

## Depression and Generalized Anxiety disorders among Chronically Ill Middle and Older Adults in Saudi Arabia

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### Abstract

**Background:** Depression and anxiety are common prevalent in patients with chronic disease, and Chronic illness are long-lasting conditions with persistent effects and complications. Depression and anxiety disorders are well known to have a negative but significant impact on the course, outcomes, long-term survival, and treatment efficacy of patients suffering from physical disease. Given the high prevalence and potential negative consequences of this type of comorbidity in elderly patients, there is an urgent need for this study to be conducted due to the scarcity of statistics on the topic among middle and older adults in the Al-Qassim region. On the other hand, early identification of people who are more likely to experience psychological distress is critical in prevention and management strategies.

**Objectives:** To assess the severity of depression and anxiety, using validated self-report measures of middle-aged and older adults; and to determine the association between anxiety and depression levels and socio-demographic characteristics.

**Methods:** In February 2021 and for two months, a cross-sectional study of middle- aged and older adults from Al-Shifa hospital at Al-Qassim region was conducted with questionnaires on socio-demographic and clinical characteristics, and validated Generalized Anxiety Disorders (GAD-7), and Patient Health Questionnaire (PHQ-9) anxiety and depression questionnaires. Two hundreds middle- aged and older adults participants of Al-Shifa Hospital participated in this study and agreed to complete the questionnaire.

**Results:** 79% (n=158) of participants had minimal to mild depression and 21% (n=42) had moderate-to-severe depression; the average PHQ-9 score was 7.05 (M =7.05; SD=4.4), while 81.5% (n=163) of participants had minimal to mild anxiety and 18.5% (n=37) had moderate-to-severe anxiety; the average GAD score was 6.6 (M =6.6; SD =4.3). The significant predictors of moderate-to-severe depression in the logistic regression analysis were: male sex (odds ratio (OR):0.0.272; confidence interval (CI):0.101-0.730) and psychiatric disorders (odds ratio (OR):13.131; confidence interval (CI):2.975-57.949). The significant predictors of moderate-to-severe anxiety in the logistic regression analysis were psychiatric disorders (odds ratio (OR):13.080; confidence interval (CI):3.261-52.464). There was a strong significant positive correlation between PHQ-9 score and GAD score.

**Conclusion:** The study group had higher prevalence of moderate and severe depression, which was significantly associated with female sex and psychiatric disorders; while the prevalence of moderate and severe anxiety was significantly associated with the presence of psychiatric disorders. Our findings reaffirm the importance of providing appropriate specialized interventions to promote the mental health of chronically ill elderly, with a focus on high-risk groups.

**Keywords:** elderly, chronically ill, Saudi Arabia, anxiety, depression, GAD-7 and PHQ-9

## 1. Introduction

Population ageing is one of the most significant global demographic trends (Thapa, Visentin, Kornhaber, & Cleary, 2020). Saudi Arabia demographic trends are changing. The kingdom follows the global increase in aging population. As a result, elderly population of those aged 60 and above is projected to increase from 3% in 2010 to 9.5% and 18.4% in 2035 and 2050, respectively (Khoja et al., 2018).

Ageing can increase the risk of mental health problems and subsequently the prevalence of mental health disorders has been observed to be higher among the older people. More than one fifth of older adults aged experience a mental disorder with depression, dementia and anxiety the most common (Thapa et al., 2020).

In recent decades, the global prevalence of depression and depressive symptoms has increased. In women, the lifetime prevalence of depression ranges from 20% to 25%, while in men it ranges from 7% to 12%. Depression is a significant predictor of quality of life and survival, accounting for roughly half of all psychiatric consultations and 12% of all hospital admissions. (Wang et al., 2017) A meta-analysis found the lifetime prevalence of depressive disorders for older adults was 16.5% in Western countries (Reynolds, Pietrzak, El-Gabalawy, Mackenzie, & Sareen, 2015).

In the general population, anxiety disorders are the most common type of psychiatric disorder. According to the Global Burden of Disease study, anxiety disorders account for approximately 26.8 million disability-adjusted life years and have an annual direct cost of \$42.3 billion. Generalized anxiety disorder (GAD) is characterized by persistent worry as well as a number of additional symptoms such as restlessness, muscle tension, and difficulty concentrating. It is a common and disabling condition in adults that can impair social and occupational functioning. Despite the fact that there is an effective treatment for GAD, only a small percentage of those affected receive it. This is due to the fact that anxiety disorders are frequently misdiagnosed and mismanaged by clinicians in primary care, which is frequently the first point of contact for those with mental health problems (Remes et al., 2018). The prevalence of anxiety disorder was 11.4% among US older adults (Reynolds et al., 2015).

