PERCEIVED STRESS, COPING STRATEGIES AND PSYCHOLOGICAL WELL-BEING OF PEOPLE WITH DIABETES AND PEOPLE WITHOUT DIABETES IN BANGLADESH: A COMPARATIVE STUDY

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ABSTRACT

The aim of the present study was to investigate whether there is any difference between individuals with diabetes and without diabetes in their perceived stress, use of coping strategies and psychological well-being. A comparative study was conducted on 240 Bangladeshi adult participants. Among them 120 participants were with diabetes ranging in age from 27 through 56 years (M = 40.10 years, SD = 6.86) and 120 were healthy persons without diabetes and their mean age was 41.07 years (SD = 6.81), with a range from 31 to 59 years. They were equally distributed according to sex. No significant differences were found between the two groups in their age, occupation, educational level, monthly family income using χ^2 and Mann-Whitney U test. Data were collected using a package of self-report measures including: (1) the Bangla version of perceived stress scale (2) the Bangla version of coping scale (3) the Bangla version of psychological well-being scale and (4) Personal information form. The Results of Mann Whitney U test showed significant differences between participants with diabetes and participants without diabetes in perceived stress, coping strategies and psychological well-being. The findings suggest implications for healthcare practitioners to pay attention to psychological state of patients with diabetes. This research suggests that more research should explore the psychological state of poorly versus well controlled patients with diabetes.

Keywords*: coping strategies; diabetes; perceived stress; psychological well-being*

INTRODUCTION

Diabetes is one of the most challenging and serious diseases of the 21st century, and is a growing threat to public health and well-being (Peer et al., 2012; Zimmet, Alberti, & Shaw, 2001). It can lead to physical complications and can increase the overall risk of premature death and caused 1.5 million deaths in 2012 as well (World Health Organization, 2016). Diabetes is a chronic and progressive disease that occurs either when the pancreas does not produce enough insulin (a hormone that regulates blood sugar, or glucose) (type-I diabetes), or when the body cannot effectively use the insulin it produces (type- II diabetes) (WHO, 2016).The global prevalence of diabetes has nearly doubled (from 4.7% to 8.5%) in the adult population since 1980 to 2014. Over the past decade, diabetes prevalence has risen faster in low- and middle-income countries than in high-income countries (WHO, 2016) mainly in Asia and Pacific region (Rahim et al., 2007; Yang et al., 2010; Zhang et al., 2013). Bangladesh is in the second position in this region for having higher numbers of adults with diabetes (10% of the total population) (Akter, Rahman, Abe, & Sultana, 2014; International Diabetes Federation, 2011).

Stress is a potential contributor to both the onset and exacerbation of diabetes (Lloyd, Smith, & Weinger, 2005; Rose, Fliege, Hildebrant, Shirop, & Klapp, 2002). Stress is a negative emotional experience accompanied by predictable a) biochemical b) physiological c) cognitive and d) behavioral changes that are in direction of altering the stressful event or accommodating to its effects (Taylor, 2015). It is common in modern life and brought on by ordinary daily hassles (e.g., conflict with family members, problems at work, work deadlines), negative life events (e.g., death of a loved one, financial problem, divorce) and the additional burdens of coping with chronic illness (Madhu & Sridhar, 2001).

Stress directly affects diabetes both through physiological mechanisms and through disruption in behavioral patterns and well-being (Lloyd et al., 2005; Madhu & Sridhar, 2001). Björntorp (1997) explained the association between stress and diabetes in a theory which states that perceived psychological stress with a helplessness reaction can lead to an activation of the hypothalamic– pituitary–adrenal axis resulting in high cortisol levels which antagonise the actions of insulin. Several research evidences support this theory that psychosocial stress and stressful life events have been positively associated with the onset of type 2 diabetes (Heraclides, Chandola, Witte, & Brunner, 2009; Mooy, Vries, Grootenhuis, Bouter, & Heine, 2000). Perceived stress have been linked to poor metabolic control (Surwit, Schneider, Feinglos, 1992; Viner, McGrath, & Trudinger, 1996) which can lead to deleterious long-term complications in patients with diabetes, such as blindness, kidney failure, lower limb amputation, coronary heart disease, nervous system damage, loss of sensation, Alzheimer's disease and vascular dementia (De la, 2012; Xu et al., 2009). Furthermore, these complications and diabetes itself is also an important cause of stress in these patients due to life style changes, balance diet, exercise, frequent medical examinations and drugs taking (Mooy et al., 2000). It may also create financial crisis for the patients and their families which ultimately impacts on health systems and national economies through direct medical costs, loss of work and income. All these diabetes related stress affects the well-being of patients with diabetes and may contribute to psychological symptoms like anxiety (Trovato et al., 2006; Weinger & Lee, 2006).

