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PREVALENCE OF DEPRESSION AMONG MEDICAL STUDENTS IN SAUDI ARABIA

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Abstract

Background: Depression is a common mental condition that manifests as sadness, a lack of interest or enjoyment, a sense of guilt or low self-worth, interrupted sleep or food, fatigue, and difficulty concentrating. According to the World Health Organization, mental health is a crucial component of health. This study aimed to determine the prevalence of depression among medical students during their clinical years in SA. **Methods:** This is a cross-sectional study conducted in Saudi Arabia, using questionnaire, data was collected from adult male and female medical students in their clinical years from the kingdom of Saudi Arabia from August to November 2023 in Saudi medical college. The data was analyzed with the help of Microsoft excel and SPSS. **Results:** As regard the prevalence of depression among medical students, there was 85% out of 740 participants exhibited some level of depressive symptoms. The largest group, representing 31.4% of the sample, falls under the "mild depression" category. Furthermore, 25.6% of the students were experiencing moderate to severe levels of depression and 28% reported moderate depression. Moreover, no statistically significant relation was found between gender and depressive symptoms (p value =0.421). **Conclusion:** the study revealed that a striking 85% of participants reporting some level of depression. These findings align with global research indicating that medical students are at an increased risk for mental health issues, often exacerbated by the rigorous demands of their education. Notably, despite the significant proportions of mild to severe depressive symptoms identified, there was no statistically significant difference in prevalence based on gender.

Keywords: depression, anxiety, medical student, clinical years.

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Introduction: According to the World Health Organization, depression is a common mental condition that manifests as sadness, a lack of interest or enjoyment, a sense of guilt or low self-worth, interrupted sleep or food, fatigue, and difficulty concentrating [1]. Mental health is considered by the World Health Organization as an essential and fundamental aspect of health [2]. Many medical students have reported experiencing psychological morbidity, including stress, interpersonal issues, suicide ideation, and psychiatric disorders. Medical education is usually seen to be stressful [3]. A medical student may experience several of these symptoms at once, with negative long-term effects on their health, relationships with others, and future opportunities [4]. Stress and depression are strongly associated, and both negatively affect academic performance and outcomes, increase the probability of errors, and cause psychological and physical symptoms as well as suicidal thoughts. [5]. Compared to the general population, medical students had a higher prevalence of depressed symptoms [6]. Many previous studies have provided evidence of a strong association between medial students and depression on a global level. In India, the prevalence of depression among medical students between 2019 and 2022 was found to be 50.0% [7]. In the north of Egypt, 55.5% of the medical students in 2022 had depressive symptoms [8]. In Palestine, 56.6% of the medical students were found to have had minimal depression in 2020 [9]. In Saudi Arabia, prevalence of depression was found to be the highest among second-year medical students at 43.8% in the first two months of 2020 [10]. In Thailand, second and fourth-year medical students were found to be the highest risk groups for high prevalence of depression [11]. In Turkey, sixth-year medical students were found to have lower rates of depression prevalence when compared to third-year medical students [12]. In 2019, a study was conducted to investigate the prevalence of depression among male medical students and interns at Albaha University in Saudi Arabia. The findings revealed that the prevalence of depression was determined to be 53.8%, utilizing Beck Depression Inventory scale
[13]. A different study found a substantial occurrence of depression within the population of medical students enrolled at Al-Azhar University in Cairo, Egypt. The prevalence was estimated to be 42.9% [14]. systemic review study conducted an extensive review of 46 studies regarding the prevalence of depression in Europe. The findings of this analysis indicated an average prevalence rate of 20.1% [15].

We select this important topic because of high number related to depression among medical students in Saudi Arabia. The frequency of depression in Saudi medical students ranged from 30.9% to 77.6%, with a mean prevalence of 51.5% Our findings emphasize the high occurrence of depression and the necessity for psychological intervention programs at medical schools to prevent the worsening of student mental health, which has been linked to medical student progress.

Data for burnout and depression, their risk factors, and correlates among Saudi medical students are scarce. The published studies are primarily concerned with burnout. Therefore, there is a crucial need for further studies to explore the determinants of depression and burnout.

