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## Diabetes mellitus (*Ziabetus shakari*) in light of Greco-arabic medicine

**Abdul Khalique and Md Wasi Akhtar**

### Abstract

Diabetes Mellitus (DM) is a metabolic disorder with multiple etiologies, characterized by chronic hyperglycemia with disturbances of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion, insulin action or both. It is a major challenge of 21<sup>st</sup> century health and development. It is not a new disease but very well known to Greco-Arab Physicians. They have mentioned this disease with its main symptom i.e. frequency of micturition soon after taking fluid. It has been described by various Greek vernaculars and synonyms of diabetes like “*Ziabetus*”, “*Ziasqomus*” and “*Qaramees*” and also by different Arabic vernacular like “*Dolab*” (water wheel) and “*Zalaqul kulya*”. Greco-Arab physicians proposed the sole cause of Diabetes as *Sue Mizaj Haar of Kulya* (deranged hot temperament of kidney). In this syndrome patients develop excessive thirst, excessive micturition, nocturia, malaise, fatigue, loss of weight, vaginitis, balanitis, cramps in lower extremities, numbness in hands and feet, physical, mental and sexual weakness and suffers from boils, abscesses, gangrene and complains sweetness of urine. All these symptoms were well known to them and they have managed it by different treatment modalities as well. The present review gives detailed consideration of Greco-Arab physicians of that time about different aspects of this syndrome.

**Keywords:** Diabetes Mellitus, *Ziabetus shakari*, Greco-Arab, *Sue Mizaj*

### Introduction

Diabetes mellitus (DM) is a metabolic disorder with multiple etiologies, characterized by chronic hyperglycemia with disturbances of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion, insulin action or both [1]. Diabetes Mellitus is a major challenge of 21<sup>st</sup> century health and development. This chronic and incurable non-communicable disease (NCD) is largely preventable but remains responsible for millions of deaths annually and many life-threatening complications. No country, rich or poor, is immune to the prevailing epidemic [2]. It is an important public health problem, worldwide. According to IDF Diabetes Atlas 7<sup>th</sup> Edition (2015) one in eleven adults has Diabetes and one in ten adults will have Diabetes by the year 2040. And worldwide prevalence of Type 2 Diabetes Mellitus in 2015 was 415 million and will be 642 million by the year 2040. The number of people living with diabetes in India currently is around 69.2 million [3]. According to Madras Diabetes Research Foundation Chennai, this disorder is most prevalent in south Asia, especially in India, which has earned the unwelcome sobriquet of the “Diabetes Capital” of the world [4]. Each year, 3.2 million people around the world die from complications associated with diabetes. Type 2 diabetes mellitus, which accounts for 90 per cent of all diabetes, has become one of the major causes of premature illness and death, mainly through the increased risk of CVD which is responsible for up to 80 per cent of these deaths [5]. Worldwide 5.0 million adults died from Diabetes in 2015. Factors for this steep rise include urbanization, changing life style, ethnicity, insulin resistance, genetic predisposition, and central obesity, fortunately most of these factors are modifiable.

The term Diabetes is derived from Greek word “*Diabainein*” or “*Diabainmo*” which means passing through or to run through or siphon, while Mellitus is a Latin word means sweetened with honey, all these names suggest towards the symptoms of disease (excessive thirst, excessive urination, presence of sugar in urine, increased appetite and gradual loss of body weight), hence named as Diabetes Mellitus [6, 7]. Long term effect of diabetes leads to various complications viz., diabetic nephropathy, neuropathy, retinopathy, diabetic foot,

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Charcot joints and sexual dysfunction<sup>[8, 9]</sup>. People with diabetes are at increased risk of cardiovascular, peripheral vascular and cerebrovascular diseases<sup>[10]</sup>.

In Greco-Arabic System of Medicine, diabetes has been described by various Greek and Arabic vernaculars like “*Ziabetus*”, “*Ziasqomas*”, “*Qaramees*”, “*Dawarah*”, “*Dolabia*” (water wheel), “*zalqul majari*”, “*Zalaqulkulya*” (slippery nature of the kidneys or diarrhea of the kidneys), “*Barkar*”, “*Illat-e-Barkariyah*”, “*Istisqa-e-Anmas*”, “*Moattisha*”, “*Atsha*”, “*Salsulbaul*”, “*Baul-e-shireen*”, “*Madhuprameha*” and “*shahdiya*”.

