

Ziabetus Shakari (Type 2 Diabetes Mellitus) in Elderly and its Dietary Management

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Prevalence of type 2 diabetes mellitus is increasing rapidly around the world. The ageing of the overall population is a significant driver of the diabetes epidemic. Diabetes in older adults is linked to higher mortality, reduced functional status, and increased risk of institutionalization.

Nutrition is an integral part of diabetes care for all ages, but there are additional considerations for older adults with diabetes. The Unani system of medicine believes that a physician is not the healer but an assistant to nature *Tabiyat* (physique) of the body, which is the true healer hence the diet should be in accordance with it. Diets have been mentioned according to various stages of life to maintain the digestive system at its best.

Keywords: Diet, Elderly, Type 2 Diabetes Mellitus, Ziabetus Shakari

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Introduction

Diabetes mellitus is an important public health problem, worldwide. The global increase in the prevalence of diabetes is due to population growth, ageing, urbanization, an increase of obesity and physical inactivity [1,2]. Globally, the number of people with diabetes will more than double over the next 25 years, increasing from 171 million in year 2006 to 366 million by 2030 [3,4,5].

The International Diabetes Federation estimates the total number of people in India with diabetes to be around 50.8 million in 2010, rising to 87.0 million by 2030 [2,4]. According to the 2011 census, percentage of Indians above the age of 60 years is 8.3% as compared to 6.9% in 2001 census. In terms of numbers, according to the provisional data of census 2011, this comes to an estimated 99.87 million [6].

Attiba mentioned *Barid wa Yabis mizaj* (cold and dry) in *Sinne Shaikhookhat* which is the age after 60 years till death. During this stage, quantity of the *Rutoobate Ghareeziya* (Innate fluid) is deficient and lesser than the quantity required for the preservation of *Hararate Ghareeziya* (Innate heat). There is also dominance of *Rutoobate Ghareeba* (abnormal metabolic product). In this period, there is an insidious decline in organ functions. Diabetes mellitus is a major cause of adverse health outcomes in elderly [7,8].

Type 2 diabetes mellitus is closely related to lifestyle factors including diet, physical activities, alcohol and smoking as well as obesity and a family history of diabetes. Available data suggest that diet is the main culprit [2,9,10].

Change in dietary habits and dietetics have a greater potential to improve type 2 diabetes, because many persons with type 2 diabetes are overweight and insulin resistant, medical nutrition therapy should emphasize lifestyle changes which result in reduced energy intake and increased energy expenditure through physical activity [9,11].

Greco-Arab and Islamic healers treated patients through a scheme starting with physiotherapy and diet; if this failed, drugs were used. *Rhazes's* treatment scheme started with diet therapy, he noted that "if the physician is able to treat with foodstuffs, not medication, then he has succeeded" [12].

According to Unani physicians, old age is dominance of *buroodat* and *yaboosat*, (cold and dry) therefore *Tadabeer e Ghiza*, (Dietotherapy) *Musakkin* and *Murattib* (demulcent and moisture) diets advocated [33]. According to their lesser digestion and to their physical strength the aged should be served with small amount of food at a time and thus fed two to three times a day [13].

Unani system of Medicine lays rules for a balanced lifestyle, which revolves around six essential factors (*Asbab e Sitta Zooriya*); these are atmospheric air, dietetics, rest and physical activities, psychological activities and rest, sleeping patterns and wakefulness and eliminations and retentions. Dietetics is an important component among essential factors. Noncompliance with these principles leads to an errant lifestyle and ultimately leads to disease. Modification and moderation of these six essential factors in an individual prevent diseases and promote optimal health in any age category [14].

India is a vast and heavily populated country, but also the people who live here are ethnically heterogeneous. This heterogeneity is manifested in significantly different religions, communities, castes, cultures, languages and food habits. One of the main reasons for proliferating diabetic cases is the sedentary lifestyle, intake of junk food, and obesity. Unhealthy eating with increasing dependence on the "energy dense food" or simply put the junk food, is the main reason for increasing lifestyle ailments [15].

