

## Exploring the Causes of Irritability in Type 2 Diabetes Mellitus

Mohd Fazil<sup>1\*</sup> and Mohd Akram<sup>2</sup>

<sup>1</sup>Hakim Ajmal Khan Institute of Literary and Historical Research in Unani Medicine, CCRUM, Government of Ayush, New Delhi, India

<sup>2</sup>Department of TST, School of Unani Medical Education and Research, Jamia Hamdard, New Delhi, India

\*Corresponding author: Mohd Fazil, Hakim Ajmal Khan Institute of Literary and Historical Research in Unani Medicine, CCRUM, Government of Ayush, New Delhi, India, Tel: 9818345757; E-mail: fazilmd00@gmail.com

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### Abstract

Diabetes Mellitus type-2 encompasses a widespread clinical syndrome associated with several metabolic abnormalities associated with a range of complications over a period of time. Since the disease is practically incurable, the continued adaptations and restriction imposed by the disease cause a variety of psychological problems in patients, which are associated with several factors such as chronicity, severity, personal characteristics and several others. According to the concept of mizaj (temperament) in Unani medicine, the persons having a cold temperament which may be balghami (phlegmatic) or saudavi (melancholic) are more likely to be depressed, anxious and irritable than others. It was postulated that the same psychic reactions may determine their illness behaviour. With this background, the present clinical study explored the factors associated with irritable behaviour in 100 diabetic subjects. It was observed that diabetic subjects having a saudavi temperament were most likely to be irritable ( $p < 0.01$ , highly significant). Also, irritability was associated with taking injectable medication and those having higher blood glucose ( $p < 0.0001$ , extremely significant). It was concluded that diabetes-related management and therapeutics must take into account these factors along with other clinical and biochemical parameters.

**Keywords:** Irritability; Mizaj; Diabetes; Behaviour

### Introduction

Diabetes mellitus encompasses a group of metabolic abnormalities characterized by high levels of blood glucose. Patients having diabetes have an amplified risk of developing a range of severe health problems leading to escalated financial burden, decreased quality of life and increased mortality. Persistent rise of blood glucose levels lead to generalized vascular damage affecting the eyes, heart, kidneys and nerves and resulting in various complications [1].

Depending on the etiology, Diabetes Mellitus can be divided into two principal forms, type 1 and type 2 diabetes. Type 1 diabetes is primarily due to autoimmune-mediated destruction of pancreatic  $\beta$ -cell islets, resulting in absolute insulin deficiency. People with type 1 diabetes must take exogenous insulin for survival to prevent the development of ketoacidosis. Type 2 diabetes is characterized by insulin resistance and/or abnormal insulin secretion. Individuals with type 2 diabetes are not dependent on exogenous insulin, but may require it for control of blood glucose levels if this is not achieved with diet alone or with oral hypoglycemic agents [2].

The prevalence of diabetes has been increasing globally over recent decades as reflected in the data of International Diabetes Federation. The global prevalence of diabetes was estimated to be 151 million in 2000, 194 million in 2003, 246 million in 2006, 285 million in 2009, 366 million in 2011, 382 million in 2013 and 415 million in 2015 rising to 451 million in 2017.

It was also estimated that nearly half (49.7%) of the diabetic population remains undiagnosed [3]. Asia is the seat of a rapidly emerging diabetes epidemic, with China and India being the epicentres [4]. In such a scenario, it becomes imperative to search for better

management options to enable the patients to lead a healthy and productive life.

Illness behaviour was defined as *"the ways in which individuals experience perceive, evaluate and respond to their own health status."* by Mechanic and Volkart who had noticed the ways in which people reacted to symptoms they might have. Normal illness behaviour is a term intended to convey that the behaviour is appropriate and adaptive. In the course of their work, clinicians inevitably develop their own norms for defining normal illness behaviour and based on clinical observation and sometimes, on their personal experience of illness [5].

The whole concept of illness behaviour assumes more significance in the context of chronic diseases such as Diabetes and their management. For chronic illness such as diabetes, patients' perception of their condition and its management are generally believed to be important factors in determining successful adjustment to and self-care of the disease condition [6].

The overriding goals of diabetes self-management education are to empower individuals to avoid the short-term risks and long-term complications associated with the disease as well as to maintain/improve quality of life. However, the diabetes-specific health behaviours that compose up to 99% of disease treatment are difficult to maintain over time [7]. However, it has been observed in many studies that even behavioral interventions have varied results, and adjustments need to be made with regard to ethnicity etc. [8].

In Persian and Arabic language, diabetes is known by various terms, which were principally coined based on its signs and symptoms. In Persian language, it is known as Dulaab (water-wheel) because the patient always feels thirsty and never seems to be quenched.