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Objective**s:**

This study aimed to determine the prevalence of depression among medical students during their clinical years in KSA.

Materials and Methods:

Study design:
The cross-sectional survey was carried out from August 2023 to July 2024 in Saudi medical college, Saudi Arabia.

Study setting: Participants, recruitment, and sampling procedure:
Inclusion and Exclusion criteria:

The study's inclusion criteria included adult male and female medical students in their clinical years who provided their consent to participate in the research in Saudi Arabia. The exclusion criteria excluded medical students in the pre-clinical years or student who either did not provide their consent or refused to participate.

Sample size:

The sample size was determined using the Qualtrics calculator with a 95% level of confidence, hence the minimum sample size was 384.
The following formula was used to calculate the sample size:

n= P (1-P) * Zα 2 / d 2 with a confidence level of 95%.

n: Calculated sample size
Z: The z-value for the selected level of confidence (1- a) = 1.96 P: An estimated knowledge
Q: (1 – 0.50) = 50%, i.e., 0.50
D: The maximum acceptable error = 0.05
:So, the calculated minimum sample size was
n = (1.96)2 X 0.50 X 0.50/ (0.05) 2 = 384.

Method for data collection and instrument (*Data collection Technique and tools)*:
Data collection was done by using Google form questionnaire in English modified by the author and was used as a study tool. The PHQ-9 validated Questionnaire was used in our study. The questionnaire was consisted of 2 main sections: the first section contained socioeconomic background characteristics and academic profile questions of the participants. The second section contained questions related to depression and its symptoms with a rate from 0 to 3 to each characteristic.

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Scoring system

PHQ-9 Depression Severity. This is calculated by assigning scores of 0, 1, 2, and 3, to the response categories of not at all, several days, more than half the days and nearly every day respectively. PHQ-9 total score for the nine items ranges from 0 to 27.

Scores of 5, 10, 15, and 20 represent cutpoints for mild, moderate, moderately severe and severe depression, respectively. Sensitivity to change has also been confirmed.

Analyzes and entry method:

The data entered on the computer using the "Microsoft Office Excel Software" program (2016) for windows. Data then transfer to the Statistical Package of Social Science Software (SPSS) program, version 20 (IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp.) to be statistically analyzed.

Results:

Table (1) displays various demographic parameters of participants with a total number of 740. The data provides a comprehensive overview of the study population, including their age, gender, marital status, province of residence, university affiliation, year of medical school, and grade point average (GPA). The age distribution of the participants reveals that the majority (38.2%) are between 23 and 24 years old, with a mean age of 23.1 and a standard deviation of 2.4. This suggests that the study population is predominantly composed of young adults, which is typical for a medical school cohort. The gender breakdown shows a significant female representation, with 70.5% of the participants being female, reflecting the growing trend of women's participation in the medical field. The data also highlights the geographic diversity of the study population, with participants hailing from various provinces across the country, including the Northern, Southern, Middle, Eastern, and Western provinces. The highest proportion of participants (55.7%) are from the Western province, followed by the Eastern province (33.6%), indicating a potential regional bias in the study's sampling. Regarding university affiliation, the data shows that most participants (35.8%) are from King Abdulaziz University, followed by King Faisal University (25.0%) and Batterigee Medical College (15.4%). This distribution suggests that the study drew participants from a diverse range of academic institutions, providing a more representative sample of the medical student population in the region. The data on the participants' year of medical school reveals that the majority are in their 5th year (35.8%), followed by the 4th and 6th years, respectively. This information can help researchers understand the educational stage and progression of the study population, which may be relevant to the research questions or hypotheses being investigated. Finally, the GPA data indicates that most participants (42.3%) have a GPA between 4.50 and 5.00, suggesting a high-performing student population.