Mental disorders in older adults contribute to increased mortality, higher suicide rates, cognitive disorders, with negative effects on well-being and quality of life. Older adults with mental disorders may experience physical health problems such as stroke and heart disease, increased disability and limited capacity to undertake activities of daily living, increased use of health and home care services, financial issues, and social isolation (Thapa et al., 2020).

The correlates of mental health conditions among older people may differ from younger cohorts, with differing levels of exposure and impacts. Older people are more likely to experience life stressors related to functional ability, cognition and mobility, chronic pain, fragility and bereavement. These factors may contribute to mental disorders such as depression, anxiety, stress, isolation, loneliness or psychological distress in older people (WHO, 2017).

Vink et al. (2008) provided a comprehensive review on the risk factors for depression and anxiety among older adults. Common risk factors for depression and anxiety were female gender, lack of social support, adverse life events, functional limitations, chronic health conditions, poor self-perceived health, personality traits, inadequate coping strategies and psychopathology (Vink, Aartsen, & Schoevers, 2008).

In studies conducted in a variety of countries around the world, depressive and anxiety disorders have been repeatedly established as very common in primary care settings (Goldberg et al., 2017).

The coexistence of depression and generalized anxiety disorder (GAD) is a consistent finding across age groups. Comorbidity in adults is associated with a worse prognosis, greater functional disability, and higher service utilization than in people with a single disorder. Much less is known about the course and consequences of depression with coexisting GAD in the elderly (Schoevers, Deeg, Van Tilburg, & Beekman, 2005).

Despite their prevalence and importance in primary care, as well as their significant contribution to disability, rates of identification and treatment remain very low, with less than half of depressive episodes correctly identified even in high-resource primary care settings (Goldberg et al., 2017).

Depression and anxiety disorders are well known to have a negative but significant impact on the course, outcomes, long-term survival, and treatment efficacy of patients suffering from physical disease (Guerrero & Ramos, 2015).

Given the high prevalence and potential negative consequences of this type of comorbidity in elderly patients, there is an urgent need for this study to be conducted due to the scarcity of statistics on the topic among middle and older adults in the Al-Qassim region. On the other hand, early identification of people who are more likely to experience psychological distress is critical in prevention and management strategies.

The aim of this study is to assess the levels of anxiety and depression in a sample of middle and older adults using validated self-report measures. Our secondary aim was to determine psychologically vulnerable groups by examining the relationship between anxiety and depression levels and socio-demographic characteristics.

## 2. Material and Methods

### 2.1 Study Design & Setting

A cross-sectional study design was conducted among the elderly in Unayzah, Al-Qassim, Saudi Arabia from February to April, 2021.

### 2.2 Study Participants

Chronically ill Elderly attending Alshifa Hospital (geriatric hospital), Unayzah, Al-Qassim region were the target population. The study included both; male and female who agreed to participate, and those who refused to participate; or having any psychiatric disorders will be excluded from the study.

### 2.3 Study Sample

All chronically ill elderly selected from Al Shifa hospital in Unayzah; Al-Qassim region; agreed to participate. Between 1<sup>st</sup>February 2021 until 1<sup>st</sup>April 2021 were included in the study. Two hundreds middle- aged and older adults participants of Al-Shifa Hospital participated in this study and completed the questionnaire.

### 2.4 Data Collection Method and Tools

A structured interview questionnaire was administered to willing participants. The questionnaire divided into 3 parts was used to assess depression and generalized anxiety disorders among study participants at Al Qassim region, Saudi Arabia. A pilot study for 30 users at Al Shifa hospital were carried out before data collection to ensure clarity and easiness of the questionnaire. Asked every participant over the last 2 weeks, how often have you been bothered by any of the following problems?

**Part 1:** A 5-item question; Socio-demographic data of study participants included: age, gender, education level, nationality and having any chronic diseases.

**Part 2:** A 9-item question; using the validated Patient Health Questionnaire (PHQ-9) to assess depression severity. This is calculated by assigning scores of 0, 1, 2, and 3 to the response categories, respectively, of “not at all,” “several days,” “more than half the days,” and “nearly every day.” GAD-7 total score for the seven items ranges from 0 to 27. It is measured by the 5-point Likert scale. Final response scores were identified as: Minimal depression (1-4); moderate depression (5-9); moderately severe depression (15-19); and severe depression (20-27). The psychometric properties of the PHQ-9 scores have been widely supported, and the reliability of the scale among previous studies was excellent ( $\alpha = 0.92$ ). (Shevlin et al., n.d.)

