RESEARCH

Prevalence and correlates of stress, anxiety, and depression in patients with chronic diseases: a cross-sectional study

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Abstract

Background Many chronic diseases, including diabetes, heart disease, cancer, and respiratory problems, can lead to emotional distress, anxiety, and depression among patients. Likewise, psychological conditions such as anxiety and depression can elevate the risk of developing chronic diseases. The objective of the study was to examine the prevalence of stress, anxiety, and depression in individuals with chronic diseases, as well as to identify the chronic disease with the highest prevalence among all chronic conditions and the factors associated with stress, anxiety, and depression.

Results In our study, the prevalence rate of stress, anxiety, and depression in patients having chronic diseases was found to be 68.7%, 51.1%, and 58.8%, respectively. The chronic diseases which are included in this study are cardiovascular diseases, metabolic disorders, cancer, respiratory disorders, degenerative disorders, chronic kidney disease, and chronic liver disorders. Among these diseases, cardiovascular disease patients were found to have the highest prevalence of stress, anxiety, and depression. The psychosocial determinants that can trigger stress, anxiety, and depression were analyzed. The factors like age, marital status, primary caretakers of the patient, social isolation, length of hospital stay, social relationships, number of frequent visits to the hospital/month, and the lifestyle of the patient have a significant association with the levels of stress, anxiety, and depression. Factors like monthly income and educational status were also found to be statistically significant with the stress levels, and length of intensive care unit (ICU) stay was significantly associated with the levels of anxiety.

Conclusion In conclusion, this study found a high prevalence of stress, anxiety, and depression among patients with chronic disease(s). Among all the chronic diseases, cardiovascular disease patients were found to have the highest prevalence of stress, anxiety, and depression. In addition, our study also identified several psychosocial factors that contribute to the development of these mental health conditions which exacerbate the present chronic condition of the patient. These findings highlight the importance of considering the impact of chronic disease on mental health problems.

Keywords Chronic diseases, Psychosocial factors, Stress, Anxiety, Depression

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Background

The population of the world is being silently engulfed by chronic illnesses, which are spreading to all parts of the globe [1]. The Centers for Disease Control and Prevention (CDC) defined chronic disease as a condition that persists for a year or more and impedes activities of daily life, requiring continuous medical treatment [2]. It can also be defined as a condition that lasts

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3 months or more and meets the criteria set out by the US National Centre for Health Statistics [3]. Chronic illnesses often cannot be healed by drugs or vaccinations, and they do not just go away [4]. According to the World Health Organization (WHO), chronic illnesses are the main global cause of mortality and disability [5]. They also place a tremendous and expanding burden on people, families, society, and global healthcare systems [6].

The Australian Institute of Health and Welfare (AIHW) commonly reports on 10 major chronic condition groups: arthritis, asthma, chronic liver diseases, cancer, cardiovascular disease, chronic obstructive pulmonary disease, diabetes, chronic kidney disease, mental health conditions, and osteoporosis [7]. The chronic diseases which are included in this study are cardiovascular diseases, metabolic disorders, cancer, respiratory disorders, degenerative disorders, chronic kidney disease, and chronic liver disorders.

Seven of the top ten causes of mortality worldwide in 2019 were noncommunicable illnesses. These seven factors, or 80% of the top 10, were responsible for 44% of all fatalities. However, 74% of fatalities worldwide in 2019 were caused by noncommunicable illnesses as a whole [8]. Nearly 75% of fatalities from noncommunicable diseases (NCDs) take place in lower-middle-income countries (LMIs), which are already struggling to control large infectious disease epidemics like human immunodeficiency virus (HIV)/acquired immune deficiency syndrome (AIDS) and tuberculosis (TB). Given that many LMIs are going through a fast epidemiological change, the development of NCDs as a major cause of death presents the risk of stressing their health systems twice as much [9].

In India, with a population of 1.34 billion, scientists who are concerned with global health actively follows the disease load. The two seemingly unrelated disease clusters that make up the majority of India's disease burden are cardiovascular disease and diabetes which are diagnosed in 18% and 27% of Indian people, respectively, with the prevalence of both conditions being significantly higher in urban than rural areas. Only 19% of rural residents have health insurance, and over 10% do not have access to basic medications [10].

People who suffer from chronic diseases have considerable difficulties that influence their physical and emotional health. It is commonly known that people with chronic illnesses are more likely than the general population to experience mental health problems [11, 12]. Those mental health problems that can affect the social and psychological aspects of an individual's life include stress, anxiety, depression, post-traumatic stress disorders, and obsessive–compulsive disorders [13].

Stress is a process that strains the body to cope with environmental demands, leading to psychological and biological changes that may contribute to illness. Prolonged stress can negatively impact the immune, cardiovascular, neuroendocrine, and central nervous systems [14]. Untreated chronic stress can result in disabilities like high blood pressure, insomnia, anxiety, and muscle pain, as well as increase the risk of heart disease, depression, obesity, and other chronic illnesses. Studies have investigated stress, anxiety, and depression in patients with chronic diseases, finding disruptions in their psycho-emotional state [15]. However, if stress remains intensified, it can amplify anxiety and can lead to mood disorders, most commonly depression. Repeated or recurrent stress can worsen the situation [14].

