

Available online on 15.07.2019 at <http://jddtonline.info>

# Journal of Drug Delivery and Therapeutics

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Review Article

## Efficacy of Riyazat (Exercise) in the Management of Diabetes Mellitus: A Review

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### ABSTRACT

Diabetes mellitus is a metabolic ailment characterized by the presence of hyperglycemia due to defective insulin secretion, defective insulin action or both. It is a chronic disease caused by inherited and/or acquired factors. Obesity and sedentary life style are one of the most causative factors of diabetes mellitus or type 2 dm *aka* (non-insulin dependent diabetes). Unani system of Medicine which is one of the main parts of TCAM (traditional complementary and alternative system of medicine) have a holistic approach for every disease. Ancient Unani scholars have advised a six-essential theory for the wellbeing of human being i.e. *Asbab-e-Sitta Zarroriyah* which include very good approach for the management of NCDs. Diabetes mellitus is one of NCDs which have increasing drastically from last 2 decades. Among *Asbab-e-Sitta Zarroriyah*, *Harkat-wa-sukoon-e-badni* will play a major roll in the management of NCDs. Among all, Riyazat (exercise) is the actual basic and useful way for preservation of health. Physical activity includes all movement that increases consumption of energy, whereas exercise is planned, structured physical activity. Exercise increase uptake of glucose by skeletal muscle so, improves blood glucose level in type 2 diabetes, reduces cardiovascular risk factors, contributes to weight loss, and improves well-being. Unani physicians in 2<sup>nd</sup> and 3<sup>rd</sup> AD century have paved great attention towards this important task in ratiocinative way. Unani physicians provided perceptions about timing, modes, and benefits of Riyazat. Babylonians, Egyptians, Greeks and Mesopotamians all the ancient has tried to suggest the best ways for the human achievements of well beingness from very beginning, human is very curious about health and its prevention. In this review paper, it will be tried to provide the benefitting knowledge to the humanity about exercise which improves blood glucose levels in type 2 DM patients to save the health and promote the life.

**Keywords:** Riyazat; Greek physicians; Unani; Humor; Mizaj; Exercise

**Article Info:** Received 14 May 2019; Review Completed 26 June 2019; Accepted 03 July 2019; Available online 15 July 2019



### Cite this article as:

Hassan A, Perveen A, Bhardwaj U, Sana-Ur-Rehman, Efficacy of Riyazat (Exercise) in the Management of Diabetes Mellitus: A Review, Journal of Drug Delivery and Therapeutics. 2019; 9(4):709-712  
<http://dx.doi.org/10.22270/jddt.v9i4.3099>

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### INTRODUCTION

In this era of fast paced world, human is more concerned of modern-day life style diseases as they are affecting us without any alarming sign. As per WHO 41 million people died due to NCDs globally, which is 71% of all deaths yearly. Non-communicable diseases (NCDs) or life style diseases also known as long-lasting diseases or chronic diseases, tend to be of long duration and are the result of a combination of genetic, physiological, environmental and behavior's factors. NCDs are main four types, (1) cardiovascular diseases (like heart attacks and stroke), (2) cancers, (3) chronic respiratory diseases (such as chronic obstructive pulmonary disease and asthma) and (4) diabetes <sup>(1)</sup>. Among all NCDs only diabetes kills 1.6 million people globally. One of the

major problems caused by Type 2 diabetes is dysfunction and failure of various organs, especially the heart and peripheral blood vessels. Both insulin resistance and *b* cell dysfunction are contributing factors to the disease, as are environmental influences and genetic factors. It has also become clear that the increasing prevalence of obesity and a sedentary lifestyle are also key contributors to the rising prevalence of type 2 diabetes in the India and throughout the world. Regular exercise is considered a cornerstone of good health especially for adults with high-risk condition such as diabetes. Concerning about the management of T2DM, scholars have highlighted the use of modern medicines, TCAMS (traditionally, complementary and alternative system of medicine) and exercise in management therapy. The whole management schedule proves to have a

positive impact on the disease. Nevertheless, the adverse effects of the medicines are also challenging, and it cannot be ignored. Therefore, physical activity or exercise is considered as the beneficial treatment regimen for the treatment T2DM<sup>(2)</sup> <sup>(3)</sup>. Unani is very old and Holistic approach system which dated back its origin between 460-370 BC. It includes a wide range of practices which deals in treatment such as: - 1) Ilaj-bil-dawa (Pharmacotherapy) 2) Ilaj-bil-ghiza (Diet therapy) 3) ilaj -bil-tadbeer (Regimenal therapy)4) ilaj-bil-yad (Surgery). Riyazat is one of the parts of ilaj bit tadbeer. Riyazat is a voluntary movement with the purpose of tanqiyae mawad (evacuation of wastes material) for an individual. Unani Scholars advised different riyazat for different purpose according to time and speed etc. The objectives of performing Riyazat are as follows:1) to improve istehala (metabolism) for proper functioning of the body, 2) to remove waste product from the body, 3) to tone up individual organs,4) to maintain or improve flexibility of the body,4) to maintain coordination and balance of the musculoskeletal system of the body,5) to relieve anxiety, insomnia, depression as well.