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Table (1): Sociodemographic characteristics of participants (n=740)

Parameter		**No.**	**Percent (%)**
Age ***(Mean: 23.1, STD:2.4)***	21 or less	82	15.2
	22 years old	157	29.1
	23 to 24 years old	206	38.2
	25 years and older	94	17.4
Gender	Female	380	70.5
	Male	159	29.5
Marital status	Single	493	91.5
	Married	46	8.5
Province of residence	Northern province	6	1.1
	Southern province	32	5.9
	Middle province	20	3.7
	Eastern province	181	33.6
	Western province	300	55.7
University	AL Faisal university	3	.6
	Al Maarefa university	3	.6
	Batterigee medical college	83	15.4
	Hail university	3	.6
	Ibn Sina university	13	2.4
	Imam Abdulrahman bin Faisal university	3	.6
	Jeddah university	14	2.6
	King Abdulaziz university	193	35.8
	King Faisal university	135	25.0
	King Khalid university	6	1.1
	King Saud bin Abdulaziz university	13	2.4
	King Saud university	7	1.3
	Najran university	22	4.1
	Tabuk university	3	.6
	Taibah university	3	.6
	Taif university	6	1.1
	Umm Al Qura university	29	5.4
Which year of medical school are you in (including preparatory year)	4th year	172	31.9
	5th year	193	35.8
	6th year	174	32.3

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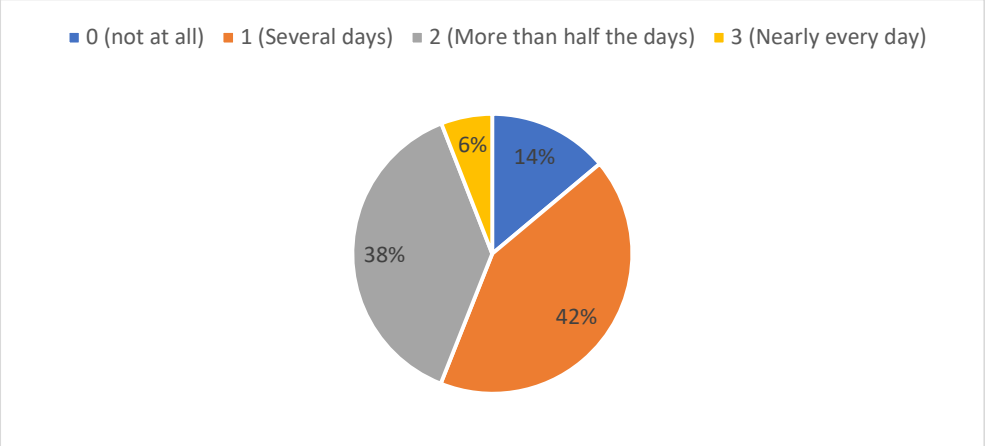
GPA (or what represents it if GPA is out of 4)	2.5-3	13	2.4
	3-3.49	53	9.8
	3.50-4	77	14.3
	4-4.49	168	31.2
	4.50-5	228	42.3

As shown in figure 1, The figure presents valuable insights into the level of depression among medical students in Saudi Arabia, as measured by their reported interest and pleasure in daily activities. The data shows a concerning trend, with most respondents (227 students) indicating they have experienced anhedonia, or a loss of interest or pleasure, on several days during the assessment period. An additional 205 students reported experiencing this symptom more than half the days, which is a significant proportion and suggests clinical-level depression may be prevalent in this population. While a smaller cohort (32 students) reported near-daily anhedonia, indicative of severe depressive episodes, the fact that 75 students reported a complete lack of interest or pleasure is also quite alarming.

Figure (1): Illustrates participants' level of interest or pleasure in doing things.



As illustrated in table (2), The data presented in the provided table highlights the concerning prevalence of depressive symptoms among medical students in Saudi Arabia. The findings suggest that a significant proportion of the sampled population is experiencing various manifestations of depression, including loss of interest or pleasure, feelings of hopelessness, sleep disturbances, fatigue, and changes in appetite. Notably, over 40% of the students reported experiencing a loss of interest or pleasure in doing things for several days or more, while nearly half of the respondents (46.8%) reported feeling down, depressed, or hopeless for several days or more. Additionally, a substantial number of students (40.4%) reported facing trouble with falling or staying asleep, or sleeping too much, for more than half the days or nearly every day. The data also reveals that a significant percentage of the students (52.6%) felt tired or had little energy for more than half the days or nearly every day, and a considerable proportion (44%) experienced changes in their appetite, either poor appetite or overeating, for more than half the days or

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http://magellanes.com/

nearly every day.