Anxiety is a mental health disorder characterized by excessive worry or fear that impacts daily life. It includes panic disorders, generalized anxiety disorder, phobic disorders, post-traumatic stress disorder (PTSD), and obsessive–compulsive disorder (OCD) according to the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision* (DSM IV-TR). Some studies show a significant correlation between anxiety and depression saying that anxiety leads to depression [15]. The co-morbid state of depression along with other chronic diseases incrementally worsens health compared with depression alone, with any of the chronic diseases alone, and with any combination of chronic diseases without depression. Several studies have shown that there is an increased risk of having major depression in people with one or more chronic diseases [16].

The increasing prevalence of stress, anxiety, and depression among patients with chronic diseases raises the question of how these disorders compare in terms of their impact on overall individual health [12]. Chronic diseases often have a longer disease course and are associated with high public health expenditures, including the consumption of pharmacological therapies, as well as a challenging prognosis. Consequently, chronic diseases impose significant psychological stress and detrimentally affect mental health, serving as negative psychological stimuli [17].

Anxiety and depression often coexist and are typically not distinguished from one another [16]. Hence, it is crucial to investigate the prevalence of stress, anxiety, and depression in patients with chronic illnesses, as well as identify the risk factors that contribute to the development of these conditions.

Methodology

This cross-sectional study was conducted at SS Institute of Medical Sciences and Research Centre, a tertiary care teaching hospital of Davangere, Karnataka,

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from April 2022 to October 2022. A total of 430 hospitalized patients with chronic diseases were identified, but a total of 323 inpatients were enrolled in the study according to the inclusion criteria.

Patients over the age of 18 years, those with a chronic illness, and those who were willing to participate in the study were considered to be included. Patients with a previous history of psychological disorders, those under the age of 18 years, those who refused to sign the consent form, and those who withdrew from the study were considered to be excluded.

The sample size was calculated using Cochran's formula, i.e., $S = (z1-\alpha/2)2\ pq/e2$ where $Z = 1.96$ (when the confidence interval is 95%), d is the absolute error or precision (10%), and P is the expected proportion in population based on other studies.

Based on prior studies, we assume that 50% of hospitalized patients may experience anxiety or depression, considering this as a worst-case scenario [18].

A self-designed questionnaire was prepared in English and Kannada (primary language of Karnataka people), and the patients, who gave their written informed consent to participate in the study which was approved by the hospital ethical committee, answered the questionnaire face to face. An average time of 20–30 min was taken to complete the questionnaire. The questionnaire had of three parts:

- Sociodemographic: The data on patient's gender, age, marital status, an educational level, employment status, income, primary caretakers, and lifestyle were collected.
- Social: Questions about social habits, behavior towards others, avoidance by family or society, ability to tackle problems if any, and other life-stressing problems were asked.
- Medical condition and history: Patients present condition (chronic disease), other comorbidities, length of hospital or ICU stay, any permanent disabilities, and number of frequent visits to hospital/month.

To assess the levels of stress, anxiety, and depression, the scales like Perceived Stress Scale (PSS) and Hospital Anxiety and Depression Scale (HADS) were used:

1. For stress: A standardized and validated Hindi version of the PSS-10 [19] was used. On a 5-point Likert scale, respondents rate how unexpected, unmanageable, and overcrowded their life has been during the previous month (0 = never, 1 = almost never, 2 = sometimes, 3 = fairly often, 4 = very often).

The PSS score is calculated in the following way:

- The four things that were affirmatively mentioned (items 4, 5, 7, and 8) had their scores reversed. Change the results for these four questions as follows: 0 = 4, 1 = 3, 2 = 2, 3 = 1, and 4 = 0.
- Sum the total score of the items
- Individual PSS scores can vary from 0 to 40, with higher levels indicating more perceived stress. If the score falls between 0 and 13 considered low stress, 14–26 has moderate stress, and 27–40 is considered as high perceived stress.

2. For anxiety and depression: We used Hospital Anxiety and Depression Scale (HADS), which Zigmong and Snaith established in 1983 [20]. There are seven questions for depression and seven more for anxiety. By adding the responses to the seven questions for each subscale, the total depression and anxiety scores are determined. Individuals are categorized as having normal depression or anxiety if their score falls between 0 and 7, borderline depression or anxiety if it falls between 8 and 10, and excessive depression or anxiety if it falls between 11 and 21.

Statistical analysis

Data obtained in Microsoft Excel spreadsheet was coded and analyzed using SPSS software version 20. Demographic variables, social life, and psychological parts like stress, anxiety, and depression were analyzed using descriptive statistics including mean, standard deviation, and frequency. The association between dependent and independent variables was analyzed using the chi-square test. P-value < 0.05 was considered statistically significant.

