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Predictors of Depressive Symptoms among Menoufia University Students, Egypt

Nagwa Nashat Hegazy, Emad Samir Al-Hanafy Saleh*, Marwa Mohammad Mohasseb
Department of Family Medicine, Faculty of Medicine, Menoufia University, Shebin Alkom, Menoufia, Egypt
***Corresponding author:** Emad Samir Saleh, **Mobile**: (+20) 01063113516, **Email:** emadtorky1@gmail.com

ABSTRACT

Background: Students at universities frequently encounter a variety of stressors, making them more susceptible to psychological issues that might harm their mental, emotional, and physical well-being.

Objectives: To assess the prevalence and predictors of depressive symptoms among Menoufia University students in Shebin Alkom City, Menoufia Governorate.

Patients and methods: This study was a cross-sectional study conducted on 400 students. They were interviewed using a predesigned interview questionnaire, which was distributed to the participants in Shebin Alkom faculties.

Results: There were significant differences between the studied group with depressive symptoms regarding social and academic predictors for depressive symptoms as family problems, habits, physical activities, study factors, financial pressures, and romantic relationships. There were significant differences between the studied group with depressive symptoms regarding medical problem, physical factors, and family history of mental illness as predictors for depressive symptoms among the studied students. Normal body mass index was the most frequent among non-depressed group and depressed patients. The results of binary logistic regression analysis indicated that crowding index, socioeconomic data, physical activities, family history of mental illness, study factors, obesity, financial pressures, and romantic relationships were the most significant predictors with Odds ratio of 2.9, 21.61, 3.13, 5.3, 4.34, 3,18, 3.48 and 0.413 respectively ($p<0.05$).

Conclusion: It is concerning that a high percentage of university students have depressed symptoms, it was found in 41.5% among university students under study. It was more prevalent among students with crowding index ≥2, low or moderate socio-demographic score, low physical activity, theoretical study, financial pressures, family history of mental illness, overweight, and romantic relationships.

Keywords: Adolescents, Depressive symptoms, Predictors, Prevalence.

INTRODUCTION

Depression is a frequent and dangerous medical condition that has an adverse effect on feelings, thoughts, and behaviour. Thankfully, there is treatment for it [1]. Because of their distinct social, physical, and neurological growth stage, adolescents and young adults deserve special attention apart from younger or older cohorts [2].

One of the main causes of disability and a major contribution to the burden of disease worldwide is depression. Adolescent depression is a regular occurrence. According to studies, 3–11% of teens at any given time fulfil the criteria for depression, while up to 20% of teenagers report having depression at some point in their lives. Teens' reluctance to seek professional assistance is one of the difficulties in treating their depression [3].

With reported rates of 11% among teenagers, the incidence of depression in young people has been rising. Psychological, social, and emotional development are all significantly impacted by depression. When teenagers are sad, they lose friends, have arguments with their families, and struggle academically. Teens with depression are at high risk of suicide, which is a serious worry [4].

Depression often manifests at a young age; half of cases appear by the age of 14, and 75% by the age of 24. Early diagnosis and treatment of depression are linked to a host of detrimental long-term effects, which has led to the international community to prioritise the early prevention of depression [5].

Depression often strikes young people, and its effects may be disproportionately felt in low-income nations where access to quality healthcare is limited [6].

A strong relationship between smoking, alcohol use, chronic medical illness and depression was well documented in many studies. Moreover, repetitive failure in exams contributes to the development of depression. Also, consumption of food rich in carbohydrate could be a possible risk factor for depression. Moreover, the psychological benefits of physical activity have been revealed to have negative impact on the development of depression [7].

This study aimed at assessing the prevalence and predictors of depressive symptoms among Menoufia University students in Shebin Alkom City, Menoufia Governorate.

