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A study of psychiatric disorders in a sample of patients with coronary heart disease

Nermeen.S.Ahmed, Mohamed.M.EL-Hamady, Shorouk.F.Abd-Elmaksoud and Asmaa.S.Said
Psychiatry Dept., Faculty of Medicine, Benha University
E-mail: nermeensamy0@gmail.com

Abstract:
The focus here is on evaluating individuals with coronary heart disease from a psychological perspective. Outpatient clinics at Shebin Elkom teaching hospital and Benha University Hospital provided the sample of 400 participants; 200 patients with CHD and 200 healthy control volunteers were evaluated using the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID1) and the Structured Clinical Interview for DSM-IV Axis II Disorders (SCID11), respectively.

Patients with coronary heart disease had a mean age of (57.159.50) years; 80% were males and 20% were females; healthy volunteers had a mean age of (43.5610.52) years; 63% were females and 37% were males. Statistically, the cases group of CHD had a significantly higher rate of depressive disorder (50% vs. 0%) and a significantly higher rate of generalized anxiety disorder (37% vs. 0%) than the control healthy group. Manic episodes, hypomanic episodes, psychotic disorders, delusional disorders, panic disorders, and post-traumatic stress disorder were not significantly different between the CHD patients and control groups. Depressive Personality Disorder was also significantly less common in CHD patients than in the control group (P=0.026). Other personality abnormalities were not significantly different between the CHD sufferers and the healthy controls. The correlation between coronary heart disease and socioeconomic status and mental illness was examined in this research.

CHD, PTSD, and other mental illnesses are discussed, along with their links to heart disease (PTSD).

Keywords: Coronary heart disease (CHD), Psychiatric disorders, Post-traumatic stress disorder (PTSD).

Introduction:

Coronary heart disease is one of the leading killers in the twenty-first century, cardiovascular disease (CHD) is a major concern for public health [25]

In almost every part of the globe, CHD is the main killer [8]. The World Health Organization (WHO) estimates that 17.7 million fatalities, or 31% of all deaths, are caused by CHD. Heart disease is responsible for an estimated 7.4 million of these deaths [26]. Furthermore, it will be the leading cause of death worldwide by the year 2030.

The rate of CHD in Egypt is 8.3 percent. It accounts for 22% of all deaths and is thus the leading cause of death. With a rate of 174 deaths per 100,000 people when adjusted for age, Egypt is the 33rd most populous country in the world [2].

Numerous health problems, such as cardiovascular disease, have been related to stress and have been identified as risk factors for the illness [21]. Acute stress causes a number of changes in the cardiovascular system, most notably a rise in both heart rate and blood pressure.

Among the eight other risk factors of hypertension or diabetes, waist/hip ratio, dietary patterns, physical activity, smoking, alcohol consumption, and blood apolipoprotein association with the increased risk of CHD, the INTER HEART study found a higher prevalence of stress at work and home, financial stress, and major life events in the past year [23].

Recent scientific studies have focused more and more on the significant co morbidity of mental diseases with cardiovascular disease (CVD) [7].

The burden of illness due to depressive disorders is at number four worldwide. It is predicted that by 2020, depression would be the second leading cause of mortality globally, behind heart disease. Cardiovascular illnesses and mental co-morbidities have been shown to have a mutually reinforcing association. One of the major mechanisms of acute coronary syndrome (ACS), which includes ST-segment elevation myocardial infarction (STEMI), non-ST-segment elevation myocardial infarction (NSTEMI), and unstable angina (USA), is the sudden rupture of plaque in the coronary artery, resulting in a flow-limiting lesion [14].

There seems to be a fascinating connection between mental health problems and CHD. It has been shown that those with CHD are more likely to have psychological co morbidities. In contrast, it seems that those with psychological co-morbidities are at a higher risk of CHD. Possible shared pathophysiological processes between the two illnesses [17].

Limitations in daily life, worries about dying soon, and other symptoms of chronic illness all contribute to the development of co-morbid mental health conditions including sadness and anxiety. However, a bidirectional model of co morbidity may exist, since depressive symptoms have been observed to predict CHD in groups hat did not originally display cardiac symptoms [5].

