

Factors Influencing the Perception of Stress among Patients with Chronic Illnesses

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The present study examined the influence of age, gender, education and monthly income on perceived stress of type-2 diabetes and coronary heart disease patients. The study was conducted on 100 chronic patients (50 diabetic and 50 coronary heart disease) selected randomly from six hospitals and clinics of Rajshahi city in Bangladesh. The age range of sample was 35 to 65 years ($M=53.03$, $SD=8.597$). All of the participants were out-patients. Perceived Stress Questionnaire (Keya, 2006) was used to assess the stress level. The *t*-test analyses revealed that female patients perceive high level of stress than male patients. Results of the analysis of variance revealed that the main effect of education on perceived stress was statistically significant, illiterate patients perceived high level of stress compare to primary, secondary, higher secondary and graduate group. Regression analysis revealed that demographic variables (age, gender and monthly income) explained 26.8 percent of the variance that highlighting contributions to patients' perceived stress. The findings conclude that gender, monthly income and level of education have significant effects on patients' perceived stress.

Keywords: perceived stress, chronic illness, diabetes, coronary heart disease

Nowadays, chronic illness is very common among adult or middle aged population. The number of people having chronic illness is increasing day by day. Chronic illness is a condition of human health or a disease persistent and long lasting in its effects or coming with time. If the duration of the disease last for more than three months it is termed as chronic (Kaptein *et al.*, 2003). The most common chronic illness include coronary heart disease, diabetes, arthritis, asthma, Alzheimer's disease, inflammatory bowel syndrome, chronic obstructive pulmonary disease (COPD), HIV/AIDS and certain cancers. In recent years, chronic illness has

become an epidemic among the adult population of Bangladesh. The prevalence of type 2 diabetes ranged between 4.5 percent and 35 percent (Biswas *et al.*, 2016), COPD prevalence is 11.4 percent among older population (Islam *et al.*, 2013), and cardiovascular disease is a major public health burden in Bangladesh (Islam *et al.* 2016). Among these chronic illnesses, Type-2 diabetes and Coronary heart disease are noteworthy. According to the World Health Organization report (2017) in Bangladesh diabetes and coronary heart disease accounted for 5.09 percent and 14.31 percent respectively of total deaths and chronic illnesses are

estimated to account for 67 percent of total deaths. Chronic illness is viewed as a major source of stress because it creates a number of stressful situation and life changes (Devins & Binik, 1996). According to Moos and Schaefer's (1984) crisis theory living with chronic illness imposes many challenges and threats to patients such as dealing with uncertainties about their future physical abilities, dealing with pain and other physical symptoms, sustaining relationship with friends and family and concern about their capabilities to resume previous lifestyle. These types of life changes are responsible for creating stress and exert serious challenges to adapt with the chronic illness (Zautra, 1996). Stress is simply a combined effect of natural forces from the outside world on an individual. "Stress occurs when environmental demands tax or exceed the adaptive capacity of an organism; the demands result in physiological or psychological processes that put the organism at risk for disease" (Cohen et al., 2007) and "perceived stress is the degree to which an individual experiences life events as unpredictable, uncontrollable, or overloading" (Cohen et al., 1983). Stress has a serious negative impact on illness and it deteriorates body function through physiological, behavioral, emotional and cognitive change (Taylor, 2006). Research has indicated that stress has significant role on the onset of illness and its progression. Stress increases physiological reactivity, depress the immune system, alter health habits and influence the offset and progression of physical illness (Curtis et al., 2004). Chronically ill patients are more vulnerable to stress. The susceptibility to stress varies from person to person (Salleh, 2008) and patient's perception of stress depends on various demographic factors such as age, sex, education, income, socio-economic status etc (Farcas & Nastasa, 2014). These demographic factors affect the psychological status of chronic patients due to their vulnerable characteristics and

increased the prevalence of stress perception. Hara et al., (2014) found that perceived stress was strongly affected by gender and female patients feel greater stress than male patients. They also found that perceived stress was affected by age for males, but not affected by age for females. Heijmans et al., (2004) found that personal characteristics age and sex were important in determining the degree and type of stress experienced. Feizi, Aliyari and Roohafza (2012) found that higher levels of education were negatively associated with perceived stress and high perceived stress was associated with low or middle levels of income. Antoni & Merghani (2016) suggest that improvement in educational level and monthly income should be considered for the management of the chronic patients. A number of studies have been conducted on gender differences in patients with type-2 diabetes mellitus (Nilsson et al., 2004; Tang et al., 2008; Legato et al., 2006) and indicated that female patients feel greater stress from diabetes mellitus than do males and as a result their cautious approach make them more reluctant to take proper action. Gender difference was also found in the use of adaptive and maladaptive coping strategies among chronic patients which are associated with perceived stress (Sirois et al., 2015). Researches have indicated lower income and lower education to be associated with higher level of stress. Whereas, perceived stress level tended to be relatively low among people with higher level of income and education (Baum et al., 1999; Booth & Amato, 1991). Based on research evidence it is clear that demographic factor has significant influence on perceived stress.