For better understanding of Greco-Arabic System of Medicine’s concept of *Ziabetus*, let us see the brief historical background of diabetes, which will surely help in making better understanding of the syndrome.

### Historical Perspectives

The first earliest description that resembles the features of diabetes is found in 1552 BC written on a 3<sup>rd</sup> dynasty’s Egyptian papyrus. Indian scholars in 1500 BC had described diabetes “*a mysterious disease*”<sup>[11, 12]</sup>. The first known clinical description of diabetes appears to have been made by Aulus Cornelius Celsus (30 BC-50 AD); but it was Aretaeus (81-138 AD) of Cappadocia who provided a detailed and accurate account and coined the term “*Diabetes*” from the Greek word which means “to run through” or “*Siphon*” he described disease as a dreadful affliction, not very frequent among men, being a melting down of the flesh and limbs into urine. Patients never stop making water and the flow is incessant. Life is short, unpleasant and painful<sup>[13, 14]</sup>. Hippocrates (460 BC) mentioned a disease with excessive urinary flow and waste out of the body<sup>[15]</sup>. Greek physician *Jalinoos* (Claudius Galenus) described it as a disease specific to kidneys because of weakness in their *Qu’at-e masika* (retentive ability), and as he came across only two cases of diabetes, therefore he termed it a rare disease. He employed alternative terms for diabetes including “*diarrhea urinosa*” and “*dipsakos*” emphasizing the cardinal symptoms of polydipsia and drinking<sup>[13, 16]</sup>. In medieval era, various Unani physicians gave detailed descriptions about diabetes like Ibn Sina (980-1037 AD) who has accurately described the clinical pictures of diabetes mellitus such as sweet urine and increased appetite, and also mentioned some specific complications such as gangrene and sexual dysfunction. He was the first who wrote that the differentiating features of diabetes associated with emaciation from other causes of polyuria<sup>[13, 17]</sup>. Around this period, ‘*uroscopy*’ came into existence as a way of identifying disease (betterley C *et al* 1983). The color, and odor of the urine were examined to establish the disease of the patient. Some physicians even tasted the urine of patients, and this apparently lead how to the second name, mellitus, meaning ‘honey’ in Latin<sup>[18]</sup>. In 1920, an American called Moses Barron linked the Langerhans cells with the basis of diabetes mellitus<sup>[19]</sup>. Based upon the research of Barron, a doctor called Frederick Banting conducted critical experiments linking the pancreas and diabetes. Banting discovered an essential hormone named insulin, named after the ‘islands’ of cells described by Langerhans. Banting and one of his colleagues were recognized for their achievement and were awarded Nobel Prize. Throughout the 20th century, treatment of the disease has advanced drastically. Although prevention and management remains difficult for diabetes mellitus, the life of an average diabetic is becoming both longer and easier due to advanced treatments which are being used nowadays<sup>[20]</sup>.

### Concepts of Ziabetus (Diabetes) in Greco-Arabic Medicine

According to Greco-Arabic System of Medicine, *Ziabetus shakari* is a disease of kidney in which patient feels excessive thirst without fever and dryness and consumed water is passed out through the kidneys immediately after intake by the patient without any metabolic change and patient still feels thirsty<sup>[21]</sup>. Razi says in *Kitab-ul-Hawi fit-Tib* that the patient of diabetes complains of polydipsia, whereas the consumed water is passed out as such. He further mentions that patients may also present with polyuria, polydipsia, even nocturia and dribbling or incontinence of urine. It resembles the *Zalqul Meda wal Ama* (irritable bowel syndrome) in which the food passes rapidly through the stomach and intestine without proper digestion<sup>[22, 23]</sup>. *Ibn Sina* stated in his book of *al qanoon fit tib*, in reference to the excessive urine produced as a symptom of this disease. Patients feel thirsty, the amount of water uptake by kidney, simply does not match by the amount of water drunk by the patients and soon after taking water, it is excreted out<sup>[24]</sup>.

