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A Comparative Study of Stress-Related Symptoms among Diabetic and Coronary Artery Disease (CAD) Patients

Sabiha Baby
Assistant Professor,
Deptt. of Psychology,
Aligarh Muslim University,
Aligarh

Abstract

Psychological stress refers to the emotional and physiological reactions experienced when an individual confronts a situation in which the demand goes beyond their coping resources. The present attempt is a comparative study of stress-related symptoms among diabetic and coronary artery disease (CAD) patients. Data consisted of 200 patients, of these there were 100 diabetic and 100 CAD patients. Patients were drawn from OPD of Jawahar Lal Nehru Medical College and Hospital (JNMCH) AMU, Aligarh. Stress symptom check list (Husain, 2006) was used to measure different types of stress namely mental, physical, emotional and social. Analysis of Variance (ANOVA) was applied to analyze the data. Results revealed that main effect of gender was found significant on *mental, physical, emotional and social symptoms* of stress and overall symptoms of stress. These results indicate that male and female patients differed significantly on stress symptoms. Diabetic and CAD patients did not differ on mental symptoms, physical symptoms and emotional symptoms and *overall symptoms of stress*. Whereas on social symptoms of stress, the main effect of type of diseases (Diabetic and CAD) was found statistically significant. Interactional effect between gender and type of diseases was not found significant on *mental, physical, emotional and social symptoms* of stress and overall symptoms of stress. It may be concluded that psychological distress may be a natural cause of development of stress-related disorders.

Keywords: Stress Symptoms, Diabetes, Coronary Artery Disease (CAD).

Introduction

Now a day's life is full of hassles, time limits, frustrations, and demands. Many people are so usual to stress that it has become a way of life. Health is continuously under attack from countless sources of stress, environmental pollution, unhealthy work conditions, industrial smoke, unsafe water, noise and so on that ultimately can affect all aspects of life, including emotions, behaviors, thinking ability, and physical health. No part of the body is immune. But, because people handle stress differently, symptoms of stress can vary. Symptoms can be vague and may be the same as those caused by medical conditions.

Psychological stress refers to the emotional and physiological reactions experienced when an individual confronts a situation in which the demand goes beyond their coping resources. Stress increases catecholamine and the increases the plasma catecholamine, enhances platelet aggression, lowers the threshold to cardiac arrythminea, induces narrowing of the blood vessels and suppresses insulin secretion (McEween & Stellar, 1993). Emotional, social, spiritual, or physical pain or suffering that may cause a person to feel sad, afraid, depressed, anxious, or lonely. People in distress may also feel that they are not able to manage or cope with changes caused by normal life activities or by having a disease, such as diabetes and CAD, patients may have trouble coping with their diagnosis, physical symptoms, or treatment. It is being increasingly recognized that stress is one of the components of every kind of disease and not just of those labeled as 'psychosomatic'. Infect, researches like **(**Grant, 1974; Holmes & Rahe 1967; Schmalo & Engel 1967) have established this point beyond doubt that there exists a positive relationship between stressful life events and subsequent illness.

Under review of scientific literature on the relationship between stress and disease, stress is a causative factor in human disease; it triggers a response by the body's endocrine systems, which release

hormones that influence multiple other biological systems, including the immune systems. Stress also causes chemical changes in the body that can raise blood pressure, heart rate, and blood sugar level. It may also lead to feelings of frustration, anxiety, anger or depression. Stress can be caused by normal life activities or by any event, such as trauma or illness. Long term stress may lead to mental and physical health problems.

Stress can take a toll on your body as well as your mind and spirit. It is important for a person to know whether he/she is exhibiting a stress related symptoms, because stress can lead to ulcers insomnia, heart disease as well as relationship problems. People may show many physical, emotional, mental or even an occasional anti-social signs on the stress-related symptoms because they are trying to keep up with changing technology.

Stress-related symptoms list was found in American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders-IV, 1994 edition. They include the following physical signs on their stress related symptoms list such as: sleeplessness, sweaty palms, indigestion, sleep too much, fatigue, tight muscles, diarrhea, tight stomach pain, heart pounding, holding breath, skin breaks out, cold hands, shortness of breath, headaches and nausea.