Results

Sociodemographic characteristics

Table 1 shows the sociodemographic characteristics of the study sample (323 participants) who were recruited from a tertiary care teaching hospital, Karnataka, India. It was found that majority of the participants were aged between 18 and 64 years (71.8%); 58.5% were males; most of them were married and taken care by spouse (78.3%); nearly one-quarter of participants were illiterates (30.7%) and 52.9% were unemployed, and most of them had monthly income < 5000/- rupees; 9.3% of people were having sedentary lifestyle; 30.7% had smoking habit; and 4.6% had both smoking and drinking habit. A total of 17.3% participants were staying in hospital for > 15 days, 6.5% stayed in ICU for > 5 days, and 2.8% were having permanent disabilities. Most of the participants used to revisit the hospital every month for treatment.

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Table 1 Sociodemographic characteristics of the patients

Variable	N (%)
Age	
18–64	232 (71.8)
65 and more	91 (28.2)
Gender	
Male	189 (58.5)
Female	134 (41.5)
Primary caretakers	
Spouse	241 (74.6)
Children	66 (20.4)
Parents	10 (3.1)
Others	6 (1.9)
Educational status	
Illiterate	99 (30.7)
Primary	120 (37.2)
Secondary	68 (21.1)
University	36 (11.1)
Marital status	
Single	5 (1.5)
Married	253 (78.3)
Widowed	65 (20.1)
Employment status	
Employed	152 (47.1)
Unemployed	171 (52.9)
Monthly income (in rupees)	
< 5000/-	207 (64.1)
> 5000/-	116 (35.9)
Lifestyle	
Sedentary	30 (9.3)
< 1 h of moderate activity of work	81 (25.1)
1 h of moderate activity of work	79 (24.5)
> 1 h of moderate activity of work	133 (41.2)
Behavior towards others	
Good	165 (51.1)
Fair	91 (28.2)
Poor	67 (20.7)
Social habits	
Nil	188 (58.2)
Smoking	99 (30.7)
Alcoholic	14 (4.3)
Chewing tobacco	3 (0.9)
Smoking, alcoholic	15 (4.6)
Smoking, chewing tobacco	3 (0.9)
Chewing tobacco, alcoholic	1 (0.3)
Avoiding problems	
No	196 (60.7)
Somewhat	24 (7.4)
Not often	21 (6.5)
Often	85 (25.4)

Table 1 (continued)

Variable	N (%)
Other life stressors	
Nil	297 (92.0)
Family problems	11 (3.4)
Job stress	8 (2.5)
Financial	7 (2.2)
Length of hospital stay (days)	
Less than 15 days	267 (82.7)
15 or more days	56 (17.3)
ICU stay (days)	
< 5 days	302 (93.5)
5 or more days	21 (6.5)
Permanent disabilities	
No	314 (97.2)
Yes	9 (2.8)
Number of frequent visits to hospital/month	
< 5 days	291 (90.1)
5 or more days	32 (9.9)

Numbers are expressed as frequency N (percentage %)

Table 2 Level of stress, anxiety, and depression

		N	%
Level of stress	Low stress	30	9.3
	Moderate stress	71	22.0
	High perceived stress	222	68.7
Level of anxiety	Normal	53	16.4
	Borderline abnormal	105	32.5
	Abnormal	165	51.1
Level of depression	Normal	61	18.9
	Borderline abnormal	72	22.3
	Abnormal	190	58.8

N frequency, % percentage

Table 3 Descriptive statistics

Variables	Minimum	Maximum	Mean	Std. deviation
Stress	3	40	28.03	7.86
Anxiety	2	21	11.49	4.60
Depression	0.0	21	11.87	5.18

Prevalence of stress, anxiety, and depression among patients with chronic disease

Table 2 shows that 68.7% of participants were found to have high perceived stress, 51.1% were having abnormal anxiety levels, and 58.8% participants had abnormal depression levels.

From Table 3, it is interpreted that the mean and standard deviation of stress among patients with chronic

disease were 28.03 and 7.86, the mean and standard deviation of anxiety were 11.49 and 4.60, and the mean and standard deviation of depression were 11.87 and 5.18, respectively.

Chronic diseases

Figure 1 shows the frequency of different types of chronic disease included. Out of all the participants (100%), one-third of them have cardiovascular diseases (73.1%) followed by metabolic disorders (54.5%), kidney diseases (27.6%), respiratory problems (11.8%), liver diseases (6.5%), cancer (5.6%), and degenerative disorders (5.3%).

Cross-tabulation of chronic disease with stress, anxiety, and depression

Table 4 shows that patients with cardiovascular disease have high stress, anxiety, and depression levels compared to other chronic disease patients.

Association between sociodemographic variables and dependent variables

A. Association between sociodemographic variables and stress The association of the sociodemographic parameters with the stress levels in a patient is of great importance. From Table 5, the factors like age, primary caretakers, educational status, monthly income, lifestyle of the patient, social relationships, social isolation, length of hospital stay, and number of frequent visits to hospital/month were found to be statistically significant and correlated with the stress levels of a patient with P-value < 0.05.

B. Association between sociodemographic variables and anxiety Table 6 shows that the factors like age, primary caretakers, marital status, the lifestyle of the patient, social relationships, social isolation, length of hospital stay, length of ICU stay, and number of frequent visits to hospital/month were found to be statistically significant with the anxiety levels of a patient with P-value < 0.05.