### Mahiyat-e-Maraz (Pathology)

The Greco-Arabic System of Medicine’s (Unani) philosophy of disease causation is based on *mizaji* (temperamental) and *saakhti* (structural) deviation. Any imbalance between *mizaj* and *saakht* (structure) results in disease. According to Unani concept there are three types of *Quwa* (Faculties) which plays a major function in the absorption, digestion and excretion of the water absorbed by the kidney from the liver. These are

1. *Quwwat-e-Jaziba* (Absorptive faculty)
2. *Quwwat-e-Masika* (Retentive faculty)
3. *Quwwat-e-Dafea* (Expulsive faculty)

According to the Greco-Arab physicians, due to *Sue-Mizaj Gurda Haar* (deranged hot temperament of the kidney), there is disturbance in the renal function. So, the *Quwwat-e-Jaziba* (Absorptive faculty) of the kidneys absorbs water from the blood and liver but due to weakness of *Quwwat-e-Masika* (Retentive faculty) of kidneys the renal tubules are not able to retain water inside them. As a result, the *Quwwat-e-Dafea* (Expulsive faculty) of the kidneys is increased and causes increase in the excretion of water (polyuria). Subsequently, the kidneys absorb water again from the liver, but due to reasons mentioned above the water are excreted again by the urinary system. To meet the water requirement of kidneys, the liver absorbs water from the stomach and intestines causing dryness of these organs, so the patient feels thirsty and tends to take water frequently (polydipsia)<sup>[22, 23, 25-28]</sup>.

### Classification of Ziabetus in Greco-Arabic Medicine

According to *Atibba-e-Mutaqaddimin* there are two types of *Ziabetus*. Which is based on *khiffat* and *shiddat* (intensity) of the sign and symptom of the disease.

1. *Ziabetus Haar*
2. *Ziabetus Barid*

***Ziabetus Haar*:** Characterized by abrupt onset of polydipsia, polyuria and weakness with the symptom and sign of other *suemizaj haar*, such as heat in flanks and dryness of the body, due to *suemizaj haar sada* (excess of heat) of kidneys.

***Ziabetus Barid*:** In which the thirst and frequency of urine is comparatively less. In this disease *mizaj* of kidneys disturbed so they absorb water from blood and send to the urinary bladder immediately due to weakness in *Quwate Masika* (retentive power) of kidneys.

*Ibn Sina* said “I have never seen the patient of *Ziabetus Barid*

in my whole life” [29]. Akbar Arzani said *Ziabetes Haaris* due to *Sue Mizaj kulya haar mufrad*. and *Ziabetes Barid* is due to *Sue Mizaj kulya barid*, drinking cold water and excessive cold [30].

On the basis of sugar Hakeem Ajmal Khan divided the *Ziabetes* into two types:

1. *Ziabetes shakari*
2. *Ziabetes Sada (Ghair Shakari)*

***Ziabetes shakari***: (Diabetes Mellitus) is characterized by excessive urination (polyuria), excessive thirst (polydipsia), presence of sugar in urine and due to sugar urine smells sweet and tastes sweet. Ants and flies are attracted on urine. It has been correlated with type 2 diabetes mellitus.

***Ziabetes Sada***: (Diabetes Insipidus) is characterized by excessive, clear and sweet less urine, low specific gravity and do not have any smell and taste and is usually due to excess cold [31, 32].

Allama Hakeem Kabeeruddin classified Diabetes as below:

1. *Ziabetes Haar (Shakari)*
2. *Ziabetes Barid (Sada)*

***Ziabetes Haar (Shakari)*** is characterized by excessive thirst, excessive and frequent urination, patient becomes weak early and on examination urine shows sugar.

***Ziabetes Barid (Sadaa)*** is characterized by polydipsia, polyuria, but urine has no sugar. When *Ziabetes* is spoken, *Ziabetes shakari* is considered because *Ziabetes shakari* is more common than *Ziabetes Sada*. He has been correlated *Ziabetes Haar* with *Ziabetes shakari* (type 2 diabetes mellitus) and *Ziabetes Barid* with *Ziabetes sada* (diabetes Insipidus) [33, 34].