Person may show a *physical stress symptom* caused by an illness or disease. It is important to check with medical professional if he/she notices any new stress symptom. Often, they will find their physical stress symptom such as headache is exacerbated by emotional stress.

An *emotional stress-related symptom* which differ from a physical stress symptom and a mental stress symptom. The emotional stress-related symptom list is: irritability, nervousness, moodiness, hostility, depression, anxiety, seriousness, poor and irrational judgment and mistakes in easy computation. Some people say they can't concentrate. The mental stress related symptom is negative self-talk. A less obvious mental stress-related symptom is being disorganized.

Stress-related symptom does not mean you are weak or inferior person. It simply means your body is giving you a warning signal that you are taking on too much. Everyone has a different response to stress. Likewise, every one may show a different sign or symptom of stress, depending on their temperament and life situation. For thousands of years, our body has used stress and a warning sign for our personal defense. It is important to know when a stress-related symptom has a warning signal. Our body will tell us something wrong through a stress-related symptom that could be a dizzy spell, rapid heartbeat or tightened muscles. Stress, both mental and physical, is the principal culprit for diabetes, hypertension and CAD (Pal**,** 2008).

Diabetes

Globally Diabetes mellitus (DM) is one of the most common non-communicable diseases (NCDs). It is unquestionably one of the most challenging health problems in the 21st century. India is one of the 6 countries of the IDF SEA region. 425 million people have diabetes in the world and 82 million people in the SEA Region; by 2045 this will rise to 151 million. There were over 72.946.400 cases of diabetes in India in 2017. India is deemed as the world's capital of diabetes. The diabetic population in the country is close to hitting the alarming mark of 69.9 million by 2025 and 80 million by 2030 (Pandey & Sharma, 2018).

Diabetes is the result of a deficiency of insulin function. There may insufficient insulin produced by the pancreas or the insulin produced may not be effectively used so that the person requires more insulin than the pancreas is secreting. It may also be due to action of the glucagons produced by the alpha cells of the pancreas itself. Antibodies which combine with a neutralize insulin may also be the cause of the diabetes. Insulin is produced by the beta cells of the pancreas and promotes the uptake of glucose from the blood by the body cells. Without insulin glucose may neither be consumed as a fuel nor adequately stored. It simply accumulates in the blood. When it reaches a sufficiently high level, (and passes the renal threshold) it 'spill over' into the urine and is excreted. When this occurs, an increased volume of urine is required to carry away the excess glucose and the body may become dehydrated. Thus, severe thirst may be a symptom of untreated diabetes. When glucose is not available as a fuel fat is used instead. However, complete combustion of fats requires the presence of substances produced during combustion of glucose. In the absence of glucose metabolism, fat combustion is incomplete resulting in the production and accumulation of toxic ketone bodies in the blood. If they collect insufficient amounts, they cause acidosis and eventually coma which may be fatal.

Coronary Artery Disease (CAD)

According to the Global Burden of Disease study age-standardized estimates (2010), nearly a quarter (24.8%) of all deaths in India are attributable to CVD (Institute of Health Metrics & Evaluation)The age-standardized CVD death rate of 272 per 100 000 population in India is higher than the global average of 235 per 100 000 population (Institute of Health Metrics & Evaluation).

Coronary artery disease (CAD) is the scourge of modern civilization. According to the World Health Organization (WHO), CAD is the leading cause of death in the world. It is called as "epidemic of modern times" more prevalent in developed world due to affluent life style and increasing life expectancy. WHO (1982) defines the CAD as "impairment of heart function due to inadequate blood flow to the heart compared to its needs, caused by obstructive changes in the coronary circulation to the heart." Coronary artery disease is our "modern epidemic" i.e. a disease that affects population and not an unavoidable attribute of ageing.

