postgraduate medical program duration ranges between 4 up to 6 years, in relation to the specialty. Throughout that training program, the undergraduates in clinical years and postgraduates rotate at different teaching hospitals and are in charge for every aspects of patient care, as students advance through the curriculum, with progressively more responsibilities. Additionally, to their clinical duties, postgraduate students must engage in educational activities such as group discussions, the teaching of undergraduate students, grand rounds presentations, examinations, and dissertations. They are under the supervision of a consultant (specialist) in charge of patient care and a teaching faculty member. This study started in February 2022 it ended in the middle of April 2022.

III.2. Participants

The School of medicine and Pharmacy comprises the Department of General medicine and Surgery, Department of Pharmacy, and Departments of Clinical Psychology for the undergraduate with the postgraduate program in different departments.

This study enrolled students studying at the undergraduate level a Bachelor of Medicine and Surgery (MBBS) at the School of Medicine and Pharmacy and postgraduate students doing clinical rotations at different teaching hospitals in Rwanda.

III.3: Selection criteria

III.3.1 Inclusion criteria

All undergraduate and postgraduate medical students aged 18 and above consent to participate in this study**.**

III.3.2. Exclusion criteria

Undergraduate and postgraduate students who do not consent to participate in this study.

Undergraduate and postgraduate students enrolled in medical school for less than two weeks.

Students in the Department of Pharmacy and Department of Clinical Psychology.

III.3.3. The sample sizes and sampling technique

According to the registrar, the School of Medicine and Pharmacy in the Department of General medicine and surgery, as of January 2022, the number of medical students was 1,149.

We used the class Preclinical I and II, clinical (Doc I, II, and III), and postgraduate to determine the size of different clusters, as shown in the table below.

Then simple random sampling was used using a list of the class in each class cluster.

We calculated the sample size using the Yamane formula

N = Population of the study

K = Constant and is 1

e = degree of error expected (5%)

n=sample size

where the Confidence level is 95% with a precision of +/- 5%

$$\frac{N}{k + N(e)^2} = \frac{1149}{1 + 1149(0.05)^2}$$

n = 297

III.4: Study procedure

The first phase was in January and mid-February: elaboration of the study protocol and submission of CMHS IRB approval. We obtained the approval in March. After getting the approval, the second phase in March and April consisted of data collection through the online survey and statistical data analysis. The final stage of the study was submitting the thesis and protocol of publication which we did in May and July.

III.5: Data collection and statistical analysis

III.5.1. Data collection

A self-administered questionnaire was distributed online and filled out by undergraduate and postgraduate students in the College of Medicine and Health Sciences, meeting the inclusion

criteria to participate in this study. We shared it through their class WhatsApp group and/or email using a created link in the Google Form. The undergraduate students were rotating in different specialties and subspecialties in small groups of 10-20 students or less. The team leader of each small class group was contacted and explained the process, and they helped in sharing the created link in that small group to be filled out. We sent a reminder every three days to the class leader, who sent it to small groups. For postgraduate students, we also contacted the chief resident of each specialty. Fortunately, they helped in sharing the link to their respective WhatsApp groups. Students who responded yes after leading the consent to participate had access to fill the survey and were limited to be filled once through Google Form settings. The online questionnaire survey was composed of social demographic variants, the depression and anxiety symptoms assessed using validated scales such as PHQ-9 and DAS-7, and closed-ended questions related to depression and anxiety.

In undergraduate and postgraduate programs, they teach courses in English. Therefore, we kept the questionnaire in its original English form; hence there was no need to translate it.

We pretested the questionnaire on a pilot study of 16 randomly selected medical students. We shared the online link with them to complete the survey; we did not include those students to fill out the survey again.

We used three measurement methods to ascertain the frequency of anxiety and depressive disorders, as well as the risk factors connected thereto:

1. The Patient Health Questionnaire (PHQ-9) is a measurement method of depression composed of 9 items accepted internationally for depression screening with a sensitivity of 88% and specificity of 85% (28). It scores between 0-27, with a score greater than 10 suggesting possible depression disorder.

2. We used the GAD-7 scale for screening anxiety (29). A score of 0 to 4 points indicates no anxiety or minimal, 5 up to 9 mild anxiety, 10-14 moderate anxiety, and 19-21 indicate severe anxiety (29). A score of 10 or greater on the GAD-7 represents a reasonable cut point for identifying cases of GAD (29).

3. To determine risk factors, we asked closed-ended questions from other studies related to anxiety and depression.

III.5.2 Statistical data analysis

The gathered information was entered into version 3.1of Epidata for database creation and then exported to SPSS version 25 for analysis. We presented the descriptive data as follows: categorical data using frequencies and percentages. We summarized tables and continuous data by mean and median values depending on their distribution. We use the chi-square test and logistic regression (binary and multivariable regression analysis) to study the relationship between the outcomes (presence of depression and anxiety) and possible predictors. We took statistical significance for associations at the level of $p < 0.05$.

III.6. Ethical Considerations:

III.6.1 Protection of privacy and confidentiality

We did not reproduce participant names on the online questionnaire. The online survey was kept under strict measures with a password to maximize the confidentiality of the obtained information.

III.6.2. Informed consent

We asked for informed consent through the online survey questionnaire after explaining the purpose of the study.

III.6.3 Ethical approval

Ethical approval was sought from the IRB board at the University of Rwanda before the beginning of the study. After authorization to conduct this study, we selected participants who met the study's inclusion criteria.

III.6.4 Incentives for subjects and potential benefits

Participants did not receive any incentive for the study. After filling out the survey, the participants viewed their score if above the cut-off point of depression which is greater than ten or moderates to severe anxiety, and were advised for psychological support from one of the clinics which have a psychiatrist such as CHUK, Ndera, or others depending on the participant preference.

