MEDICAL SCIENCE

Association of depression and anxiety with diabetes mellitus and asthma among adults in Riyadh, Saudi Arabia 2022

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ABSTRACT

Background: Depression is a mood disorder that affects the daily functions negatively, while anxiety disorders are the most commonly diagnosed mental disorders. Increased blood pressure, palpitations, hyperglycemia and other chronic diseases and physiological imbalances can result from various psychiatric disorders. They can also predispose the patients to psychiatric illnesses. This study aims to assess the relationship between Psychological Disorders, Diabetes Mellitus and Asthma among adults in Saudi Arabia in 2022. *Methods:* A cross-sectional study, targeted adults in a sample of 304 adults. Through paper-based questionnaires using Hospital Anxiety Depression Scale (HADS) in Arabic and English languages. Data cleared, coded and entered using Statistical Package for Social Science and Microsoft office Excel. *Results:* Out of 304 participants, 3.3% were diagnosed with diabetes mellitus (DM) and 10.2% were diagnosed with asthma. In the anxiety section of HADS, 1% of diabetic patients had borderline abnormal results while 0.7% had abnormal results (p=0.73). For asthma patients, 1.3% had borderline abnormal results and 3.3% had abnormal results (p=0.45). In the depression section of the HADS, 2.6% of asthmatic patients had borderline abnormal results and 1% had abnormal results (p=0.69). Diabetic patients had 0.7% borderline abnormal results and 0% abnormal (p=19). *Conclusion:* The number of participants diagnosed with asthma or DM in our study was limited, therefore, results were not statistically significant and a clear relationship was difficult to establish. Further research on a much larger population is needed to find a definite relationship.

Keywords: Psychological disorder, Ashtma, Diabetes Mellitus, Anxiety, Depression.

1. INTRODUCTION

Depression is a serious mental condition that negatively impacts persons' daily functioning, despite the fact that its treatment is typically overlooked.

Additionally, among mental problems, anxiety disorders tend to be the most prevalent (Kessler et al., 1994). Chronic diseases are conditions that persist beyond three months. Thus, mental disorders are a major contributor to the development of chronic diseases. According to previous research, chronic conditions such as numerous cardiovascular diseases, diabetes mellitus, asthma, osteoporosis and various types of cancers have been linked to psychological disorders (Clarke and Currie, 2009), specifically depression and anxiety. In addition, coronary heart disease (CHD) incidence has been predicted by generalized anxiety. There is an increase in mental problems in Saudi Arabia.

According to the King Salman Center for Disability Studies In their lifetime, 34.2% of Saudi nationals will suffer from a mental disease. 40 percent of Saudi people between the ages of 25 and 34 have been diagnosed with a mental condition. Only 13.6% of Saudi adults who suffer from mental problems seek treatment (Saudi National Mental Health Survey, 2019). In a separate study involving 340 Saudi adults, it was found that 72.9% were depressed (Abumadini, 2019). In a survey conducted between 1995 and 2000, 26.1% of Saudi Arabian adults aged 30-70 had hypertension (Al-Nozha et al., 2007). Yet, in Yagoub et al., (2022) study the rate of high blood pressure among Saudi Arabian adults was 55%-65%. In addition, the incidence of diabetes has grown during the previous quarter-century (Alotaibi et al., 2017). When the incidence of mental problems increased, the incidence of hypertension and diabetes also climbed. This project will evaluate the particular and shared link between several psychiatric problems and long-term chronic diseases. In addition, it may benefit future research focusing on the early detection and prevention of psychosomatic illnesses. We aim to assess the relationship between Psychological Disorders and Diabetes Mellitus and Asthma among adults in Saudi Arabia 2022.

