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Research Article

**ANALYSIS OF RELATIONSHIP BETWEEN INSULIN
RESISTANCE AND PHYSICAL ACTIVITY AMONG ADULTS
WITH DIABETES MELLITUS****Dr. Ayesha Amjad¹, Dr Sadia Rauf¹, Dr Sidra Iqbal¹**
¹Health Department Punjab.**Article Received:** April 2019**Accepted:** May 2019**Published:** June 2019**Abstract:**

Introduction: Diabetes Mellitus (DM) has affected millions of people worldwide and this count continues to increase at an alarming rate. **Aims and objectives:** The main objective of the study is to analyse the relationship between insulin resistance and physical activity among adults with diabetes mellitus. **Material and methods:** This descriptive study was conducted in Health department Punjab during June 2018 to December 2018. The data was collected from 100 patients of diabetes mellitus. Data on sex, age, present physical activity, physical activity in earlier decades of life, smoking and drinking habits, and use of hypoglycemic drugs was collected from the questionnaire. **Results:** The data was collected from 100 patients. Men and women responding with "some" exercise in the past composed the largest group and had the youngest average age. Those whose exercise was "consistent" through earlier decades had the highest percentage of individuals who maintained physical activity in the present, approximately 10% to 15% higher than "some" or "none" among both men and women. **Conclusion:** It is concluded that Past physical activity was inversely associated with present insulin resistance. It is hoped that this study, focusing on the influence of physical activity at an early age on insulin resistance later in life.

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INTRODUCTION:

Diabetes Mellitus (DM) has affected millions of people worldwide and this count continues to increase at an alarming rate. Estimates show that the number of diabetics in the world will reach up to 366 million in 2030. In the US alone, about 9% of the adult population are affected with type 2 diabetes. Many studies have emphasized the importance of physical exercise in preventing type 2 diabetes. Physical activity along with diet change inhibit or at least postpone the progression of impaired glucose tolerance to overt type 2 diabetes [1]. A meta-analysis of 14 studies showed a clinically significant reduction in glycosylated hemoglobin (HbA1c) in response to exercise in type 2 diabetic population. In type 1 diabetes physical exercise restores insulin sensitivity thus affords better glycaemic control [2].

Insulin resistance is a characteristic of type 2 diabetes, but it can exist in Type 1 diabetes as well. Insulin resistance describes the inability of a known quantity of exogenous or endogenous insulin to increase glucose uptake and utilization in an individual as much as it does in a normal population [3]. The exact molecular action leads to insulin resistance is not yet understood. Several mechanisms have been proposed to be the underlying cause of insulin resistance. These include: (1) genetic abnormalities of proteins involved in insulin action cascade (2) fatal malnutrition (3) high visceral adiposity. In most patients, Insulin resistance occurs as part of a cluster of cardiovascular and metabolic abnormalities commonly referred to as “The Metabolic Syndrome”, which may contribute to the development of type 2 diabetes [4]. It is well established that acute exercise is associated with substantial improvement in insulin sensitivity. A single bout of moderate intensity exercise can increase the glucose uptake by at least 40%. Several of the early studies observed significant improvements in glucose tolerance and insulin sensitivity in response to exercise training obtained post-training measurements within 12 to 48 hours of the last exercise session [5]. It is well-known that people who are physically active are at a lower risk of mortality and morbidity related to ischemic heart disease, hypertension, diabetes,

obesity, and osteoporosis. Physical activity is also beneficial to mental health and quality of life. Despite the variety of benefits that physical activity brings, however, there are very few long-term chronological studies on the effects of physical activity on subsequent prevention of lifestyle-related diseases [6].

Aims and objectives:

The main objective of the study is to analyse the relationship between insulin resistance and physical activity among adults with diabetes mellitus.