SUBJECTS AND METHODS

The study was conducted in a time frame context of 22 months (starting from the 1st of December 2018 until the end of April 2022). This study has been suspended for a year and a half due to the Covid-19. All faculties of Menoufia University in Shebin El-Kom City were included in the study.

With a power of 80% and a confidence level of 95%, the research's prevalence of knowledge is 50%, which is the required level to get the largest sample size. The original study population consisted of 385 students but was later enlarged to 400 students in order to prevent questionnaires from being lost or incomplete.

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Students receiving therapy for mental issues were excluded from the research. The students were picked using a proportionate allocation approach from the practical faculty (Medicine, Nursing, Engineering, Science, Computer Science, Agriculture, and Home Economics), which had 219 students, and the theoretical faculties, which had 181 students.

The score of the questionnaire was divided into three levels: First, second and third parts.

The first part included socio-demographic data involving: age, sex. Marital status. The place of residence (urban or rural). Anthropometric measurements as weight, height, and body mass index.

The second part of the questionnaire inquired about medical history including socioeconomic status and social history asking about mother's and father education level, crowding index (CI), parental job, per capita income of the family, number of family members, medical problem, family history of mental illness, chronic diseases, cigarette smoking, accommodation type, habits, physical activity, study types, financial pressures, being bullied, the death of a close family member, romantic relationships, social withdrawal, stressful life events (e.g., social relationships, exams, high workload, Physical separation from friends and family, financial circumstances).

The third part was a questionnaire to screen depressive symptoms (PHQ9 Questionnaire [8], which consisted of 10 questions, each question rated on a four-point scale ranging from 0 to 3 according to the frequency of occurrence was used. The interpretation of the total score was as follows: score 0–4 minimal or none, 5–9 mild depressive symptoms, 10–14 moderate depressive symptoms, 15–19 moderately severe depressive symptoms, and 20–27 severe depressive symptoms.

A pilot study was conducted to evaluate the validity and reliability of the questionnaire using a convenient sample of forty students who were not included in the study. Two medical professionals and one English-Arabic bilingual translator translated the questionnaire into Arabic and verified it using a cutting-edge forward-backward translation technique. Cronbach's alpha was used to calculate dependability, and the result was r = 0.91. It took fifteen minutes from the students to fill in the questionnaire.

Ethical approval:

The Ethics Committee of Menoufia University's Faculty of Medicine accepted the study; an official clearance letter was produced and sent to the Shebin Alkom faculties officials. All participants gave their informed permission after being given a brief and unambiguous description of the study's goals. Every phase of the study was conducted in accordance with the Helsinki Declaration for studies involving humans.

Statistical analysis

SPSS version 25.0 for Windows® was used to code, process, and analyse the gathered data. For quantitative data, the data were described using mean (±) SD and range, whereas frequency and percentage were used for qualitative data. χ^2-test was used to compare two qualitative data, and the Student-t test (t) was used to compare two quantitative normally distributed data. The best predictors of depressed symptoms were identified by regression analysis. When the p-value was equal to or less than 0.05, it was deemed significant.

RESULTS

This study involved 400 students, 166 of them had depressive symptoms **(Figure 1)**.

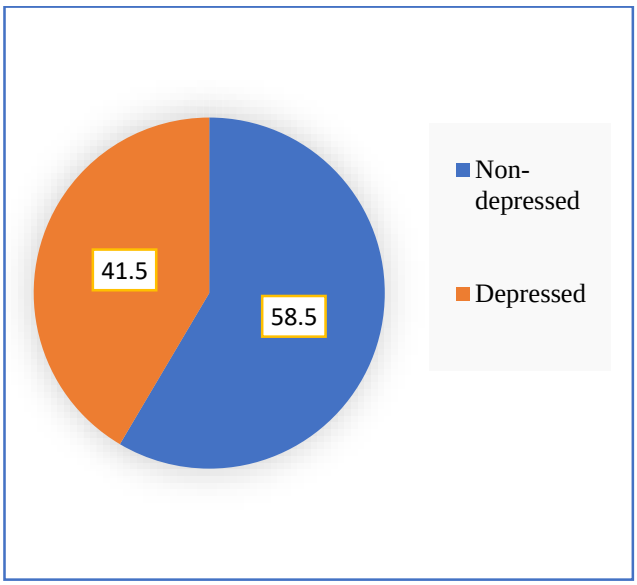

Figure (1): Prevalence of depressive symptoms among the studied students (n=400).