**Part 3:** A 9-item question; using the validated Generalized Anxiety Disorders (GAD-7), This is calculated by assigning scores of 0, 1, 2, and 3 to the response categories, respectively, of “not at all,” “several days,” “more than half the days,” and “nearly every day.” GAD-7 total score for the seven items ranges from 0 to 21. It is measured by the 5-point Likert scale. Final response scores were identified as: minimal anxiety (0-4); mild anxiety (5-9); moderate anxiety 9-14 and severe anxiety (15-21). The GAD-7 has been shown to produce reliable and valid scores in community studies,<sup>17</sup> and the reliability in the current sample was high ( $\alpha = 0.94$ ). (Hinz et al., 2016)

### 2.5 Data Management and Analysis

SPSS program version 25 (Statistical Package for Social science) for Windows. Mean, standard deviation (SD), median, and range were used to describe the quantitative variables (min-max). Numbers (number) and percentages (%) were used to describe the qualitative variables. Chi-Squared test/fisher exact was used to test the relationship between categorical variables. Multivariable binary logistic regression analysis was performed to analyze the risk variables for the occurrence of depression and anxiety in the form of adjusted odds ratio and confidence interval for the odds ratio. The significance of the results was assessed in the term of P-value which was differentiated into: non-significant when P-value > 0.05 and significant when P-value  $\leq$  0.05. The correlation coefficient was used to determine the association between different variables. P-value  $\leq$  0.05 reflected the significant level.

### 2.6 Ethical Consideration

Ethical approval was obtained from the Research, Ethical Committee of the General Directorate of Health, Al-Qassim Region of the Ministry of Health-Saudi Arabia (H-04-Q-001-1442-1140657 on –February 01-2021), and each participant gave written informed consent. This consent was included in the first section of the questionnaire. Participants were informed that the information collected from them would be kept confidential.

### 3. Result

Out of the total 200 middle- aged and older adults participants of Al-Shifa Hospital participated in this study and completed the questionnaire. Their ages ranged from 45 to 80 years, with a mean of  $60.35\pm 7.8$  years. The proportion of Female study participants was 55%. The vast majority the respondents were married (89%). In terms of educational level, 25% of the participants attended preparatory school, followed by 21% in primary school. The mean number of chronic diseases among the middle-aged and older adults participants was  $2\pm 1.5$ . Eighty one percent of the study participants had chronic diseases, 62.5% of study participants had diabetes, 60% had hypertension, and 33.5 % having CHD (Table 1).

Table 1. Socio-Demographic and Clinical Characteristics of the study Participants ( $N=200$ )

Variables	F	%
<b>Sex</b>		
Females	110	55.0
Males	90	45.0
<b>Marital status</b>		
Unmarried	22	11.0
Married	178	89.0
<b>Education</b>		
Illiterate	10	5.0
Read and write	19	9.5
Primary	43	21.5
Preparatory	50	25.0
Secondary	35	17.5
University	34	17.0
Master	5	2.5
PhD	4	2.0
<b>DM</b>	125	62.5
<b>HTN</b>	121	60.5
<b>CHD</b>	67	33.5
<b>Renal</b>	22	11.0
<b>Hematological</b>	13	6.5
<b>Neurological</b>	7	3.5
<b>Psychological</b>	13	6.5
<b>Immunological</b>	7	3.5
<b>Other chronic diseases</b>	21	10.5
<b>Presence of chronic diseases</b>	162	81
<b>Age (mean<math>\pm</math>SD)</b>	60.35 $\pm$ 7.8	
Median	60	
Range (min-max)	45-80	
<b>Number of chronic diseases</b>		
Mean $\pm$ SD	2 $\pm$ 1.5	
Min-max	0-6	
Median	2	

In PATIENT HEALTH QUESTIONNAIRE (PHQ-9), several days was the most common response to Q1 (65.5%), Q2 (62.5%), Q3 (56.5%), Q4 (66.5%), Q5 (56.5%) and Q7 (46%), while Not at all was the most common response to Q6 (53.0%), Q8 (64.5%) and Q9 (75.0%) (Table 2).

Table 2. Frequency distribution PHQ-9 parameters among study participants (no=200)

<b>Depression PHQ-9 (Over the last two weeks, how often have you been bothered by the following problems)</b>	<b>Not at all</b>	<b>Several days</b>	<b>More than half the days</b>	<b>Nearly every day</b>
	<b>F(%)</b>	<b>F(%)</b>	<b>F(%)</b>	<b>F(%)</b>
Q1-Little interest or pleasure in doing things	48(24.0)	131(65.5)	15(7.5)	6(3.0)
Q2-Feeling down, depressed or hopeless	40(20.0)	125(62.5)	25(12.5)	10(5.0)
Q3-Trouble falling or staying asleep, or sleeping too much	46(23.0)	113(56.5)	34(17.0)	7(3.5)
Q4-Feeling tired or having little energy	26(13.0)	133(66.5)	31(15.5)	10(5.0)
Q5-Poor appetite or overeating	53(26.5)	113(56.5)	31(15.5)	3(1.5)
Q6- Feeling bad about yourself or that you are a failure or have let yourself or your family down	106(53.0)	71(35.5)	16(8.0)	7(3.5)
Q7- Trouble concentrating on things, such as reading the newspaper or watching television	86(43.0)	92(46.0)	15(7.5)	7(3.5)
Q8- 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	129(64.5)	57(28.5)	11(5.5)	3(1.5)
Q9- Thoughts that you would be better off dead, or of hurting yourself	150(75.0)	43(21.5)	4(2.0)	3(1.5)