C. Association between sociodemographic variables and depression Table 7 shows that the factors like age, primary caretakers, marital status, the lifestyle of the patient, social relationships, social isolation, length of hospital stay, and the number of frequent visits to hospital/month were found to be statistically significant with the depression levels of a patient with P-value < 0.05.

Discussion

A number of epidemiological studies on stress, anxiety, and depression were conducted on various chronic diseases worldwide with different research methods and designs. The present study aimed to investigate the prevalence and associated factors of stress, anxiety, and depression in patients with various chronic diseases. The specific chronic diseases included in the study were cardiovascular diseases, metabolic disorders, cancer, respiratory disorders, degenerative disorders, chronic kidney disease, and chronic liver disorders. Among these chronic diseases, cardiovascular disease was found to have the highest prevalence. By including a diverse range of chronic diseases, the study aimed to provide a comprehensive understanding of the psychological impact on
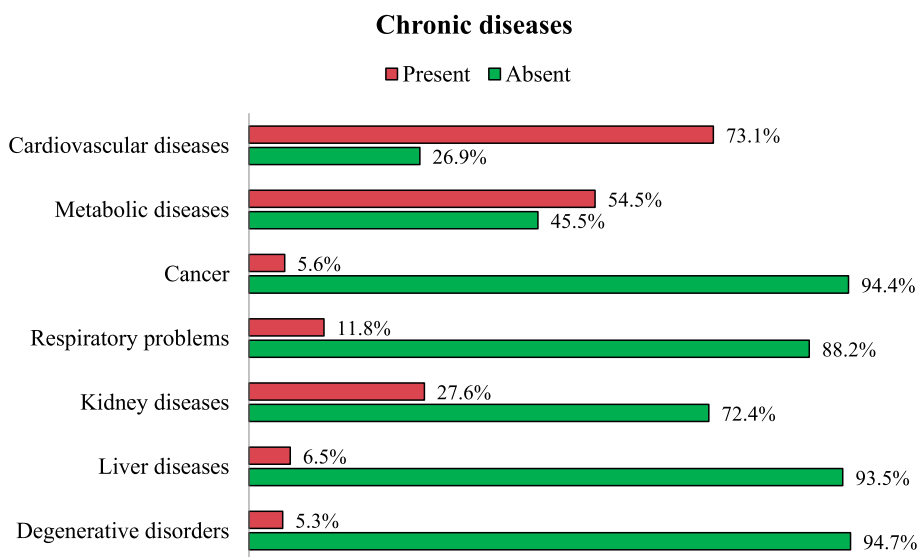

Fig. 1 Prevalence of chronic diseases among the selected population

Table 4 Cross-tabulation of chronic disease with stress, anxiety, and depression

Chronic diseases		Level of stress, N (%)			Level of anxiety, N (%)			Level of depression, N (%)		
		Low	Moderate	High perceived	Normal	Borderline abnormal	Abnormal	Normal	Borderline abnormal	Abnormal
Cardiovascular diseases	No	17 (5.3)	26 (8.0)	44 (13.6)	31 (9.6)	21 (6.5)	35 (10.8)	31 (9.6)	18 (5.6)	38 (11.8)
	Yes	13 (4.0)	45 (13.9)	178 (55.1)	22 (6.8)	84 (26.0)	130 (40.2)	30 (9.3)	54 (16.7)	152 (47.1)
Metabolic diseases	No	18 (5.6)	38 (11.8)	91 (28.2)	28 (8.7)	47 (14.6)	72 (22.3)	30 (9.3)	36 (11.1)	81 (25.1)
	Yes	12 (3.7)	33 (10.2)	131 (40.6)	25 (7.7)	58 (18.0)	93 (28.8)	31 (9.6)	36 (11.1)	109 (33.7)
Cancer	No	30 (9.3)	71 (22.0)	204 (63.2)	53 (16.4)	97 (30.0)	155 (48.0)	61 (18.9)	72 (22.3)	172 (53.3)
	Yes	0 (0.0)	0 (0.0)	18 (5.6)	0 (0.0)	8 (2.5)	10 (3.1)	0 (0.0)	0 (0.0)	18 (5.6)
Respiratory problems	No	24 (7.4)	64 (19.8)	197 (61.0)	46 (14.2)	96 (29.7)	143 (44.3)	53 (16.4)	64 (19.8)	168 (52.0)
	Yes	6 (1.9)	7 (2.2)	25 (7.7)	7 (2.2)	9 (2.8)	22 (6.8)	8 (2.5)	8 (2.5)	22 (6.8)
Kidney diseases	No	29 (9.0)	55 (17.0)	150 (46.4)	53 (16.4)	64 (19.8)	117 (36.2)	59 (18.3)	52 (16.1)	123 (38.1)
	Yes	1 (0.3)	16 (5.0)	72 (22.3)	0 (0.0)	41 (12.7)	48 (14.9)	2 (0.6)	20 (6.2)	67 (20.7)
Liver diseases	No	30 (9.3)	68 (21.1)	204 (63.2)	52 (16.1)	101 (31.3)	149 (46.1)	60 (18.6)	69 (21.4)	173 (53.6)
	Yes	0 (0.0)	3 (0.9)	18 (5.6)	1 (0.3)	4 (1.2)	16 (5.0)	1 (0.3)	3 (0.9)	17 (5.3)
Degenerative disorders	No	30 (9.3)	69 (21.4)	207 (64.1)	52 (16.1)	97 (30.0)	157 (48.6)	60 (18.6)	68 (21.1)	178 (55.1)
	Yes	0 (0.0)	2 (0.6)	15 (4.6)	1 (0.3)	8 (2.5)	8 (2.5)	1 (0.3)	4 (1.2)	12 (3.7)