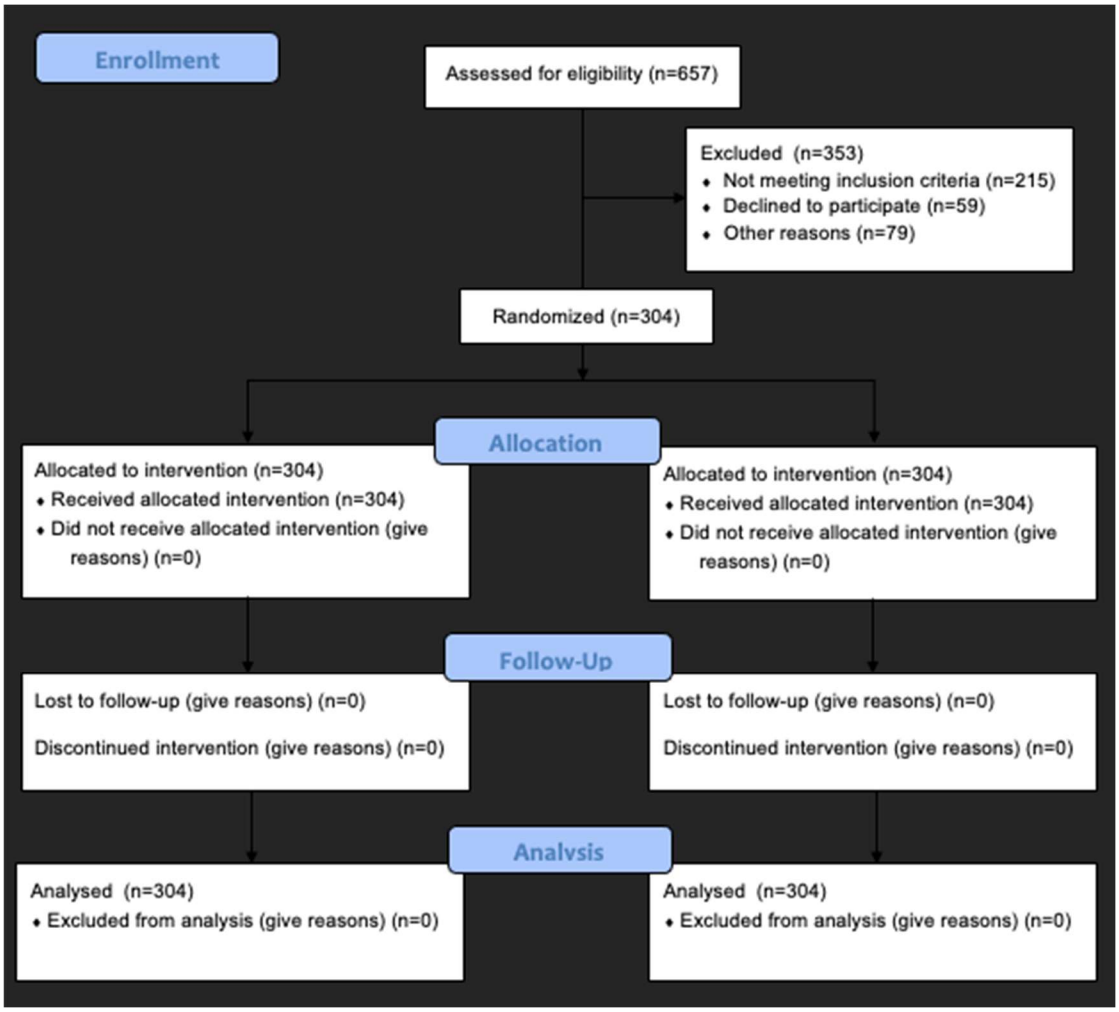

Figure 1 Consort Flow Chart

2. METHODS

A cross-sectional study. The target population are adults 18 years old and over, with a sample size of 304 adults. The data was collected between April of 2022 and June of 2022 in Riyadh, KSA. Paper based questionnaires were distributed to eligible

participants to assess the relationship between psychological disorders and Diabetes Mellitus and Asthma. Using the Hospital Anxiety Depression Scale (HADS) in Arabic and English languages. The (HADS) is a reliable self-assessment scale for detecting states of depression and anxiety. The questionnaire contains three parts, the first part was the demographic data, the second part was the scale and finally the third part was their past diagnosis of Diabetes Mellitus and Asthma, to link it with their psychological state. The data was cleared, coded and entered through (SPSS).

The results were presented in tables as frequencies and percentages. Suitable statistical tests of significance were used for data analysis. A p-value of < 0.05 considered significant. Permission was obtained from the participants to use their information; participants were assured that the data in this study will be used only for scientific purposes with preserving their anonymity and the confidentiality of their responses.