Table (2): Parameters related to depression among medical students in Saudi Arabia (n=740).

Parameter		***No.***	***Percent (%)***
On a scale of 0-3, how would you rate your level of interest or pleasure in doing things?	0 (not at all)	75	13.9
	1 (Several days)	227	42.1
	2 (More than half the days)	205	38.0
	3 (Nearly every day)	32	5.9
On a scale of 0-3, how often do you feel down, depressed or hopeless?	0 (not at all)	84	15.6
	1 (Several days)	252	46.8
	2 (More than half the days)	150	27.8
	3 (Nearly every day)	53	9.8
On a scale of 0-3 do you face trouble falling or staying asleep, or sleep too much?	0 (not at all)	126	23.4
	1 (Several days)	195	36.2
	2 (More than half the days)	121	22.4
	3 (Nearly every day)	97	18.0
On a scale of 0-3, how often do you feel tired or have little energy?	0 (not at all)	59	10.9
	1 (Several days)	196	36.4
	2 (More than half the days)	197	36.5
	3 (Nearly every day)	87	16.1
On a scale of 0-3, how often do you have a poor appetite or overeat?	0 (not at all)	138	25.6
	1 (Several days)	164	30.4
	2 (More than half the days)	138	25.6
	3 (Nearly every day)	99	18.4

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As shown in figure (2), The distribution of responses to “On a scale of 0-3, how often do you feel bad about yourself or that you are a failure or have let yourself or your family down?" provides valuable insights into the mental health of this vulnerable population. Most respondents (208 individuals) reported experiencing these feelings of self-deprecation and failure several days a week, which is concerning. Furthermore, a significant proportion (128 individuals) indicated that they grappled with these emotions more than half the days, while an alarming 86 individuals experienced them nearly every day. This suggests that a substantial number of medical students in Saudi Arabia are struggling with severe depressive symptoms that may hinder their academic performance, personal well-being, and ability to provide optimal patient care.

Figure (2): Illustrates the rate the participants feel bad about themselves or feel as if they have failed.