Chapter IV: RESULTS

IV.1 Respondents rate

By the time of data collection in April 2022, the number of medical students in the Department of Medicine and surgery for undergraduate and Residency programs was 1149, subdivided into 189 postgraduates, 697 clinical years, and 263 preclinical, with a total response of 454 participants. The response rate among postgraduate students in different specialties was 116/189, which represented 62% of postgraduates. The students in clinical and preclinical years had response rates of 245/697(35%) and 91/263(31%), respectively.

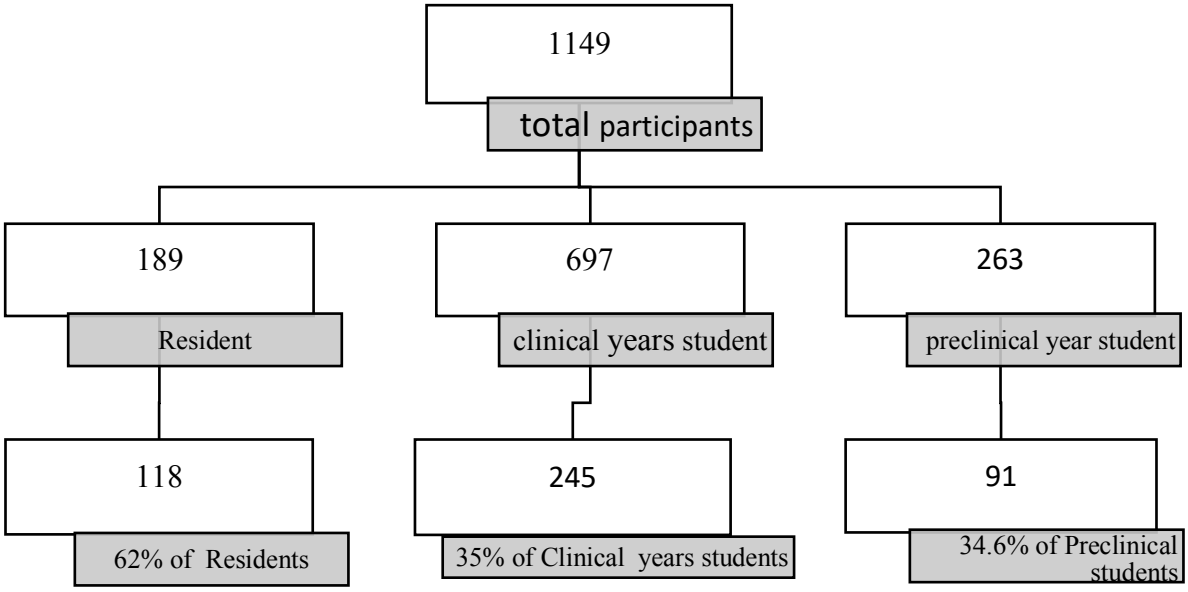


Figure 1.

IV.2 Demographic characteristics of study respondents

The male gender was prevalent at 64.5% among all participants, and 59.3% were single. Twenty-six percent of the respondents were residents doing their clinical rotations in specialty programs, while the remaining 74% were medical students in the undergraduate program. Seventy-eight percent of the respondents were government-sponsored (had bursary) Table 1.

Table 1: Socio-demographic detail of study of undergraduate and postgraduate.

Characteristics	n	%
Sex of respondent		
Female	161	35.5
Male	293	64.5
Age of respondent		
18-23	125	27.5
24-29	222	48.9
30-35	85	18.7
36-41	15	3.3
42+	7	1.5
Marital status		
Single	269	59.3
In relationship	97	21.4
Married	87	19.2
Divorced	1	0.2
Level of study		
Pre-clinical	91	20.0
Clinical	245	54.0
Resident	118	26.0
Accommodation status		
School hostel	132	29.1
Home	113	24.9
Renting	209	46.0
Living status		
Alone	93	20.5
With friends	196	43.2
With parents	70	15.4
Hosted by a family member	22	4.8
With spouse and child	73	16.1
Sponsor of the respondent		
Public	354	78.0
Private	77	17.0

NGO	23	5.1

When asked about main predictors of depression and anxiety, 58.4% experienced worry about academic school performance, 43.6% reported to have absence of mentorship. We also found that 39.6% reported stress from attending physicians, 37.2% reported regrets of attending medical school ,34.1% reported experiencing traumatic patient events, 32.4% reported having exhaustive nights shifts (nocturnal shift work) and 31.7% reported to be stressed by the next of kin or patient themselves (Table 2).

Table 2: Proportion of predictors of depression and anxiety among study participants

Characteristics	n	%
Nocturnal shift work		
Yes	147	32.4
No	307	67.6
Stress from attending physicians/seniors		
Yes	180	39.6
No	274	60.4
Traumatic patient events		
Yes	155	34.1
No	298	65.6
Absence of mentorship		
Yes	198	43.6
No	256	56.4
Worry about academic school performance		
Yes	265	58.4
No	189	41.6
Chronic illness		
Yes	42	9.3
No	412	90.7
Regrets of attending medical school		
Yes	169	37.2
No	285	62.8
Stressed by the next of kin or patients		
Yes	144	31.7

No	310	68.3

IV.3 Rate of depression and anxiety among study participants

Among the participants of our study, 26.4% reported feelings of depression. Stratified analysis showed a significant difference in the prevalence of depression across the different respondent groups. Among residents, 37.3% had depression, whereas 24.5% of the medical student in clinical rotations had depression, and 17.6% of the pre-clinical medical students had depression (p=0.0010).