Aim of the Study:

Psychiatric examination of individuals with coronary heart disease and the evaluation of the association between mental health issues and CHD.

Patients and Methods:

The Two hundred individuals with coronary heart disease (CHD) served as cases, whereas two hundred volunteers who were of similar age and socioeconomic status served as controls.

Inclusion criteria of cases group:

Coronary heart disease individuals of both sexes and ages ranging from 30 to 70 who are stable enough to finish the evaluation

Inclusion criteria of control group:

Healthy volunteers of both sex and same age group 30to70.

Exclusion criteria of cases and control groups:

history of mental disorders, neurological or physical sickness (with the exception of diabetes and hypertension), or a history of alcohol or substance-related illnesses

Implications for Ethics:

The An approval was obtained from the research ethical committee in Shebin Elkom Teaching Hospital and an approval consent was obtained from Benha Faculty of Medicine ethical committee and an official letter was issued from Benha Faculty of Medicine and Shebin Elkom Teaching Hospital to approve performing the research.

Number crunching:

Twovarious statistical analyses:

Quantitative descriptions:

- The Mean (standard deviation) was used to characterize quantitative data, whereas frequency and percentage were used to characterize qualitative data. The standard deviation quantifies the dispersion of samples from the mean. Median values were used to represent data that did not follow a normal distribution (IQR).
- Statistical analysis: To compare the means of two or more groups on a single qualitative variable, use Chi-Squared (2); when the predicted frequency is less than 5, use Fisher's exact test. One Way ANOVA may be replaced with the non-parametric Kruskal-Wallis test. A non-parametric test is one that makes no assumptions about the distribution of your data. Spearman's correlation (r) is a test used to examine the relationship between quantitative and qualitative ordinal variables, whereas the H test is used when the conditions for ANOVA aren't satisfied (such as the assumption of normality).

Results:

We consisted of 400 people, split into two groups of 200 (100 male, 100 female)..

Table (1) shows the breakdown of demographics between those diagnosed with CHD and a healthy comparison group.

Variables	Studied groups N=400				X^2	P value
	Case N=200		Control N=200			
Age (years)						
Mean± SD	57.15±9.50		43.56±10.52		**t=**	**<0.001*** **
Range	40.00-70.00		30.00-70.00		13.556	
Sex	**N**	**%**	**N**	**%**		
Male	160	80.00	74	37.00	31.607	**<0.001*** **
Female	40	20.00	126	63.00	44.554	**<0.001*** **
Residence						
Urban	80	40.00	116	58.00	6.612	**<0.01** **
Rural	120	60.00	84	42.00	6.353	**<0.01** **
Marital status						
Single	0	0.00	14	7.00	14.000	**<0.001*** **
Married	180	90.00	178	89.00	0.011	0.916
Divorced	10	5.00	4	2.00	2.571	0.109
Widow	10	5.00	4	2.00	2.571	0.109

Education level						
Primary Education	80	40.00	14	7.00	46.340	**<0.001*** **
Secondary Education	50	25.00	22	11.00	10.889	**<0.001*** **
Bachelor	70	35.00	146	73.00	26.741	**<0.001*** **
Diploma	0	0.00	4	2.00	4.000	**<0.05* **
Master	0	0.00	10	5.00	10.000	**<0.01** **
Ph.D.	0	0.00	4	2.00	4.000	**<0.05* **
Occupation						
Not working	90	45.00	50	25.00	11.429	**<0.001*** **
Working	110	55.00	150	75.00	6.154	**<0.05* **
Smoking						
No	60	30.00	165	82.50	49.000	**<0.001*** **
Yes	140	70.00	35	17.50	63.000	**<0.001*** **
Family history of chronic diseases						
No	60	30.00	70	35.00	0.769	0.381
Yes	140	70.00	130	65.00	0.370	0.543
Number of children						
No children	20	10.0	18	9.0	0.105	0.746
1-3	139	69.5	129	64.5	0.373	0.541
>3	41	20.5	53	26.5	1.532	0.216
Presence of pregnancy						
No	200	100.00	194	97.00	0.091	0.762
Yes	0	0.00	6	3.00	6.000	**<0.05* **
Presence of HTN or DM						
No	30	15.00	118	59.00	52.324	**<0.001*** **
Yes	170	85.00	82	41.00	30.730	**<0.001*** **
HTN	80	40	34	17.00	18.561	**<0.001*** **
DM	50	25.00	36	18.00	2.279	0.131
HTN+DM	40	20.00	12	6.00	15.077	**<0.001*** **

The following table presents demographic data for the various study groups.