Coronary artery disease (CAD) also has been thought to have a psychosomatic component; the three stages of coronary artery disease are *atherogenesis, atherosclerosis, and arteriosclerosis***.** With atherogenesis, the initial stage of a fatty streak

appears on the inner lining of the artery wall. There is evidence that this can occur as early as ages 3 to 5 years. As the fatty streak continues to develop around the perimeter of the artery and grow in length, a buildup of plaque occurs. This plaque results in a narrowing of the inside of the artery and is referred to as atherosclerosis. As the plaque accumulates, other constituents in the blood are attracted to the site, including calcium, resulting in an increased resistance in the blood flow and increased blood pressure. As the individual ages, plaque hardens, resulting in rigid artery walls that no longer can constrict or dilate. These compounds the effect of high blood pressure and is one reason why resting pressure increases with age. At the third stage, arteriosclerosis, the arteries become hard and possibly occluded from the flow of blood. When the blood flow to any organ is impeded, signs of ischemia develop, resulting in pain (angina) or death of tissues (infraction). The degree of coronary artery blockage and the location of the affected artery determine the severity of the heart attacks. The most extreme result is death. Similar etiology occurs in the carotid arteries that lead to the brain and arteries within the brain that provide oxygen to this major organ. Strokes, like coronary heart disease, are the end result of blocked arteries, creating an inadequate oxygen supply to the brain (Guyton**,** 1996).

Research Objectives

The objectives of the present study were as follows:

1. To examine the main effects of gender (male and female), types of disease (diabetes and CAD) and the interaction between them on *mental symptoms, physical symptoms, emotional symptom, and social symptoms* of stress.
2. To examine the main effects of gender (male and female), types of disease (diabetes and CAD) and the interaction between them on *overall stress symptom.*

Research Hypothesis

1. There will be no significant difference between male and female patients on *overall stress symptoms* as well as on *mental, physical, emotional and social symptoms* of stress.

2. Diabetic and coronary artery disease patients will not differ on the *overall symptoms of stress* as well as on *mental, physical, emotional and social symptoms* of stress.

Method

Participants

The study was conducted on 200 patients, of these there were 100 diabetic patients and 100 coronary artery disease (CAD). Patients were drawn from the Out Door Patients (OPD) of the Jawahar Lal Nehru Medical College Hospital Aligarh Muslim University, Aligarh. The coronary artery disease (CAD) group consisted of 70 males and 30 females. Under diabetic group there were 39 males and 61 females.

Measure

Stress symptoms Checklist developed by Husain (2006) was used. The checklist comprised 59 items for measuring different types of stress, namely, mental, physical, emotional and social. These items express the intensity or the changes that patient found to occur after the exposure to different kinds of illness. Stress symptoms were assessed on five-point scale i.e., “very low”, “low”, “moderate”, “much” and “very much” and were scored from 1 to 5 respectively. The Stress Symptoms Checklist has demonstrated good internal consistency, α = .930 for diabetics and α = .936 for coronary artery disease (CAD).

Data Analysis

Obtained data was analyzed by SPSS (16 version) Analysis of Variance (Two Way ANOVA) in which 2x2 research design was used to analyze the data.

Result

Descriptive

		Variable	N
Gender	1	Male	109
	2	Female	91
Disease	1	DM	100
	2	CAD	100

Table 1: Analysis of Variance Using Scores Obtained on Overall Stress Symptoms as the Dependent Variable

Sources	*Sum of Square*	*df*	*Mean Scores*	*F*	Sig.
Gender	11292.714	1	11292.714	14.408	.000
Disease	80.342	1	80.342	.103	.749
Gender* Diseases	4.953	1	4.953	.006	.937
Error	153625.449	196	783.803		
Total	4336480.000	200			
Corrected Total	165630.380	199			

*p < .05, ** p < .01

Results presented in the Table 1 indicate that, statistically significant main effect was found for gender (F = 14.408 p < .01). Type of diseases (F = .103, p > .05) and their interactional effect that is gender and diseases (F = .006, p > .05) were not found significant on over all stress symptoms.

Table 2: Mean, Standard Deviation and Sample Size

Gender	Type of Diseases	Mean	Std. Deviation	N
Male	Diabetic	137.96	28.676	70
	CAD	136.28	26.093	39
	Total	137.36	27.669	109
Female	Diabetic	153.53	32.341	30
	CAD	152.52	26.039	61
	Total	152.86	28.094	91
Total	Diabetic	142.63	30.512	100
	CAD	146.19	27.123	100
	Total	144.41	28.850	200

As can be seen from the Table 2 mean score of males was found (M = 137.96) slightly lower than females (M = 152.86). And the total diabetic and CAD patients mean scores were found (M = 142.63), and (M = 146.19) respectively.