We found 14% of all study participants to have anxiety. Anxiety was more prevalent among residents at 20.3%, followed by medical students in clinical rotations who were found to have anxiety at 12.7%. The difference in the prevalence of anxiety was not statistically significant across the groups (p=0.062).

We found fifty-one participants (11.2%) with both depression and anxiety.

Table 3: Rate of depression and anxiety among study participants

Mood disorder	Total	Pre-clinical	Clinical	Residents	P value
Depression					
Yes	120 (26.4%)	16 (17.6%)	60 (24.5%)	44 (37.3%)	**0.004**
No	334 (73.6%)	75 (82.4%)	185 (75.5%)	74 (62.7%)	
Anxiety					
Yes	64 (14.1%)	9 (9.9%)	31 (12.7%)	24 (20.3%)	0.062
No	390 (85.9%)	82 (90.1%)	214 (87.3%)	94 (79.7%)	

Table 3.1: Classification of depression across education class levels

Score	Depression severity	Undergraduates		Residents
		Pre-clinical	Clinical	
0 to 9	**No Depression**	75 (82.4%)	185 (75.5%)	74 (62.7%)
10 to 14	**Moderate**	11 (12.1%)	41 (16.7%)	32 (27.1%)
15 to 19	**Moderately severe**	4 (4.4%)	9 (3.7%)	8 (6.8%)

20-27	**Severe depression**	1 (1.1%)	10 (4.1%)	4 (3.4%)
Total		**91**	**245**	**118**

Table 3.2: Classification of anxiety across education class levels

Score	Depression severity	Undergraduates		Residents
		Pre-clinical	Clinical	
0 to 9	**No anxiety**	**82 (90.1%)**	**214 (87.3%)**	**94 (79.7%)**
10 to 14	**Mild & Moderate anxiety**	**7 (7.7%)**	**18 (7.3%)**	**19 (16.1%)**
15 to 21	**Severe anxiety**	**2 (2.2%)**	**13 (5.3%)**	**5 (4.2%)**
Total		**91**	**245**	**118**

IV 4. Predictors of depression and anxiety among study respondents

Female participants were 1.66 times more likely to have depression than male participants, and the difference was statistically significant (OR=1.66, 95% CI: 1.08-2.54, p=0.021). Participants above 30 years of age were 1.88 times more likely to have depression than those who are less than 30 years of age (OR=1.88, 95% CI: 1.18-3.0, p=0.008). Compared to respondents who were unmarried, married respondents had a 2.19-times higher risk of depression, with a statistically significant difference (OR=2.19, 95% CI: 1.30-3.67, p=0.003). Residents were 2.79 times more likely to be depressed than preclinical medical students (OR=2.79, 95% CI: 1.44-5.37, p=0.002). Participants who rent their accommodations were 1.97 times more likely to have depression than those who live in school hostels (OR=1.97, 95% CI: 1.17-3.34, p=0.011), as detailed in Table 4.

Table 4: Relationship between sociodemographic characteristics and having depression among study participants

Predictors	Depression		OR (95% CI)	p	AOR (95% CI)	p
	Yes	No				
Gender of respondent						
Female	53 (32.9%)	108 (67.1%)	1.66 (1.08-2.54)	0.021	1.95 (1.25-3.06)	0.003
Male	67 (22.9%)	226 (77.1%)	Ref			
Age of respondent						
<30 years	81 (23.3%)	266 (76.7%)	Ref			
≥30 years	39 (36.4%)	68 (63.6%)	1.88 (1.18-3.00)	0.008	-	

Marital status						
Single	61 (22.7%)	208 (77.3 %)	Ref			
In relationship	25 (25.8%)	72 (74.2%)	1.18 (0.69-2.03)	0.538	-	
Married	34 (39.1%)	53 (60.9%)	2.19 (1.30-3.67)	0.003	-	
Divorced	0 (0.0%)	1 (100%)				
Level of study						
Pre-clinical	16 (17.6%)	75 (82.4%)	Ref			
Clinical	60 (24.5%)	185 (75.5%)	1.52 (0.82-2.81)	0.181	1.50 (0.81-2.79)	0.197
Resident	44 (37.3%)	74 (62.7%)	2.79 (1.44-5.37)	0.002	3.22 (1.64-6.29)	0.001
Accommodation status						
School hostel	25 (18.9%)	107 (81.1%)	Ref			
Home	29 (25.7%)	84 (74.3%)	1.48 (0.81-2.71)	0.207	-	
Renting	66 (31.6%)	143 (68.4%)	1.97 (1.17-3.34)	0.011	-	
Living status						
Alone	25 (26.9%)	68 (73.1%)	Ref			
With friends	46 (23.5%)	150 (76.5%)	0.83 (0.47-1.47)	0.529	-	
With parents	15 (21.4%)	55 (78.6%)	0.74 (0.36-1.54)	0.742	-	
Hosted by family	6 (27.3%)	16 (72.7%)	1.02 (0.36-2.89)	0.97	-	
Spouse and child	28 (38.4%)	45 (61.6%)	1.69 (0.88-3.27)	0.117	-	
Sponsor of the respondent						
Public	94 (26.6%)	260 (73.4%)	Ref			
Private	20 (26.0%)	57 (74.0%)	0.97 (0.55-1.70)	0.917	-	
NGO	6 (26.1%)	17 (73.9%)	0.98 (0.37-2.55)	0.961	-	

Female participants were two times more likely to have anxiety than male participants, and the difference was statistically significant (OR=2.02, 95% CI: 1.19-3.45, p=0.01). Residents were 2.33 times more likely to have anxiety than preclinical medical students (OR=2.33, 95% CI: 1.02-5.30, p=0.044). (Table 5)

Table 5: Relationship between sociodemographic characteristics and having anxiety among study participants