*PHQ-9: Patient Health Questionnaire-9.*

Regarding Generalized Anxiety Disorders (GAD-7), several days was the most common response to Q1 (56.5%), Q2 (49.0%), Q3 (52.5%), Q4 (59.5%), Q5 (54.0%) and Q6 (61.0%). 46.0% reported that this was said, it Not at all for Q7 and also more than a third for Q2(35.5%) and Q5 (32.5%) (Table 3).

Table 3. Frequency distribution GAD-7 parameters among study participants (no=200)

<b>GAD-7 (Over the last two weeks, how often have you been bothered by the following problems)</b>	<b>Not at all</b>	<b>Several days</b>	<b>More than half the days</b>	<b>Nearly every day</b>
	<b>F(%)</b>	<b>F(%)</b>	<b>F(%)</b>	<b>F(%)</b>
Q1. Feeling nervous, anxious, or on edge	53(26.5)	113(56.5)	23(11.5)	11(5.5)
Q2. Not being able to stop or control worrying	71(35.5)	98(49.0)	21(10.5)	10(5.0)
Q3. Worrying too much about different things	45(22.5)	105(52.5)	34(17.0)	16(8.0)
Q4. Trouble relaxing	52(26.0)	119(59.5)	20(10.0)	9(4.5)
Q5. Being so restless that it is hard to sit still	65(32.5)	108(54.0)	18(9.0)	9(4.5)
Q6. Becoming easily annoyed or irritable	38(19.0)	122(61.0)	21(10.5)	19(9.5)
Q7. Feeling afraid, as if something awful might happen	92(46.0)	75(37.5)	17(8.5)	16(8.0)

*GAD-7: Generalized Anxiety Disorder-7.*

The average PHQ-9 score for depression among study participants was 7.05 (mean±SD=7.05±4.4), with mild depression accounting for just over half of participants (51.0%), minimal depression (28.0%), and moderate depression representing 13.0%. The average GAD-7 score for anxiety was 6.6 (mean±SD=6.6±4.3), with 49.5% of participants having mild anxiety, minimal anxiety (32.0%), and moderate anxiety 13.0% (Table 4).

Table 4. Descriptive statistics of the total PHQ-9 and GAD-7 scores and severity among study participants (n=200)

PHQ-9	Values
<u>PHQ-9 score</u>	
Mean±SD	7.05±4.4
Min-max	0-25
Median	6
<u>PHQ-9 categories</u>	
	<u>F(%)</u>
Minimal depression	56(28.0)
Mild depression	102(51.0)
Moderate depression	26(13.0)
Moderately severe depression	14(7.0)
Severe depression	2(1.0)
<u>GAD-7</u>	
<u>GAD -7 score</u>	
Mean±SD	6.6±4.3
Min-max	0-21
Median	6
<u>GAD -7 categories</u>	
	<u>F(%)</u>
Minimal anxiety	64(32.0)
Mild anxiety	99(49.5)
Moderate anxiety	26(13.0)
Severe anxiety	11(5.5)

PHQ-9: Patient Health Questionnaire-9; GAD-7: Generalized Anxiety Disorder-7.

Table 5 shows that the severity of depression in the studied group is higher among those who are 60 years or older (62.0% and 54.8%, respectively), female (53.8% and 59.5%, respectively), married (90.5% and 83.3%, respectively), have low to medium level of education (77.8%&81.0%), have chronic diseases (81.6% & 78.6%) and have two chronic diseases or more (63.7% & 59.5%).