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Table 5 Association between sociodemographic variables and stress

		Level of stress			χ^2	df	*p-value*
		Low stress	Moderate stress	High perceived stress			
Age category (years)	18–64	25	59	148	9.34	2	***<0.01****
	65 and more	5	12	74			
Gender	Male	20	37	132	2.1	2	*0.35*
	Female	10	34	90			
Primary caretakers	Spouse	20	61	160	33.3	6	***<0.001****
	Children	3	8	55			
	Parents	5	2	3			
	Others	2	0	4			
Educational status	Illiterate	3	15	81	14.24	6	***<0.05****
	Primary	13	29	78			
	Secondary	10	19	39			
	University	4	8	24			
Marital status	Single	2	1	2	13.39	4	***<0.01****
	Married	24	63	166			
	Widowed	4	7	54			
Employment	Employed	20	31	101	5.18	2	*0.075*
	Unemployed	10	40	121			
Monthly income (rupees)	<5000/-	13	45	149	6.52	2	***<0.05****
	>5000/-	17	26	73			
Lifestyle	Sedentary	1	4	25	19.59	6	***<0.01****
	<1 h of moderate activity of work	4	12	65			
	1 h of moderate activity of work	4	20	55			
	>1 h of moderate activity of work	21	35	77			
Behavior towards others	Good	25	51	89	36.32	4	***<0.001****
	Fair	4	13	74			
	Poor	1	7	59			
Social habits	Nil	15	44	129	8.42	12	*0.75*
	Smoking	14	21	64			
	Alcoholic	1	1	12			
	Chewing tobacco	0	1	2			
	Smoking, alcoholic	0	3	12			
	Smoking, tobacco	0	1	2			
	Tobacco, alcoholic	0	0	1			
Other life stressors	Nil	29	66	202	2.77	6	*0.84*
	Family problems	0	2	9			
	Job stress	1	2	5			
	Financial	0	1	6			
Avoiding problems	No	26	56	114	26.94	6	***<0.001****
	Somewhat	0	3	21			
	Not often	1	3	17			
	Often	3	9	70			
Length of hospital stay (days)	Less than 15 days	30	66	171	16.46	2	***<0.001****
	15 or more days	0	5	51			
ICU stay (days)	<5 days	30	69	203	5.22	2	*0.074*
	5 or more days	0	2	19			
Permanent disabilities	No	30	70	214	1.91	2	*0.386*
	Yes	0	1	8			
Number of frequent visits to hospital/month	<5 days	30	68	193	8.34	2	***<0.05****
	5 or more days	0	3	29			

χ^2 chi-square, *df* degree of freedom. *P-value < 0.05, considered as statistically significant

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Table 6 Association between sociodemographic variables and anxiety

		Level of anxiety			x^2	df	p-value
		Normal	Borderline abnormal	Abnormal			
Age category (years)	18–64	47	69	116	9.57	2	**< 0.01***
	65 and more	6	36	49			
Gender	Male	26	61	102	2.7	2	0.259
	Female	27	44	63			
Primary caretakers	Spouse	43	86	112	15.22	6	**< 0.05***
	Children	5	16	45			
	Parents	4	2	4			
	Others	1	1	4			
Educational status	Illiterate	9	27	63	11.75	6	0.068
	Primary	23	40	57			
	Secondary	15	26	27			
	University	6	12	18			
Marital status	Single	2	1	2	13.76	4	**< 0.01***
	Married	47	88	118			
	Widowed	4	16	45			
Employment	Employed	23	51	78	0.385	2	0.825
	Unemployed	30	54	87			
Monthly income (rupees)	< 5000/-	33	75	99	3.73	2	0.155
	> 5000/-	20	30	66			
Lifestyle	Sedentary	2	4	24	20.09	6	**< 0.01***
	< 1 h of moderate activity of work	6	29	46			
	1 h of moderate activity of work	18	28	33			
	> 1 h of moderate activity of work	27	44	62			
Behavior towards others	Good	43	66	56	45.21	4	**< 0.001***
	Fair	7	24	60			
	Poor	3	15	49			
Social habits	Nil	33	64	91	10.01	12	0.616
	Smoking	17	31	51			
	Alcoholic	2	1	11			
	Chewing tobacco	0	1	2			
	Smoking, alcoholic	1	6	8			
	Smoking, chewing tobacco	0	2	1			
	Chewing tobacco, alcoholic	0	0	1			
Other life stressors	Nil	49	99	149	7.6	6	0.269
	Family problems	3	1	7			
	Job stress	1	1	6			
	Financial	0	4	3			
Avoiding problems	No	47	71	78	35.03	6	**< 0.001***
	Somewhat	0	4	20			
	Not often	1	5	15			
	Often	5	25	52			
Length of hospital stay (days)	Less than 15 days	52	93	122	20.15	2	**< 0.001***
	15 or more days	1	12	43			
ICU stay (days)	< 5 days	53	100	149	6.98	2	**< 0.05***
	5 or more days	0	5	16			
Permanent disabilities	No	52	103	159	0.9	2	0.64
	Yes	1	2	6			
Number of frequent visits to hospital/month	< 5 days	53	94	144	7.34	2	**< 0.05***
	5 or more days	0	11	21			

x^2 chi-square, *df* degree of freedom. *P-value < 0.05, considered as statistically significant