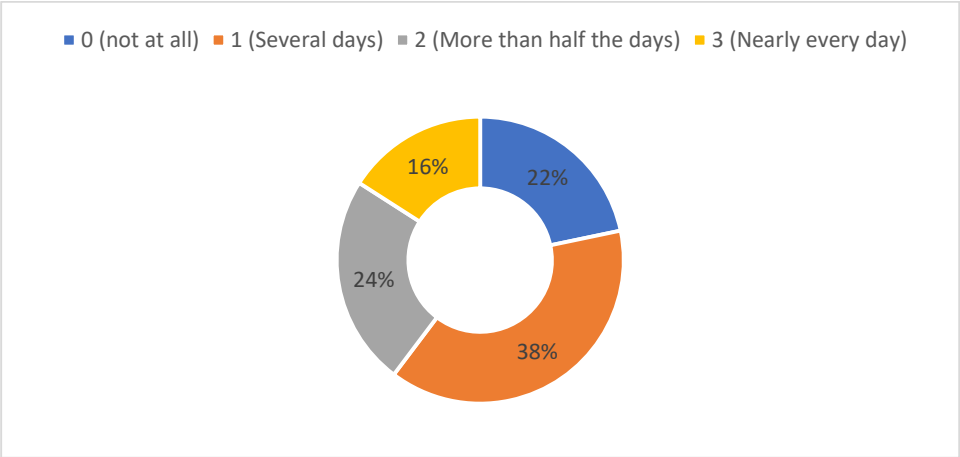

Table (3) reveals valuable insights into the prevalence of depressive symptoms among medical students in Saudi Arabia. The findings suggest that a significant proportion of the study participants experienced various manifestations of depression, including feelings of worthlessness, difficulty concentrating, changes in physical activity, and suicidal ideation. Notably, over 38% of the respondents reported feeling bad about themselves or experiencing a sense of failure or disappointment in themselves or their families for several days, while nearly 40% struggled with concentration issues for a similar duration. These results highlight the need for comprehensive mental health support and interventions to address the unique challenges faced by medical students, as they navigate the demanding academic and clinical environments. Furthermore, the data reveals that a concerning percentage of participants (16% and 15%, respectively) experienced these depressive symptoms on a near-daily basis, indicating the severity and persistence of their mental health concerns. The findings related to thoughts of self-harm or suicidal ideation are particularly alarming, with over 16% of the students reporting these thoughts for at least several days. These results underscore the importance of implementing robust mental health strategies within medical education programs, including the provision of accessible counseling services, stress management workshops, and targeted interventions to support the overall well-being of medical students. Addressing the mental health needs of this population is crucial, as their academic success,

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http://magellanes.com/

professional development, and ultimately, the quality of patient care they provide, can be greatly impacted by unresolved mental health challenges.

Table (3): participants' parameters related to depression among medical students in Saudi Arabia (n=740).

Parameter		*No.*	*Percent (%)*
On a scale of 0-3, how often do you feel bad about yourself or that you are a failure or have let yourself or your family down?	0 (not at all)	117	21.7
	1 (Several days)	208	38.6
	2 (More than half the days)	128	23.7
	3 (Nearly every day)	86	16.0
On a scale of 0-3, how often do you find trouble concentrating on things, such as reading the newspaper or watching television?	0 (not at all)	137	25.4
	1 (Several days)	194	36.0
	2 (More than half the days)	127	23.6
	3 (Nearly every day)	81	15.0
On a scale of 0-3, how often do you move or speak so slowly that other people could have noticed. Or the opposite being so figety or restless that you have been moving around a lot more than usual?	0 (not at all)	261	48.4
	1 (Several days)	154	28.6
	2 (More than half the days)	85	15.8
	3 (Nearly every day)	39	7.2
On a scale of 0-3, how often do you have thoughts that you would be better off dead, or of hurting yourself?	0 (not at all)	290	53.8
	1 (Several days)	161	29.9
	2 (More than half the days)	51	9.5

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http://magellanes.com/

	3 (Nearly every day)	37	6.9

The data presented in Table (4) provides valuable insights into the prevalence of depression among medical students. The findings reveal that a significant proportion of the surveyed population is affected by varying degrees of depression, with 85% of the participants exhibiting some level of depressive symptoms. The largest group, representing 31.4% of the sample, falls under the "mild depression" category, indicating that a substantial number of medical students are experiencing mental health challenges that may impact their academic performance and overall well-being. Furthermore, the data shows that a concerning 25.6% of the students are experiencing moderate to severe levels of depression, which requires close monitoring and appropriate interventions to ensure their academic and professional success, as well as their overall quality of life. These results underscore the importance of addressing mental health issues within the medical student population, as they not only affect the individuals themselves but also have the potential to impact the quality of healthcare they will provide in the future. It is crucial for educational institutions and healthcare organizations to implement comprehensive mental health support systems, promote awareness, and foster a culture of open dialogue and empathy to address this pressing concern effectively.

Table (4): Shows prevalence of depression among medical students score results.

	Frequency	**Percent**
No depression	81	15.0
Mild depression	169	31.4
Moderate depression	151	28.0
Moderately severe depression	117	21.7
Severe depression	21	3.9
Total	539	100.0

Table (5) shows that knowledge level of depression has statistically significant relation to age (p value=0.004), and GPA (p value=0.0001). It also shows statistically insignificant relation to gender, marital status, province of residence, and year of medical student.

Table (5): Relation between knowledge level of depression and sociodemographic characteristics.