**Method-** The classic and related books of Unani medicine were studied; the literature and claims in support of this article were taken from these books. Authors visited the library of Jamia Hamdard, India, for collecting valid literature. The databases applied for obtaining information are scientific research publications from journals indexed/available through Google Scholar, Scopus, PubMed, and Science Direct. Relevant facts were also obtained from general databases such as Google.

### Concept of exercise in Unani system of Medicine; -

Therapeutic exercise is very old roots dated back 800 BC. Therapeutic exercise was much popular in Greece. <sup>(4)</sup> <sup>(5)</sup> Exercise is a sequence of voluntary and continuous movements of the body which produces rapid and deep respiration. Ibn sina has defined this definition for the complete exercise. A person who is doing regular exercise at a given time he will save from all temperamental and humoral disturbances which occur in the body. <sup>(6)</sup> <sup>(7)</sup>Unani Scholars were keener on the concept of prevention of disease and promotion of health, so they describe different exercises for different diseases. Unani scholars advised different types of exercise on the basis of time, duration, continuity, speed, strength, etc. Ancient Unani scholars' thoughts about exercise are;

**1.Herodicus** physician of the 5th century BC is believed to be the first physician to write on the subject, and is considered the father of therapeutic exercise. Herodicus have used exercise to cure himself of an incurable disease and then he developed an elaborate system for athletes.

**2. Hippocrates (460BC - 370 BC)** the most famous herodicus student, wrote on the beneficial effects of the exercise and its value in strengthening muscles, improving mental attitude, decreasing obesity.

**3.Razi (865AD-925AD)** has described time, uses, types and precautionary *kitabul murshid*, measures before and after riyazat in the body.

**4. Jalinoos (129 AD - 200AD)** considered the some as the greatest physician in the Rome, wrote on exercise in 2nd century AD. He was appointed as the physician for gladiators and classified exercise according to intensity, duration and frequency. In the 5th century another physician Aurelianus recommended exercise during convalescence from surgery and advocated the use of weights and pulleys.

**5. Ibn-E-Sina(980AD-1030AD)** has well discussed regarding riyazat in his treatise, Al Qanoon Fi Tib. He discussed the mechanism of movements, varieties, methods, special exercise for each organ, therapeutic exercise, the limit and amount of riyazat. Therapeutic exercise of modern times appears to have originated in Sweden in 19th century with fencing instructor named Per Henri Ling. His system of therapeutic exercise included dosage counting and detailed instruction of each exercise. He demonstrated that precise movements if scientifically applied could serve to remedy disease and dysfunction of the body<sup>(8)</sup>.

### Types of exercise in Unani system of medicine; -

- 1) **Riyazat-e-Haqeeqi/Riyazat-e-Qulli/complete exercise** e.g. Horse riding <sup>(9)</sup> <sup>(10)</sup>
- 2) **Riyazate Juziya /Partial exercise** e.g. stone lifting <sup>(10)</sup> <sup>(9)</sup> <sup>(11)</sup> <sup>(12)</sup>

### Another classification of Riyazat

- 1)Riyazate A'arziya/Gair Iradi (unwillingly)
- 2) Riyazate Zatiya/Khalisa (willingly)

This exercise is done purposefully to gain its benefits. It is further subdivided according to its duration, strength, and mode etc. <sup>(5)</sup> <sup>(10)</sup>

### Types of riyazat zatiya/khalisa

#### According to duration

- 1) Riyazat qaleela- Short duration exercise <sup>(9)</sup>
- (2)Riyazat kaseera- Long duration exercise
- (3) Riyazat moatadil- Moderate duration exercise <sup>(5)</sup>

#### According to strength

- 1)Riyazat-e-qawiya/shadeeda- force full exercise <sup>(5)</sup> <sup>(9)</sup>
- 2)Riyazat-e-zaeefa/mild-exercise-in which less force is used <sup>(5)</sup> <sup>(9)</sup>
- 3)Riyazat-e-moatadil-average strenuous exercise in which average force is used <sup>(5)</sup> <sup>(9)</sup>

#### According to sura'at

Riyazat sariya-the exercise in which movements should be rapid and fast <sup>(5)</sup> 1.1Riyazat batiya-exercise in which movements should be dull and delay <sup>(5)</sup> 1.2 Riyazat moatadil-movements in between riyazat sariya and batiya.