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Table 7 Association between sociodemographic variables and depression

		Level of depression			χ^2	df	*p-value*
		Normal	Borderline abnormal	Abnormal			
Age category (years)	18–64	51	53	128	6.16	2	*< 0.05**
	65 and more	10	19	62			
Gender	Male	35	42	112	0.048	2	*0.976*
	Female	26	30	78			
Primary caretakers	Spouse	50	57	134	15.54	6	*< 0.05**
	Children	5	12	49			
	Parents	5	1	4			
	Others	1	2	3			
Educational status	Illiterate	13	20	66	8.15	6	*0.23*
	Primary	23	28	69			
	Secondary	19	13	36			
	University	6	11	19			
Marital status	Single	3	0	2	11.64	4	*< 0.05**
	Married	52	59	142			
	Widowed	6	13	46			
Employment	Employed	30	37	85	1.06	2	*0.588*
	Unemployed	31	35	105			
Monthly income (rupees)	< 5000/-	35	45	127	1.89	2	*0.38*
	> 5000/-	26	27	63			
Lifestyle	Sedentary	2	4	24	13.39	6	*< 0.05**
	< 1 h of moderate activity of work	11	16	54			
	1 h of moderate activity of work	14	20	45			
	> 1 h of moderate activity of work	34	32	67			
Behavior towards others	Good	47	41	77	31.31	4	*< 0.001**
	Fair	11	22	58			
	Poor	3	9	55			
Social habits	Nil	35	44	109	10.32	12	*0.588*
	Smoking	21	24	54			
	Alcoholic	2	3	9			
	Chewing tobacco	0	0	3			
	Smoking, alcoholic	2	0	13			
	Smoking, chewing tobacco	1	1	1			
	Chewing tobacco, alcoholic	0	0	1			
Other life stressors	Nil	57	65	175	2.84	6	*0.83*
	Family problems	1	3	7			
	Job stress	2	3	3			
	Financial	1	1	5			
Avoiding problems	No	49	55	92	31.99	6	*< 0.001**
	Somewhat	2	2	20			
	Not often	3	5	13			
	Often	7	10	65			
Length of hospital stay (days)	Less than 15 days	59	64	144	16.62	2	*< 0.001**
	15 or more days	2	8	46			
ICU stay (days)	< 5 days	59	68	175	1.76	2	*0.416*
	5 or more days	2	4	15			
Permanent disabilities	No	61	71	182	3.69	2	*0.158*
	Yes	0	1	8			
No. of frequent visits to hospital/month	< 5 days	60	71	160	17.89	2	*< 0.001**
	5 or more days	1	1	30			

χ^2 chi-square, *df* degree of freedom. **P*-value < 0.05, considered as statistically significant

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patients across different medical conditions. The study focus on stress, anxiety, and depression in patients with chronic diseases highlights the importance of addressing mental health in the context of chronic illness.

The present study found that chronic diseases were associated with the risk of stress, anxiety, and depression. A previous research conducted by Liu et al. [17] highlighted that individuals with noncommunicable disorders, which are chronic diseases, had higher rates of psychological symptoms. Similarly, the studies conducted by Wong et al. [21] and Gerontoukou et al. [15] identified a connection between chronic diseases and the emergence of psychiatric conditions. They found high rates of depression and anxiety symptoms among their study participants, which is consistent with the present study's findings. These studies emphasize the psychological impact of chronic diseases.

The studies by Scott et al. [22] and Kohlmann et al. [23] explored the association between depression and anxiety, noting that these two conditions often co-occur. They further suggested that chronic diseases may cause anxiety and depression, while anxiety and depression may also contribute to the development of chronic diseases. Additionally, the presence of comorbidities was identified as a predictive factor for stress and anxiety, reinforcing the interplay between mental health and chronic diseases. Collectively, these studies provide support for the present study's findings that chronic diseases are associated with an increased risk of stress, anxiety, and depression. They highlight the bidirectional relationship between mental health and chronic illnesses, suggesting that addressing psychological well-being is essential in the context of managing chronic diseases. Furthermore, the presence of comorbidities may exacerbate stress and anxiety levels in individuals with chronic diseases. These findings underscore the importance of integrating mental healthcare into the overall management of chronic illnesses to improve patient outcomes and overall well-being.

In our study, cardiovascular diseases were found to be the most prevalent among the chronic diseases included in the sample, comprising approximately one-third of the participants. Metabolic diseases and kidney diseases followed cardiovascular diseases in terms of prevalence within the sample. This distribution of chronic diseases within the study sample provides valuable information about the population being studied and their specific health conditions. Understanding the distribution of chronic diseases in the sample is important for several reasons like it may help researchers and healthcare professionals to identify the most common chronic conditions affecting the population and allocate appropriate resources and interventions accordingly.