Predictors	Anxiety		OR (95% CI)	p	AOR (95% CI)	p
	Yes	No				
Sex of respondent						
Female	32 (19.9%)	129 (80.1%)	2.02 (1.19-3.45)	0.01	2.33 (1.32-4.08)	0.003
Male	32 (10.9%)	261 (89.1%)				
Age of respondent						
<30 years	49 (14.1%)	298 (85.9%)				

≥30 years	15 (14.0%)	92 (86.0%)	0.99 (0.53-1.85)	0.979	2.54 (1.05-6.16)	0.039
Marital status						
Single	32 (11.9%)	237 (88.1%)				
In relationship	15 (15.5%)	82 (84.5%)	1.35 (0.69-2.63)	0.369	-	
Married	17 (19.5%)	70 (80.5%)	1.80 (0.94-3.43)	0.075	-	
Divorced	0 (0.0%)	1 (100%)				
Level of study						
Pre-clinical	9 (9.9%)	82 (90.1%)				
Clinical	31 (12.7%)	214 (87.3%)	1.32 (0.60-2.89)	0.488	1.34 (0.61-2.96)	0.467
Resident	24 (20.3%)	94 (79.7%)	2.33 (1.02-5.30)	0.044	5.29 (1.91-14.6)	0.001
Accommodation status						
School hostel	14 (10.6%)	118 (89.4%)				
Home	13 (11.5%)	100 (88.5%)	1.09 (0.49-2.44)	0.823	-	
Renting	37 (17.7%)	172 (82.3%)	1.81 (0.94-3.50)	0.076	-	
Living status						
Alone	14 (15.1%)	79 (84.9%)				
With friends	25 (12.8%)	171 (87.2%)	0.83 (0.41-1.67)	0.594	-	
With parents	9 (12.9%)	61 (87.1%)	0.83 (0.34-2.05)	0.69	-	
Hosted by family	3 (13.6%)	19 (86.4%)	0.89 (0.23-3.41)	0.866	-	
Spouse and child	13 (17.8%)	60 (82.2%)	1.22 (0.53-2.79)	0.633	-	
Sponsor of the respondent						
Public	53 (15.0%)	301 (85.0%)				
Private	9 (11.7%)	68 (88.3%)	0.75 (0.35-1.60)	0.458	-	
NGO	2 (8.7%)	21 (91.3%)	0.54 (0.12-2.37)	0.416	-	

In comparison to those who did not work nights, respondents who did so had a 2.12 times greater likelihood of having depression (OR=2.12, 95% CI: 1.38-3.27, p=0.001). Respondents who had stress from the attending physicians were two times more likely to have depression than those who did not experience stress from the attending physicians (OR=2.05, 95% CI: 1.34-3.13, p=0.001). Participants who experienced traumatic patient events were 1.56 times more likely to be depressed than those who did not experience traumatic events from their patients (OR=1.56, 95% CI: 1.01-

2.39, p=0.043). Respondents who spent a long time waiting at the bus station were 1.89 times more likely to be depressed than those who did not spend a long time at the bus station (OR=1.89, 95% CI: 1.24-2.88, p=0.003). Participants who experienced the absence of mentorship were 3.3 times more likely to be depressed than those who did not experience the absence of mentorship (OR=3.31, 95% CI: 2.14-5.12, p=0.003). Participants who were worried about their academic performance were 2.4 times more likely to be depressed than those who were not worried (OR=2.44, 95% CI: 1.45-3.47, p<0.001). Participants who regretted going to medical school had a 2.57 times higher chance of being depressed than participants who did not regret going to medical school (OR=2.57, 95% CI: 1.66-3.99, p<0.001). Participants who experience stress from the next of kin or patients were 2.17 times more likely to have depression than those who do not experience stress from the next of kin or patients (OR=2.17, 95% CI: 1.39-3.39, p=0.001) **(Table 6)**

Table 6: Association between the predictors and depression (binary and multivariable analysis)

Predictors	Depression		OR (95% CI)	P value	AOR (95% CI)	P value
	Yes	No				
Nocturnal shift work						
Yes	54 (36.7%)	93 (63.3%)	2.12 (1.38-3.27)	0.001	-	
No	66 (21.5%)	241 (78.5%)				
Stress from attending physicians/seniors						
Yes	63 (35.0%)	117 (65.0%)	2.05 (1.34-3.13)	0.001	-	
No	57 (20.8%)	217 (79.2%)				
Traumatic patients events						
Yes	50 (32.3%)	105 (67.7%)	1.56 (1.01-2.39)	0.043	-	
No	70 (23.4%)	229 (76.6%)				
Long wait for a bus at the bus station						
Yes	67 (33.3%)	134 (66.7%)	1.89 (1.24-2.88)	0.003	-	
No	53 (20.9%)	200 (79.1%)				
Absence of mentorship						
Yes	78 (39.4%)	120 (60.6%)	3.31 (2.14-5.12)	<0.001	2.24 (1.37-3.64)	0.001
No	42 (16.4%)	214 (83.6%)				

Worry about academic school performance						
Yes	88 (33.2%)	177 (66.8%)	2.44 (1.54-3.86)	<0.001	1.62 (0.97-2.65)	0.057
No	32 (16.9%)	157 (83.1%)				
Chronic illness						
Yes	18 (42.9%)	24 (57.1%)	1.76 (0.89-3.47)	0.103	-	
No	102 (24.8%)	310 (75.2%)				
Regrets of attending medical school						
Yes	67 (39.6%)	102 (60.4%)	2.57 (1.66-3.99)	<0.001	2.31 (1.47-3.62)	<0.001
No	53 (18.6%)	232 (81.4%)				
Stressed by the next of kin or patients						
Yes	56 (38.9%)	88 (61.1%)	2.17 (1.39-3.39)	0.001	1.52 (0.94-2.47)	0.09
No	64 (20.6%)	246 (79.4%)				