This table shows that age was significantly increased among the students with depressive symptoms. Most of students with depressive symptoms were women (86.75%). While, weight, height and BMI were significantly increased among non-depressed group than depressed group. Also, there were significant differences between the studied groups regarding crowding index **(Table 1)**.

Table (1): Comparison of the socio-demographic data between the studied groups.

Variable	Depression				Total		X^2	p-value
	Non-depressed N=234		Depressed N=166					
Age(years) Mean ± SD Range	20.63±2.74 17.00-28.00		23.61± 4.19 19.00-35.0		21.87± 3.72 17.00-35.00		t= 8.595	< **0.001***
Sex	**N**	**%**	**N**	**%**	**N**	**%**	91.779	< **0.001***
Male	143	61.11	22	13.25	103	25.8		
Female	91	38.89	144	86.75	297	74.3		
Marital status								
Single	208	88.89	140	84.34	348	87.0	1.779	0.182
Married	26	11.11	26	15.66	52	13.0		
Crowding index (CI)								
More than or Equal 4	65	27.78	65	39.16	130	32.5	50.255	<**0.001***
Equal 2	81	34.62	90	54.22	171	42.8		
Less than 2	88	37.61	11	6.63	99	24.8		
Socio-demographic score								
Low	55	23.50	56	34.00	111	27.75		
Moderate	64	27.35	70	42.00	134	33.50	5.76	<**0.001***
High	115	49.15	40	24.00	155	38.75		

There were significant differences between the studied group with depressive symptoms regarding social and academic predictors for depressive symptoms as family problems, habits, physical activities, study factors, financial pressures, and romantic relationships **(Table 2)**.

Table (2): Comparison of the studied groups as regard social and academic predictors for depressive symptoms.

	Variable	Depression				Total		X^2	p-value
		Non-depressed N=234		Depressed N=166					
		No.	**%**	**No.**	**%**	**N**	**%**		
Family problems	No	151	64.53	91	54.82	242	60.5	3.832	>**0.050**
	Yes	83	35.47	75	45.18	158	39.5		
Accommodation type	Living alone	0	0.00	0	0.00	0	0	NA	---
	Living with roommate	0	0.00	0	0.00	0	0		
	Living with family	234	100.00	166	100.00	400	100.0		
Habits	Non- smoker	190	81.20	155	93.37	345	86.3	12.142	<**0.001***
	Smoker	44	18.80	11	6.63	55	13.8		
Physical activities	Low activity	94	40.17	140	84.34	234	58.5	80.590	<**0.001***
	Average	118	50.43	26	15.66	144	36.0		
	Intense	22	9.40	0	0.00	22	5.5		
Study types	Theoretical	103	44.02	116	69.88	219	54.8	26.218	<**0.001***
	Practical study	131	55.98	50	30.12	181	45.3		
Work while studying	Non- worker	186	79.49	127	76.51	313	78.3	0.507	0.476
	Worker	48	20.51	39	23.49	87	21.8		
Financial pressures	Absent	166	70.94	65	39.16	231	57.8	40.206	<**0.001***
	Exist	68	29.06	101	60.84	169	42.3		
Being bullied	No	175	74.79	128	77.11	303	75.8	0.285	0.593
	Yes	59	25.21	38	22.89	97	24.3		
The death of a close family member	No	129	55.13	78	46.99	207	51.8	2.577	0.108
	Yes	105	44.87	88	53.01	193	48.3		
Acquisition of a new family member	No	184	78.63	127	76.51	311	77.8	0.254	0.614
	Yes	50	21.37	39	23.49	89	22.3		
Romantic relationships	No	125	53.42	114	68.67	239	59.8	9.398	**0.002***
	Yes	109	46.58	52	31.33	161	40.3		

There were significant differences between the studied groups regarding medical problem, physical factors, and family history of mental illness as predictors for depressive symptoms among the studied students. Normal body mass index was the most frequent among non-depressed group and depressed patients **(Table 3, Figure 2)**.

