

PERSONALITY AND STRESS OF NIDDM PATIENTS – A COMPARATIVE STUDY

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ABSTRACT

In the modern age certain life style related diseases are on the rise. Sedentary life style combined with stress make people with certain personality traits more vulnerable to develop problems like hypertension, inadequate blood pressure, cardiac problems, diabetes and the like. The study was conducted on the subjects suffering from non-insulin dependent diabetes mellitus (NIDDM) and on normal subjects. The study was conducted on total 260 subjects (N=130 in each group i.e experimental group-NIDDM patients and control group- non-diabetic subjects). Personality and stress levels of the subjects of the two groups were measured. Results show the significant differences in the personality and stress levels of the subjects of the two groups.

INTRODUCTION

Diabetes mellitus has long being regarded as a disease, the expression of which depends upon an interaction between hereditary susceptibility and environmental determinants. The relative strength of these two components and precise nature of their interaction in the individual case has not yet been fully documented; but both genetic susceptibility and environmental determinants are assumed to be multifactorial and to contribute in varying proportion to the 'diabetogenic mix'. Thus, at one extreme there would be almost entirely genetically determined diabetic, i.e. IDDM- insulin dependent diabetes mellitus (Type-1), presumably with an acute onset early in life i.e., the juvenile onset. At the other end would be environmental diabetic, i.e. NIDDM-non-insulin dependent diabetes mellitus (Type-2), exhibiting in increasing abundance as the years passed by, the accumulation of life's diabetogenic insults.

According to the World Health Organization, approximately 220 million people world-wide have type 2 diabetes mellitus. Patients with type 2 diabetes not only have a chronic disease to cope with, they are also at increased risk for coronary heart disease, peripheral vascular disease, retinopathy, nephropathy and neuropathy. The exact causes of type 2 diabetes are still not clear. Since the 17th century, it has been suggested that emotional stress plays a role in the etiology of type 2 diabetes mellitus.

Type 2 diabetes mellitus is a serious and common metabolic disorder .The World Health Organization has estimated the number of persons with diabetes worldwide at more than 220 million (WHO, 2009). These figures are expected to rise to 366 million by 2030 (Wild et al., 2004). Besides diabetes mellitus is associated with a two-to four –fold increased risk for micro vascular diseases. Patients with type 2 diabetes also have a doubled risk level for co-morbid depression compared to healthy controls, hampering the quality of life of patients (Pouwer et al., 2003; Schram et al., 2009).

Thomas Willis, an English physician (1621-1675) noted that diabetes often appeared among persons who had experienced significant life stresses, sadness, or long sorrow (Willis, 1675). One of the first systematic studies testing Willis's hypothesis was described in 1935, by the American psychiatrist Dr W. Menninger, who postulated the existence of psychogenic diabetes and described a “diabetic personality” (Menninger,1935).

The two major types of diabetes, insulin dependent (or Type- 1) diabetes and non-insulin dependent (or Type- 2) diabetes differ in origin, pathology, role of genetics in their development, age of onset, and treatment. Type- 1 diabetes is characterized by the abrupt onset of symptoms, which result from lack of insulin production by the beta cells of the pancreas. The disorder may result from viral infection or autoimmune reactions, and probably has a genetic contribution as well. Type-1 diabetes is a serious, life threatening illness accounting for about 10% of all diabetes. Type-2 diabetes is milder than the insulin dependent type and is typically a disorder of middle and old age, striking those primarily over the age of 40. This type of diabetes is increasing at astronomical rates.

Both Type- 1 and Type- 2 diabetics are sensitive to the effects of stress (Gonder- Frederick et al., 1990; Halford et al., 1990). Stress may precipitate Type- 1 diabetes in individuals with the affected gene (Lehman, Rodin, McEwen, & Brinton, 1991). People at high risk for diabetes show abnormal glycemic responsiveness to stress, which, when coupled with the experience of intermittent or long term stress, may be implicated in the development of the disease (Esposito-Del Puente et al., 1994). Stress also aggravates both Type -1 and Type -2 diabetes after the disease is diagnosed (Surwit & Schneider, 1993; Surwit & Williams, 1996).