3. RESULTS

Out of the 304 total participants, in Table 1, 172 people were in the 18 to 28 age group, 95 people were in the 29 to 39 age group and 25 people were in the 40 to 50 age group. Only 12 of the participants were 50 years of age or older. In addition, there were 166 female participants, compared to 138 male individuals. The majority received high education and accounted for 148 participants, while 114 had high school degree, 41 had middle school degree and only 1 was not educated. Moreover, the majority of participants in this section were 126, have incomes of 3000 or less, 113 have incomes of 5000 to 10000 and 65 have incomes of 20000 or more.

Table 1 Personal Data

Age	Frequency	Percent
18-28	172	56.6
29-39	95	31.3
40-50	25	8.2
50 and more	12	3.9
Gender	Frequency	Percent
Male	138	45.4
Female	166	54.6
Education Level	Frequency	Percent
Not educated	1	0.3
Middle school	41	13.5
High school	114	37.5
Higher education	148	48.7
Monthly Income	Frequency	Percent
3000 or less	126	41.4
5000-10000	113	37.2
20000 or more	65	21.4
Total	304	100.0

N=304

Table 2 Prevalence of Diabetes Mellitus and Asthma

Diagnosed with DM	Frequency	Percent
Yes	10	3.3
No	294	96.7
Diagnosed with Asthma	Frequency	Percent
Yes	31	10.2
No	273	89.8
Total	304	100.0

N=304

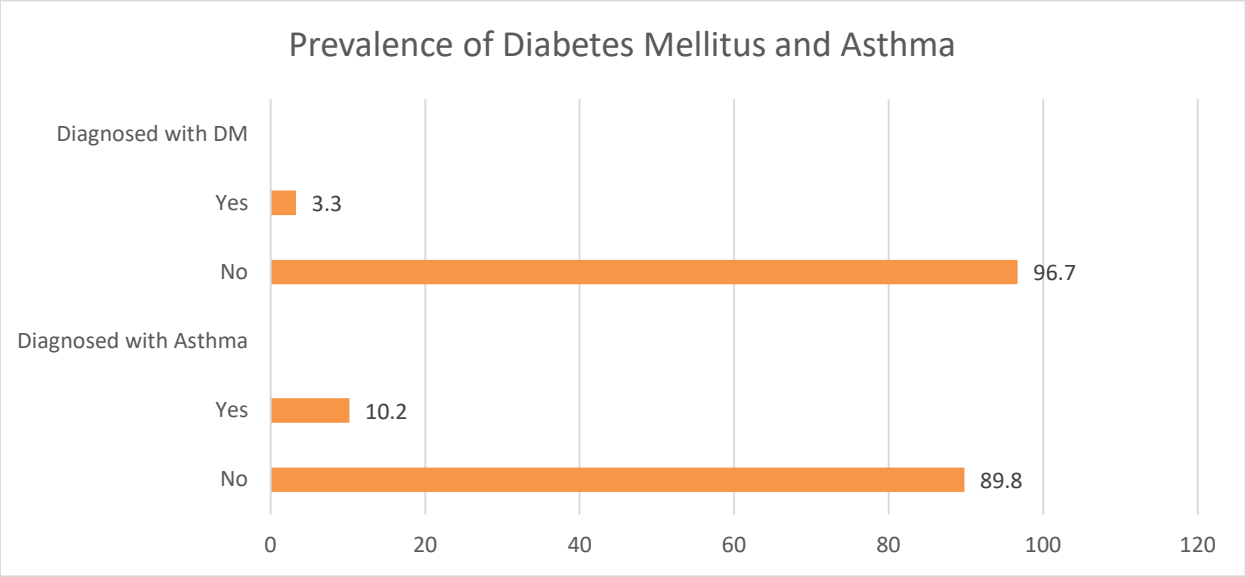

Figure 2 Prevalence of Diabetes Mellitus and Asthma

The majority of participants in Figure 2 and Table 2 were not having either DM or asthma; Only 10 out of all 304 participants was diagnosed with DM (3.3%), while 31 out of all 304 were diagnosed with asthma (10.2%).