Coping strategies used to deal with stressor like diabetes can play a key role in the maintenance of diabetes (Graue, Wentzel-Larsen, Bru, Hanestad, & Sovik, 2004). Coping has been defined as cognitive and behavioral attempts aimed at diminishing the physical, emotional and psychological burden that is linked to stressful life events and daily hassles (Duangdao & Roesch, 2008; Snyder, 1999). Generally, coping strategies are classified into emotion focused and problem focused coping strategies (Folkman, Schaefer, & Lazarus, 1979). Problem focused coping involves attempts to do something constructive about the stressful conditions or situations that are harming, threatening, or challenging an individual. Emotion focused coping involves efforts to regulate emotions experienced due to the stressful event (Taylor, 2015). Some previous research has shown that problem focused coping strategies are considered more effective and adaptive, and are correlated with fewer psychological problems and healthier psychological well-being although the impact of these coping strategies appears to depend on the specific constraints imposed by the stressful situation (Holahan & Moos, 1987; Karlsen & Bru, 2002; Ridder & Schreurs, 2001). Additionally, maladaptive coping could increase the risk for psychological problems in patients with diabetes (Sultan, Epel, Sachon, Vaillant, & Hartemann-Heurtier, 2008; Tuncay, Musabak, Gok, & Kutlu, 2008; Weinger & Lee, 2006). Use of problem focused coping or emotion focused coping strategies might be depend on nature of illness (Tuncay et al., 2008). Patients with chronic illness use more emotion focused coping strategies (Blakely et al., 1991; Neerinckx, Houdenhove, Lysens, Vertommen, & Onghena, 2000).

Research findings assert that diabetes negatively affect patients' quality of life, causes inconvenience and persist till the end of their lifetime, presents a major challenge to patients' psychological functioning and psychological well-being (Chouhan et al., 2006; Engum, 2007; Weinger & Jacobson, 2001; Ziarko et al., 2015). Psychological well-being refers to how people evaluate their lives or it is the measure of how happy people are (Diener, 2000). In a study of Bangladeshi sample of diabetic patients (n = 1952) showed that about half of patients have poor quality of life with poor adherence to diet, exercise and self testing of blood glucose (Latif, Jain, & Rahman, 2011).

Bangladesh is likely come to view as the 8th highest ranking country in the world in terms of prevalence of diabetes by 2030 (Whiting, Guariguata, Weil, & Shaw, 2011). In Bangladesh lacking of health insurance forces individuals and families to bear the cost of health care. Ultimately it affects the economy of the country as a whole through loss of productivity, morbidity and mortality (Islam et al., 2013). In spite of having high prevalence of

diabetes in the Chittagong division (Akter et al., 2014) there is lack of sufficient community health care as well as mental health service in Chittagong, Bangladesh. Moreover, the psychological state, coping strategies, psychological well-being of patients with diabetes are still unclear and unidentified compared to healthy adults in Bangladesh. There is a dearth of literature in Bangladesh about psychological issues and diabetes. To address this gap of knowledge the main research question was – do individuals with diabetes significantly differ from individuals without diabetes in terms of their perceived stress, coping strategies and psychological well- being.

METHOD

Target Population

The target population of this study was adult individuals with diabetes and without diabetes in Chittagong city, Bangladesh.

Participants

The sample of the study comprised of 240 adult participants. Among them 120 adults having diabetes comprised the group with diabetes and 120 were healthy persons comprised the group without diabetes. Although, initially a total of 266 adult participants completed the questionnaire but finally 26 participants were excluded from this study for matching the both groups. Individuals with diabetes who came for regular check up and treatment for having diabetes were conveniently selected by the help of doctors from diabetes care unit of two medical centers (Popular Diagnostic Center and Lab Asia in Chittagong city).Their fasting plasma glucose level (mmol/l) on that day also taken (M = 7.29 , SD = .43, Mdn = 7.00). All patients with diabetes were type–II patients with diabetes. Patients with disease duration of less than six months and with severe physical comorbidity (such as coronary artery disease, chronic kidney disease etc.) were excluded from the study to surely investigate the solely role of diabetes on perceived stress, coping and over all psychological well-being. The control group of healthy individuals was used for comparison. Those people were conveniently selected as participants who were not suffering from diabetes and any kind of chronic disease during the survey. Before collecting data researchers personally communicated conveniently with individuals. Among them who were assured that they have tested their blood glucose level within last three months and had normal blood glucose level asked to come in the medical center in schedule date in fasting condition (overnight fasting at least for 8 hours) for fasting plasma glucose test. As individuals who had normal fasting plasma glucose (< 5.6 mmol/l) according to American Diabetes Association (2003) were finally included in the control group and they filled up the questionnaire on the next day of their blood test. The fasting plasma glucose level (mmol/l) of control group was M = 4.72, SD = .40, Mdn = 5.00.