In Arabic language, it is known as Istisqa-e-Amnas because whatever fluids the patient consumes, they are collected almost

immediately in the bladder just like Istisqa (Ascites). It is also known as Mo'attisha (Dipsetic), which is derived from 'atsh meaning thirst [9].

According to Ibn Rushd (1126-1198 AD), diabetes is caused due to increased quwwat-e-jaziba (power of absorption) of the kidneys. Simultaneously, the quwwat-e-masika (Power of retention) is weakened, so that the water is excreted without undergoing metabolism. He has referred to the disease as silsil-al-baul (polyuria), barkan and barkariyah [10].

There are four major groups of mizaj (temperament) recognized in Unani medicine, damwi (sanguineous), safravi (bilious), balghami (phlegmatic) and saudawi (melancholic). Of these, the first two are inclined towards hotness which leads to active personality, increased anger, and more psychic reactions.

The latter two groups of temperament are inclined towards coldness which gives rise to sluggishness, depression and laziness [10]. In Unani medicine, diabetes is classified in diseases of hot temperament, although some scholars have stated it to be a disease of cold temperament.

However, the generally accepted concept is that diabetes is caused due to hot temperament, which is reflected in the drugs used for its treatment that consist mainly of cold temperament drugs, in accordance with ilaj bil zid (Counter-treatment, heteropathy) [11]. Imperatively, the psychic reactions associated with different temperaments are reflected in case of an illness, which may reflect in varied illness behavior among patients.

More than 50 years of empirical research has examined illness behaviour. Most of the research has used quantitative methodology. Recent inclusion of qualitative research has opened up new questions about the adequacy of either method in delineating the complex issue that is illness behaviour [12].

The reality is that the psychological underpinning of people varies across socio-cultural groups. Therefore, research to understand these perceptions must precede any intervention [13]. As we develop more efficacious treatments, behavioral issues become increasingly important in determining how, to whom, and under what conditions and settings these treatments are optimally delivered [14]. In this background, the present study was planned to explore the factors associated with illness behaviour in diabetic subjects.

## Research Methodology

The study was a cross-sectional, descriptive, hospital based study undertaken to assess the illness behavior and temperament of diabetic type-2 patients. The patients of either sex between 30-60 years of age receiving oral/ injectable hypoglycemic therapy and not having any co-morbidity or acute severe complications of diabetes were recruited after taking informed consent from Medicine OPD of Majeedia Hospital, Jamia Hamdard and data was collected by interview and observation method.

Illness behavior was assessed with the Illness Behaviour Questionnaire developed by I. Pilowsky and ND Spence [15]. The temperament was assessed with the temperament assessment format which is a 17-point observation and examination format developed and authenticated by Central Council for Research in Unani Medicine, New Delhi, an autonomous research organization under the Ministry of Ayurveda, Yoga, Unani, Siddha and Homeopathy (AYUSH), Government of India. It is based on Ajnās-i-'ashrah (ten

characteristics) on the basis of which the temperament of a person is diagnosed.

The sample was divided into three groups based on their fasting blood glucose levels of the same day. Subjects having fasting blood sugar level between 90-130 mg/dl were labelled as Group-I, the subjects having fasting blood sugar level between 131-200 mg/dl were labelled as Group-II, similarly, the subjects having fasting blood sugar level  $\geq 201$  mg/dl were labelled as Group-III. The statistical analysis was carried out with SPSS.

## Results and Observation

A total of 100 subjects were recruited in the study. Inclusion and exclusion criteria were fixed at age 30 yrs and 60 yrs respectively. Most of the subjects were Hindu by religion (67%). Most of the diabetics (79%) are in 40 years and above.

Overall, 51% of the subjects were females. Maximum of the subjects (95.45%) were educated up to or below matriculation. Maximum of these (45.45%) were illiterate. Most of the subjects (76%) were semi-skilled workers, unskilled workers or unemployed. 81.81% of the subjects belonged to lower socioeconomic status (Middle/Lower Middle or lower).

Temperament of the subjects was classified into four groups according to the basic concept of mizaj in Unani medicine. Most of the subjects were of Balghami temperament (53%), followed by Safravi (28%), Damvi (14%) and Saudavi (5%). The demographic characteristics of the subjects are summarized in Table 1.

Variables	
Age-group (yrs)	% of subjects
30-39	21
40-49	39
50-60	40
Gender	% of subjects
Males	39
Females	61
Religion	% of subjects
Hindu	67
Muslim	30
Sikh	2
Christian	1
Marital Status	% of subjects
Married	90
Unmarried	3
Widowed	5
Divorced	2
Literacy status	% of subjects
Profession or Honours	2

Graduate or post graduate	12
Intermediate/post high school diploma	4
High school certificate	21
Middle school certificate	11
Primary school certificate	21
Illiterate	29
<b>Occupation</b>	<b>% of subjects</b>
Profession	10
Semi-Profession	4
Clerical, Shop-owner, Farmer	7
Skilled worker	3
Semi-skilled worker	12
Unskilled worker	4
Unemployed	60

Table 1: Demographic characteristics of the study sample (n=100).