Table 3 Severity of Anxiety and Depression

Severity of Anxiety	Frequency	Percent
Normal	155	51.0
Borderline abnormal	64	21.1
Abnormal	85	28.0
Severity of Depression	Frequency	Percent
Normal	193	63.5
Borderline abnormal	68	22.4
Abnormal	43	14.1
Total	304	100.0

N=304

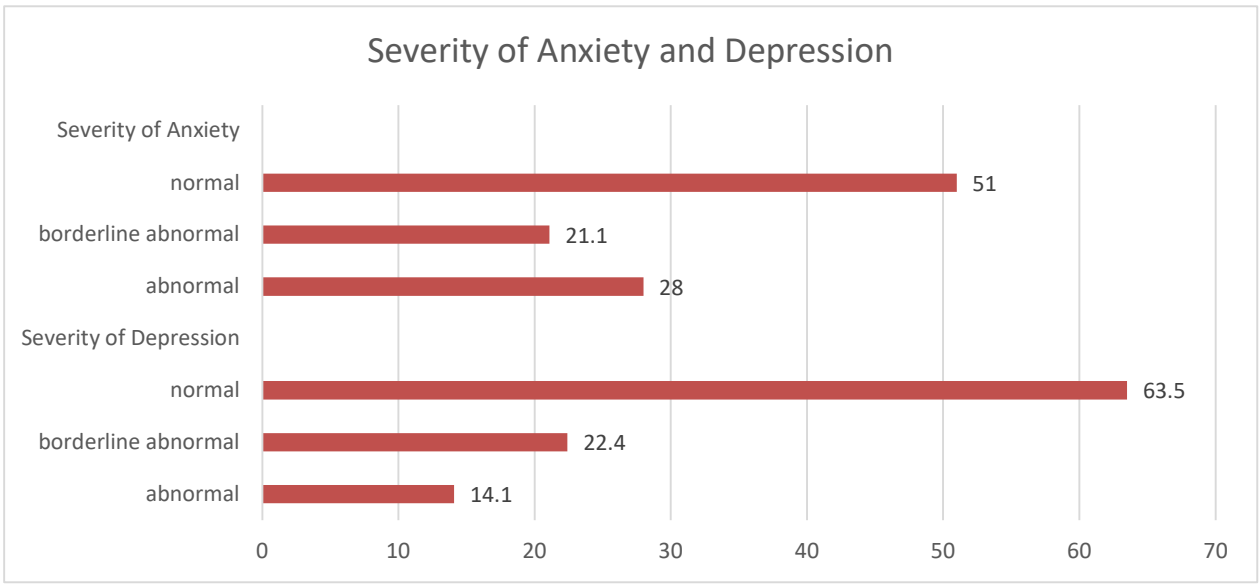

Figure 3 Severity of Anxiety and Depression

In Figure 3 and Table 3 the association of severity of anxiety, 155 participants showed normal results, 64 showed borderline results, while 85 had abnormal results. However, participants with normal results in the correlation of severity of depression accounted for 193 individuals, while 68 had borderline results and 43 showed abnormal results.

Table 4 Correlation between Age and Severity of Anxiety and Depression

		Anxiety			
		Normal	Borderline abnormal	Abnormal	Total
Age	18-28	80	36	56	172
		26.3%	11.8%	18.4%	56.6%
	29-39	54	20	21	95
		17.8%	6.6%	6.9%	31.3%
	40-50	15	7	3	25
		4.9%	2.3%	1.0%	8.2%
	50 and more	6	1	5	12
		2.0%	0.3%	1.6%	3.9%
	Total	155	64	85	304
		51.0%	21.1%	28.0%	100.0%
		Depression			
		Normal	Borderline abnormal	Abnormal	Total
Age	18-28	106	42	24	172
		34.9%	13.8%	7.9%	56.6%
	29-39	63	20	12	95
		20.7%	6.6%	3.9%	31.3%
	40-50	16	5	4	25
		5.3%	1.6%	1.3%	8.2%
	50 and more	8	1	3	12
		2.6%	0.3%	1.0%	3.9%
	Total	193	68	43	304
		63.5%	22.4%	14.1%	100.0%