Table (3): Comparison of the studied groups as regard medical conditions and physical factor as predictors for depressive symptoms.

Variable	Depression				Total N=400		Significance test	p-value
	Non-depressed N=234		Depressed N=166					
	N	%	N	%	N	%		
Medical problem								
No	**199**	**85.04**	**155**	**93.37**	**354**	**88.50**		
Yes	**35**	**14.96**	**11**	**6.63**	**46**	**11.50**	X^2=36.21	**<0.001***
Acute	24	68.57	11	100.0	35	76.09		
Chronic	11	31.43	0	0.0	11	23.91		
Family history of mental illness								
Absent	234	100.00	131	78.92	365	91.3	X^2=54.068	**<0.001***
Exist	0	0.00	35	21.08	35	8.8		
BMI (kg/m^2)								
Under weight	11	4.70	0	0.00	11	2.75		
Normal	154	65.81	96	57.83	247	61.75	X^2= 27.117	**< 0.001***
Overweight	36	15.38	57	34.34	93	23.25		
Obese	33	14.10	13	7.83	46	11.50		
Weight/kg								
Mean ± SD	72.64 ± 12.08		63.94± 9.65		69.03± 11.92		**t**=6.479	**< 0.001***
Range	56.00-95.00		55.00-90.00		55.00-95.00			
Height/cm								
Mean ± SD	168.63±8.29		162.81 ±13.63		166.22± 11.19		**t**=5.296	**< 0.001***
Range	156.00-181.00		153.00-212.00		153.00-212.00			