Research on stress and diabetes suggests that stress affect diabetes, in terms of both its onset and exacerbation (Luthra, 2011). Diabetic patients experience emotional and physical problems and pass through shock, anger, fear, stress, depression, denial and so on

(Ijaz & Ajmal, 2011). Stress blocks the body from releasing insulin and the release of stress hormones can increase glucose level in the blood stream of people with diabetes (Wijenaik & Nishan, 2007). Recently, it has been identified that stress is associated with higher blood glucose level in diabetic patients (Rook *et al.*, 2016). Many studies have shown that both acute and chronic stress is the risk factors for the onset and progression of coronary heart disease (Matthews, 1986; Krantz *et al.*, 2013) and suffering from coronary heart disease is stressful too (Kulick, 2014). Several researches has been conducted to identify the risk factors of diabetes and coronary heart disease such as irregular eating, dietary fiber consumption, BMI, poverty, stress etc. (Begum *et al.*, 2012; Cohen *et al.*, 2007). But a very few research have been conducted to identify the underlining factors of perceived stress among patients with chronic illnesses. That's why it is important to identify the factors which are responsible for increasing level of stress among diabetes and coronary heart disease patients. Therefore, the objective of the present study was to investigate the influence of age, gender, education and monthly income on perceived stress of type-2 diabetes and coronary heart disease patients.

Method

Sample

The sample consists of 100 chronic patients who had type-2 diabetes (n=50) and coronary heart disease (n=50). Patients were recruited from six hospitals, clinics and medical centers of Rajshahi city in Bangladesh. All of the participants were out-patients and who had diagnosed diabetes or coronary heart disease at least six months before the data collection. The age range for the patients was 35 to 65 years. The demographic characteristics of sample included education varies from illiterate to graduate, monthly income range was Tk. 5000 to tk. 60,000.

Moreover, 55 percent patients were male where 30 were coronary heart disease patients and 25 were diabetes patients, whereas, 45 percent were female where 20 were coronary heart disease patients and 25 were diabetes patients; 78 percent were from nuclear family and 22 percent were from extended family.

Measures

Personal Information Form: Patients were asked about their age, gender, level of education, monthly income, type of family, residential background, duration of illness, frequency of visit to doctor in last six months, rate of hospitalization and about their care giver.

Perceived Stress Questionnaire (PSQ; Keya, 2006). The Perceived Stress Questionnaire (PSQ) was used to measure level of perceived stress. Keya (2006) developed the Perceived Stress Questionnaire (PSQ) for use in Bangladesh. The internal consistency of the PSQ was determined using Cronbach's Alpha reliability and Cronbach's alpha (0.77) of the total scale (Keya, 2006) was adequate considering this a newly developed tool (Nunnally & Bernstein, 1994). The PSQ was constructed with 20 items is an internally consistent and reliable measures of perceived stress. Temporal stability of the scale was established using test-retest method ($r = 0.73$). The scale contains 20 items with 5 point Likert (1932) type responses ranging from "never" to "highly agree". Five of them are negative and the rest 15 are positive. Higher scores in this scale indicate high perceived stress of the respondents.

Procedure

Considering the nature of the study, a stratified random sampling technique was followed for collecting data. The study population was divided into two strata, where one stratum was coronary heart

disease patients and another was diabetic patients. From each stratum, a sub-sample (50 + 50 = 100) was taken by using simple random sampling procedure. Permission was taken from the hospital authorities. The respondents were clearly described the general purpose of the study and also assured that their responses to the questions would be kept confidential. The scale was administered to each respondent individually. The scale was self-administered for the educated respondents however; it was readout to the illiterate respondents. Clarifications were provided to the respondents where necessary to help them understand the items. After completing the questionnaire, all the information was thoroughly checked up for missing response if any item was missed by the respondents then they were requested to complete the missed item. The researcher thanked each participant for their cooperation.