Whatever the etiology, in all cases of diabetes hyperglycemia results from the deficiency of insulin. This is absolute in the IDDM and relative in NIDDM. Increased gluconeogenesis and lipolysis follow as compensatory reactions under the influence of such hormones – as growth hormones, glucagon and adrenocortical hormones – in what is basically a situation of glucose lack. Thus the hyperglycemia characteristic of diabetes arises from two main sources namely a reduced rate of removal of glucose from the body by the peripheral tissues and increased rate of release of glucose from the liver into the circulation.

The clinical syndrome called Diabetes is complex. However, many studies have shown that a subject with diabetes releases after glucose load too little insulin too late relative to a comparable but non-diabetic individual. Thus an abnormality in the pancreatic B-cell appears central to the disease and the simplest definition of diabetes is absolute or relative insulin deficiency.

Stress

Stress is the buzz word in the modern world and intensity, frequency and level of effect of stress depends on many other variables, most important being the personality. There are individual differences in terms of effects and response to stress which may be manifested physically or psychologically. The word stress has many connotations and definitions based on various perspective of human condition. In Eastern philosophies, stress is considered to be an absence of inner peace. In Western culture, stress can be described as a loss of control. Stress, as defined by Lazarus and Selye, is the inability to cope with a perceived or real (or imagined) threat to one's mental, physical, and spiritual well being which results in a series of physiological responses and adaptations. The holistic definition of stress points out that it is a very complex phenomenon affecting the whole person, not just the physical body. Selye (1950) has defined stress as “the nonspecific response of the body to any demand”. However the meaning of word stress has changed during the past decades. Currently, stress usually refers to the consequence of the failure of an organism-human or animal-to respond appropriately to emotional or physical threats, whatever actual or imagined (Bao et al., 2008).

Stress is a state of threatened homeostasis in which a stimulus is interpreted as being noxious. A variety of factors can activate the stress response-psychologically, biologically and physically. The hypothalamus in the brain produces corticotrophin-releasing factor that stimulates the anterior pituitary to secrete corticotrophin or ACTH. ACTH in turn stimulates the adrenal cortex to

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secrete stress hormones. Stress causes both and modulates a diversity of physiological effects that can enhance resistance to disease or cause damage and thereby promote disease. Stress related hormones such as cortisol and epinephrine have protective and adaptive functions as well as damaging effects. The idea was put up in contemporary bio-behavioural research (Mc Ewen, 1998). The primary and secondary effects of the stress response constitute the biological pathways along with a person's experiences, living and working conditions, interpersonal relations, lifestyle, diet and personality traits can affect the body. Individual behaviour is important because it increases or decreases the patho-physiological cost of stress.

The stress response is one aspect of an array of biological and behavioural processes that either protects or causes damage; e.g. secretion of stress related hormones such as cortisol and catecholamine (epinephrine and norepinephrine) typically vary in a daily rhythm of life. But chronic increase in cortisol through out the diurnal cycle is associated with negative consequences such as accelerated bone mineral loss and hyperglycemia. The autonomic nervous system responds rapidly to stress. The sympathetic and parasympathetic limbs of ANS regulate cardiovascular, respiratory, renal and endocrine systems. The brain ultimately orchestrates the global response by fine tuning the secretion of several neurotransmitters; CRH, AVP, opioid peptides, dopamine and norepinephrine along with prolactin, glucagons, neuropeptidey and others. There is interaction between nervous system, the immune system and behaviour (Ader & Cohen, 1975). Stressful conditions can affect immune system function such as lowering of B-cells, T-cells and natural killer cells (McKinnon & Weisse et al., 1989). Chronic stress has also been related to decreases in immune competence (Schleifer & Keller, 1983; Kiecolt-Glaser et al., 1987, 1996, 1997).