Parameters		***level of depression***		***Total (N=740)***	***P value****
		Moderate to severe	**None or mild**		
Gender	Female	208	172	380	0.421
		72.0%	68.8%	70.5%	
	Male	81	78	159	

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http://magellanes.com/

		28.0%	31.2%	29.5%	
Age	21 or less	46	36	82	0.004
		15.9%	14.4%	15.2%	
	22 years old	82	75	157	
		28.4%	30.0%	29.1%	
	23 to 24 years old	96	110	206	
		33.2%	44.0%	38.2%	
	25 years and older	65	29	94	
		22.5%	11.6%	17.4%	
Marital status	Single	264	229	493	0.917
		91.3%	91.6%	91.5%	
	Married	25	21	46	
		8.7%	8.4%	8.5%	
Province of residence	Northern province	3	3	6	0.084
		1.0%	1.2%	1.1%	
	Southern province	12	20	32	
		4.2%	8.0%	5.9%	
	Middle province	13	7	20	
		4.5%	2.8%	3.7%	
	Eastern province	88	93	181	
		30.4%	37.2%	33.6%	
	Western province	173	127	300	
		59.9%	50.8%	55.7%	
University	Al Faisal university	3	0	3	N/A
		1.0%	0.0%	0.6%	
	Al Maarefa university	3	0	3	
		1.0%	0.0%	0.6%	
	Batterigee medical college	56	27	83	
		19.4%	10.8%	15.4%	
	Hail university	0	3	3	
		0.0%	1.2%	0.6%	
	Ibn Sina university	13	0	13	
		4.5%	0.0%	2.4%	
	Imam Abdulrahman bin Faisal university	0	3	3	
		0.0%	1.2%	0.6%	
	Jeddah university	11	3	14	
		3.8%	1.2%	2.6%	
		111	82	193	

ISSN:1624-1940
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http://magellanes.com/

	King Abdulaziz university	38.4%	32.8%	35.8%	
	King Faisal university	55	80	135	
		19.0%	32.0%	25.0%	
	King Khalid university	3	3	6	
		1.0%	1.2%	1.1%	
	King Saud bin Abdulaziz university	4	9	13	
		1.4%	3.6%	2.4%	
	King Saud university	3	4	7	
		1.0%	1.6%	1.3%	
	Najran university	12	10	22	
		4.2%	4.0%	4.1%	
	Tabuk university	0	3	3	
		0.0%	1.2%	0.6%	
	Taibah university	0	3	3	
		0.0%	1.2%	0.6%	
	Taif university	3	3	6	
		1.0%	1.2%	1.1%	
	Umm Al Qura university	12	17	29	
		4.2%	6.8%	5.4%	
Which year of medical school are you in (including preparatory year)	4th year	91	81	172	0.974
		31.5%	32.4%	31.9%	
	5th year	104	89	193	
		36.0%	35.6%	35.8%	
	6th year	94	80	174	
		32.5%	32.0%	32.3%	
GPA (or what represents it if GPA is out of 4)	2.5-3	3	10	13	0.0001
		1.0%	4.0%	2.4%	
	3-3.49	30	23	53	
		10.4%	9.2%	9.8%	
	3.50-4	60	17	77	
		20.8%	6.8%	14.3%	
	4-4.49	97	71	168	
		33.6%	28.4%	31.2%	
	4.50-5	99	129	228	
		34.3%	51.6%	42.3%	

P value was considered significant if ≤ 0.05.

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Discussion:

