J M A S H

IMPORTANCE OF EXERCISE IN DIABETES MELLITUS: AN ESSENTIAL COMPONENT FOR SUGAR CONTROL AND GENERAL HEALTH

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ORIGINAL ARTICLE

ABSTRACT

Background: Physical activity (PA) has been identified as the cornerstone in diabetes management, as it constitutes a type of modifiable lifestyle factor. While the advances in pharmacotherapy have lowered this toll, the overall burden of diabetes-related complications is clearly still considerable influenced by sedentism and imperfect lifestyle compliance.
Objective: The aim of this study was to evaluate the effects of regular physical activity on glycemic control, body mass index (BMI), and quality of life in T2DM patients.
Methods: Using a cross-sectional study, we investigated 200 adult patients with T2DM. The participants were categorized into two groups those who exercised regularly at a moderate intensity for at least 150 minutes/week and the sedentary group. The recorded clinical parameters included HbA1c levels, BMI, blood pressure and lipid profiles. The quality-of-life (QoL) questionnaire was also filled by subjects. Results were analyzed with SPSS 25.
Results: Individuals who were physically active (PA) had significantly better glycemic control (mean HbA1c 6.8% vs. 8.2%), and body mass index, lipid profiles and quality of life parameters also showed greater improvement than their sedentary counterparts. The three most frequently perceived obstacles to participation in physical activity were lack of time, joint pain and lack of motivation. A regular physical activity is central to glucose homeostasis and mental well-being in DM.
Conclusion: Regular physical exercise plays a fundamental role in the management of T2DM on metabolic control and psychosocials evaluation. Structured exercise programs and an active lifestyle should take precedence in public health initiatives aimed at people with diabetes, as should educational efforts about these interventions.
Keywords: Type 2 diabetes mellitus, physical activity, exercise, glycemic control; BMI; quality of life.

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INTRODUCTION: The occurrences of diabetes are increasing around the globe and are related to changes in urbanization, sedentary lifestyles, unhealthy dietary patterns, and obesity. [1, 2] Despite necessity for pharmacotherapy in glucose control, the importance of lifestyle modification and activity, in particular, are recognized as foremost among prevention and treatment strategies for diabetes. When you move your body, it creates a lowering of the glucose in your blood by improving insulin sensitivity, increasing glucose absorption into muscle and reducing insulin resistance. [3]
The sad reality is most diabetic patients do not include exercise as part of their daily routine, many times due to the lack of knowledge about benefits, motivation or physical restraints. And this gets to the wider issue that we need good, solid data in what the business world would call

a TCO (total cost of ownership) on exercise and lowering barriers.
The purpose of this research is to investigate the impact of physical activity on clinical aspects in T2DM (including glycemic control, body composition, cardiovascular risk factors and quality of life overall).

METHODOLOGY: The present study was cross-sectional observational study done at the OPD endocrinology and internal medicine departments of a tertiary care hospital Hyderabad during July 2024 to Dec 2024.
A total of 200 adult patients diagnosed with type 2 diabetes mellitus for at least one year were recruited, they ranged in age between 30 and 65 years. Purposive sampling was done to select the participants. All individuals provided written informed consent.

Inclusion Criteria:
Living with T2DM for ≥1 year
Age between 30 and 65 years
Ability to perform physical activity
Volunteers who want to participate and agree to give their consent

Exclusion Criteria:
Type 1 diabetes mellitus
Complications of diabetes (e.g., retinopathy, nephropathy, amputations)
Physical disability preventing exercise
Pregnancy
Psychiatric illness
Data Collection: Two groups of people were divided into part,
Active Group (n=100): Regular moderate-intensity physical activity (e.g., brisk walking, cycling, and swimming) of at least 150 minutes/week.
Inactive Group (n=100): Self-reported minimal or negligible activity recommended by American college of sports medicine (ACSM) regular physical activity.
Demographic information, lifestyle habits and diabetes related history were collected using a structured questionnaire clinical assessment included:
Glycosylated hemoglobin (HbA1c)
Body Mass Index (BMI)
Blood pressure (BP)
Cholesterol panel (total cholesterol, LDL, HDL, triglycerides)
The quality of life measures have been evaluated with the WHOQOL-BREF instrument
Statistical Analysis: The data gathered were coded and then analyzed using SPSS. Continuous data were presented as the mean and SD, while categorical variables were reported as counts and percentages. Comparisons between groups were performed using independent t-tests for continuous variables and chi-square tests for categorical variables. Statistical significance was set as p-value less than 0.05