Ziabetes Shakari (Type 2 Diabetes Mellitus)

Ibn Sina stated in his book of *al qanoon fit tib*, the word diabetes is derived from Greek word of, "*diabanein*" which means to "passing through" or "run through" or "siphon" in reference to the excessive urine produced as a symptom of this disease. It is not a new disease, ancient Greeks and Arabic physicians knew it well. They investigated it, thoroughly and have prescribed various treatments. 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. The causes of disease are *sue e mizaj wa zauf e kulliya, masana wa jigar* (disordered temperament and weakness of kidney, bladder and liver) [16].

This condition can be correlated with modern concept that stated excessive free fatty acids inhibits the insulin signaling pathways and preventing GLUT 2 and 4 translocations in liver and pancreatic β cells, skeletal muscles and adipocytes, respectively. Although these modern terminology was not existing in ancient era but description of excessive heat that cause weakening of liver in *Sue mizaj wa zauf e jigar* (disordered temperament and weakness of liver) and the role of this *mizaj* (temperament) in *Ziabetes shakari* (type 2 diabetes mellitus) was described in ancient literature. Dryness of liver is a concept of holism (broader view) in Unani medicine that disturbed the *mizaj* of liver [16,17,18,19].

Excessive and abnormal distribution of free fatty acids and the well known existing metabolic co-morbidities / risk factors i.e. obesity, dyslipidemia, gestational diabetes mellitus and especially, fatty liver or abnormalities together with skeletal muscles weakness are most common causes for insulin resistance, impaired insulin sensitivity and dysregulated insulin action in the liver and contributes significantly to the pathogenesis of type 2 DM.

Ziabetes Shakari has been correlated with type 2 diabetes mellitus and described accurately the clinical features and specific complications of disease in classical Unani literature.

Type 2 diabetes used to be called non-insulin dependent diabetes (NIDDM) or adult-onset of diabetes. Type 2 Diabetes is a heterogenous disorder caused by a combination of genetic factors related to impaired insulin secretion, insulin resistance and environmental factors such as obesity, overeating, lack of exercise, and stress as well as ageing. It is often, but not always, associated with overweight or obesity, which itself can cause insulin resistance and lead to high blood glucose levels. People with type 2 diabetes can often initially manage their condition through exercise and diet [20,21].

Current theories of type 2 diabetes include a defect in insulin mediated glucose uptake in muscle, a dysfunction of the pancreatic β -cells, a disruption of adipocytes and an impaired insulin action in liver. Type 2 diabetes causes dysfunctions in multiple organs or tissues and leads to severe complications, including renal failure, blindness, slow healing wounds, and arterial diseases.

It is not an autoimmune disorder and the susceptible genes that predispose to NIDDM have not been identified in most patients [5,22].

Diet plays a pivotal role in the therapeutic strategy to keep patients with diabetes in good glycaemic control and prevent micro and macrovascular complications [23]. Type 2 diabetes mellitus is closely related to life style factors including diet, physical activities, alcohol consumption and smoking as well as obesity and a family history of diabetes [9,10].

Diabetes mellitus in elderly

The ageing of the overall population is a significant driver of the diabetes epidemic. Older adults with diabetes are at substantial risk for both acute and chronic microvascular and cardiovascular complications of the disease. Diabetes in older adults is linked to higher mortality, reduced functional status, and increased risk of institutionalization [24,25].

Degenerative disorders like cardiovascular disease, chronic obstructive pulmonary disease, diabetes, osteoarthritis, infection – related disorders like pneumonias, urinary tract and other infections occur more frequently in older persons [26]. Type 2 diabetes mellitus usually begins after the age of 40 years and the frequency increases with ageing, although the disease is increasingly making its appearance in adolescence and early adulthood, especially among sedentary persons at high genetic risk [27].