Stress and personality:

There are individual differences in response to stress. Specific types of personalities seem to be more susceptible to the effects of stress than others. Friedman and Roseman summarized two types of personalities –Type A and Type B. Type A men are 2 to 3 times more likely to suffer blood pressure or hyperglycemia like problems (Coon, 1995).How we perceive a given stress may make it more or less stressful. A lot depends on our personality make up. People plagued by inner doubt, low self esteem, and suspiciousness may misconstrue even the routine demands of everyday life as stressful. The people with Type A personality are more likely to develop stress related illnesses because of their personal traits.

Objectives:

1. To find out the significance of difference in the personality traits of NIDDM patients and non-diabetic subjects.
2. To find out the significance of difference in different dimensions of stress in NIDDM patients and non-diabetic subjects.

METHOD

Tools:

16P.F (Cattell, R.B., 1972): This test measures sixteen primary factors of Personality. It consists of 187 questions. Three alternative answers are provided for each of the questions. In the present study Factors A, C, E, G, L, N, Q₂, Q₃, Q₄ of personality were measured.

Bisht Battery of Stress Scale (Bisht, A.R., 1987): It measures thirteen types of stresses on five point scale. In the present study only twelve types of stresses have been measured as the scale of academic stress was not relevant for the selected sample. The twelve types of stresses measured are: Institutional stress, family stress, financial stress, social stress, superstition stress, vocational stress, physical stress, self concept stress, self actualization stress, role stress, existential stress, achievement stress.

Sample:

The sample comprised of total 260 subjects including managers and officers age ranging between 35 to 55 yrs. Out of which 130 were diagnosed patients of NIDDM. The sample belonged to upper –middle socio-economic background. The NIDDM patients' group has been termed as Experimental group and non-diabetic subjects' group has been defined as Control group in this study.

PROCEDURE

The patients diagnosed with type 2 diabetes were contacted to participate in the study with the help of the doctors and it was assured that these patients were not suffering from any other chronic disease. 16 PF questionnaire and Bisht battery of stress scale were administered on the selected NIDDM patients. The same tests were administered on normal subjects too (without NIDDM and any other chronic ailment). The analysis was done on the basis of obtained scores on certain selected factors of 16 PF questionnaire (i.e Factor A (Affectia-Sizia), C (Ego strength), E (Dominance-Submissiveness), G (Superego strength), L (Protension-Alaxia), N (Shrewdness-Artlessness), Q₂ (Group dependent-Self sufficient), Q₃ (Disciplined-controlled), Q₄ (Tranquil-Tense) and different dimensions of stress scale.

Statistical analysis:

Descriptive statistics

t-test

RESULTS AND DISCUSSION

On the basis of the results given in Table-1 it is evident that on many of the personality factors there are significant differences in the subjects of the experimental group and control group. The diabetic patients tend to be more aloof, critical and stiff ($t=3.42$ on Factor A). The significant difference has been found on Factor C of personality which depicts that diabetic people are affected by feelings, changeable and are emotionally less stable. Subjects in experimental group have been found to be more aggressive, competitive and stubborn too ($p<.01$; Factor E). Golden et al. (2005) have conducted a longitudinal cohort study of 11,615 non-diabetic adults aged 48-67 years at baseline. Anger, particularly anger temperament, appeared to be associated with onset of type 2 diabetes. Diabetic people have also been found to be more conscientious and vulnerable to feelings of guilt. On personality factor Q2, Q3 and Q4 also significant differences ($p<.01$) have been obtained between the experimental and control group, which depict that diabetic subjects tend to be self sufficient, prefer own decisions, controlled and compulsive and tend to be socially precise. Subjects of the experimental group i.e. diabetic patients remain more tense, are driven overwrought in comparison to the subjects of the control group i.e. non-diabetic subjects. Researches reported that people with type A personality characteristics such as urgency, impatience, aggressiveness and excessively strong achievement orientation also seem to show up physical characteristics as facial tension, tongue clicking, teeth grinding, facial sweating.

Table – I: Significance of difference between means of Experimental group and Control group on personality and stress.