Two hundred CHD patients were analyzed in this research; the mean age was 57.15 (standard deviation: 9.50), there were 160 men (80%) and 40 females (20%).

In addition to a control group of 200 people of the same age and gender,

Cases of CHD were statistically much more likely to be male than the control group, and rural residency was also significantly more likely for cases than the control group.

In terms of level of education, we have a statistically significant prevalence of patients with just elementary and secondary schooling and a much smaller prevalence of cases with bachelor's, diploma, master's, and doctoral degrees.

In terms of employment, instances indicate a much lower prevalence among employed individuals, but a relatively high incidence among unemployed individuals.

Furthermore, both smokers and nonsmokers saw significantly higher and lower incidence, respectively.

Additionally, there is a very strong correlation between the existence of hypertension and the prevalence of diabetes in these individuals.

There was no difference in each group's family background or total number of children.

The SCID I scale's distribution among CHD patients and healthy people is shown in Table (2).

Psychiatric disorders	**Studied groups N=400**				**X^2**	**P value**
	Cases N=200		**Control N=200**			
	No	**(%)**	**No**	**(%)**		
Absent	**7**	**3.5**	**67**	**13.5**	---	**---**
Present	**193**	**96.5**	**133**	**86.5**	---	**---**
Depression	100	50.0	62	31	14.981	**<0.001*** **
Generalized anxiety disorder.	74	37.0	50	45.0	4.645	**<0.05* **
Manic episode	3	1.5	1	0.5	1.010	0.315
Hypomanic episode	4	2	8	4	1.375	0.241
Psychotic disorder	4	2	3	1.5	0.145	0.703
Delusion disorder	5	2.5	6	3	0.093	0.760
Panic disorder	2	1	1	0.5	0.336	0.562
Post-traumatic stress disorder	1	0.5	2	1	0.336	0.562

When comparing the CHD cases group to the healthy control group, the table shows that there was a statistically significant association between the two groups for depression disorder (P0.001) and generalized anxiety disorder (P = 0.05), but no significant difference for manic episode (P=0.315), hypomanic episode (P=0.241), or psychotic episode (P=0.801).

Cases of coronary heart disease and healthy controls are shown in Table 3 below, along with the distribution of personality disorders as measured by the SCID II questionnaire.

SCID II (PD)	Studied groups N=400 Case N=200		Control N=200		X^2	P value
	No	(%)	No	(%)		
Avoidant Personality Disorder						
Absent	123	61.5%	126	63%	1.177	0.496
Present	77	38.5%	74	37%		
Dependent Personality Disorder						
Absent	151	75.5%	163	81.5%	14.258	0.217
Present	49	24.5%	37	18.5%		
Obsessive Compulsive Personality Disorder					6.756	0.283
Absent	109	54.5%	121	60.5%		
Present	91	45.5%	79	39.5%		
Passive aggressive personality disorder						
Absent	146	73%	153	76.5%	17.793	0.106
Present	54	27%	47	23.5%		
Depressive Personality Disorder						
Absent	123	61.5%	151	75.5%	15.080	**0.026***
Present	77	38.5%	49	24.5%		
Paranoid Personality Disorder						
Absent	111	55.5%	125	62.5%	6.870	0.227
Present	89	44.5%	75	37.5%		
Schizotypal Personality Disorder						
Absent	182	91%	168	84%	14.035	0.083
Present	18	9%	32	16%		
Schizoid Personality Disorder						
Absent	92	46%	115	57.5%	17.791	0.113
Present	108	54%	85	42.5%		
Histrionic Personality Disorder						
Absent	151	75.5%	143	71.5%	5.493	0.123
Present	49	24.5%	57	28.5%		
Narcissistic Personality Disorder						
Absent	155	77.5%	151	75.5%	6.090	0.195
Present	45	22.5%	49	24.5%		
Borderline Personality Disorder						
Absent	147	73.5%	154	77%	10.900	0.099
Present	53	26.5%	46	23%		
Antisocial Personality Disorder						
Absent	193	96.5%	195	97.5%	2.706	0.166
Present	7	3.5%	5	2.5%		
Not otherwise specified						
Absent	180	90%	186	93%	1.260	0.381
Present	20	10%	14	7%		