A progressive failure of insulin production from the pancreatic beta cells may be a pre-programmed genetic defect or a natural concomitant of the ageing process. The emergence of postprandial hyperglycaemia is followed by fasting hyperglycaemia. Lifestyle modifications that include efforts at weight loss and physical activity lead to improved insulin sensitivity and can prevent glucose intolerance and type 2 diabetes mellitus in older adults. Interestingly, recent evidence suggests that the rate of carbohydrate digestion and absorption may influence the development of type 2 diabetes in the older individual [9].

Unfortunately, normal ageing is associated with a progressive increase in A1C, and there is a significant discordance between fasting plasma glucose based and A1C based diagnosis of diabetes in this age group, a difference that is accentuated by race and gender [28].

The presentation of diabetes in old age is different from that at younger ages. Many are diagnosed as a result of routine testing, some because of the development of disorders associated with diabetes, and relatively fewer because of classical symptoms. Approximately one case in six of diabetes ketosis occurs in patients over the age of 60. The degree of metabolic decompensation is often greater in the elderly and non ketotic hyperosmolar coma is virtually confined to elderly patients. Complications occur more frequently in elderly diabetics. The neurological complication of diabetes associated with old age [29].

Older adulthood there is a gradual loss of functioning cells with reduced cell metabolism. As a result body organ systems gradually lose some capacity to do their jobs and maintain their reserves [30,31].

Older adults with diabetes have the highest rates of major lower-extremity amputation, myocardial infarction (MI), visual impairment, and end-stage renal disease of any age-group. Those aged 75 years have higher rates than those aged 65-74 years for most complications. Deaths from hyperglycaemic crisis also are significantly higher in older adults. Older adults are at high risk for the development of type 2 diabetes due to the combined effects of increasing insulin resistance and impaired pancreatic islet function with ageing [25].

Diet and dietary habits among elderly

Some of the physical changes of ageing affect food patterns. For example, secretion of digestive juices and motility of gastrointestinal muscles gradually decrease. This causes decreased absorption and use of nutrients. Also decreased taste, smell, and vision affect appetite, and individuals eat less [25,30].

The primary nutrition problem of older adults is lack of sufficient nourishment. Each older adult has specific needs [30].

According to their digestion and to their physical strength the old people should be served with small amount of food at a time and thus fed two or three times a day [13]. Nutrition is an integral part of diabetes care for all ages, but there are additional considerations for older adults with diabetes.

Though energy needs decline with age, macronutrient needs are similar throughout adulthood.

Meeting micronutrient needs with lower caloric intake is challenging; therefore older adults with diabetes are at higher risk for deficiencies [25]. With ageing, energy needs decrease but recommendations for several nutrients, including calcium, vitamin D, and vitamin B-6 is higher. Intakes of micronutrients, especially calcium, zinc, iron, and vitamin B-12, decline in older adults. Older adults can meet protein needs on a vegetarian diet if a variety of protein-rich plant foods, including legumes and soy products, are eaten daily [32].

Tadabeer e Ghiza for Mashaikh (Dietotherapy for Elderly)

Unani system of Medicine lays rules for a balanced lifestyle, which revolves around six essential factors (asbab e sitta zarooriya), these are atmospheric air, food and drinks, rest and physical activities, psychological activities, sleep and wakefulness, elimination and retention. Noncompliance with these principles leads to an errant lifestyle and ultimately leads to disease. Diet is an important component of these essential factors. The Unani system of medicine believes that a physician is not the healer but an assistant to nature *Tabiyat* (physique) of the body, which is the true healer hence the diet should be in accordance with it. Diets have been mentioned according to various stages of life to maintain the digestive system at its best [14].

Tadabeer e Ghiza, according to Unani physicians, in old age there is dominancy of buroodat and yaboosat, therefore *musakkin* and *murattib* (demulcent and moiture) diet should be advocated for elderly people [33].