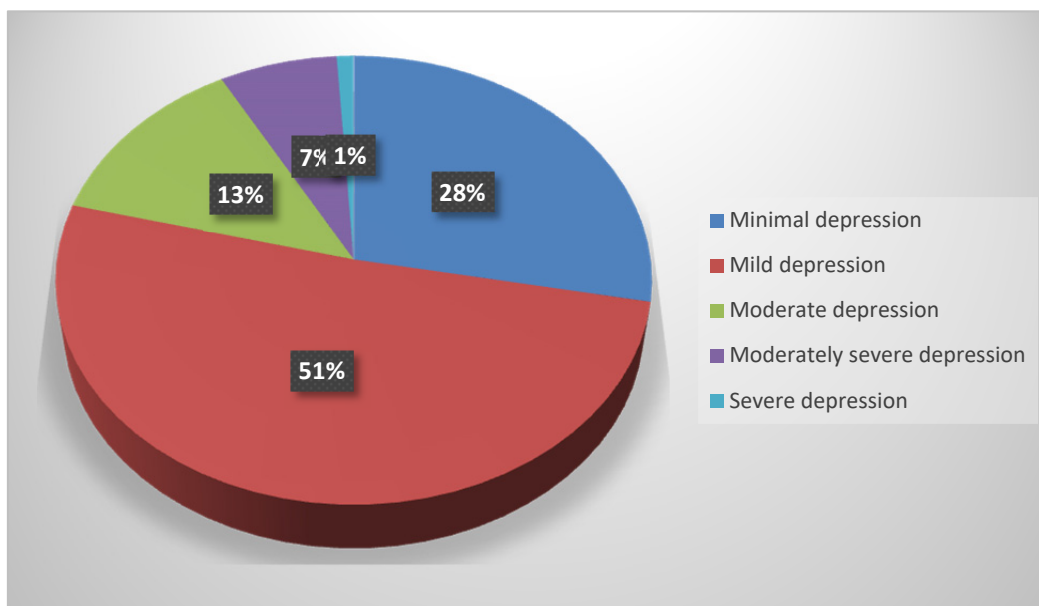


Figure 1. Showing different categories of depression among studied participants

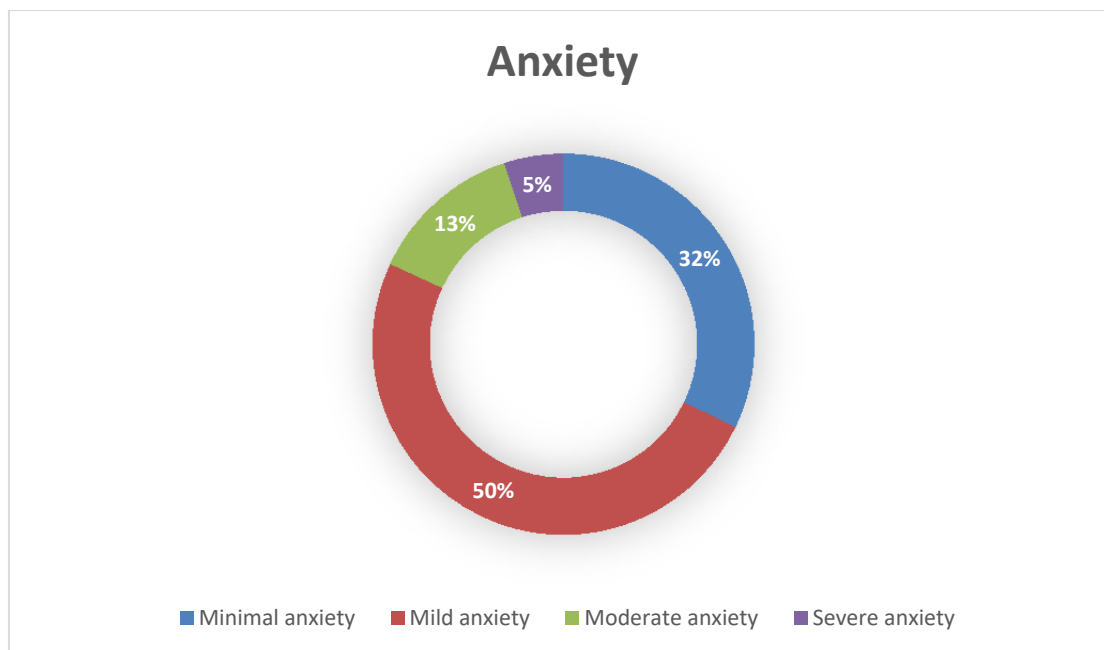


Figure 2. Showing different categories of anxiety among studied participants

Table 5. Comparison between depression severity regarding socio-Demographic and clinical Characteristics of the study Participants (n=200)

Variables	Minimal to mild (n=158)		Moderate to severe (n=42)		p-value
	F	%	F	%	
<b>Age</b>					
≤60 years	98	62.0%	23	54.8%	0.392
>60 years	60	38.0%	19	45.2%	
<b>Sex</b>					
Females	85	53.8%	25	59.5%	0.507
Males	73	46.2%	17	40.5%	
<b>Marital status</b>					
Unmarried	15	9.5%	7	16.7%	0.187
Married	143	90.5%	35	83.3%	
<b>Education Level</b>					
Illiterate	7	4.4%	3	7.1%	0.451
Read and write	14	8.9%	5	11.9%	
Primary	35	22.2%	8	19.0%	
Preparatory	43	27.2%	7	16.7%	
Secondary	24	15.2%	11	26.2%	
University	26	16.5%	8	19.0%	
Master	5	3.2%	0	0.0%	
PhD	4	2.5%	0	0.0%	
<b>Education degree</b>					
Low to medium	123	77.8%	34	81.0%	0.663
High	35	22.2%	8	19.0%	
<b>Chronic Diseases</b>					