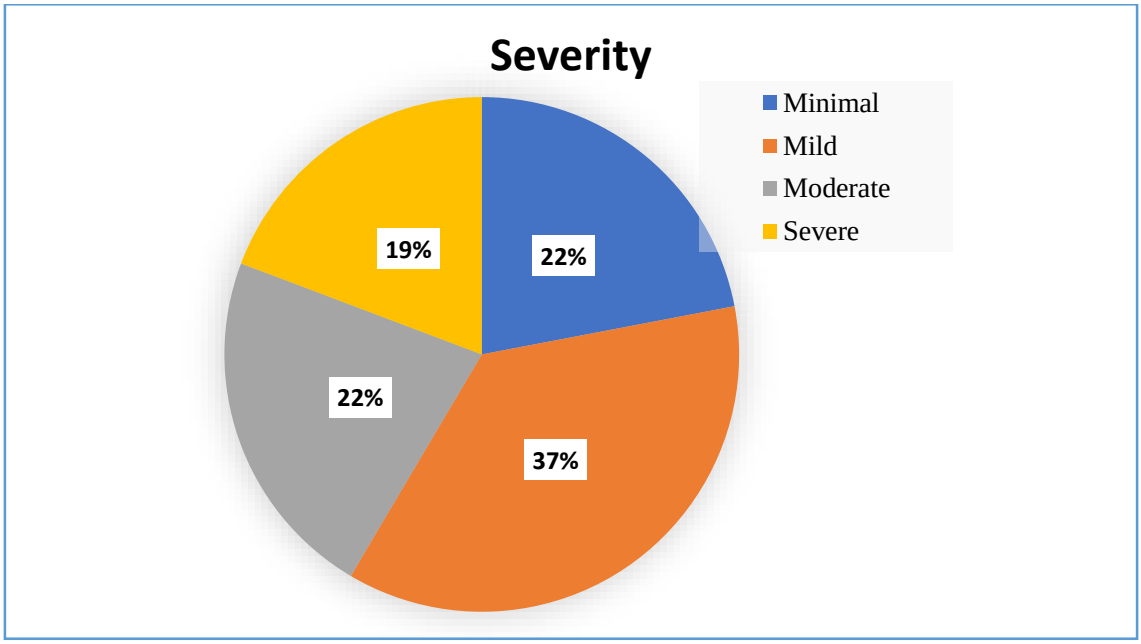

Figure (2): Severity among depression groups of the studied students.

The results of binary logistic regression analysis indicated that physical activities, family history of mental illness, study types, obesity, financial pressures, and romantic relationships were the most significant predictors **(Table 4).**

Table (4): Binary logistic regression analysis of factors associated with the participants having depressive symptoms.

Variable	Depressive patients			
	B	**S.E.**	**Wald**	**p-value**
Constant	**9.232**	**1.675**	**30.365**	**0.0001***
Age	0.670	0.312	1.610	0.071
Mother education	-0.115	0.450	0.720	0.260
Father education	-0.210	0.358	0.811	0.195
Mother job	-0.188	0.520	2.060	0.416
Father job	-0.202	0.216	1.250	0.110
Crowding index	-2.80	0.125	2.900	**0.034***
Family congestion	0.200	0.251	1.221	0.426
Socioeconomic data	2.323	0.500	21.61	<**0.001***
Medical problems	0.080	0.231	1.084	0.728
Habits	-0.005	0.431	0.995	0.991
Physical activities	-1.970	0.254	3.139	<**0.001***
Family history of mental illness	-1.821	0.512	5.300	<**0.001***
Study types	-1.073	0.216	4.342	<**0.001***
Obesity	1.158	0.306	3.184	<**0.001***
Financial pressures	1.250	0.247	3.489	<**0.001***
Romantic relationships	-0.884	0.237	0.413	<**0.001***

DISCUSSION

One of the most prevalent mental health issues among students is depression [9]. It is well known that university students are among the demographics most vulnerable to depression since they are in the later stages of adolescence and frequently make important life decisions that result in several pressures [10].

In this study, the incidence of depressive symptoms among university students was 41.5%, which is substantially in the same range as previous studies from different nations found a broad diversity of percentages ranging from 10% to 44% [11-14]. On contrast, our results percentage was comparatively higher when compared to another study by **Al-Busaidi *et al.*** [15] which estimated the proportion of students (133) with depressive symptoms (27.7%). The conclusion that subclinical depression is more common in these groups is supported by this study. Cultural variations, variations in the healthcare system, variations in the population, and variations in the study instruments have all been cited as causes of this variance. Furthermore, the rate is greater than that of a community research done by **Afifi *et al.*** [16] on Omani schoolchildren. This discrepancy may suggest that there are aspects of academic life that lead to stress and maladjustment, which can manifest as depression.

In our study, the most of depressive symptoms were more prevalent among females (86.75%). Compared to the study of **Girgus and Yang** [17] which noted that, beginning in mid-adolescence, women are much more likely to be depressed than male. Women have generally been shown to have a higher frequency of depressed symptoms than males. These sociocultural elements include those connected to biological and psychological causes [11].

Our study demonstrated that there was significant difference between the studied groups regarding the social predictors for depressive symptoms as family problems, smoking, habits, physical activities, and romantic relationships, ($p<0.05$). In our results smokers were 11 of depressed students (6.63%) compared to 44 in non-depressed students (18.8%). In line with our research, **Ngin *et al.*** [18] discovered that depressed students were more likely to be less physically active, to have discomfort that interfered with their regular tasks, and to be more dismayed or sorrowful. These results are in line with those of earlier research conducted in various populations and environments [19,20]. Additionally, **Ngin *et al.*** [18] found that students with depressive symptoms, regardless of severity, were more likely to experience family issues as children, such as physical abuse by a parent or guardian, psychological abuse by family members, and a lack of general and medical care.