While anxiety, depression, and stress have been identified as risk factors that may contribute to the development or exacerbation of certain cardiovascular diseases, it is important to note that the relationship between mental health and cardiovascular health is complex and multifactorial. The studies by Silverman, Herzog, and Silverman [24] and Bomhof-Roordink, Seldenrijk, van Hout, van Marwijk, Diamant, and Penninx [25] likely provide insights into this relationship. A study conducted by Polikandrioti et al. [26] in patients with the coronary disease found that 58.2% of the participants had medium and high levels of anxiety, a finding that is less compared to the anxiety levels in our study which is 66.2%. There are several studies that have found a strong correlation between chronic diseases and depression, suggesting that chronic diseases can contribute to the development or worsening of depressive symptoms. For example, the studies conducted by Ingle et al. [27], Zhang et al. [28], and Read et al. [29] provide evidence supporting this relationship, specifically in the context of depression and cardiovascular risk.

The systematic review and meta-analysis conducted by Bartoli et al. [30] focused on the relationship between depression and mortality in stroke patients. Their findings suggested that depression can indeed be a risk factor for increased mortality in individuals who have experienced a stroke. This study also gave valuable evidence highlighting the importance of recognizing and addressing depression in stroke patients. Effective management of depression through appropriate psychological interventions, support systems, and integrated care approaches may not only improve the mental health outcomes but also reduce potentially the risk of mortality in this population. The study conducted by Chauvet-Gelinier et al. [31] suggests that emotional disorders, such as anxiety and depression, can impact the management of patients with cardiovascular diseases. Furthermore, their study indicates that cardiac rehabilitation programs can help in addressing these psychological problems, leading to improved cardiac health outcomes.

Moreover, the study conducted by Alkhathami et al. [32] examined the prevalence of mental health disorders among patients with diabetes and hypertension attending primary healthcare centers. The findings of the study revealed a high prevalence rate of mental health disorders, with 57.3% of the patients being affected. Additionally, the study conducted by Shinkov et al. [33] investigated the relationship between anxiety, depression, type-2 diabetes mellitus, and metabolic syndrome. The findings of the study indicated that patients with type-2 diabetes mellitus who also had metabolic syndrome had higher scores for anxiety and depression.

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The study conducted by Bujang et al. [34] examined the impact of psychological symptoms on patients undergoing dialysis. The findings of the study indicated that all three psychological symptoms (anxiety, depression, and stress) had a significant impact on these patients. This suggests that individuals receiving dialysis treatment may experience psychological distress, which can affect their overall well-being and quality of life. Furthermore, the study by Finkelstein et al. [35] highlighted that depressive symptoms and clinical depression are commonly observed in patients with end-stage renal disease (ESRD) and chronic kidney disease (CKD). Living with the challenges and uncertainties associated with these conditions can contribute to the development of depressive symptoms. Identifying and addressing these symptoms are crucial for the holistic care of patients with ESRD and CKD. Similarly, Turkistani et al. [36] conducted a study that focused specifically on patients on dialysis with end-stage renal disease. They found that anxiety and depression symptoms were prevalent among these patients. Coping with the demands of dialysis treatment and the chronic nature of their kidney disease can lead to increased levels of anxiety and depression.

Several studies, including those conducted by Jung et al. [37], Kim et al. [38], Cho et al. [39], Labenz et al. [40], Sayiner et al. [41], and Xiao et al. [42], have indicated an association between depression and nonalcoholic fatty liver disease (NAFLD), which is indeed the most prevalent form of chronic liver disease. The chronic nature of NAFLD, the burden of managing the condition, and the potential for disease progression can cause psychological distress, impaired quality of life, and increased risk of depression.

In our study, we found that among cancer patients, the majority had breast cancer. The findings of this study align with the research conducted by Tsaras et al. [43] and Guo et al. [44], which suggest that breast cancer patients are at a high risk of developing anxiety and depression. Tsaras et al. [43] conducted a study specifically focusing on breast cancer patients and found that this population is indeed susceptible to experiencing anxiety and depression. The diagnosis of breast cancer, the associated treatment procedures, and the uncertainty surrounding the disease can contribute to increased psychological distress. Similarly, Guo et al. [44] conducted a study specifically focusing on women with metastatic breast cancer. Their findings indicated a high prevalence of depression, anxiety, and stress among this group. Metastatic breast cancer is an advanced stage of the disease, often associated with more significant physical and emotional challenges, which can contribute to the heightened psychological burden.

This study also analyzed the factors which are associated with the levels of stress, anxiety, and depression in patients with chronic disease which in turn exacerbate the present condition. The parameters considered in this study are age, gender, marital status, monthly income, educational status which influence health literacy, access to health information, and self-management skills; the availability and quality of support from primary caretakers; social isolation or lack of social support; prolonged hospitalization or intensive care unit stays; the quality and quantity of social relationships; frequent hospital visits may disrupt daily routines which increase financial burden; permanent disabilities; and avoidance by the family or society and the lifestyle factors, such as physical activity.