Table 1

Mean Difference in Perceived Stress Scores of Male and Female Patients

Group	<i>n</i>	<i>Mean</i>	<i>SD</i>	<i>df</i>	<i>t</i>	<i>p</i>
Male	55	36.35	12.076	98	3.476	.001
Female	45	45.36	13.893			

Table 1 shows that mean difference in perceived stress of male and female was statistically significant ($t=3.476$, $p<.01$). The mean scores of female ($M=45.36$) is higher than male ($M=36.35$). That means female patients feel more stress than male patients.

Education and Perceived Stress

Table 2

Summary of One-way ANOVA Representing Variations in Perceived Stress Scores According to Education.

Source	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Between Groups	3083.086	4	770.772	4.809	.001
Within Groups	15226.914	95	160.283		
Total	18310.000	99			

Data Processing and Statistical Analysis

To analyze these scores, the raw data were coded and entered into data analysis software (IBM statistics version 20.0). Gender difference was calculated using independent sample *t*-test and one-way analysis of variance was applied to find out the variation of different level of education on patient’s perceived stress. Multiple linear regression analysis was conducted to identify significant predictors of perceived stress.

Results

Gender and perceived stress

In order to examine the effects of gender on perceived stress data was analyzed through independent sample *t*-test. The results of *t*-test and mean difference of perceived stress scores according to gender is presented in Table 1.

In order to examine the effects of education on perceived stress data was analyzed by using one-way analysis of variance. The result of one-way analysis of variance of perceived stress scores according to education is presented in Table 2.

Table-2 shows that the main effect of education on perceived stress ($F=4.809$, $df=4/95$, $p<0.01$) was statistically

significant. In other words perceived stress varied according to different levels of education.

Table 3

Mean of perceived stress score by educational level.

Level of education	Mean
Illiterate	46.61
Primary	44.60
Secondary	44.29
Higher Secondary	37.75
Graduate	33.50

Table3 shows that mean scores of perceived stress is highest for illiterate patients ($M=46.61$) followed by primary ($M=44.60$), secondary ($M=44.29$), higher secondary ($M=37.75$) and graduate ($M=33.50$). That means, levels of education is a significant factor for perceived stress and high level of education is important to reduce the level of stress.

Demographic factors (age, gender, monthly income) were considered as the predictors of perceived stress. Findings of the demographic factors that predict perceived stress are presented in Table 4.

Adjusted R^2 in table 4 indicates that the model (includes patients age, gender, monthly income) was significant and explains 26.8% of variation in patients perceived stress.

Predictors of Perceived Stress

Table 4

Regression Analysis of Perceived Stress on Patient’s Age, Gender and Monthly Income. Predictors of perceived stress.

Variable	Perceived Stress		
	B	β	95% CI
Constant	86.590**		[55.441, 117.739]
Age	.165	.104	[-.108, .438]
¹ Gender	9.833**	.361	[5.153, 14.512]
Monthly income	-6.945**	-.423	[-9.769, -4.121]
R^2	.290		
Adjusted R^2	.268		
F	13.051**		

** $P < .001$

Note: $N=100$, $CI=$ Confidence interval

¹ Patients gender (M) was used here and subsequently as a dummy variable coded as ‘1’ or ‘0’. 1 stands for a membership of the male category and ‘0’ for a non-membership of the male category. If 1 unit change occurs in this variable it switches to patients gender (F).

Standardized β value in table 4 indicates that patients monthly income ($\beta = -.423$, $P < .001$) was the strongest predictor of patients perceived stress. The other significant predictor was patients gender ($\beta = .361$, $P < .001$).

Discussion

In this study we used Perceived Stress Questionnaire to examine how patients with type-2 diabetes and coronary heart disease perceived stress. The main objective of the present study was to investigate the influence of demographic factors (age, gender, education, monthly income) on perceived stress.

Gender wise difference in perceived was found from independent sample t-test (Table-1). Stress was found to be more in female patients compared with male patients. The significantly higher scores of females suggest that gender plays a role in the perception of stress. A number of studies have been conducted on gender differences in patients (Tang *et al.*, 2008; Legato *et al.*, 2006; Heijmans *et al.*, 2004; Nilsson *et al.*, 2004). In the context of Bangladesh, the society is male governed and a few female are financially independent and most of them are depend on their husband or family, they are confined within the family and have less opportunity to communicate with outer world. In most of the families women are marginalized and lack the power of decision making. As a result they lack confidence and perceive higher level of stress in comparison to male. Besides this, during illness they are often ignored and neglected by their family member. They do not have timely medical facility and proper nursing. They also face difficulty as they find no one to help doing their household work during their illnesses. Sometimes their family refuses to pay extra expenses for their treatment and considered them as a burden to the family. These may be the causes of high level of perceived stress among female patients.