Depression is a widespread mental health issue. According to a WHO report, it was the fourth leading cause of morbidity globally in 2001, and it was projected to become the second leading cause by 2020 [16]. By 2015, approximately 322 million individuals around the world were estimated to be suffering from depression [17]. Common symptoms in patients include a persistently low mood, diminished interest in activities, alterations in weight or appetite, sleep issues, psychomotor slowing or agitation, feelings of guilt, difficulty concentrating, and suicidal thoughts or past suicide attempts [18]. Although depression is prevalent in the general population, research has indicated that medical students experience a higher prevalence, particularly among females [19]. It has been proposed that the intense stress associated with medical school globally may negatively impact students' mental health. In 2008, a cross-sectional study was carried out at the University of Dammam in Saudi Arabia, examining perceived stress levels in medical versus non-medical students. The findings revealed that a greater proportion of medical students (48.6%) reported frequent academic-related stress compared to non-medical students (38.7%, $p<0.01$) [20]. Consequently, the objective of this study was to assess the prevalence of depression among medical students during their clinical years in Saudi Arabia. As regard the prevalence of depression among medical students, we have found that 85% of the participants exhibited some level of depressive symptoms. The largest group, representing 31.4% of the sample, falls under the "mild depression" category. Furthermore, 25.6% of the students were experiencing moderate to severe levels of depression and 28% reported moderate depression. Moreover, no statistically significant relation was found between gender and depressive symptoms (p value =0.421). In contrast, a study conducted in Egypt estimated the frequency of depression, anxiety and stress symptoms among undergraduates in a medical college and demonstrated the relationship of such conditions with sociodemographic data. They showed that the female gender, university campus residents, pre-clinical years students, and students with lower academic accomplishment had higher scores of anxiety than other groups [21]. On the other hand, a cross-sectional study was conducted among 353 medical students at the Institute of Medical Sciences at Bhubaneswar, Odisha, India, in 2012 to assess the prevalence of depression, anxiety and stress among medical students using the Depression Anxiety Stress Scale (DASS 42) instrument [22]. The study revealed that 51.3% of the students had depression, 66.9% had anxiety and 53% had stress. Severe depression was reported by 12.7% of the students, severe anxiety by 19.8 % and severe stress by 10.8%. In 2016, a meta-analysis that included 62 728 medical students revealed that the global prevalence of depression was 28.0% [23]. Additionally, several studies in other countries in the Middle East showed a high prevalence of depression in adolescents. An Iranian study using the Center for Epidemiologic Studies Depression Scale reported a prevalence of severe depression among 52.6% of female participants, [24] and in a Qatari study using Beck's Depression Inventory – II tool, depression was found in 34% of of the studied medical students [25]. Additionally, a systemic review reported that the prevalence rates of depression among medical students ranged from 10% to 85% with a weighted mean prevalence of 30.6% [26]. From 2009 to 2014, studies reported that the prevalence of depression among medical and university students in the UAE, Saudi Arabia and Oman ranged from 22.2% to 48.2% [27,28]. Furthermore, a study conducted by

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Dyrbye et al. (2006) [29] assessed the prevalence of depression among medical students in India and found that 36% of students in clinical years reported depressive symptoms, as measured by the Patient Health Questionnaire-9 (PHQ-9). Similarly, a more recent study by Kumar et al. (2020) [30] involved a sample of 510 medical students across various institutions in India, revealing that 55.5% of them experienced moderate to severe depression, as assessed by the Beck Depression Inventory (BDI). Another study by Rotenstein et al. (2016) [31] conducted a systematic review and meta-analysis involving 23,000 medical students from various countries and reported that approximately 27% of those in clinical years met the criteria for depression, highlighting the universality of this issue across different educational settings. A notable study by Wang et al. (2020) [32] surveyed 1,200 medical students across five medical universities in China and found that 45.2% of participants reported moderate to severe depressive symptoms as assessed by the Patient Health Questionnaire-9 (PHQ-9). Another significant study by Wu et al. (2021) [33] involved 800 medical students and revealed that 34.5% of students exhibited depressive symptoms based on the Beck Depression Inventory (BDI), indicating a substantial mental health issue within this population. These findings highlight the urgent need for effective mental health interventions and support mechanisms tailored for medical students during their clinical training, which often involves high stress and intense workloads.

Conclusion:

In conclusion, this study highlights the alarming prevalence of depressive symptoms among medical students in Saudi Arabia, with 85% of participants reporting varying degrees of depression. The significant proportion of students experiencing moderate to severe depression underscores the urgent need for targeted psychological interventions and support programs within medical educational institutions. Given the detrimental effects of depression on academic performance and overall well-being, it is imperative that stakeholders prioritize mental health resources, create a supportive environment, and conduct further research into the contributing factors to effectively mitigate this growing concern. Enhanced awareness and proactive measures are crucial to safeguarding the mental health of future healthcare professionals.

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Ethical approval

An informed consent was obtained from each participant after explaining the study in full and clarifying that participation is voluntary. Data collected were securely saved and used for research purposes only.

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Conflict of interests

The authors declare that there are no conflicts of interest.

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Informed consent:

Written informed consent was obtained from all individual participants included in the study.

Data and materials availability

All data associated with this study are present in the paper.

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