<b>Presence of chronic diseases</b>					
No	29	18.4%	9	21.4%	0.652
Yes	129	81.6%	33	78.6%	
<b>Number of chronic diseases</b>					
≤2 diseases	101	63.9%	25	59.5%	0.600
>2 diseases	57	36.1%	17	40.5%	
<b>DM</b>					
No	58	36.7%	17	40.5%	0.654
Yes	100	63.3%	25	59.5%	
<b>HTN</b>					
No	62	39.2%	17	40.5%	0.884
Yes	96	60.8%	25	59.5%	
<b>CHD</b>					
No	103	65.2%	30	71.4%	0.446
Yes	55	34.8%	12	28.6%	
<b>Renal disorders</b>					
No	140	88.6%	38	90.5%	0.731
Yes	18	11.4%	4	9.5%	
<b>Hematological disorders</b>					
No	149	94.3%	38	90.5%	0.371
Yes	9	5.7%	4	9.5%	
<b>Neurological disorders</b>					
No	154	97.5%	39	92.9%	0.148
Yes	4	2.5%	3	7.1%	
<b>Psychological disorders</b>					
No	154	97.5%	33	78.6%	<0.001*
Yes	4	2.5%	9	21.4%	
<b>Immunological disorders</b>					
No	155	98.1%	38	90.5%	0.017*
Yes	3	1.9%	4	9.5%	
<b>Others chronic diseases</b>					
No	143	90.5%	36	85.7%	0.386
Yes	15	9.5%	6	14.3%	

\*  $p$ -value  $\leq 0.05$  is considered significant.

Low to medium education includes: Illiterate, Read and write, Primary, Preparatory and Secondary & high education includes: University, Master and PhD.

There is a statistically significant difference between the severity of depression and psychological disorders ( $p < 0.001$ ), and immunological disorders ( $p = 0.017$ ), but there was no significant difference between depression severity and DM, HTN, CHD, renal disorders, hematological disorders, neurological disorders, and other chronic diseases. After adjustment for age, sex, education, and the presence of a psychiatric disorders, Table 6 showed that male sex and the presence of a previous psychiatric disorder were associated with the occurrence of moderate to severe depression. Having a psychiatric disorder; increased the risk of depression by more than tenfold (OR, 95 percent CI for OR was 13.131, 2.975 to 57.949). Being a male was found to decrease the risk of developing depression (OR, 95 percent CI for OR was 0.272, 0.101 to 0.730) (Table 6).



Table 6. Multivariable binary logistic regression analysis for prediction of moderate to severe depression from different risk factors

Independent variables	B	p-value	Odds Ratio (OR)	95% CI for OR	
				Lower	Upper
Old age ≥ 60 years	0.335	0.494	1.398	0.536	3.645
Male sex	-1.302	0.010*	0.272	0.101	0.730
High education	-0.183	0.774	0.833	0.238	2.914
Presence of psychiatric disorder	2.575	0.001*	13.131	2.975	57.949

\* P-value ≤ 0.05 is considered significant CI=confidence interval.

Table 7 illustrates that the severity of anxiety in the studied group was higher among those who 60 years or older (62.1% and 62.2%, respectively), female (53.4% and 62.2%, respectively), married (88.3% and 83.3%, respectively), low to medium level of education (78.5% and 78.40%, respectively), suffer from chronic diseases (82.2% and 75.7%, respectively) and have chronic diseases or more (63.8% & 59.5%).

Table 7. Comparison between anxiety severity regarding to socio-Demographic and clinical Characteristics of the study Participants (n=200)

Variables	Minimal to mild (n=163)		Moderate to severe (n=37)		p-value
	F	%	F	%	
	<b>Age</b>				
≤60 years	98	60.1%	23	62.2%	
>60 years	65	39.9%	14	37.8%	
<b>Sex</b>					0.332
Females	87	53.4%	23	62.2%	
Males	76	46.6%	14	37.8%	
<b>Marital status</b>					0.772
Unmarried	19	11.7%	3	8.1%	
Married	144	88.3%	34	91.9%	
<b>Education level</b>					0.155
Illiterate	5	3.1%	5	13.5%	
Read and write	14	8.6%	5	13.5%	
Primary	38	23.3%	5	13.5%	
Intermediate	43	26.4%	7	18.9%	
Secondary	28	17.2%	7	18.9%	
University	26	16.0%	8	21.6%	
Master	5	3.1%	0	0.0%	
PhD	4	2.5%	0	0.0%	
<b>Education level</b>					0.999
Low to medium	128	78.5%	29	78.4%	
High	35	21.5%	8	21.6%	
<b>Chronic diseases</b>					
<b>Presence of chronic diseases</b>					0.360