Many researches supported this finding. A recent study by Hara *et al.*, (2014) found that perceived stress was strongly affected by gender and female patients feel greater stress than male patients. Farcas and Nastasa (2014) found increased levels of stress in all patients and significantly more in women than in men.

In the present study, education was found as a significant demographic factor in creating stress among patients. Result of the one way ANOVA in Table 2 shows that the main effect of different educational level was statistically significant. The findings suggest that education has effect on perceived stress of chronic patients. From this study, it was also found that there were significant differences among patients possessing different educational level (Table-3). The illiterate patients had high level of perceived stress compare to other educational level and graduate patients were found to have low level of perceived stress compare to other educational level. The illiterate or low-literate people are unaware about the causes of diseases, future consequences and modern treatment of diseases. Most of the illiterate or low-educated people are poor; due to poverty or financial insolvency they are not capable of getting proper health service or to visit a qualified doctor. They do not understand or misunderstand their doctor's advice as a result they do not follow their doctor's advice. This might be the reasons of high level of stress. On the other hand, highly educated people are conscious about their healthy way of living, they have sufficient information about different diseases and their modern treatment. So, it is logical to conclude that lower level of education is a liable factor for high level of perceived stress. This result is consistent with the recent findings of Farcas and Nastasa (2014) who found that education influence the patient's perception of stress. Feizi, Aliyari and Roohafza (2012) also found that higher levels of education were

negatively associated with perceived stress. Heijmans *et al.*, (2004) and Shields (2004) also found that stress tended to be relatively low among people with higher level of education.

In the present study, in order to understand which factors play the important role in perceived stress of chronic patients, we calculated a multiple linear regression. Results clearly point out that demographic factors are significant predictor to create variations in patient's perceived stress. From Table 4, it was seen that predictor variable or demographic factors (age, gender and monthly income) explained 26.8% variance of criterion variable perceived stress. The first predictor variable age indicated that patient's perceived stress did not associate with age. Thus, patient's age is not an important factor of perceived stress. However, previous studies suggested that age is a significant factor for perceived stress. Farcas and Nastasa (2014) found that aging decreases the level of perceived stress. The reason of this inconsistent result in the present study may be that sample size was very small and the age difference of the participants was very small. The second predictor variable gender indicated that gender was strongly and positively associated with patient's perceived stress ($\beta=.361$, $p<.001$). Results indicated that a change of one standard deviation in gender (male) resulted in a change of .36 standard deviation in perceived stress of chronic patients. The results are consistent with previous findings of Farcas and Nastasa (2014), Hara *et al.*, (2014), Heijmans *et al.*, (2004). A study by Farcas and Nastasa's (2014) showed that the level of perceived stress was significantly more in women than men. Hara *et al.*, (2014) found that perceived stress was strongly affected by gender and female patients feel greater stress than their male counterpart.

The third predictor variable monthly income indicated that monthly income was

strongly and negatively associated with perceived stress ($\beta=-.423$, $p<.001$). Results indicated that a change of 1 standard deviation in monthly income resulted in a change of .42 standard deviation in perceived stress of chronic patients. The findings of this result indicate that chronic patient with lower income perceived high level of stress whereas, chronic patient with higher income perceived low level of stress. The reason may be that people with lower level of income are always in financial difficulty and deprived of food consumption, housing, clothing, recreation, human rights, health, medical care and other modern facilities. Beside this, it is very difficult for them to effort extra expenses for the treatment of chronic illness. Moreover, they are concerned about the future consequence of illness which is highly liable for high level of stress. On the other hand, people with higher level of income feel less stress because of having financial sufficiency to effort long-term treatment. In support of these findings a number of previous researches have shown that people with lower monthly income generally reported higher levels of perceived stress and people with higher monthly income reported lower levels of perceived stress (Shields, 2004; Baum, Garofalo & Yali, 1999; Booth & Amato, 1991). A study by Farcas and Nastasa (2014) showed that income level represent major cognitive and behavioral resources in the coping with disease and with stress and low income increased the level of perceived stress. Feizi, Aliyari and Roohafza (2012) investigated that high perceived stress was associated with low or middle levels of income.

Diabetes and Coronary heart disease are the most common chronic illness in Bangladesh. The results of this study explore the further need of this type of research. In the present study gender, monthly income and education are identified as the dominating factor in

patient's perceived stress. So, it is important to conduct research to focus on other variables impact on perceived stress.

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