The food therapy is an important part of Traditional Medicine, it not only nourishes and strengthens the body, but it can also prevent diseases and prolongs life [14]. According to the *mizaj* of old person, it is to adopt both moistening and warming foods and drinks in their diet. They should avoid any heavy food which produces black bile and phlegm and similarly avoid any hot, pungent, and desiccant food, such as *kawa-mikh* (some kind of sauce and pickles). Milk is good for them because it is nutritious and humectants. Care should be taken that be pasturage is free of astringent, pungent, sour or very salty herbs [13].

Beets and little leek, these should be spiced with olive oil and vinegar. Garlic is useful to old person if it is taken occasionally provided they are accustomed to it.

Preserved ginger, and other hot type of preserves are suitable for them. These should, however, be taken in quantity which (merely) warms the body and aids digestion but not in a quantity which produce dryness. Food such as meat-soup prepared with Roman wheat and barley is good for elderly [13,33,34]. The holy Quran speaks very high of the health and medicinal value of various fruits like pomegranate, figs, dates, olives, milk, honey, ginger etc. and forbids certain harmful foods like blood, putrefied and unslaughtered meat etc [14].

Dietary Management for type 2 diabetes mellitus

Plate model is the useful tool of meal planning in type 2 diabetes. The plate is divided into three sections. The smallest section 20% (one-fifth of total area) is for the meat, fish, eggs, or cheese, and the remainder divided in roughly equal proportions between the staple food 40% for rice, pasta, potatoes, bread etc, and 40% for vegetables or fruits. For people with type 2 diabetes, limitation of refined carbohydrate and restriction of total caloric intake is important, and a 'plate model' can provide a simple visual aid to show the proportions of carbohydrate and other food groups for selection at meal times [35].

Most of these authorities recommend a carbohydrate intake of 50–60% of total energy intake, total fat intake 30% of energy (with moderate poly unsaturated fat and restriction of saturated and Trans fat intake). However, there is insufficient evidence to justify these recommendations. It is clear that weight loss and reduced total calorie intake are important in the obtainment of good glycaemic control, but the ideal proportion of the 3 main food components (carbohydrate, fat, and protein) that should be recommended remains unclear [36,37].

The objective of dietary therapy is the optimization of glycaemic control and provides a nutritious and balanced diet. In type 2 diabetes patients, the calories need to be restricted in order to avoid obesity. Dietary articles such as saturated fats, excess salt and cholesterol, which promote vascular complications have to be avoided.

Forbidden foods to type 2 Diabetes: Sugar, Jam, Jellies, Honey, Jaggary, Tinned fruits, Juices, Sweets, Chocolates, Ice-creams, Pastries, Glucose drinks, Foods made with sugar, Pudding, Sauces [36].

Foods allowed in moderation to type 2 Diabetes: Bread of all kinds, Chapattes made from wheat or millets, plain biscuits, most of the fresh fruits, baked beans, and breakfast cereals [36].

Ghiza for Ziaetus Shakari (Diet for Type 2 diabetes mellitus) mentioned in classical Unani literature: Greco-Arab and Islamic healers treated patients through a scheme starting with physiotherapy and diet; if this failed, drugs were used. *Rhazes's* treatment scheme started with diet therapy, he noted that "if the physician is able to treat with foodstuffs, not medication, then he has succeeded [12].

In classical Unani literature, ancient physicians clearly mentioned *ghiza* for *Ziaetus Shakari*; Jamoon, unripe grapes juice, sour pomegranate, milk, fresh fish, *teetar* (Grey Francolin bird), *murghabi* (common teal), *seekh kabab*, Pears, dried fruits, goat milk, cheese with milk, fresh vegetables, barley water, oily extract of astringent fruits, *rube hamaz* (Sorrel fruit jam), and curd are beneficial for *Ziaetus Shakari* [16,38,39].

Abbreviations

GLUT 2- Glucose Transporters 2

GLUT 4- Glucose Transporters 4

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