RESULTS: The mean age of the 200 participants was 52.3 ± 8.9 years, with just over half (54%) male and half female (46%). Mean diabetes duration: 7.4 ± 3.1 years
The lifestyle modification group showed lower HbA1c, BMI and LDL cholesterol levels in comparison to physically active group but it was significant (Table 1). They well also had better HDL cholesterol and blood pressure control. Active participants also had much higher quality of life scores.

TABLE 01: GROUP (ACTIVE VS. INACTIVE)

Parameter	Active (n=100)	Inactive (n=100)	p-value
Mean HbA1c (%)	6.8 ± 0.7	8.2 ± 1.1	<0.001
BMI (kg/m²)	25.1 ± 2.8	29.3 ± 3.5	<0.001
Systolic BP (mmHg)	122 ± 10	138 ± 12	<0.001
LDL Cholesterol (mg/dL)	96 ± 15	118 ± 18	<0.001
HDL Cholesterol (mg/dL)	52 ± 8	40 ± 6	<0.001
QoL Score (mean ± SD)	74.5 ± 6.4	60.2 ± 7.1	<0.001

Barriers to Physical Activity:

The most common barriers most frequently reported by the inactive group included:
Lack of time (47%)
Joint or muscle pain (32%)
Lack of motivation (28%)
Fear of hypoglycemia while exercising (21%)
No access to safe places for exercise (18%)

DISCUSSION: Findings from this study confirm that regular physical activity has beneficial effect on different health parameters in patients suffering from T2DM. Applying with ACSM (American college of sports medicine) recommendations resulted in benefits extending to glycemic control, body composition, cardiovascular risk profiles and psychological well-being.
This is consistent with the findings of recent literature on lifestyle modification, as a cornerstone of diabetes therapy. For example, the diabetes prevention program showed that a small amount of weight loss from exercise can dramatically cut the incidence of diabetes and its complications.
Mechanisms of Benefit:
Physical activity increases insulin sensitivity that leads to increased glucose uptake in skeletal muscles. It additionally aids in weight management, decreases visceral adiposity and, ameliorates lipid metabolism that is crucial to reduce diabetes-related complications. [4, 5]
Additionally, exercise releases endorphins and other neurochemicals that improve mood, reducing stress by affecting a decrease in cortisol, which in indirectly supports glucose control. [6]
Importance of Addressing Barriers:
Many diabetic individuals, however, fail to exercise regularly despite the pronounced benefits. From a broad perspective, physical reasons, logistical reasons, psychological reasons: Addressing the causes for their physical reason is very much important if you want them to stick on that alright. [7] Tailored programs, supervised group exercises or community-based initiatives might help to overcome these hindrances.
All patients should be provided with regular education on non-harmful activities they can engage in and it could also benefit the provider professionally because even limited duration of exercise may result in profound health improvements over time. [8]
Promoting physical activity should be a top priority in diabetes care programs. Future interventions should focus on individualized counseling, structured exercise regimens, and public health strategies aimed at making physical activity more accessible and sustainable.

CONCLUSION: This study gives strong evidence to the fact that physical activity plays a significant role in managing type 2 diabetes mellitus. In addition to improved glycemic control, the participants who exercise regularly have better heart health and a higher grand mean standard of living.

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Authors Contribution

Dr. Mukhtiar Hussain Jaffery	*Concept & design*
Dr. Surhan Uzair	*Acquisition of data*
Dr. Janeeta Tehreem	*Study Design*