Respondents who worked night shifts were two times more likely to have anxiety than those who did not (OR=2.06, 95% CI: 1.20-3.52, p=0.008). Respondents who experienced stress from attending physicians were 1.76 times more likely to have anxiety than those who did not experience stress from the attending physicians (OR=1.76, 95% CI: 1.03-2.99, p=0.037). Participants who experienced the absence of mentorship were 2.65 times more likely to have anxiety than those who did not experience the absence of mentorship (OR=2.65, 95% CI: 1.53-4.58, p=0.001). Participants who were worried about their academic performance were 3.23 times more likely to have anxiety than those who were not worried about their school performance (OR=2.23, 95% CI: 1.70-6.12, p<0.001). Participants who had regrets about attending medical school were 2.31 times more likely to have anxiety than those who did not have regrets about attending medical school (OR=2.31, 95% CI: 1.35-3.94, p=0.002). Participants who experienced stress from the next of kin or patients were 3.36 (OR=3.36, 95% CI: 1.95-5.77, p<0.001), as detailed in table **7.**

Table 7: Association between the predictors and having anxiety (binary and multivariable analysis)

Predictors	**Anxiety**		**OR (95% CI)**	**p**	**AOR (95% CI)**	**p**
	Yes	**No**				
Night shifts						
Yes	30 (20.4%)	117 (79.6%)	2.06 (1.20-3.52)	0.008		

No	34 (11.1%)	273 (88.9%)				
Traumatic patients events						
Yes	25 (16.1%)	130 (83.9%)	1.28 (0.74-2.21)	0.371		
No	39 (13.0%)	260 (87.0%)				
Long wait for a bus at the bus station						
Yes	30 (14.9%)	171 (85.1%)	1.13 (0.66-1.92)	0.651		
No	34 (13.4%)	219 (86.6%)				
Stress from attending physicians/seniors						
Yes	33 (18.3%)	147 (81.7%)	1.76 (1.03-2.99)	0.037		
No	31 (11.3%)	243 (88.7%)				
Absence of mentorship and guidance						
Yes	41 (20.7%)	157 (79.3%)	2.65 (1.53-4.58)	0.001		
No	23 (9.0%)	233 (91.0%)				
Worry about academic school performance						
Yes	51 (19.2%)	214 (80.8%)	3.23 (1.70-6.12)	<0.001	2.41 (1.24-4.67)	0.009
No	13 (6.9%)	176 (93.1%)				
Chronic illness						
Yes	9 (21.4%)	33 (78.6%)	1.77 (0.80-3.90)	0.156		
No	55 (13.3%)	357 (86.7%)				
Regrets of attending medical school						
Yes	35 (20.7%)	134 (79.3%)	2.31 (1.35-3.94)	0.002	1.85 (1.06-3.23)	0.029
No	29 (10.2%)	256 (89.8%)				
Stressed by the next of kin or patients						
Yes	36 (25.0%)	108 (75.0%)	3.36 (1.95-5.77)	<0.001	2.66 (1.52-4.66)	0.001
No	28 (9.0%)	282 (91.0%)				

Chapter V: DISCUSSION

V.1 Discussion

This survey's had 544 total respondents, composed of 118 postgraduates, 245 in clinical years, and 91 in preclinical, representing 26%, 54%, and 20% of the participants, respectively. As measures for mental health disorders, we used the PHQ -9 scale for Depression and GAD-7 for Anxiety, with a cut-off point greater than ten for both (Depression and Anxiety). We found the prevalence of depression to be 37% among postgraduate students, 24.5% for medical students in clinical years, and 17.6% in preclinical years. These results are relatively similar to those of a study done in Nepal, where depression was 33.7% among postgraduate students and 29.1% among undergraduate medical students (8). In another study done among resident doctors in Tunisia, the depression was also relatively similar to our study at 30.5% (2). In a study done in Uganda among undergraduate medical students, depression was found to be 21% which is low compared to our study results (15). The difference could be that among undergraduate students in Rwanda, year 4 (Doc 2) students were joined by a cohort from another private medical school in Rwanda, which was closed due to accreditation problems. This thereby caused a delay in academic years for those joining from that private university.

Comparing our results to that of a study done at one university in India among undergraduate medical students, which had a higher depression of 57%, with severe depression present at 3% compared to 37%, severe depression was 4.1% among medical students in clinical years and 1.1% in preclinical students which relatively similar to that of our study (3). A survey done among postgraduate students in Nairobi found severe depression to be at 16.9%, which was higher than our findings of 3.4% (23). This difference could be due to different tools used in screening, study settings, and other exposures. Another reason could be that this study was done post COVID-19 era. during that period medical school in Rwanda were close, hence no academic stressors.

In our study, postgraduate students were also more anxious than undergraduates at a rate of 20.3% among doctoral students, 12.6% in clinical years, and 9.9 % in preclinical years. In a study done in Tunisia among resident doctors, the prevalence of anxiety was 43.6%, which was higher than the 20.3% in our study (2). The reasons could be that undergraduates compare to postgraduates they don't have same exposure in the same way as the responsibility differ. A postgraduate is in charge of patient well-being as a Doctor and also has to pursue at the same time the academic related activities, this increases the workload hence could be among reasons of anxiety. On the

other hand, the lower rate of anxiety in this study comparing to that of the study done in Tunisia could be due that, the Tunisia one has a big number of participants almost ten time more, the instrumental use and the study settings.