Both groups (participates with diabetes and participants without diabetes) were matched for age, sex, monthly family income, educational level and occupation. Distribution of participants according to socio demographic characteristics is given in Table 1.

Table 1 Socio-Demographic Characteristics of Participants with Diabetes and Participants without Diabetes

Socio-Demographic Characteristics	Participants with diabetes (n = 120)	Participants without diabetes (n = 120)	Total (n = 240)
	M (*SD*), Range, *Mdn*		
Age (years)	40.10 (6.86), 27-56 *Mdn* = 39.50	41.07 (6.81), 31-59 *Mdn* = 40.50	40.58 (6.83), 27-59 *Mdn* = 40
Monthly Family Income (Bangladeshi Taka*)	34950 (19087.97), 5000-75000, *Mdn* = 37500	39600 (20691.57), 5000-80000, *Mdn* = 40000	37275 (20000.40), 5000-80000, *Mdn* = 40000

	n (%)		
Sex			
Men	60 (50)	60 (50)	120 (50)
Women	60 (50)	60 (50)	120 (50)
Educational Level			
Primary Level (Class i-v)	10 (8.3)	6 (5)	16 (6.7)
Secondary Level (Class vi-x)	26 (21.7)	20 (16.7)	46 (19.2)
Higher Secondary (Class xi-xii)	24 (20)	24 (20)	48 (20)
Bachelor (Class xiii-xvi)	6 (5)	4 (3.3)	10 (4.2)
Masters (Class xvii)	54 (45)	66 (55)	120 (50)
Occupation			
Business	28 (23.3)	28 (23.3)	56 (23.3)
Govt. Service	20 (16.7)	22 (18.3)	42 (17.5)
Private Service	14 (11.71)	24 (20)	38 (15.8)
Service in Autonomous Org.	10 (8.3)	10 (8.3)	20 (8.3)
Housewife	36 (30)	24 (20)	60 (25)
Others	12 (10)	12 (10)	24 (10)

*Currency of Bangladesh (1US$ = 80 Bangladeshi taka)

The socio-demographic characteristics of two groups of participants were compared using Pearson χ^2 and Mann-Whitney *U* test. No significant differences were found between the two groups of participants regarding these variables such as age ($z = -1.04$, $p = .30$), occupation ($\chi^2 = 5.13$, $p = .40$, $df = 5$), educational level (actual educational level was taken by year of study/ education) ($z = -1.67$; $p = .10$), monthly family income ($z = -1.69$; $p = .09$).

Measures

All respondents in this study responded to three self report questionnaires along with a personal information form. All questionnaires were translated and adapted into Bangla language and culture. The three measures and personal information form are in details as follows-

Perceived Stress Scale. Bangla version of Perceived Stress Scale (PSS) (Fahim, 2001) originally developed by Cohen, Kamarck, & Mermelstein (1983) was used to measure respondents' stress. It is a 10-item 5-point Likert type scale. It measures the degree to which situations in one's life are appraised as stressful. Items were designed to tap how unpredictable, uncontrollable, and overloaded respondents find their lives. The scale also includes a number of direct queries about current levels of experienced stress. The questions in this scale ask about feelings and thoughts during the last month. In each case, respondents were asked how often they felt a certain way. There were 4 positive and 6 negative items in the scale. For the positive items respondents got '4' for never, '3' for almost never, '2' for sometimes, '1' for fairly often, '0' for very often responses. For negative items, scoring was in reverse order. The sum of scores of all items was the total score of the scale with a range of 0 to 40 for an individual. The higher the score, the higher is the stress. The coefficient of correlation between the Bangla and the English versions of the PSS was .90 and two administrations of the Bangla version with an interval of 2 weeks was .94.

Coping Scale. Bangla version (Huque, 2004) of coping scale originally developed by

Folkman and Lazarus (1980) was used to measure coping behavior of the respondents. The test–retest reliability of the translated version of the coping scale was reported to be highly significant (r = .86, p < .01).The coping scale is a 22 item self report measure of coping strategies. The measure is a 4-point Likert type scale with 1 (I usually don't do this at all), 2 (I usually do this sometimes), 3 (I do this most of the time) and 4 (I do this always). Total items of PFC (problem focused coping) are 12 and the highest and lowest score for PFC is 48 and 12 respectively. Total items of EFC (emotion focused coping) are 10 and the highest and lowest score for EFC is 40 and 10 respectively. The higher score for EFC indicates the more emotion focused coping strategies and higher score for PFC indicates the better problem focused coping strategies of a particular respondent.