P value of anxiety =0.14
P value of depression =0.79

In Table 4 total of 172 were in the age of 18-28, 95 were in the age of 29-39, 25 participants were the age of 40-50, while 12 participants were in the age group of 50 and more. Results regarding anxiety and its correlation with age: 26.3% of the age group of 18-28 showed normal results, while 11.8% showed borderline abnormal results. 18.4% was the percentage of this age group who showed abnormal results. Additionally; 17.8% of the age group 29-39 had normal results, 6.6% had borderline abnormal results and 6.9% exhibited abnormal outcomes. Regarding the age group of 40-50 results showed that 4.9% had normal outcomes while 2.3% showed borderline results and only 1.0% exhibited abnormal outcomes. The age group of 50 and more showed 2.0% of participants who had normal results, 0.3% borderline results and 1.6% had abnormal results (P value =0.14). Results regarding depression and its correlation with age: 34.9% of the age group of 18-28 showed normal outcomes, 13.8% showed borderline outcomes and 7.9% had abnormal outcomes. Regarding the age group of 29-39; 20.7% had normal results, 6.6% had borderline results and 3.9 exhibited abnormal results. In the age group of 40-50; 5.3% of participants showed normal results, 1.6% showed borderline abnormal results, while 1.3% showed abnormal results. Moreover; 2.6% of the participants in the age group of 50 and more showed normal results, 0.3% was the percentage of the abnormal borderline section and 1.0% exhibited abnormal outcomes (P value =0.79).

Table 5 Relationship between Anxiety and Depression with Gender

		Anxiety			
		Normal	Borderline abnormal	Abnormal	Total
Gender	Male	78	29	31	138
		25.7%	9.5%	10.2%	45.4%
	Female	77	35	54	166
		25.3%	11.5%	17.8%	54.6%
	Total	155	64	85	304
		51.0%	21.1%	28.0%	100.0%
		Depression			
		Normal	Borderline abnormal	Abnormal	Total
Gender	Male	87	31	20	138
		28.6%	10.2%	6.6%	45.4%
	Female	106	37	23	166
		34.9%	12.2%	7.6%	54.6%
	Total	193	68	43	304
		63.5%	22.4%	14.1%	100.0%

P value of anxiety =0.11
P value depression=0.98

Regarding the correlation Between Gender and Anxiety in Table 5 male participants in this study were total of 138 men, 25.7% showed normal results, 9.5% showed borderline abnormal results, while 10.2% of male participants exhibited abnormal results. Moreover, the results of female participants were as follow; 25.3% had normal results, 11.5% had borderline abnormal results and 17.8% of female participants had abnormal results (P value =0.11). In the section of depression; 28.6% of male participants showed normal outcomes, 10.2% showed borderline abnormal outcomes and 6.6% exhibited abnormal outcomes. Female participants in this section showed 34.9% of normal results, 12.2% borderline abnormal results, while 7.6% had abnormal results (P value=0.98).

Regarding the correlation Between Education Level and Anxiety in Table 6, this study showed that participants with higher education level accounted for 148 persons; 25.0% had normal results, while 11.5% had borderline result and 12.2% had abnormal results. Furthermore, 19.1% of the participants with high school degree showed normal results, 6.9% showed borderline abnormal results and 11.5% exhibited abnormal results. Results of participants with middle school education were as follow: 6.9% had normal outcomes, 2.6 % had borderline abnormal outcomes and 3.9% had abnormal outcomes (P value =0.64). In the section of depression; 32.2% of the higher education group showed normal results, while 9.5% showed borderline abnormal result and 6.9% showed abnormal results. Furthermore, 23.4% of the participants with high school education had normal results, 9.5% had borderline abnormal results and 4.6% exhibited abnormal results. Results of participants with middle school education were as follow: 7.9% showed normal outcomes, 3.3% showed borderline abnormal outcomes and 2.3% showed abnormal outcomes. Moreover, participants who were uneducated made up almost 0.3 of the result percentage in both sections (P value =0.43).

Table 6 Correlation between Education Level and Severity of Anxiety and Depression

		Anxiety			
		Normal	Borderline abnormal	Abnormal	Total
Education Level	Not educated	0	0	1	1
		0.0%	0.0%	0.3%	0.3%
	Middle school	21	8	12	41
		6.9%	2.6%	3.9%	13.5%
	High school	58	21	35	114
		19.1%	6.9%	11.5%	37.5%
	Higher education	76	35	37	148

		25.0%	11.5%	12.2%	48.7%
	Total	155	64	85	304
		51.0%	21.1%	28.0%	100.0%
		Depression			
		Normal	Borderline abnormal	Abnormal	Total
Education Level	Not educated	0	0	1	1
		0.0%	0.0%	0.3%	0.3%
	Middle school	24	10	7	41
		7.9%	3.3%	2.3%	13.5%
	High school	71	29	14	114
		23.4%	9.5%	4.6%	37.5%
	Higher education	98	29	21	148
		32.2%	9.5%	6.9%	48.7%
	Total	193	68	43	304
		63.5%	22.4%	14.1%	100.0%