Among the study participants, we had a greater number of male respondents at 64.5%. It is relatively similar to other studies done in different settings where the male gender was predominant, like one done in Kenya among postgraduates, where 53.3% were male. In another study done in Ethiopia, among undergraduates, 63.1% also were male (15,25). It could be due to social culture favoring the male sex to study more than females and others understanding that the female gender has a different perspective about studying. Another reason could be that the number of female genders in this study was low at 35.5% compare to their fellow gender Also, the female gender feels pressure from society to get married early than studying. The majority were between 24-29 years old at 48.9%, followed by 18-23 at 27.5%. 59.3% were single, while married and those in a relationship were 19.2% and 21.4%, respectively. A large number of participants were undergraduate students in clinical years (Doc students) at a rate of 58 % (245), representing a response rate of 35%, the postgraduate students represented 26% of participants, but they were the ones with a higher response rate of 118 /189 (62%). Regarding living status, most of the participants rented 46%, and others lived in school hostels 29.1%, the number of ones living with friends was 43%, while those who lived alone and spouse with children were 20.2% and 16.1%, respectively. The government-sponsored most of the participants, 78%.

The independent risk factors of depression and anxiety among the participant were: being female, postgraduate students, renting accommodation, working night shifts, stress from attending physicians and absence of mentorship, worrying about the academic program, and stress from patients and caretakers. We found that age greater than 30 years old and being married were associated with depression only.

Our results showed that the female gender had a higher prevalence of reported depression and anxiety at a rate of 1.66 times that of the male respondents. Other studies done in different medical universities show similar results. Our results are lower than those conducted in Ethiopia, where it was associated with 2.56 higher (31). The possible explanation could be the role of the female gender in society due to our culture, thinking, and family stress and expectations. Another reason could be that due to hormonal differences, women are 2-3 times more to develop depression than

men. Some women experienced depression-related disorders such as pre-menstruation dysphoric disorder and postpartum depression associated with hormonal change (30).

Other studies showed that those who were content with their performance in school had a lower rate of depression and anxiety. Those academic stressors were school timetables, lack of free time for revisions, and difficulty in understanding studies content(11).

Age greater than 30 was associated with depression in a study done in India among postgraduate doctors showing similarity with our results. On the other hand, among undergraduate students, another study done in Ethiopia showed that those between the ages of 18 and 21 had a 2.5-fold increased risk of depression (31), while our study did not stratify age groups by year of study. The majority of 30-year-old participants in our study were postgraduate students. They have multiple responsibilities, from family, caring for patients, and working night shifts, among others. Those factors could be among the reasons for the reported rates of depression.

V.2 The strength and limitations of the Study

This study's strength was that the study had an adequate sample size, every participant group had an adequate representation and the instrument used in measurement was a validated tool with good sensitivity and specificity (PHQ-9 and GAD-7)

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Our major limitation was that this study was an online cross-section survey. Thus, it prevented us from using open questions to better characterize the associated risk factors, and the more the survey is long, the more the response rate is low. The study does not go into detail about the sub-group to analyze each ground as such, and that could have provided more information.

V.3 Conclusion and recommendations

This study revealed a higher prevalence rate of depression among postgraduate students (37 %) with anxiety among medical students at a rate of 31%. There were correlations between predictors, including being a resident and female gender, with some school-related activities (night shift, stress from attending physician). This study showed that medical students need continuous screening throughout their training to prevent severe depression associated with a higher rate of suicide. Based on the finding of this study,

There is a need at the University of Rwanda of establishing a continuous screening program for mentor disorders, mostly depression and anxiety.

During induction week of starting medical field to address and teach about mental disorders and seek help when needed.

To establish a law addressing the number of night shifts per week and number of working hours per week with adjustment to the academic activity.

Establish a well-structured mentorship program to improve the relationship between attendings, residents, and medical students.

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CHAPTER VII. APPENDICES

VII. 1. Appendix I: Data collection form and consent form

VII 1.1 consent form

Title: ***"****Prevalence and Associated Risk Factors of Depression and Anxiety Disorder among Medical Students in College of Medicine and Health Science****".***

Dear Mr/Mrs,

I hope this email finds you well. I am Dr. Alain Prince Kubwayo, PGY4 in Internal Medicine. I humbly request your help in responding to this survey on a screening measure to help you determine whether you might have depression and/or Anxiety. This screening tool is not designed to make a diagnosis of Depression and/or Anxiety but to see if the issues exist and prevent any long term complication associated with it by giving a general recommendation to a physician or a mental health professional to inform further investigations about diagnosis and treatment of the same.

Objective of the study: This study is entitled "Prevalence and Associated Risk Factors of Depression and Anxiety Disorder among Medical Students in College of Medicine and Health Science". It will help in detecting some of the causes of depression and anxiety in our daily activities and give a way to recommend providing good learning and working environments.

Methods of the study intervention: This will be a descriptive cross-sectional

Confidentiality, benefits, and reimbursement: The participants who filled the survey implicated that the participants agreeing to participate in this study. We kept the data collected in this study in strict confidence and we did not disclose to any other person for any other purpose whatsoever. they was no remuneration to anyone participating in this survey.

Sharing the results: We plan to publish the results for academic and research purposes, we will always protect your confidentiality.

We highly appreciated your help.