Psychological Well-being Scale. Psychological Well-being Scale (PWBS) (Huque & Begum, 2005) containing 66 items (among them 33 were positive and 33 were negative) was used to measure the psychological well-being of the participants. It is a 5 point Likert type scale (strongly disagree to strongly agree) where negative items have reversed scoring. Possible score range is 66-330. The Cronbach Alpha of PWBS was .88 (whole scale), test-retest reliability was .86, and convergent validity was .76 with Goldberg's scale of general health questionnaire (12 items).

Personal Information Form (PIF). A PIF including sex, age, educational level, monthly family income, occupation, and duration of diabetes, current treatment type, plasma glucose level (mmol/l) etc.

Procedure

Data was collected individually from the participants and each participant was informed about the purpose of the study, informed consent was obtained, and participants were told that they had the right to refuse participation and could withdraw at any time without any obligations. The participants with diabetes were surveyed first. All of them were outpatients, who visit hospital periodically for checking blood glucose level and getting treatment and followed by participants without diabetes were surveyed. Necessary instructions with printed questionnaire were given to participants to make sure about their understanding of the task. Further clarifications were given to the participants where necessary. Respondents were also asked to complete the survey at their own paces. They were also assured the confidentiality of their information obtained through this study. Most respondents took almost an hour to complete the questionnaires. Gratitude was shown to the participants for their cooperation and support after the completion of the questionnaires.

Data Analyses

We performed non parametric Mann-Whitney *U* test to compare medians (or ranks) of continuous data since the data of perceived stress, coping strategies and psychological well-being of participants with and without diabetes were not normally distributed (tested by Shapiro–Wilk test). Spearman's correlation was performed to assess the relationship between perceived stress, problem focused coping, emotion focused coping and psychological well-being of participants with diabetes and without diabetes separately. All statistical analyses were carried out using the statistical program SPSS version 16.0 for window.

RESULTS

We computed Mann Whitney *U* Tests to test groups (participants with diabetes vs. participants without diabetes) differences in major variables.

Table 2 Difference between Participants with Diabetes and Participants without Diabetes in Measures of Perceived Stress, Coping Strategies and Psychological Well-being

Measures	Participants	*Mdn*	Range	Mean Rank	Sum of Ranks	Mann Whitney *U*	*z*	Effect Size *r*
PSS	WD	22.00	12-40	134.17	16100	5560	-3.06**	-.20
	WOD	20.50	13-27	106.83	12820			
PFC	WD	26.00	15-41	93.28	11194	3934	-6.09**	-.39
	WOD	31.00	19-38	147.72	17726			
EFC	WD	25.00	14-40	146.78	17614	4046	-5.88**	-.38
	WOD	21.50	12-37	94.22	11306			
PWB	WD	201.50	80-290	87.95	10554	3294	-7.27**	-.47
	WOD	252.00	182-298	153.05	18366			

Note. PSS = Perceived Stress, PFC = Problem Focused Coping, EFC = Emotion Focused Coping, PWB = Psychological Well-being, WD = With Diabetes, WOD = Without Diabetes, *Mdn* = Median
**p <.01

As shown from Table 2 that persons with diabetes significantly differ from persons without diabetes in perceived stress, problem focused coping, emotion focused coping and psychological well-being. Persons with diabetes (*Mdn* = 22) have more stress than those participants who are not suffering from diabetes (*Mdn* = 20.50, z = -3.06, p < .01, r = -.20).

It is also observed from Table 2 that persons with diabetes employ more emotion focused coping strategies (*Mdn* = 25) than persons without diabetes (*Mdn* = 21.50, z = -5.88, p < .01, r = -.38). Whereas persons without diabetes use more problem focused coping strategies (*Mdn* =31) than persons with diabetes (*Mdn* = 26, z = -6.09, p < .01, r = -.39). Psychological well-being is better among participants without diabetes (*Mdn* = 252) than participants with diabetes (*Mdn* = 201.50, z = -7.27, p < .01, r = -.47).

To investigate the relation between perceived stress, coping strategies (problem focused coping and emotion focused coping), psychological well-being of persons with diabetes and without diabetes we computed Spearmen's correlation.

Table 3 reveals that perceived stress of participants with diabetes and without diabetes is significantly negatively correlated with their psychological well-being. Problem focused coping of participants with diabetes is significantly negatively correlated with perceived stress as well as positively associated with psychological well-being. However, emotion focused coping of participants with diabetes is significantly positively associated with stress and negatively associated with psychological well-being.