Current investigation demonstrated that, there were significant differences between the studied groups regarding academic predictors as study types for depressive symptoms. In this concern, a study by **Ahmed *et al.*** [21] found that, there is a considerable correlation between depressed symptoms and academic achievement. Research carried out in Pakistan and Saudi Arabia produced same results [22,23]. **Salem *et al.*** [22] found, in contrast to our study, that students in the Faculty of Pharmacy had a higher prevalence of depressive symptoms, anxiety, and stress than students in the Faculty of Arts (53%, 58%, 47% versus 33.5%, 38.5%, 27%, respectively), i.e., their findings were depending on the type of faculty.

The findings of this study are consistent with those of **Abdallah and Gabr** [24] at Menoufia University's Faculty of Medicine, wherein they reported that 63.6%, 57.8%, and 78.4% of medical students at Menoufia University had depressive symptoms, anxiety, and stress, respectively. Since medical students are more likely to encounter certain difficulties and stresses that negatively impact their psychological well-being [25].

In the current study, weight, height, and BMI were significantly higher among non-depressed group (72.64 ± 12.08, 168.63±8.29, 25.41±2.86) than depressed group (63.94± 9.65, 162.81 ±13.63, and 24.44±4.55). While we found physical factors associated with depressive symptoms was significantly lower with depressed patients compared non-depressed group ($p>0.05$). Our findings concur with those of **Rossetti *et al.* [26],** who examined the relationship between depression symptoms and obesity. They compared the degrees of depressed symptoms in an obese and non-obese subject sample, which included an underweight sample. Their findings lead us to the conclusion that because there is a chance that the underweight group would have high levels of depressed symptoms, the results of comparing the levels of depressive symptoms between the obese and non-obesity groups may not be as significant. Depressive symptoms are linked to changes in food consumption as well as changes in physical activity, according to the DSM-IV [27]. Another study by **Garg *et al.* [28]** found that, it's possible that those who are depressed are more prone to go for comfort food. This behaviour could become a regular coping strategy for handling low feelings over time. It would be predicted that such increased total calorie consumption and consumption of sugary, high-fat snack foods will encourage excessive weight gain [29].

In the current study, there were significant differences between the studied groups regarding medical problem and family history of mental illness as predictors for depressive symptoms among the studied students, ($p<0.05$). It is different from the study of **Ma *et al.* [30]**, which reported that through the mediating influence of pain severity, chronic illnesses have a direct impact on the occurrence and risk of depressive symptoms. The symptoms of chronic illnesses including rheumatism, arthritis, and gastrointestinal disorders are frequently accompanied by pain. Physical discomfort that causes pain lowers a patient's quality of life and increases irritation, restlessness, and other unpleasant feelings, all of which contribute to the development of depressive symptoms [31]. The limited student sample size and effective chronic illness management might be the cause of this difference. Additionally, a survival study revealed that those who have a positive family history of depression symptoms are more likely to develop the condition than people who do not. Several published research have already demonstrated this result using an alternative methodology [32].

This study found that physical factors associated with depressive symptoms were significantly increased among female than male depressive symptoms patients. Also, weight, height and BMI were significantly increased among minimal to mild patients than moderate to severe patients, ($p<0.001$). Consistent with other research according to research by **Baldursdottir *et al.* [33] and Langvik *et al.* [34],** females reported being far less active than boys. In addition, females reported much greater levels of sleeplessness and depressed symptoms than boys did, and there was a larger correlation between physical activity and these two variables in the case of girls. Furthermore, BMI has been shown to increase the intensity of depression symptoms; women who are more severely obese are likely to experience more severe depressed symptoms, according to **Iodice *et al.* [35]**. They also discovered that several biological changes are influenced by BMI. Lower plasma levels of oxytocin and a higher incidence of vitamin D insufficiency are found in women who are more severely obese.