Table 3: Analysis of Variance using Scores Obtained on Mental Stress Symptoms as the Dependent Variable

Sources	***Sum of Square***	***df***	***Mean Scores***	***F***	Sig.
Gender	910.615	1	910.615	10.734	.001
Disease	16.488	1	16.488	.194	.660
Gender* Diseases	.302	1	.302	.004	.952
Error	16627.928	196	84.836		
Total	310644.000	200			
Corrected Total	17572.320	199			

*p < .05, ** p < .01

It is clear from the Table 3 there was statistically significant main effect for the gender of patients (F = 10.734, p < .01) on the *mental symptoms* of stress, but the effects for the type of diseases (F = .194, p > .05) and interaction effect of gender and diseases (F = .004, p > .05) were found to be non- significant on *mental symptoms* of stress.

TABLE 4: Mean, Standard Deviation and Sample Size

Gender	Type of Diseases	Mean	Std. Deviation	N
Male	Diabetic	36.50	9.581	70
	CAD	35.97	9.360	39
	Total	36.31	9.462	109
Female	Diabetic	41.10	10.142	30
	CAD	40.41	8.147	61
	Total	40.64	8.803	91
Total	Diabetic	37.88	9.929	100
	CAD	38.68	8.865	100
	Total	38.28	9.397	200

From Table 4, it is clear that mean scores of male patients (M = 36.31) were less than the mean scores of female patients (M = 40.64). There was significant difference between the mean scores of male and female patients which show that female patient were more mentally stressed than male patients. But the mean scores of all diabetic (M = 37.88) and CAD (M = 38.68) were found more or less similar.

Table 5: Analysis of Variance using scores Obtained on Physical Stress Symptoms as the Dependent Variable

Sources	***Sum of Square***	***df***	***Mean Scores***	***F***	Sig.
Gender	1851.069	1	1851.069	11.855	.001
Disease	42.148	1	42.148	.270	.604
Gender* Diseases	1.927	1	1.927	.012	.912
Error	30603.986	196	156.143		
Total	830365.000	200			
Corrected Total	32906.795	199			

*p < .05, ** p < .01

Results presented in Table 5 reveled that there were no significant effects for type of diseases (F = .270, p > .05) and the interaction effect of gender and diseases (F = .012, p > .05) on *physical symptoms* of stress as dependent variable. But the gender effect (F = 11.855, p < .01) was found to be statistically significant on *physical symptoms* of stress.

Table 6: Mean, Standard Deviation and Sample Size

Gender	Type of Diseases	Mean	Std. Deviation	N
Male	Diabetic	59.80	12.676	70
	CAD	60.56	11.269	39
	Total	**60.07**	12.144	109
Female	Diabetic	66.03	14.972	30
	CAD	67.21	11.683	61
	Total	**66.82**	12.789	91
Total	Diabetic	61.67	13.635	100
	CAD	64.62	11.920	100
	Total	63.15	12.859	200

Results presented in 6 shows that mean score of females (M = 66.82) was much higher than males (M = 60.07). This result suggests that female patients perceived more physical stress than the male patients. The mean score of CAD patients (M = 64.62) was greater as compared to diabetic (M = 61.67).

Table 7: Analysis of Variance using Scores Obtained on Emotional Stress Symptoms as the Dependent Variable

Sources	***Sum of Square***	***df***	***Mean Scores***	***F***	Sig.
Gender	774.556	1	774.556	14.305	.000
Disease	7.233	1	7.233	.134	.715
Gender* Diseases	2.431	1	2.431	.045	.832
Error	10612.884	196	54.147		
Total	258885.000	200			
Corrected Total	11428.875	199			

*p < .05, ** p < .01

As can be seen from the Table 7 there was statistically significant main effect for the gender (F = 14.305, p < .01) on *emotional symptoms* of stress as dependent variable. Whereas no significant main effect of type of diseases (F = .134, p > .05) and interaction effects of gender and type of diseases (F = .045, p >.05) were found on *emotional symptoms* of stress.