Should you need any information, you can contact on the following:

- Dr. Kubwayo Alain Prince, Email: alainprincek@gmail.com, Phone number 0788557772.
- Dr Gafaranga Jean Pierre, Email: gafajepi@gmail.com, Phone number: 0788224854
- Dr.Nkeshimana Menelas, Email: mnls.nke@gmail.com, Phone number :0784732678

Sincerely,

Alain Prince Kubwayo

Do you agree to participate? - *Mark only one oval*

- ◯ Yes
- ◯ No

VII .1.2 Data Correction tools

VII 1.2.1. social demographic background

1. Your initials (optional):
2. gender - *Mark only one oval*
   - ◯ Male (1)
   - ◯ Female (2)
3. Age categories - *Mark only one oval*
   - ◯ 18 – 23 (1)
   - ◯ 24 – 29 (2)
   - ◯ 30 – 35 (3)
   - ◯ 36 – 41 (4)
   - ◯ 42 and above (5)
4. Marital status - *Mark only one oval.*
   - ◯ Single (1)
   - ◯ In relationship (2)
   - ◯ Married (3)
   - ◯ Widow (4)
   - ◯ Divorced (5)
5. Class of study - *Mark only one oval.*
   - ◯ PCL 1 (1)
   - ◯ PCL 2 (2)
   - ◯ Doc 1 (3)
   - ◯ Doc 2 (4)
   - ◯ Doc 3 (5)
   - ◯ Resident doctors (6)

6. Currents rotations site -*Mark only one oval.*

- Pediatric (1)
- Internal medicine (2)
- Surgery (3)
- Obstetrics and Gynecology (4)
- Other (5)

7. Accommodation renting status -*Mark only one oval.*
   - Yes (1)
   - No (2)
8. Accommodation whereabout -*Mark only one oval.*
   - School hostel (1)
   - Home (2)
   - Renting (3)
9. Living situation -*Mark only one oval.*
   - Alone (1)
   - With friends (2)
   - With parents (3)
   - Hosted by family member (4)
   - With spouse and child (5)

10 Sponsored by -*Mark only one oval.*
   - Public (1)
   - Private (2)
   - NGO (3)

VII 1.2. 2. Depression screening tool

It is a screening measure to help you determine whether you might have depression or Anxiety Over the last two weeks, how often have you been bothered by any of the following problems?

1. Little interest or pleasure in doing things -*Mark only one oval.*
   - Not at all (1)

Several days (2)

More than a half of days (3)

Nearly every day (4)

2. Feeling down, depressed, or hopeless -*Mark only one oval.*

Not at all (1)

Several days (2)

More than a half of days (3)

Nearly every day (4)

3. Trouble falling or staying asleep, or sleeping too much -*Mark only one oval.*

Not at all (1)

Several days (2)

More than a half to the day (3)

Nearly every day (4)

4. Feeling tired or having little energy -*Mark only one oval.*

Not at all (1)

Several days (2)

More than a half to the day (3)

Nearly every day (4)

5. Poor appetite or overeating -*Mark only one oval.*

Not at all (1)

Several days (2)

More than a half to the day (3)

Nearly every day (4)

6. Feeling bad about yourself—or that you are a failure or have let yourself or your family down -*Mark only one oval.*

Not at all (1)

Several days (2)

More than a half to the day (3)

Nearly every day (4)

7. Trouble concentrating on things such as reading the newspaper or watching television -*Mark only one oval.*

Not at all (1)

Several days (2)

More than a half to the day (3)

Nearly every day (4)

8. Moving or speaking so slowly that other people could have noticed? Or the opposite—being so fidgety or restless that you have been moving around a lot more than usual -*Mark only one oval.*

Not at all (1)

Several days (2)

More than a half to the day (4)

Nearly every day (5)

9. Thoughts that you would be better off dead or of hurting yourself in some way -*Mark only one oval.*

Not at all (1)

Several days (2)

More than a half to the day (3)

Nearly every day (4)

If you clicked on any problems above, how difficult have they made it for you to do your work, take care of things at home, or get along with other people?

-*Mark only one oval.*

Not difficult at all (1)

Somewhat difficult (2)

very difficult (3)

4.extremely difficult (4)

VII 1 .2 .3. Generalized anxiety disorder (GAD) screening tool

Over the last 2 weeks, how often have you been bothered by the following problems

1. Feeling nervous, anxious or on edge -*Mark only one oval.*

- ◯ Not at all (1)
- ◯ Several days (2)
- ◯ More than a half to the day (3)
- ◯ Nearly every day (4)

2. Not being able to stop or control worrying -*Mark only one oval.*

- ◯ Not at all (1)
- ◯ Several days (2)
- ◯ More than a half to the day (3)
- ◯ Nearly every day (4)

3. Worrying too much about different things -*Mark only one oval.*

- ◯ Not at all (1)
- ◯ Several days (2)
- ◯ More than a half to the day (3)
- ◯ Nearly every day (4)

4. Trouble relaxing -*Mark only one oval.*

- ◯ Not at all (1)
- ◯ several days (2)
- ◯ More than a half to the day (3)
- ◯ Nearly every day (4)

5. Being so restless that it is hard to sit still -*Mark only one oval.*

- ◯ Not at all (1)
- ◯ Several days (2)
- ◯ More than a half to the day (3)
- ◯ Nearly every day (4)

6. Becoming easily annoyed or irritable -*Mark only one oval.*

- Not at all (1)
- Several days (2)
- More than a half to the day (3)
- Nearly every day (4)

7. Feeling afraid as if something awful might happen -*Mark only one oval.*

- Not at all (1)
- Several days (2)
- More than a half to the day (3)
- Nearly every day (4)

If you checked off any problems, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?

-*Mark only one oval.*

- Not difficult at all (1)
- Somewhat difficult (2)
- Very difficult (3)
- Extremely difficult (4)

VII.1.2 .4 Risk factors associated with depression and anxiety

1.In the last two weeks how often did you experience

Personal financial problems?

-*Mark only one oval.*

- Yes (1)
- No (2)

2. In the last two weeks

were you bothered by academic-related examination programs?

-*Mark only one oval.*

- Yes (1)
- No (2)

3 In the last two weeks

Did you lack free time for extra-curriculum activities?