Statistically significant at the 0.05 level. P 0.01 = Extremely Significant. Significant at the 0.001-percent level.
Chi-square analysis, or X2.
t = t-test for independence.
Probability value, or p-value.
This table shows that, In contrast to the healthy controls, those with CHD had a significantly decreased incidence of Depressive Personality Disorder (P=0.026).

Other personality abnormalities were not significantly different between the CHD sufferers and the healthy controls.

CHD cases and the presence or absence of mental illnesses, as well as other demographic information, are shown in Table 4. (N=200)

demographic data	Psychiatric disorders N=200 Present N=193 Mean ± SD		Absent N=7 Mean ± SD		T	P value
Age (years)	57.03±9.55		60.57±7.72		1.183	0.277
	N	**%**	**N**	**%**	**X^2**	
Sex						
Male	155	80.3	5	71.4	0.333	0.564
Female	38	19.7	2	28.6		
Residence						
Urban	76	39.4	4	57.1	0.888	0.346
Rural	117	60.6	3	42.9		
Marital status						
Married	174	90.2	6	85.7	1.628	0.443
Divorced	10	5.2	0	0.0		
Widow	9	4.7	1	14.3		
Education level						
Primary Education	79	40.9	1	14.3	4.283	**0.018***
Secondary Education	49	25.4	1	14.3		
Bachelor	65	33.7	5	71.4		
Occupation						
Not working	87	45.1	3	42.9	0.013	0.908
Working	106	54.9	4	57.1		
Smoking						
No	58	30.1	2	28.6	0.007	0.933
Yes	135	69.9	5	71.4		
Family history of chronic diseases						
No	57	29.5	3	42.9	0.571	0.450
Yes	136	70.5	4	57.1		
Number of children						
No children	19	9.8	1	14.3	3.109	**0.025***
1-3	30	15.5	0	0.0		
>3	144	74.70	6	85.7		
Presence of chronic diseases						
No	28	14.5	2	28.6	1.048	0.306
Yes	165	85.5	5	71.4		

When comparing the presence or absence of Psychiatric Disorders between the Cases and Controls groups of CHD, the table demonstrates that a primary school education level (P=0.018) and having 1–3 children (P=0.025) are statistically significant.

Conversely, there was no statistically significant difference between the cases and controls in the CHD subgroups with regards to sex (P=0.564), place of residence (P=0.346), marital status (P=0.443), employment (P=0.908), smoking (P=0.933), or the presence or absence of chronic conditions (P=0.306).

Discussion:

Coronary CHD, or coronary heart disease, is a complex cardiovascular disorder characterized by reduced blood flow via the coronary arteries. It's responsible for a lot of deaths and illnesses all around the globe, and it costs both people and healthcare systems a lot of money. To better understand coronary heart disease (CHD) and its effects on afflicted persons, researchers have recently examined the correlation between CHD and demographic variables, QOL, and mental problems [13]. Many people who suffer from coronary heart disease also struggle with a mental health condition, and this may have serious consequences for their health. When considering mental illnesses in the setting of CHD, researchers have focused mostly on depression and anxiety. A higher incidence of CHD, worse outcomes after cardiac events, and worse treatment adherence are all linked to these factors[19]. The reciprocal association between mental diseases and CHD points to shared pathophysiological pathways linking the two, such as inflammation, autonomic dysfunction, and altered stress responses. In order to maximize CHD care and boost patient outcomes, it is essential to identify and treat psychological co morbidities [11].