Variables	Experimental Group		Control Group		T
	Mean	SD	Mean	SD	
A	4.25	1.87	5.37	1.67	3.42**
C	6.65	2.02	4.27	1.59	7.17**
E	4.1	1.82	6.1	2.16	5.48**
G	4.17	1.75	5.8	2.08	4.65**
L	5.23	2.37	5.47	2.49	0.52
N	5.23	2.32	6.47	6.77	1.33
Q2	6.93	1.88	5.12	2.09	3.96**
Q3	7.45	2.08	5.82	2.30	4.07**
Q4	7.93	1.66	5.03	2.45	8.04**
SIS	97.29	19.28	73.12	18.12	7.08**
SFS	175.11	32.09	136.81	26.81	7.09**
FSS	132.01	15.06	111.75	13.68	7.71**
SSS	166.28	39.47	156.25	14.37	1.85**
SSUS	111.23	14.23	99.89	18.28	3.79**
SVS	117.38	9.13	92.33	14.66	11.23**
SPS	168.28	40.47	158.25	15.37	1.95**
SSCS	80.31	15.86	79.50	10.55	0.88
SSAS	116.67	12.39	91.55	19.48	8.43**
SRS	117.88	12.80	90.97	9.70	12.97**
SES	135.32	14.44	113.25	12.64	9.90**
SACH	141.67	12.90	120.12	12.89	9.12**

** Significant at 0.01 level.

(Scott, 2007). Patients with coronary heart disease were likely to have negative effects such as hypertension, job stress, social isolation (Mudgil et al., 1992; Scott, 2007) and these behaviours were also found to be common among diabetics as well. People with diabetes were twice as likely to have depression compared to those without diabetes and also found to have more complexities in management of diabetes or to neuro hormonal abnormalities (Gonzalez et al., 2007; Sridhar, 2007). Studies have also reported that particular personality characteristics play a decisive, mediating role in the quality of life experienced (Testa, 1996; Wilson et al., 1995; Grey et al., 1998). Depressed subjects generally have a poorer quality of life, independent of the physical illnesses from which they might suffer (Barge & Nicolson et al., 1999; Evans et al., 1999; Rose et al., 2000; Wittchen et al., 1999) This also applies to patients with diabetes whose personality dispositions appear to be more significant for the quality of life than the presence of secondary illnesses (Grey et al., 1998; Hanninen et al., 1999; Rose et al., 1998). While on personality factor L (Protension-Alaxia) and N (Shrewdness-Artlessness) no significant differences have been observed between the experimental and control group.

On different types of stress dimensions, as shown in Table-I, the subjects of experimental group are significantly different from the subjects of control group except on self concept stress dimension (SSCS). The subjects of experimental group have been found to have higher level of existential stress (SES), achievement stress (SACH), self actualization stress (SSAS), physical stress (SPS), social stress (SSS), role stress (SRS), institutional stress (SIS), family stress (SFS), financial stress (FSS), vocational stress (SVS), and superstition stress (SSUS). Studies have reported that diabetic patients are found to experience more stress than the normal respondents and that diabetes is found to be significantly affecting the adjustment and stress levels of individuals (Chouhan & Shalini, 2006). The research review (Pouwer et al., 2010) investigated the associations between different forms of emotional stress and the development of type 2 diabetes mellitus. Results of longitudinal studies suggest that not only depression but also general emotional stress and anxiety, sleeping problems, anger and hostility are associated with an increased risk for the development of type 2 diabetes. Patients with type 2 diabetes also have a double risk level for co-morbid depression compared to healthy controls, hampering the quality of life of the patients (Pouwer et al., 2003; Schram et al., 2009). Moreover a considerable number of depressed patients suffer from high levels of diabetes-specific emotional stress (Pouwer et al., 2005; Kokoszka et al., 2009). Several prospective studies tested the hypothesis that general emotional stress is associated with an increased risk for the development of Type 2 diabetes. Rod et al. (2009) analyzed the data from the Copenhagen City Heart Study, involving 7,066 women and men, finding that particularly stressed men but not women were more than two times as likely to develop diabetes during follow up. In a Japanese community based cohort study, the associations between perceived mental stress and the onset of diabetes were investigated (Kato et al., 2009). In a study by Toshihiro et al. (2008) stress in daily life was found to be associated with an increased risk for the development of type 2 diabetes after a 3 year follow-up.

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