P value of anxiety=0.64
P value of depression=0.43

Table 7 Correlation between Monthly Income and Severity of Anxiety and Depression

		Anxiety			
		Normal	Borderline abnormal	Abnormal	Total
Monthly Income	3000 or less	57	26	43	126
		18.8%	8.6%	14.1%	41.4%
	5000-10000	64	22	27	113
		21.1%	7.2%	8.9%	37.2%
	20000 or more	34	16	15	65
		11.2%	5.3%	4.9%	21.4%
	Total	155	64	85	304
		51.0%	21.1%	28.0%	100.0%
		Depression			
		Normal	Borderline abnormal	Abnormal	Total
Monthly Income	3000 or less	78	30	18	126
		25.7%	9.9%	5.9%	41.4%
	5000-10000	71	25	17	113
		23.4%	8.2%	5.6%	37.2%
	20000 or more	44	13	8	65
		14.5%	4.3%	2.6%	21.4%
	Total	193	68	43	304
		63.5%	22.4%	14.1%	100.0%

P value of anxiety=0.29
P value of depression=0.94

Regarding the relationship between monthly income and anxiety in Table 7, 18.8% of those who made 3,000 or less had results that were normal, 8.6% had results that were borderline abnormal and 14.1% had abnormal results. Furthermore, in the income category of 5000-10000, 21.1% had normal results, 7.2% had borderline abnormal results and 8.9% had abnormal results. In the category of participants with monthly income of 20000 or more results showed as follow: 11.2% showed normal results, while 5.3% showed borderline abnormal results and 4.9% showed abnormal results (P value =0.29). In the section of depression; 25.7% in the

group of participants with monthly income of 3000 or less showed normal outcomes, 9.9% were borderline abnormal, while 5.9% exhibited abnormal outcomes. Regarding the income category of 5000-10000; 23.4% had normal findings, while 8.2% had borderline abnormal findings and 5.6% with abnormal findings. Moreover; in the category of participants with monthly income of 20000 or more results showed as follow: 14.5% showed normal results, while 4.3% showed borderline abnormal results and 2.6% exhibited abnormal results (P value =0.94).

Table 8 Correlation between Diabetes Mellitus and Severity of Anxiety

		Anxiety			
		Normal	Borderline abnormal	Abnormal	Total
Diagnosed with DM	Yes	5	3	2	10
		1.6%	1.0%	0.7%	3.3%
	No	150	61	83	294
		49.3%	20.1%	27.3%	96.7%
	Total	155	64	85	304
		51.0%	21.1%	28.0%	100.0%

P value of anxiety= 0.73

In Table 8, a total of 294 were healthy individuals, while only 10 participants were diagnosed with diabetes mellitus and the results were as follow: 1.6% of participants with DM were normal, while 1.0% had borderline abnormal outcomes and 0.7% had abnormal outcomes. Furthermore; 49.3% of participants who were not diagnosed with DM had normal results, 20.1% had borderline abnormal results and 27.3% exhibited abnormal results (P value = 0.73).

Table 9 Correlation between Asthma and Severity of Anxiety

		Anxiety			
		Normal	Borderline abnormal	Abnormal	Total
Diagnosed with Asthma	Yes	17	4	10	31
		5.6%	1.3%	3.3%	10.2%
	No	138	60	75	273
		45.4%	19.7%	24.7%	89.8%
	Total	155	64	85	304
		51.0%	21.1%	28.0%	100.0%

P value of anxiety= 0.45

In Table 9, 31 out of the 304 participants in this study had an asthma diagnosis, while 273 did not. Results of the correlation between asthma and anxiety as follow: 5.6% of participants with asthma had normal outcomes, 1.3% were borderline abnormal and 3.3% showed abnormal outcomes. Moreover; 45.4% of participants who were not diagnosed with the condition had normal results, while 19.7% had borderline abnormal results and 24.7% exhibited abnormal results (P value = 0.45).