Table (1) displays the demographic characteristics of CHD patients, including the mean age of 57.15 years (SD 9.50), the gender distribution of 160 men (80%) and 40 females (20%).In terms of marital status, 90% were in a committed relationship whereas 5% were either divorced or had never married. Forty percent of the population lived in urban areas, while sixty percent lived in rural areas. Forty percent were found to have completed just elementary school, twenty-five percent had completed only secondary school, and thirty-five percent had completed at least a bachelor's degree. In terms of employment, 55% were gainfully employed while 45% were unemployed. Thirty percent were nonsmokers, whereas seventy percent were smokers. In terms of a history of chronic illness in the family Only 30% of the population had no history of chronic illness in their family, whereas 70% did. Ten percent didn't have any kids, 69.5 percent had between one and three, and 20 percent had four or more. Forty percent had a history of hypertension, twenty-five percent had diabetes, and twenty percent had both conditions.

No statistically significant variations in family size or prevalence of chronic illness were found in the current investigation. These results go counter to those of several other studies that found a link between a family history of chronic illness and an increased risk of coronary heart disease [3]. The gap might be due to factors including research design, genetic variation, or a smaller sample size.

There was a very significant age difference between CHD patients and the healthy control group, with CHD cases being more often seen in the elderly. This may be because the risk of arterial damage and constriction rises with age. These results are consistent with those of earlier studies which shown that the prevalence of CHD increased with age, from 1.1% in those aged 45–54 to 14% among those aged 75 and above. The Australian Health and Welfare Research Institute (2023).

Due to the disproportionate number of sex-related illnesses affecting men, it is reasonable to assume that guys, on average, have fewer healthy habits than females when it comes to smoking, dietary fiber consumption, vitamin C levels, blood viscosity, HDL cholesterol, and triglycerides. After taking into account differences in age groups, the estimated prevalence of CHD in Australia in 2017 was 3.8% for males and 1.9% for women, according to the Australian Institute of Health and Welfare (2023). Furthermore, it is projected that in 2020, males will account for 66% of all cases of acute coronary events in those aged 25 and above. Among both sexes, males had higher rates of acute coronary events, and those rates rose with age. Regarding residential instances, rural living was likewise strongly linked. These results are in line with a recent research that analyzed the impact of location on CHD, particularly in low- and middle-income nations and found that 7.3 million people died from CHD over the globe in 2001. In 2010, poor and middle-income nations accounted for three-quarters of all fatalities from cardiovascular disease worldwide. Changing demographics, longer life expectancies, and more exposure to lifestyle-related risk factors have all contributed to a dramatic increase in the prevalence of coronary heart disease in low and middle-income nations. However, the fatality rate from CHD varies widely across emerging nations. Different risk factors, other competing causes of death, availability of resources to battle CVD, and the stage of epidemiologic change that each nation or area finds itself in all contribute to the wide range in incidence, prevalence, and mortality rates [10].

In terms of level of education, we have a statistically significant prevalence of patients with just elementary and secondary schooling and a much smaller prevalence of cases with bachelor's, diploma, master's, and doctoral degrees. Rather than attributing this to pre-school IQ, socioeconomic status, health, or parental mental health (to name a few possible confounders) [16]. suggest looking at the causal impacts of schooling.

In terms of employment, instances indicate a much lower prevalence among employed individuals, but a relatively high incidence among unemployed individuals. While other research has linked job stress to an increased risk of cardiovascular disease, our results go counter to that theory [12]

Cases also showed a significantly lower incidence in non-smokers and a significantly higher incidence in smokers. These results corroborate those of earlier research by [4]. which found that smokers were more likely to have coronary artery disease. Acute myocardial infarction is about three times as common in smokers than in nonsmokers [27].

Additionally, there is a very strong correlation between the existence of hypertension and the prevalence of diabetes in these individuals. The fundamental process is atherosclerosis of the coronary arteries. These results are consistent with those of a prior research by [9].