#### There are two main forms of exercise:

That pertaining to the ordinary human undertakings. (b) That which is undertaken for its own sake, namely for the advantage accruing from its pursuit (i.e. sports, athletics, gymnastic etc.) Exercise in modern medicine; -

#### List of the forms of exercise

Strenuous forms-wrestling contest, boxing, quick marching-running, jumping over an object higher than one foot, throwing the javelin-fencing, equivocations or horsemanship-hunting<sup>(8)</sup>

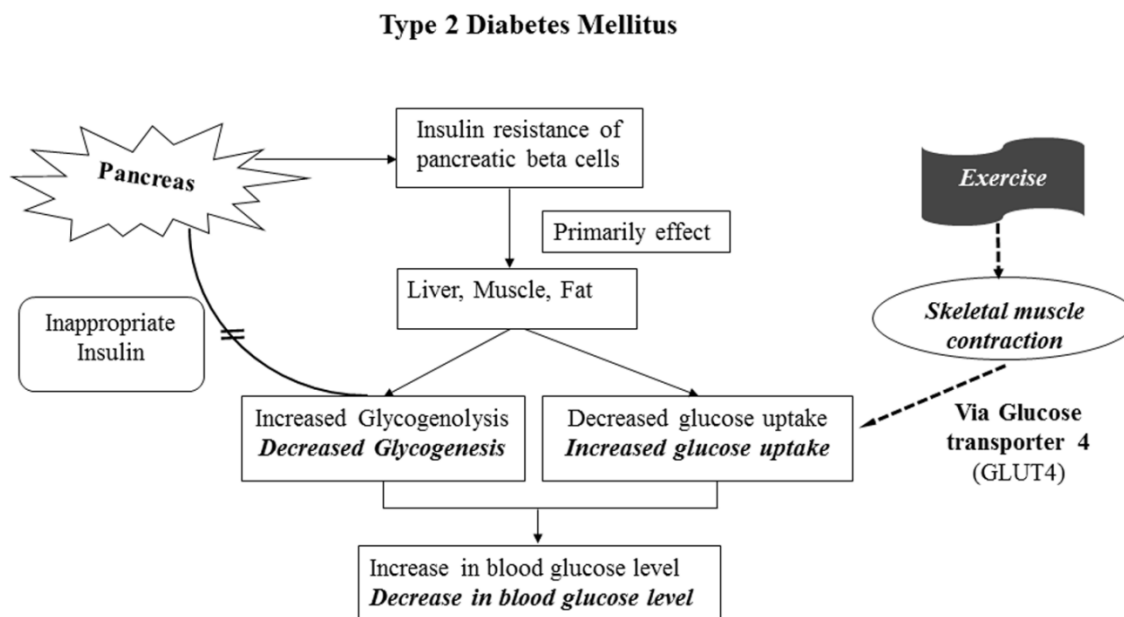
#### Effect of Exercise on diabetes mellitus according to modern science; -

Physical exercise is considered as one of the cornerstones in the treatment of diabetes mellitus along with nutrition and medication since from the past 100 years ago. <sup>(13)</sup> Diabetes mellitus is well known for having macro and micro vascular complications, which later proceeds to life-threatening conditions. Diabetes mellitus mortality as well as morbidity

rate increasing day by day. Effective management with less adverse effect is need of the hour for managing this disease. On the other hand, exercise management program influences T2DM more since it is chronic disease and showed a promising effect on the community. How exercise effect T2DM is not clearly understood till now but, it can be determined that increase glucose uptake via glucose

transporter 4 (GLUT4) to the skeletal muscle during the period of exercise is responsible for decreasing blood sugar level in T2DM patients <sup>(14)</sup>. Exercise, including aerobic exercise, durability type exercise, passive exercise and resistance exercise are fundamental therapeutic effects towards T2DM.

### Effect of Exercise in diabetes mellitus type 2; -



(3)

### Effect of aerobic exercise in T2DM

Aerobic exercise is the exercise which increase oxygen intake and increases the functioning of the cardiovascular and respiratory systems. Aerobic exercise is a valued therapeutic strategy for T2DM as it has helpful effects on physiological parameters and reduces the metabolic risk factors in insulin resistance type2 diabetes mellitus. Many studies have shown the positive effects of aerobic exercise based on different intensities on the improvement of T2DM. Aerobic exercises comprise of swimming, cycling, treadmill, walking, rowing, running and jumping rope <sup>(14)</sup>. Modest aerobic exercise leads to maintenance of the blood pressure in diabetic neuropathy patients. However, many of the randomized trial studies showed that high-volume aerobic exercise produced weight loss with important improvement in insulin sensitivity. Aerobic exercise improves the physiological limits, including glycemic control, fasting blood-glucose level and lipid profile. Furthermore, it can reinstate the endothelial function and reduces the arterial stiffness which is the positive denominator for evolving cardiovascular complications in T2DM <sup>(15) (16)</sup>. Both insulin and exercise increase glucose requirement into skeletal muscle via the glucose transporter (GLUT4) from an intracellular to the cell-surface. In T2DM, there are lacks in

the insulin receptors which result in impaired glucose uptake and GLUT4 translocation. However, exercise therapy could restore the defects of insulin by providing GLUT4 translocation.

### Effect of resistance exercise in Type 2 DM

Resistance exercise leads to develop proper glucose control and less insulin resistance among T2DM. Resistance exercises are exercises that have to be performed against the resistance. <sup>(14)</sup>

### CONCLUSION

The present review was planned to reveal the importance of various types of exercise explained by Unani scholars and modern science which are helpful in the management of T2DM. It is noteworthy that the effect of exercise revealed beneficial results for T2DM deprived of any untoward effect. Detailed researches and further studies with certain distribution of information related to the importance of exercise in T2DM may be essential for the population in the developing countries.

**CONFLICT OF INTEREST: Nil**

**FUNDING: Nil**

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