CONCLUSION

It is concerning that a high percentage of university students have depressed symptoms. There were significant differences between the studied groups regarding social and academic predictors for depressive symptoms as family problems, habits, physical activities, study factors, financial pressures, romantic relationships, medical problem, and family history of mental illness. Information on depressed symptoms, loneliness, physical activity, and related variables is reported in this study.

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REFERENCES

1. **American Psychiatric Association (2018):** What is depression?. https://www.psychiatry.org/patients-families/depression/what-is-depression
2. **Devine K, Monaghan M, Schwartz L (2017):** Introduction to the special issue on adolescent and young adult health: Why we care, how far we have come, and where we are going. Journal of Pediatric Psychology, 42(9):903-909.
3. **Rice F, Riglin L, Lomax T, Souter E *et al.* (2019):** Adolescent and adult differences in major depression symptom profiles. Journal of Affective Disorders, 243:175-181.
4. **Mojtabai R, Olfson M, Han B (2016):** National trends in the prevalence and treatment of depression in adolescents and young adults. Pediatrics, 138(6): e20161878. doi: 10.1542/peds.2016-1878.
5. **Byrne E, Kirk K, Medland S *et al.* (2020):** Cohort profile: the Australian genetics of depression study. BMJ Open, 10(5): e032580. doi: 10.1136/bmjopen-2019-032580.
6. **Kutcher S, Wei Y, Gilberds H *et al.* (2016):** Evaluating community health care providers knowledge and self-confidence in the identification, diagnosis, and treatment of adolescent Depression in Tanzania. Archives of Depression and Anxiety, 2(1): 26-30.
7. **Ishtiaq M, Afridi M, Khan S (2018):** Depression: prevalence & predictors of depression among adult population of district Peshawar. The Professional Medical Journal, 25(08):1229-1234.
8. **Fahmy S, Nofal L, Shehata S *et al.* (2015):** Updating indicators for scaling the socioeconomic level of families for health research. Journal of the Egyptian Public Health Association, 90(1):1-7.