In the current study, the researchers observed that, when comparing the CHD cases group with the control healthy group, there were statistically significant connections between the two groups for both depressive disorder (50%) and generalized anxiety disorder (37%).

Manic episodes, hypomanic episodes, psychotic disorders, delusional disorders, panic disorders, and post-traumatic stress disorder were not significantly different between the CHD patients and control groups.

These results are consistent with earlier studies showing that those with CHD are more likely to suffer from sadness and anxiety [6][28]. Twenty percent to thirty percent of people with heart disease also have mental health issues [15]. However, studies have shown that in the first year following an acute cardiac event, anxiety and sadness impact between 15 and 43 percent of patients [18]. The reciprocal association between CHD and mental diseases points to common causes such inflammation, stress, and neurotransmitter dysregulation. While some research have shown links between CHD and other mental health issues, such as bipolar disorder, schizophrenia, PTSD, and other psychotic and affective disorders, other investigations have found no such link [1].Examining the correlation between demographics and the presence of mental disorders among CHD group patients, table (4) shows that the average age of cases with psychiatric disorders was 57.03 years (standard deviation = 9.55), there were 155 males (80.3 %) and 38 females (19.7 %).

Results were inconsistent when comparing the two groups of patients, those with and without mental illnesses. When comparing the presence of Psychiatric Disorders in the Cases group to the lack of Psychiatric Disorders in the Cases group, there was a statistically significant association with primary educational level (P=0.018) and 1 3children (P=0.025).

However, there was no difference in age, sex, domicile, marital status, employment, smoking, family history of chronic illnesses (P=0.450), or the presence of chronic diseases between the cases and controls group of CHD patients with psychiatric problems.

However, a recent research [24] indicated the opposite: that females had a higher prevalence of anxiety disorders than men. It's possible that this is because estrogen and progesterone, hormones produced in the female gonads, have a significant role in regulating the activities of neurotransmitter systems associated with anxiety and influencing the process of fear extinction [22]. Also, testosterone, one of the male gonadal hormones, has been linked to anxiety relief, presumably through decreasing reactivity to stress and dampening the activity of the hypothalamic-pituitary-adrenal (HPA) axis[19]. This suggests that gonadal hormones may play a role in explaining why women have higher rates and more severe symptoms of anxiety disorders than men do.

Patients who were not married were more likely to suffer from anxiety and other mental illnesses. Similarly, patients who spent a lot of time doing housekeeping were more likely to suffer from anxiety than those who did not.

Possible explanations for the discrepancy between our Egyptian patients and those in other research include the small sample size of the former and the retrospective character of the latter, as well as the use of different evaluation instruments. Large, long-term studies will be necessary in the future to confirm this debate.

Conclusion:

This study supports prior results and adds to our knowledge of the link between CHD and socioeconomic and psychological characteristics. In addition to a substantial correlation between CHD and depression (50%) and generalized anxiety disorder, we observed that CHD disproportionately affects those over the age of 65, men, and smokers (37%).In addition, having between one and three kids in elementary school was significantly linked to the existence of mental health issues. These results emphasize the necessity for routine monitoring, counselling, and therapy referrals for individuals with coronary heart disease.

Recommendations:

Based Several suggestions may be made based on the study's results and limitations to help us learn more about the link between CHD and mental illness.

First, longitudinal designs should be considered for use in future studies. By doing longitudinal study, scientists would be able to see whether CHD comes before or after the onset of mental health problems. The effects of CHD on mental health over the long term should be better understood using longitudinal approaches.

Second, a larger, more representative sample of the general population should be used in the research. The results would be more applicable if they were collected from a more representative sample of the population. This would allow researchers to better comprehend the interplay between CHD and mental problems across demographics.

Finally, in the not-too-distant future, cardiology and psychiatry must work together to coordinate the monitoring of CHD patients, the provision of ongoing counselling services, the early diagnosis of psychological illnesses, and the referral of patients for treatment.

These suggestions for further study will help us learn more about the link between CHD and mental illness. As a result, this may help inform the creation of more effective healthcare plans and focused therapies for people with CHD.

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