No	29	17.8%	9	24.3%	
Yes	134	82.2%	28	75.7%	
<b>Number of chronic diseases</b>					0.621
≤2 diseases	104	63.8%	22	59.5%	
>2 diseases	59	36.2%	15	40.5%	
<b>DM</b>					0.054
No	56	34.4%	19	51.4%	
Yes	107	65.6%	18	48.6%	
<b>HTN</b>					0.330
No	67	41.1%	12	32.4%	
Yes	96	58.9%	25	67.6%	
<b>CHD</b>					0.879
No	108	66.3%	25	67.6%	
Yes	55	33.7%	12	32.4%	
<b>Renal disorders</b>					0.772
No	144	88.3%	34	91.9%	
Yes	19	11.7%	3	8.1%	
<b>Hematological disorders</b>					0.999
No	152	93.3%	35	94.6%	
Yes	11	6.7%	2	5.4%	
<b>Neurological disorders</b>					0.120
No	159	97.5%	34	91.9%	
Yes	4	2.5%	3	8.1%	
<b>Psychological disorders</b>					<0.001*
No	158	96.9%	29	78.4%	
Yes	5	3.1%	8	21.6%	
<b>Immunological disorders</b>					0.616
No	158	96.9%	35	94.6%	
Yes	5	3.1%	2	5.4%	
<b>Others chronic diseases</b>					0.235
No	148	90.8%	31	83.8%	
Yes	15	9.2%	6	16.2%	

\*  $p$ -value  $\leq 0.05$  is considered significant.

There is a statistically significant difference between the severity of anxiety and psychological disorders ( $P < 0.001$ ), but there was no significant difference between the severity of anxiety and immunological disorders, DM, HTN, CHD, renal disorders, hematological disorders, neurological disorders, and other chronic diseases. After adjusting for age, sex, education, and the presence of psychological disorders, Table 8 revealed that the existence of an existing psychiatric disorder was the only predictor linked with the occurrence of moderate to severe anxiety. The presence of a psychiatric disease, elevated the probability of occurrence by 9 times (OR, 95 percent CI for OR was 13.080, 3.261 to 52.464) (Table 8).

Table 8. Multivariable binary logistic regression analysis for prediction of moderate to severe anxiety from different risk factors

Independent variables	B	p-value	Odds Ratio (OR)	95% CI for OR	
				Lower	Upper
Old age≥60 years	-.341	0.519	0.711	0.252	2.006
Male sex	-.379	0.434	0.684	0.265	1.771
High education	.133	0.837	1.142	.324	4.023
Presence of psychiatric disorder	2.571	0.001*	13.080	3.261	52.464

\*p-value ≤ 0.05 is considered significant; CI=confidence interval.

Correlation Analysis between the PHQ-9 score, the GAD-7 score and age, There was a strong significant linear positive correlation between PHQ-9 score and GAD-7 score ( $r=0.728$ ;  $p<0.001$ ) (Table 9).

Table 9. correlation between total PHQ-9 score, total GAD-7 scores and age

		Total PHQ-9 score	Total GAD-7 score
Age	r	0.051	0.066
	P-value	0.469	0.351
Total PHQ-9 Score	r	----	0.728
	P-value		<0.001*

\*p-value ≤ 0.05 is considered significant, r: Pearson correlation

PHQ-9: Patient Health Questionnaire-9; GAD-7: Generalized Anxiety Disorder-7.

#### 4. Discussion

Anxiety and depression are two of the most common psychological disorders, and they frequently coexist with other psychological disorders, somatic disorders, and each other (Cosco, Doyle, Ward, & McGee, 2012). Screening for anxiety and depression in outpatient clinics, where symptoms are often milder and earlier than those seen by mental health professionals (Goldberg et al., 2017). Understanding the prevalence of comorbid depressive and anxiety disorders in older adults is critical for theoretical conceptualizations, assessment and diagnostic classification, prevention, and interventions. Previous clinical sample studies revealed high levels of comorbidity and its link to the severity of symptoms and disabilities (King-Kallimanis, Gum, & Kohn, 2009).

The prevalence of depression among the studied participants was moderate to severe in 21 % of participants. This finding is consistent with a study finding from Saudi Arabia (22.1 percent) (Alamri, Bari, & Ali, 2017), (22%) from the United States are using the same tool. However, it is lower than in Iran (43.2 percent) and Greece (32.4 percent) (Manea, Gilbody, & McMillan, 2015). Depressive symptoms are especially common in hospitalized elderly people, with rates ranging from 5.9 to 81 percent higher than in the general population (Alamri et al., 2017).