In our study, the factors like primary caretakers, social isolation, length of hospital stay, social relationships, age, marital status, number of frequent visits to the hospital/month, and the lifestyle of the patient had a significant association with the levels of stress, anxiety, and depression. Adequate caregiving and emotional support by primary caretakers are essential in influencing the psychological well-being of patients. Social isolation or lack of social support networks can increase the risk of psychological distress in individuals with chronic diseases. Having meaningful social relationships and connections is important for overall well-being. Additionally, the factors like monthly income and educational status were also found to be statistically significant with the stress levels, and length of intensive care unit stay was significantly associated with the levels of anxiety. Analyzing these factors in relation to stress, anxiety, and depression levels in patients with chronic diseases can provide valuable insights into the specific factors that contribute to psychological distress. This knowledge can guide the development of targeted interventions and support strategies to mitigate the impact of these factors and improve the overall well-being of patients.

The study conducted by Fattouh et al. [18] found a correlation between the length of hospital stay and social isolation with stress levels. This means that patients who had longer hospital stays and experienced social isolation were more likely to experience higher levels of stress. The study also identified a statistical significance between stress levels and factors such as educational status and co-morbid conditions. These findings suggest that patients with lower educational status or who have other co-morbid conditions may be more susceptible to increased stress during their hospital stay.

The studies conducted by Cirelli et al. [45] and Tucker-Seeley et al. [46] explore the relationship between educational status, financial hardship, and stress levels,

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specifically in relation to accessing health resources. The findings of these studies suggest that educational status and financial difficulties can indeed contribute to higher levels of stress due to the barriers they create in accessing necessary health resources and to promote equitable access to healthcare and reduce stress-related health outcomes. The study by Kind et al. [47] explores the impact of poverty on health outcomes, particularly the relationship between poverty, access to meals and medications, and hospitalization rates. It suggests that individuals living in poverty often face difficulties in purchasing nutritious meals and necessary medications, leading to poorer health outcomes and an increased likelihood of hospitalization. The study highlights the importance of addressing poverty as a social determinant of health to reduce hospitalization rates and improve overall well-being. The other study done by Pelegrino et al. [48] examines the association between housing-related problems, financial difficulties, and stress levels. It suggests that individuals experiencing poverty-related housing and financial issues may face increased stress levels due to the uncertainty and challenges associated with inadequate housing and limited financial resources. The study emphasizes the need for comprehensive interventions that address both housing and financial problems to alleviate stress and improve mental health outcomes.

The study conducted by Hanspal et al. [49] examines the influence of frequent hospital visits and caregiver health on patient outcomes. It highlights the direct impact that these factors have on patient well-being and emphasizes the significance of understanding and addressing them. Additionally, the study assesses the social impact of the disease among both patients and caregivers, highlighting the moderate level of stress caused by it. However, it finds that levels of anxiety and depression are high, indicating the psychological burden associated with the disease. These findings strengthen the rationale for conducting research in this area and suggest the need for interventions to address anxiety and depression in patients and caregivers.

Conclusion

In conclusion, our study found a high prevalence of stress, anxiety, and depression among patients with chronic disease(s) with approximately 68.7%, 51.1%, and 58.8%, respectively. The chronic diseases which are included in this study are cardiovascular diseases, metabolic disorders, cancer, respiratory disorders, degenerative disorders, chronic kidney disease, and chronic liver disorders. Among these diseases, cardiovascular disease patients were found to have the highest prevalence of stress, anxiety, and depression compared to the other chronic diseases. These mental health conditions can harm a patient's overall health and well-being, contributing to physical symptoms, reducing treatment adherence, and lowering quality of life. Our study also identified several psychosocial factors that contribute to the development of these conditions, including social isolation, primary caretakers, length of hospital stay, social relationships, age, marital status, number of frequent visits to the hospital/month, and the lifestyle of the patient. Further studies are needed to focus on developing effective interventions to manage mental health issues in this population and evaluate the impact of such interventions on overall health outcomes.

Limitations

The overall sample size is acceptable, but given the time constraints and the fact that many chronic diseases have low incidence rates, a bigger sample size should be taken into account if we want to focus on them specifically. The use of a questionnaire in patients may not always be accurate. Problems in question understanding, recalling problems, and over- or under-evaluating symptoms can lead to possible information bias. Even though every question was asked through a face-to-face interview, some of the questions might not have been clear to patients, particularly those who were illiterate.

Abbreviations

AIDS	Acquired immune deficiency syndrome
AIHW	Australian institute of health and welfare
CDC	Centers for disease control and prevention
CKD	Chronic kidney disease
ESRD	End-stage renal disease
DSM IV-TR	*Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision*
HADS	Hospital anxiety and depression scale
HIV	Human immunodeficiency virus
ICU	Intensive care unit
LMICs	Lower-middle-income countries
NAFLD	Nonalcoholic fatty liver disease
NCDs	Noncommunicable diseases
OCD	Obsessive–compulsive disorder
PSS	Perceived stress scale
PTSD	Post-traumatic stress disorder
TB	Tuberculosis
WHO	World health organization

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