-*Mark only one oval.*

Yes (1)

No (2)

4. In the last two weeks

Did you have relationship problems with your spouse or partner?

-*Mark only one oval.*

Yes (1)

No (2)

5. In the last two weeks

Did you experience Overwhelmed ward rounds?

? -*Mark only one oval.*

Yes (1)

No (2)

6.In the last two weeks

Were you bothered by the long distance to attend school or hospital?

Yes (1)

No (2)

7. In the last two weeks

Were you bothered by the number of night shifts?

-*Mark only one oval.*

Yes (1)

No (2)

9. In the last two weeks

Does the attending physician/senior cause you to fill uncomfortable with your daily activity?

? -*Mark only one oval.*

yes (1)

No (2)

10. In the last two weeks

Have you experienced traumatic patient events (death and suffering of patients)?

-*Mark only one oval.*

Yes (1)

No (2)

10. In the last two weeks

Where you satisfied with the mentorship or guidance

-*Mark only one oval.*

Yes (1)

No (2)

11. In the last two weeks

were you worried about academic school performance?

-*Mark only one oval.*

Yes (1)

No (2)

12. In the last two weeks

Did your chronic illness (if you have one) bother your academic/hospital activities?

-*Mark only one oval.*

Yes (1)

No (2)

13 In the last two weeks

Were you bothered by the academic curriculum?

-*Mark only one oval.*

Yes (1)

No (2)

14. In the last two weeks

Were you bothered by the long waiting for transport to attend school/hospital or to go home?

Mark only one oval.

Yes (1)

No (2)

15. In last week, two weeks

Did you experience stressful events from next of kin or patient ----*Mark only one oval?*

Yes (1)

No (2)

Appendix II. Budget and timeline

Table 1: Management plan

2022	March	April	April-July
IRB submission and approval			
Data collection			
Data analysis			
Finalizing manuscript and thesis submission			
Reporting			

Table 2: Budget

no	Items	quantity	PU	Total price
1	Internet	For 2 months	25000	50000
2	Rim of paper	2	4500	9000
3	Statistician		350000	350000
4	Publication (bookbinding)	5	5000	25000
5	Communication(airtime)	3	5000	15000

6	Miscellaneous	10%		44900
	Total			534900

Appendix III. IRB Approval

UNIVERSITY of RWANDA

COLLEGE OF MEDICINE AND HEALTH SCIENCES

DIRECTORATE OF RESEARCH & INNOVATION

CMHS INSTITUTIONAL REVIEW BOARD (IRB)

Kigali, 9th /March /2022

Dr Akain Prince Kubwayo
School of Medicine and Pharmacy, CMHS, UR

Approval Notice: No 179/CMHS IRB/2022

Your Project Title ***"Prevalence and Associated Risk Factors of Depression and Anxiety Disorder among Medical Students in College Of Medicine And Health Sciences, Rwanda"*** has been evaluated by CMHS Institutional Review Board.

Name of Members	Institute	Involved in the decision		
		Yes	No (Reason)	
			Absent	Withdrawn from the proceeding
Prof Kato J. Njunwa	UR-CMHS	X		
Prof Stefan Jansen	UR-CMHS	X		
Dr Brenda Asiimwe-Kateera	UR-CMHS	X		
Prof Ntaganira Joseph	UR-CMHS	X		
Dr Tumusiime K. David	UR-CMHS	X		
Dr Kayonga N. Egide	UR-CMHS	X		
Mr Kanyoni Maurice	UR-CMHS		X	
Prof Munyanshongore Cyprien	UR-CMHS	X		
Mrs Ruzindana Landrine	Kicukiro district		X	
Prof Gishoma Darius	UR-CMHS	X		
Prof Donatilla Mukamana	UR-CMHS	X		
Prof Kyamanywa Patrick	UR-CMHS		X	
Prof Condo Umutesi Jeannine	UR-CMHS		X	
Dr Nyirazinyoye Laetitia	UR-CMHS	X		
Dr Nkeramihigo Emmanuel	UR-CMHS		X	
Sr Maliboli Marie Josee	CHUK	X		
Dr Mudenge Charles	Centre Psycho-Social	X		

After reviewing your protocol during the IRB meeting of where quorum was met and revisions made on the advice of the CMHS IRB submitted on 7th March 2022, **Approval has been granted to your study.**

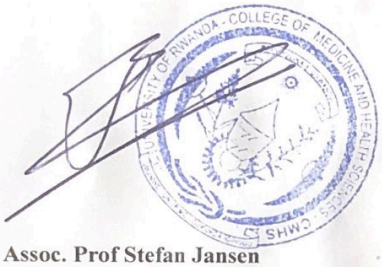
Please note that approval of the protocol and consent form is valid for **12 months**.

Email: researchcenter@ur.ac.rw P.O Box 3286 Kigali, Rwanda www.ur.ac.rw

You are responsible for fulfilling the following requirements:

1. Changes, amendments, and addenda to the protocol or consent form must be submitted to the committee for review and approval, prior to activation of the changes.
2. Only approved consent forms are to be used in the enrolment of participants.
3. All consent forms signed by subjects should be retained on file. The IRB may conduct audits of all study records, and consent documentation may be part of such audits.
4. A continuing review application must be submitted to the IRB in a timely fashion and before expiry of this approval
5. Failure to submit a continuing review application will result in termination of the study
6. Notify the IRB committee once the study is finished

Sincerely,



Date of Approval: The 9th March 2022

Expiration date: The 9th March 2023

Assoc. Prof Stefan Jansen
Ag. Chairperson Institutional Review Board,
College of Medicine and Health Sciences, UR

Cc:

- Principal College of Medicine and Health Sciences, UR
- University Director of Research and Postgraduate Studies, UR