Furthermore, for the PHQ-9 depression severity assessment method, sociodemographic factors found to be significantly associated with depression in this population were a higher likelihood of having chronic immunological disease or psychiatric disorder, which supports previous findings from other studies (Zhong et al., 2010). Besides that, several studies have found that depressive symptoms are significantly higher in hospitalized geriatric patients with medical conditions such as heart disease, diabetes, osteoporosis, stroke, and dementia, complicating the task of detecting depression early in this population (Alamri et al., 2017). The underlying reasons include the illness itself and the high medical costs, as well as inadequate medical care and a poor doctor–patient relationship (Wang et al., 2017).

Moreover, women were affected by depression at a higher rate than men, which is consistent with previous findings that depression is more prevalent in women (Alamri et al., 2017). The severity of depression in the studied group is higher in those 60 years old or older, married, with a low to moderate educational level, with chronic diseases, and with two chronic diseases or more. However, we found that gender and age were not risk factors,

which is consistent with some but not all previous studies (Zhong et al., 2010). Female gender and the presence of psychiatric disorders are significant predictors of depression.

In terms of anxiety, our findings show that those 60 years old or older, females, married status, low to moderate educational level, presence of chronic diseases, and those with two chronic diseases or more have higher anxiety severity. There is a statistically significant difference between the severity of anxiety and the presence of psychological disorders. The PHQ-9 score and the GAD-7 score had a strong significant linear positive correlation. A number of variables were suspected to be associated with comorbid anxiety disorders in late-life depression based on the literature review and were investigated for their associations. Female gender, a history of depressive disorder, and depression severity were all associated with anxiety disorder comorbidity. The explanation for this could be found in the emerging evidence for a common genetic predisposition to anxiety and depression, a theory that has long been investigated with the belief that genetic variation in personality traits could play a role in the development of both anxiety and depression (Suradom et al., 2019). The presence of a psychiatric disease was found to be a strong positive predictor of the occurrence of anxiety in our study.

Anxiety has been linked to dysregulation of the hypothalamic–pituitary–adrenal axis and inflammation, which can lead to poor health. A recent study of hospitalized patients found that people with anxiety disorders had more comorbid physical conditions than people who did not have anxiety disorders. Anxiety, on the other hand, could be a reaction to an underlying medical illness, and physical illness can exacerbate anxiety; the possibility of a bidirectional relationship between anxiety and physical health should not be ruled out. However, compelling evidence from prospective studies has shown that anxiety can indeed increase the risk of serious chronic conditions such as cancer and coronary heart disease (CHD) (Remes et al., 2018).

When looking into the links between mental disorders and health outcomes, early-onset or late-onset anxiety disorders, as well as psychiatric comorbidity, should be taken into account. A large study of over 1 million Swedish men followed for over 20 years found that early-onset mental disorders were associated with an increased risk of incident CHD. Anxiety disorders, such as GAD, are frequently comorbid with major depressive disorder (MDD), and psychiatric comorbidity has been linked to a lower quality of life, a worse prognosis, and a higher use of mental health services than pure forms of the disorder. Identifying clinical aspects such as early-onset or late-onset forms of the condition, episode chronicity and frequency, and comorbidity with MDD can thus lead to better clinical management and insight into groups at high risk for health-care utilization (Remes et al., 2018).

## 5. Conclusion

The current study found a high prevalence of depression and anxiety disorders among the participants we studied. Using validated semi-structured diagnostic interviews, we discovered that using PHQ-9 10 to estimate depression prevalence yields estimates of 21%. There is a statistically significant difference between the severity of depression and psychological and immunological disorders. Almost 18.5 percent of study participants experienced moderate to severe anxiety. There is a statistically significant difference between the severity of anxiety and the presence of psychological disorders.

## Recommendations

Our findings indicate an urgent need for clinicians in Saudi Arabia to improve their ability to detect and treat depression and anxiety in chronically ill middle and late adults. Our findings reaffirm the importance of providing appropriate specialized interventions to promote the mental health of chronically ill elderly, with a focus on high-risk groups.

## Strength and limitations

The fact that we investigated a significant number of previously reported variables with appropriate measurements is one of the study's strengths. To date, this is one of the few and most extensive studies on comorbid depression and anxiety disorders in middle and late adults in Saudi Arabia's Al-Qassim region.

This study did have some limitations. First, we collected data from middle and older adult patients who attended outpatient clinics at Alshifaa hospital in Al-Qassim region. Second, because this study was conducted on people aged 45 and up, it may not be applicable to younger age groups.

## Competing Interests Statement

The authors declare that there are no competing or potential conflicts of interest.

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