MATERIAL AND METHODS:

This descriptive study was conducted in Health department Punjab during June 2018 to December 2018. The data was collected from 100 patients of diabetes mellitus. Data on sex, age, present physical activity, physical activity in earlier decades of life, smoking and drinking habits, and use of hypoglycemic drugs was collected from the questionnaire. Fasting blood glucose and insulin ($\mu\text{U/mL}$) levels were used to calculate the homeostatic model assessment of insulin resistance (HOMA-IR), an index of insulin resistance.

Statistical analysis:

Statistical analyses were performed with SPSS version 20.0 and men and women were analysed separately. All of the P values were two-sided, with $P < 0.05$ indicating statistical significance.

RESULTS:

The data was collected from 100 patients. Men and women responding with “some” exercise in the past composed the largest group and had the youngest average age. Those whose exercise was “consistent” through earlier decades had the highest percentage of individuals who maintained physical activity in the present, approximately 10% to 15% higher than “some” or “none” among both men and women. Insulin resistance shows lowest odds ratios were observed among those with “consistent” exercise in both men and women, after adjusting for age, BMI, history of drinking alcohol, history of smoking, and present physical activity.

Table 01: Analysis of odds ratio of insulin resistance (HOMA-IR >1.6) associated with past physical activity

Past physical activity	Men					Women				
	HOMA-IR >1.6/≤1.6	Age adjusted OR (95% CI)		Multivariate ^a OR (95% CI)		HOMA-IR >1.6/≤1.6	Age adjusted OR (95% CI)		Multivariate ^a OR (95% CI)	
None	154/361	1	(Reference)	1	(Reference)	206/569	1	(Reference)	1	(Reference)
Sometimes	578/1122	1.12	(0.91–1.39)	1.02	(0.80–1.31)	415/1324	0.95	(0.78–1.16)	0.93	(0.75–1.16)
Consecutively	383/1085	0.85	(0.68–1.06)	0.75	(0.58–0.96)	169/517	0.86	(0.68–1.09)	0.76	(0.58–0.99)
<i>P</i> for trend		0.018		0.0026			0.21		0.047	

DISCUSSION:

To the best of our knowledge, this study is the first to focus on the association of early physical activity with insulin resistance later in life. Insulin resistance impacts the metabolism not only of glucose but also of fats, and it is associated with the development of diabetes, high blood pressure, and arteriosclerosis [7]. Thus, early detection of insulin resistance might contribute to increased efforts to prevent lifestyle-related diseases. Physical activity and physical therapy are positively correlated with a decrease in insulin resistance because the skeletal muscles are insulin's main target organs. Furthermore, the effects of physical therapy may bring about long-term changes in the body, in addition to short-term effects. In this research, we investigated the long-term association between past physical activity and glucose metabolism [8].

The beneficial association of past physical activity with insulin resistance in this study was not due to weight loss, since past physical activity still had a significant trend toward decreased insulin resistance after adjustment for BMI among both men and women [9]. It was interesting that the group that exercised consistently had a higher BMI than those with no physical activity. The positive association with physical activity, regardless of BMI, was consistent with the findings of Fukushima et al [10].

The higher BMI we observed among consistent exercisers might be due to increased muscle mass, which is expected to affect insulin resistance. Insulin functions as a protein anabolic hormone, suppressing degradation of muscle protein and facilitating muscle protein synthesis. The degree of change in muscle protein synthesis caused by insulin stimulation is inversely correlated with HOMA-IR, and the protein metabolic cycle is stimulated by physical activity. Furthermore, lipids in skeletal muscle cells can have a significant influence on insulin resistance

[11]. As the quantity and quality of intramuscular lipids are controlled by physical activity, we consider this also to be part of the protein metabolic cycle. Thus, continued physical activity contributes to an increase in capillary density and eventual change in skeletal muscle fiber composition [12].

CONCLUSION:

It is concluded that Past physical activity was inversely associated with present insulin resistance. It is hoped that this study, focusing on the influence of physical activity at an early age on insulin resistance later in life.

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