Table 10 Correlation between Diabetes Miletus and Severity of Depression

		Depression			
		Normal	Borderline abnormal	Abnormal	Total
Diagnosed with DM	Yes	8	2	0	10
		2.6%	0.7%	0.0%	3.3%
	No	185	66	43	294
		60.9%	21.7%	14.1%	96.7%
	Total	193	68	43	304
		63.5%	22.4%	14.1%	100.0%

P value of depression = 0.19

In Table 10, 10 out of 304 participants were diagnosed with DM and about its relation with depression results were as follow: 2.6% had normal findings, while 0.7% were borderline abnormal and almost 0.0% showed signs of abnormal findings. Additionally, the rest of 294 healthy participants: 60.9% were normal, 21.7% were abnormal borderline and 14.1% were abnormal (P value = 0.19).

Table 11 Correlation between Asthma and Severity of Depression

		Depression			
		Normal	Borderline abnormal	Abnormal	Total
Diagnosed with Asthma	Yes	20	8	3	31
		6.6%	2.6%	1.0%	10.2%
	No	173	60	40	273
		56.9%	19.7%	13.2%	89.8%
	Total	193	68	43	304
		63.5%	22.4%	14.1%	100.0%

P value of depression =0.69

In Table 11, 31 out of 304 participants were diagnosed with asthma and the findings of the relation between asthma and depression showed the following results: 6.6% of individuals diagnosed with asthma had normal findings; while, 2.6% were borderline abnormal and about 1.0% exhibited abnormal findings. Furthermore, 56.9% of individuals who were not diagnosed with the condition showed normal results, 19.7% had borderline abnormal results and 13.2 % had abnormal results (P value =0.69).

4. DISCUSSION

It was discovered that there is no statistical relationship between DM and anxiety, in contrast to a study conducted by Erickson et al., (2015) in Germany, which found that anxiety disorders were a risk factor for cardiovascular disease, independent of other risk factors. The disparity between the two researches was attributable to their respective populations. Unlike anxiety, depression and its relationship to diabetes exhibited similar outcomes to a study conducted in the United States by Holt, (2012). Up to one-third of diabetics experience depressed symptoms, which decrease their quality of life and make it more difficult to manage their diabetes. There was no direct statical connection between DM and depression at this time. Regarding asthma, our study did not find a significant relationship between it and anxiety, in contrast to study by Del-Giacco et al., (2016) in Italy. In this study, there was a significant association between asthma and lifetime anxiety disorders, but none with other psychiatric disorders. In addition, levels of historical and present worry were connected with asthma severity. In 48% of cases, asthma before anxiety, 52% of asthma cases are accompanied by anxiety. There were no significant group differences and the risk of asthma, particularly severe, uncontrolled forms, was higher in individuals with lifetime anxiety condition. We believe that the variation in outcomes was a function of a distinct population.

Similar to the findings of Zielinski et al., (2000), our investigation did not find a correlation between depression and other illnesses such as asthma and the nature of this relationship remains unknown. Given that asthma prevalence, morbidity, and mortality are on the rise, there is evidence of a correlation between depression and asthma– associated deaths. In addition, it was discovered that antidepressant therapy is connected with both mood and physical symptom improvement in various general medical diseases.

Researchers suggested conducting clinical studies in asthma patients with both depression symptoms and asthma symptoms as outcome variables to examine the relationship between the two illnesses. These results differ from those of our article and other recently published papers due to the disparity in publication years. Determining the relationship between psychological disorders and chronic diseases such as diabetes and asthma is essential for reducing the burden on this population; therefore, we encourage researchers to continue their work in this area and request that primary health care facilities provide more awareness programs.

5. CONCLUSION

Anxiety and depression showed limited significant relationship with the direct development of DM and asthma. Future studies should focus on determining the prevalence of anxiety and depression as major risk factors in indirect development of DM and asthma.

Ethical Considerations

The ethical approval of the IRB (IRB07-03082022-59) in Almaarefa University, College of Medicine was fulfilled before the start of the data collection. The aim of this study was clarified to the participants of this study and the data was kept confidential.

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Authors' contribution

All authors had substantial contribution to the paper. ESA, GNA, LAA, ABH and DHA designed the study and prepared the proposal. ABH analyzed and interpreted data. ESA wrote results and discussion. DHA checked the paper from plagiarism and did proofreading. KIM checked and revised every step of this paper. All authors critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

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Conflict of interest

The authors declare that there is no conflict of interests.

Data and materials availability

All data sets collected during this study are available upon reasonable request from the corresponding author.

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