### Etiopathogenesis Described in the Classical Unani Literature

Greco-Arab (Unani) Scholars like *Majoosi*, *Razi*, *Ibn Sina* and *Samarqandi* described some underline etiopathogenesis of *Ziabetes* in detail. It was supposed that the *Ziabetes* is related to kidney. The important etiopathological causes (factors) mentioned in Unani medicine are following.

Greeks and Arabs proposed the sole cause of Diabetes *Sue Mizaj kulya haar* (deranged hot temperament of kidney), and due to excessive hotness *Quwwat-e-Jaziba of Kulya* (absorptive power of kidney) becomes *Qawi* and *Shadeed* (strong), due to which fluid is diffused more towards kidneys, in addition to it the *Quwwat-e-Masika of Kulya* (retentive faculty of kidney) is weakened and are unable to hold the urine, which is excreted out in large quantity and a cycle of thirst and micturition is established [25, 26, 35, 36].

*Sarabiyun* said *Ziabetes* occur due to *Shiddat-e-hararat-e-kulya wa Iltihab-e-kulya* (deranged hot temperament of kidney and its dilatation) [22, 23].

*Razi* proposed the sole cause of Diabetes is *Sue Mizaj kulya haar* and it also may be due to *Zof-e-Kabid* (liver weakness), coldness of whole body, insomnia, and cold water [22, 23].

According to *Ibn Sina* the causes of Diabetes are *Zof-e-Kulya*, *Ittisa-e-Majari-e-Kulya*, and coldness of whole body or *Buroodat-e-Jigar wa kulya* [29, 37, 38].

*Jurjani* categorized the causes of *Ziabetes* into four groups [39].

1. *Zof-e-kulya*
2. *Ittisa-e-Majari-e-Baul*
3. *Sue Mizaj kulya haar mufrad*
4. *Sue Mizaj kulya barid*

***Sue Mizaj kulya haar*** (deranged hot temperament of kidneys) causes diabetes as kidneys absorb water in an excess amount from circulation due to excessive hotness or derangement in temperament, so they cannot retain much amount of fluid and pass in the form of urine frequently (polyuria) and the patient drinks water frequently (polydipsia) to overcome his thirst [4, 29, 31]. In case of *Zof-e-kulya* (weakness of kidneys) water cannot be retained properly due to the weakness of kidneys and their *Quwate masika* (retentive faculty), and kidneys are unable to metabolize the water that is coming from liver. whereas water cannot be retained for long/required time due to dilatation of *kulya wa Majari-e- baul* (Dilatation of Kidneys and Tubules) in case of *Ittisa-e-Majari-e-Baul*, so it is passed out rapidly (polyuria). And sometimes diabetes develops due to *Sue Mizaj kulya barid* as in case of *Buroodat-e Badan, Jigar wa kulya*.

In addition to the above-mentioned causes of *Ziabetes* some other causes are also described by different Unani authors in ancient period and they are: [34, 40-44].

Neurological disturbances, Psychological causes, Impaired renal functions, Cirrhosis of kidney, Renal cortical atrophy, Obesity, Excessive use of hot foods, Alcoholism, Increased work load, Impaired Pancreatic function, Sedentary life, Injury on head on 4<sup>th</sup> ventricle, Increased level of sugar in blood Pregnancy, Poisons, Males more prone than females, Food: Use of excessive carbohydrate and sugar Excessive sexual intercourse, Age: Middle age and elderly people, Some other disease like Gout, Syphilis and Malaria.

These above-mentioned factors play direct or indirect important role in the causation of *Ziabetes* syndrome.

According to *Nazamuddin et al.* We can summarize the etiopathogenesis as follows: the nutritive capacity of all the organ and body as a whole performs three functions, such as *Tahseel* (acceptance), *Ilsaaq* (adherence), and *Tashbih* (assimilation). These three functions are served by four other faculties—*Masika* (retentive), *Jaziba* (absorptive), *Hazima* (digestive) and *Dafia'* (eliminative), and these functions are mediated by four *Kaifiaat* (quality) of *Mizaj*, i.e., *Hararat*, *Burudat*, *Ratubat*, and *Yabusat*. So, deviation in these *mizaji Kaifiaat* (temperamental quality) by any cause hampers the function of *Quwwate Ghazia* and thereby results into *Badal ma yatahallal* (assimilation), which is essential for the maintenance and growth of the body and its members [45].