Temperament of the subjects was classified into four groups according to the basic concept of mizaj in Unani medicine. Most of the subjects were of Balghami temperament (53%), followed by Safravi (28%), Damvi (14%) and Saudavi (5%). The mean positive response to irritability questions was 53.57% in Damvi temperament, 65.09% in Balghami, 54.46% in Safravi and 80% in Saudavi temperament (Figure 1).

The mean positive response to irritability questions was 53.57% in Damvi temperament, 65.09% in Balghami, 54.46% in Safravi and 80% in Saudavi temperament. On statistical analysis, we find that Damvi vs Balghami  $p < 0.001$ , Damvi vs Safravi  $p > 0.05$ , Damvi vs Saudavi  $p > 0.05$ , Balghami vs Safravi  $p < 0.001$ , Balghami vs Saudavi  $p < 0.001$  and Safravi vs Saudavi  $p < 0.0$ . Hence, statistically Balghami has more severe illness irritable behavior.

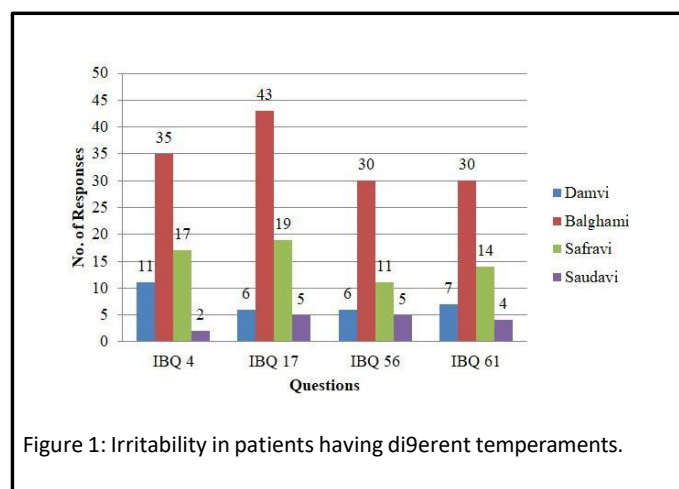


Figure 1: Irritability in patients having different temperaments.

The subjects within the blood sugar (fasting) range of 90-130 mg/dl were labelled as Group I. 40.54% of the subjects in this group were in the age-group of 40-49 years. Most of these were males (73.33%). The

subjects within the blood sugar (Fasting) range of 131-200 mg/dl were labelled as group II. 43.9% of the subjects in this group were in the age-group of 50-60 years. Most of these were females (77.77%). The subjects within the blood sugar (Fasting) range of  $>201$  mg/dl were labelled as group III. 45.45% of the subjects in this group were in the age-group of 40-49 years.

Most of these were females (70%). Most of the diabetics (67.57%) in group-I were educated up to or below matriculation. Most of the subjects (87.80%) in group-II were educated up to or below matriculation. Most of the subjects (95.45%) in group-III were educated up to or below matriculation. Maximum of these (45.45%) were illiterate. The mean positive response to irritability questions was 54.73% in the group-I, 63.41% in group-II and 68.18% in Group-III (Figure 2).

On statistical analysis, Group-III vs Group-II,  $p > 0.05$ ; Group-III vs Group-I,  $p < 0.05$  and Group-I vs Group-II,  $p > 0.05$ . i.e., Group-II has more irritability. Tukey-Kramel comparison test between the temperament of this group, we have  $p < 0.0001$ , i.e., extremely significance than expected. 51% of the subjects who had moderate to severe diabetes responded positively to most of the irritability questions.

Positive response to the same questions was lower among the mild diabetes group. The observations were found to be statistically significant. Chesla et al. observed that diabetics were more irritable when their blood glucose was high [16]. The findings support the current study where we observed a higher prevalence of irritability in the subjects having higher blood sugar.

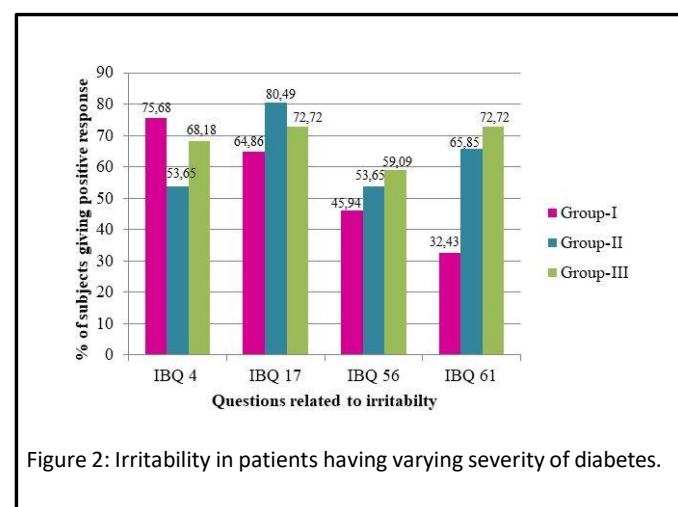


Figure 2: Irritability in patients having varying severity of diabetes.