Table 3 Correlation of Perceived Stress, Coping Strategies, Psychological Well-being of Participants with Diabetes and Participants without Diabetes

Measures	1	2	3	4
1. Perceived Stress	----	.08	.14	-.30**
2. Problem Focused Coping	-.64**	----	-.06	.12
3. Emotion Focused Coping	.52**	-.16	----	-.34**
4. Psychological Well-being	-.56**	.41**	-.30**	----

Note. Values below the diagonal pertain to participants with diabetes and above the diagonal pertain to participants without diabetes.
**p <.01

DISCUSSION

Findings of the present study indicate persons with diabetes perceive more stress than those persons who are not suffering from diabetes, as well as persons with diabetes uses more emotion focused coping strategies than problem focused strategies to cope with the stress in their lives compared to normal healthy persons. In addition, patients with diabetes have poorer psychological well-being contrasting with normal healthy persons. These findings are consistent with that of few other studies (Graue et al., 2004; Kawakami, Araki, Takatsuka, Shimizu, & Ishibashi, 1999; Lloyd et al., 2005; Mollema, Snoek, Ader, Heine, & Ploeg, 2001; Trovato et al., 2006; Weinger & Jacobson, 2001).

Present findings are also supported by one other study conducted on samples having cultural similarity with the sample of the present study. Results of this study that was conducted on Indian adults (age range: 35 to 45 years) have indicated that stress is higher for high blood sugar group than the normal respondents (Chouhan & Shalini, 2006). Moreover, the stress of dealing with diabetes may impact patients' psychosocial functioning which may also increase the risk for developing psychopathological symptoms (Weinger & Jacobson, 2001). Individuals with diabetes face more stress of maintaining tight glycemic control, they have to take care of themselves. They need to be careful about the food or limited calorie intakes, medications, treatment and sometimes it has a devastating long-term effect on their financial and social wellbeing consequently negatively effects family and interpersonal relationship (Islam et al., 2015).

Findings of correlation analyses show that perceived stress of persons with diabetes significantly negatively related with problem focused coping strategies and psychological well-being as well as positively associated wih emotion focused coping. Although, individuals significantly differ among themselves in using coping skills and use of coping strategies may also depend on nature of illness (Tuncay et al., 2008). However, several studies show similar result with our finding that emotion focused coping strategies were used by patients of chronic illness like diabetes (Collins, Bradley, Sullivan, & Perry, 2009; Samuel-Hodge et al, 2000; Willoughby, Kee, Demi, & Parker, 2000). Several studies demonstrated that patients with diabetes who uses more emotion focused coping strategies experiences more distress, depression, i.e. poorer psychological well-being (Duangdao & Roesch, 2008; Maes, Leventhal, & Ridder, 1996; Samuel-Hodge et al., 2008).

Psychological well-being may have reciprocal effect on diabetic patients and impairment in psychological well-being also increases diabetic complications and psychological stress (Engum, 2007). In a study it was appeared that adjustment level was also better in normal respondents as compared to the diabetes patients (Chouhan & Shalini, 2006) and in a meta-analysis Reynolds & Helgeson (2011) reported that level of depression are higher among individual with diabetes i.e. poorer psychological well-being compared with persons without diabetes which supported the finding of our present study.

Because of the non-probabilistic sampling procedure generalizability of the findings may be limited. We also excluded severe physical

co-morbidities to avoid the confounding effects of these variables on major variables. We only tested the fasting plasma glucose level to determine glucose level of participants due to lack of funding. If 2–h plasma glucose level were also tested additionally it would be more precise for determining participants' glucose level.

Despite these limitations, the findings of this study provided essential information, about Bangladeshi patients with diabetes, concerning: (1) perceived stress, (2) coping strategies used, and (3) condition of psychological well-being compared with Bangladeshi persons without diabetes. The findings also suggest implications for psychological practice. Healthcare practitioners need to pay attention to psychological state of patients with diabetes. This should be ensured that the government and health service of Bangladesh diabetic association take this into concern and act wisely for the improvement of the psychological issue of persons with diabetes. Through psychosocial interventions, professionals need to assist patients in using verities of coping skills may be useful in reducing stress and improving both coping skills, control and management of diabetes. This research suggested that more research should explore the psychological state of poorly controlled patients with diabetes as compared to well controlled patients with diabetes. In addition, identifying patients who are more likely to encounter difficulties dealing with the impacts of diabetes and then assisting them with the mobilization of problem focused coping strategies can help foster better psychological well-being.

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