### Clinical Features

In Unani literature, some clinical features of *Ziabetes* are commonly described as increased frequency of micturition, excessive thirst which cannot be easily quenched by water, dryness of mouth and whole body, ants and flies are attracted to urine [22, 23, 39, 46, 47].

Clinical features may differ from patient to patient; usually the patient is asymptomatic and is diagnosed randomly on routine checkups or due to some other illnesses.

According to *Ibn Sina* patient develops physical, mental and sexual weakness and suffers from boils, abscesses, gangrene and complains sweetness of urine [29].

According to *Kabeeruddin*, its onset is insidious patient is unaware for weeks to months about it, in early stages complains malaise, fatigue, increased thirst, increased

micturition and good appetite but later he feels excessive thirst, excessive and frequent micturition and patient becomes day to day weak and complains nocturia, urine taste and smells sweet due to sugar, ants and flies attract on the urine. On examination urine contains albumin and lastly patient complains of pain and burning in genital and urinary tract. In grave condition of disease, sometime patient feels increased body temperature, constipation, madarosis, wrinkles and acne on the face and face becomes lust less, body becomes cachectic, patient feels loss of libido, female patients become amenorrheic and finally temperature become subnormal, heart and pulse rate become equal, dizziness, vertigo, irritability, albuminuria, oliguria, aversion of appetite, excessive vomiting and patient dies due to excess weakness or toxemia<sup>[34]</sup>.

➤ The hallmarks of clinical features of *Ziabetus* according to Unani physicians are as below:

Excessive thirst, excessive micturition, nocturia, malaise, fatigue, loss of weight, vaginitis, balanitis, cramps in lower extremities, numbness in hands and feet, decreased libido and sterility.

### Complications

According to *Ibn Sina* diabetic patients develop *Diq* (phthiasis) and *Zooban-e-Aza* (emaciation of the body/Cachexia) due to loss of body fluid<sup>[29]</sup>.

According to *Razi* when duration of disease becomes longer, patients develop *Nahool* (emaciation) and *Huzal-e-Shadeed* (severe atrophy)<sup>[22, 23]</sup>.

*Azam Khan* mentioned in his book that it is a dangerous disease, if affects elderly people then it becomes untreatable<sup>[48]</sup>.

### Discussion

As mentioned earlier that Diabetes Mellitus (DM) is a heterogeneous group of metabolic disorders resulting from defects in insulin secretion, insulin action or both. And Long term effect of diabetes leads to various complications viz., diabetic nephropathy, neuropathy, retinopathy, diabetic foot, charcot joints and sexual dysfunction. Unani scholars considered *Ziabetus* a disease of kidney as there are some important reasons. First one is that the most prominent and important symptom of this syndrome is polyuria and nocturia, which is a symptom of renal disease. Second is that the earliest functional abnormality in the diabetic kidney is renal hypertrophy associated with a raised glomerular filtration rate. Moreover, most of the patients possibly visit a physician at the stage of complication. We all knew that the observation of Unani physicians was based on naked eye examination because at that time there was no microscope and there was no concept of hormone, hence they considered it a renal problem and categorized diabetes in the list of renal diseases.

### Conclusion

Although allopathic system of Medicine is providing wonderful drugs with tremendous results but possess their unwanted and adverse effects simultaneously and they have to use these lifelong, therefore the mass is moving towards natural/ herbal/ indigenous system of medicine having minimal such effects. Besides avoiding the risk factors responsible for the steep rise of the disease, Unani herbal drugs are having promising such medical benefits with greater safety profile and moreover much economical. So, the Unani insight of correcting organs may be effective managing

strategy, Correction of *Sue Mizaj* (in temperament) and ultimately faculties may be best preventive and curative steps to halt the progress of disease.

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