The mean positive response to irritability questions was 59% in the oral group and 63.5% in the injectable group (Figure 3). 41% of the patients who were on injectable drugs responded positively to the irritability questions. The response to the same was comparatively lower (36%) in patients being treated on oral drugs. Clark et al. reported that the subjects on injectable medication were found to have higher irritability as compared to those on oral medication (22.6% in injectable and 17.8% in the oral group) [17].

Several other studies have demonstrated increased psychological distress in patients on insulin therapy. This is mostly related to poor knowledge of skills, lack of information, lifestyle restrictions imposed by insulin injections and complications due to its use [18]. A

significant percentage of patients experience diabetes-related anxiety due to self-injecting [19]. These findings support the current study.

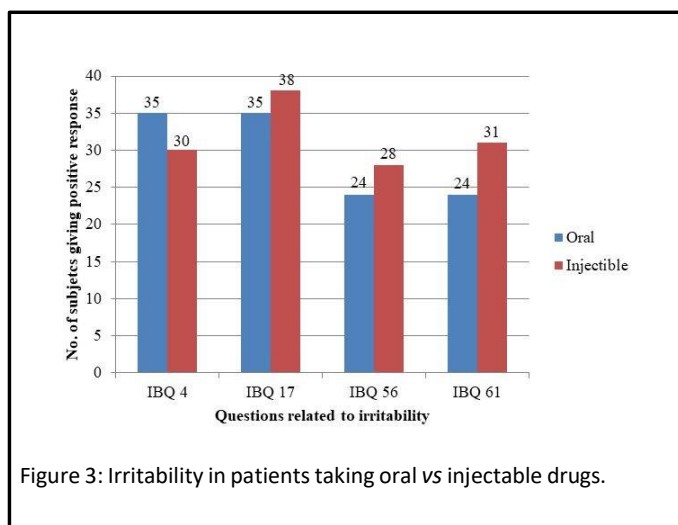


Figure 3: Irritability in patients taking oral vs injectable drugs.

## Discussion

Diabetes mellitus is gaining epidemic proportions worldwide with significant clinical, psychological and financial implications. Globally, more than 400 million adults are diabetics, [20] and more than two-fold rise in the past two decades. Much of this is related to the lifestyle and urbanization, and associated with co-morbidities and complications, which often result in handicap or mortality [21].

The chronic nature of the disease gives rise to certain psychological disturbances over time, which often leads to lesser adherence to treatment, depressive symptoms, feeling of self-pity and overall decreased well-being. Such negative behaviours leading to health deterioration have an even added impact on the disease, which gives rise to a vicious circle of 'reduced care-health problems-reduced care'. Such behaviours may at times be temporary and patients may soon recover from the anxiety, or may persist for longer duration and have severe clinical implications.

Some degree of anxiety and depression is a constant feature of diabetes in clinical settings [22] with about 20% higher prevalence than the normal population [23]. Mostly it is sub-clinical and does not require psychological intervention. However, a constant flow of stressful thinking over long periods of time related to disease outcome, reduced life-expectancy and self-blame over inadequate adherence to regimen reduces coping ability and causes unfavourable outcome [24].

In the present study, we explored three potential causes of diabetes-related irritability in a clinical setting. Increased irritability was found to be associated with raised blood sugar and also in those patients taking injectable medication. This is the first study of its kind as it puts mizaj (temperament) in direct connection with behavioural symptoms of diabetes. It is a well-established fact that diabetes and the related irritable symptoms vary widely in clinical settings.

Several attempts have been made to identify the personality types associated with such behaviour. Since Mizaj is an established entity which reflects in definite and specific behavioural changes, an attempt was made to study the behavioral changes induced by the same [25].

## Conclusion

After adjusting for all confounding factors, it was found that saudavi (melancholic) temperament patients were more likely to suffer from irritability followed by those having balghami (phlegmatic) temperament. This is in accordance with the concept of Unani medicine wherein the temperament groups inclined towards coldness are more likely to be depressed, anxious and irritable. Hence, it is concluded that the risk factors associated with abnormal behaviours in diabetes must be carefully taken into consideration while embarking on management and therapeutics.

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