TABLE 8: Mean, Standard Deviation and Sample Size

Gender	Type of Diseases	Mean	Std. Deviation	N
Male	Diabetic	33.40	7.603	70
	CAD	33.23	6.426	39
	Total	33.34	7.174	109
Female	Diabetic	37.80	7.004	30
	CAD	37.16	7.781	61
	Total	37.37	7.501	91
Total	Diabetic	34.72	7.666	100
	CAD	35.63	7.500	100
	Total	35.18	7.578	200

Results presented in Table 8 revealed that the mean score of male patients (M = 33.34) was less than mean score of female patients (M = 37.37). It means females are emotionally more stressed than males. The mean scores of diabetic and CAD were found to be (M = 34.72) (M = (M = 35.63) respectively.

Table 9: Analysis of Variance using Scores Obtained on Social Stress Symptoms as the Dependent Variable

Sources	***Sum of Square***	***df***	***Mean Scores***	***F***	Sig.
Gender	27.415	1	27.415	4.070	.045
Disease	75.786	1	75.786	11.252	.001
Gender* Diseases	8.678	1	8.678	1.288	.258
Error	1320.118	196	6.735		
Total	13618.000	200			
Corrected Total	1418.780	199			

*p < .05, ** p < .01

Results presented in the Table 9 indicate that there were statistically significant main effects were found for gender (F = 4.070, p < .05) and type of diseases (F = 11.252, p < .05) on social symptoms of stress. But their interaction effect that is gender and diseases (F = 1.288, p > .05) was found non-significant on social symptoms of stress symptoms.

Table 10: Mean, Standard Deviation and Sample Size

Gender	Type of Diseases	Mean	Std. Deviation	N
Male	Diabetic	8.26	2.674	70
	CAD	6.51	2.416	39
	Total	**7.63**	2.707	109
Female	Diabetic	8.60	3.092	30
	CAD	7.74	2.337	61
	Total	**8.02**	2.625	91
Total	Diabetic	8.36	2.794	100
	CAD	7.26	2.431	100
	Total	7.81	2.670	200

As can be seen from the Table 10 mean score of males was found (M = 7.63) slightly lower than females (M = 8.02). And the total diabetic and CAD patients mean scores were found (M = 8.36) and (M = 7.26) respectively.

Discussion

Analysis of Variance (ANOVA) was used to examine the influence of gender (male and female), types of disease (diabetic and CAD) and their interaction effects on overall scores of *stress*. By the tables (1, 3, 5, 7, 9) it was clear that significant gender difference was found. Male and female significantly differed on overall stress symptoms as well as mental, physical, emotional and social symptoms of stress. Therefore the said hypothesis that "*there will be no significant difference between male and female patients on overall stress symptoms as well as on mental, physical, emotional and social symptoms of stress*" is not supported. This finding suggests that female patients perceived more stress than male patients. Mentally, physically, emotionally, and socially female patients perceived significantly higher levels of stress. Present finding corroborated with earlier researches like, results based on mental stress imply that mental stress produces increased in blood pressure and heart rate in females (Yeung, Ganz & Selwyn, 1992-93). Brummett et. al. (2004) also found higher stress in female and young patients. Finally it can be concluded that that female patient's lives are more stressful or in other words we can say that female's patients perceived more stress that is why they scored higher on stress symptoms.

Diabetic and CAD patients did not differ significantly on *overall symptoms of stress*, and mental symptoms, physical symptoms and emotional symptoms. Investigator was of the opinion that psychological distress may be a natural cause of development of stress-related disorders. Whereas on social symptoms of stress, the main effect of type of diseases was found statistically significant. Because of the severity of health problems patients, social interaction was low and they were apathetic.

Conclusion

In this present article researcher have documented associations between stress-related symptoms and disease (Diabetes and CAD) and have described how psychosocial stressors are causative factors in human disease. . Stressors, whether mental, physical, emotional and social found as the additional reasons for diabetes and CAD. There is much we do not yet know about the relationship between stress and health, but scientific findings being made in the areas of cognitive-emotional psychology, molecular biology, neuroscience, clinical psychology, and medicine will undoubtedly lead to improved health outcomes.

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