9. **Levecque K, Anseel F, De Beuckelaer A *et al.* (2017):** Work organization and mental health problems in PhD students. Research Policy, 46(4):868-879.
10. **Park S, Andalibi N, Zou Y *et al.* (2020):** Understanding students' mental well-being challenges on a university campus: interview study. JMIR Formative Research, 4(3): e15962. doi: 10.2196/15962
11. **Kundu S, Bakchi J, Al Banna M *et al.* (2021):** Depressive symptoms associated with loneliness and physical activities among graduate university students in Bangladesh: findings from a cross-sectional pilot study. Heliyon, 7(3): e06401. doi: 10.1016/j.heliyon.2021.e06401.
12. **Bostanci M, Ozdel O, Oguzhanoglu N *et al.* (2005):** Depressive symptomatology among university students in Denizli, Turkey: prevalence and sociodemographic correlates. Croat Med J., 46(1):96-100.
13. **Nogueira-Martins L, Fagnani Neto R, Macedo P *et al.* (2004):** The mental health of graduate students at the Federal University of São Paulo: a preliminary report. Braz J Med Biol Res., 37(10):1519-1524.
14. **Omokhodion F (2003):** Psychosocial problems of pre-clinical students in the University of Ibadan Medical School. Afr J Med Med Sci., 32(2):135-138.
15. **Al-Busaidi Z, Bhargava K, Al-Ismaily A *et al.* (2011):** Prevalence of depressive symptoms among university students in Oman. Oman Med J., 26(4):235-39.
16. **Afifi M, Al Riyami A, Morsi M *et al.* (2006):** Depressive symptoms among high school adolescents in Oman. East Mediterr Health J., 12(2):126-137.
17. **Girgus J, Yang K (2015):** Gender and depression. Current Opinion in Psychology, 4: 53-60.
18. **Ngin C, Pal K, Tuot S *et al.* (2018):** Social, and behavioural factors associated with depressive symptoms among university students in Cambodia: a cross-sectional study. BMJ Open, 8(9): e019918. doi: 10.1136/bmjopen-2017-019918.
19. **Teychenne M, Ball K, Salmon J (2008):** Physical activity, and likelihood of depression in adults: a review. Preventive Medicine, 46(5):397-411.
20. **Azar D, Ball K, Salmon J *et al.* (2008):** The association between physical activity and depressive symptoms in young women: A review. Mental Health and Physical Activity, 1(2):82-88.
21. **Ahmed G, Negash A, Kerebih H *et al.* (2020):** Prevalence and associated factors of depression among Jimma University students. A cross-sectional study. International Journal of Mental Health Systems, 14(1):1-10.
22. **Salem G, Allah M, Said R (2016):** Prevalence and predictors of depression, anxiety, and stress among Zagazig University students. Med J Cairo Univ., 84(2):325-334.
23. **Khurshid S, Parveen Q, Yousuf M *et al.* (2015):** Effects of depression on students' academic performance. Sci Int (Lahore), 27(2):1619-1624.
24. **Abdallah A, Gabr H (2014):** Depression, anxiety, and stress among first year medical students in an Egyptian public university, International Research Journal of Medicine and Medical Sciences, 2(1): 11-19.
25. **Taha A, Sabra A (2012):** Perceived stresses among male students in University of Dammam, Eastern Saudi Arabia: A comparative study. Journal of American Science, 8(6):291-298.
26. **Rossetti C, Halfon O, Boutrel B (2014):** Controversies about a common etiology for eating and mood disorders. Frontiers in Psychology, 5:1205. doi: 10.3389/fpsyg.2014.01205
27. **Goodwin R, Gotlib I (2004):** Gender differences in depression: the role of personality factors. Psychiatry Research, 126(2):135-142.
28. **Garg N, Wansink B, Inman J (2007):** The influence of incidental effect on consumers' food intake. Journal of Marketing, 71(1):194-206.
29. **Skoczek-Rubińska A, Bajerska J (2021):** The consumption of energy dense snacks and some contextual factors of snacking may contribute to higher energy intake and body weight in adults. Nutrition Research, 96:20-36.
30. **Ma Y, Xiang Q, Yan C *et al.* (2021):** Relationship between chronic diseases and depression: the mediating effect of pain. BMC Psychiatry, 21(1): 436. doi: 10.1186/s12888-021-03428-3.
31. **Sanders J, Comijs H, Bremmer M *et al.* (2015):** A 13-year prospective cohort study on the effects of aging and frailty on the depression–pain relationship in older adults. International Journal of Geriatric Psychiatry, 30(7):751-757.
32. **Tozzi F, Prokopenko I, Perry J *et al.* (2008):** Family history of depression is associated with younger age of onset in patients with recurrent depression. Psychological Medicine, 38(5):641-649.
33. **Baldursdottir B, Valdimarsdottir H, Krettek A *et al.* (2017):** Age-related differences in physical activity and depressive symptoms among 10− 19-year-old adolescents: A population-based study. Psychology of Sport and Exercise, 28: 91-99.
34. **Langvik E, Saksvik-Lehouillier I, Kennair L *et al.* (2019):** Gender differences in factors associated with symptoms of depression among high school students: an examination of the direct and indirect effects of insomnia symptoms and physical activity. Health Psychology and Behavioral Medicine, 7(1):179-192.
35. **Iodice S, Ceresa A, Esposito C *et al.* (2021):** The independent role of body mass index (BMI) and severity of depressive symptoms on biological changes of women affected by overweight/obesity. International Journal of Environmental Research and Public Health, 18(6):2923. doi: 10.3390/ijerph18062923.