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# PREVALNCE OF PHYSICAL ACTIVITY AND BODY MASS INDEX AMONG PATIENTS WITH DIABETES

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**ABSTRACT**

**OBJECTIVE:** There is a clear need for more study to acquire a thorough knowledge of these linkages, particularly in the context of the Pakistani community. Although numerous studies have examined the complex correlation between PA, BMI and DM. **METHODS:** A survey based study conducted in Hyderabad, Sindh, Pakistan. 350 participants in all were included in the study, and a standardised questionnaire was used to collect the data. With the help of the International Physical Activity Questionnaire (IPAQ), this survey was used to compile crucial demographic data, assess PA levels, and calculate BMI using height and weight measurements. The gathered data was then subjected to analysis using SPSS version 25. **RESULTS:** The Findings shows that the link between elevated BMI and the incidence of Type II Diabetes, with obesity playing a prominent role in this association. Conversely, engaging in physical activity is associated with a lower prevalence of Type II Diabetes. Specifically, among participants with a normal BMI, 7.7% had Type II Diabetes, while this figure rose to 40.2% for overweight individuals and a substantial 74.7% for those categorized as obese. In contrast, only 9.2% of physically active participants were affected by Type II Diabetes, while 61.1% of those not engaging in physical activity were affected. These results highlight a clear association between higher BMI and the prevalence of Type II Diabetes, with obesity being particularly influential, and underscore the beneficial impact of physical activity in reducing the risk of Type II Diabetes. **CONCLUSION:** In conclusion, significant association between physical inactivity and elevated BMI, particularly in older individuals, with a heightened prevalence of diabetes mellitus (DM). These findings underscore physical inactivity as a distinct risk factor for DM onset.

**KEYWORDS:** Body mass index BMI, Diabetes mellitus, Physical Activity, Prevalence

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## INTRODUCTION

Diabetes mellitus (DM) is defined by high blood sugar levels brought on by problems with the body's ability to secrete or use insulin[1]. The prevalence of this chronic metabolic illness is rising swiftly in Pakistan, where it is now becoming a serious global health concern[2]. The incidence of diabetes overall in Pakistan is 26%, with 95% of cases being type II, according to the Second National Diabetes Survey of Pakistan (NDSP)[3]. As DM is linked to a number of consequences, including neuropathy, retinopathy, and cardiovascular disease, its high prevalence is concerning[4,5].

Regular exercise plays a crucial role in influencing the development and progression of diabetes mellitus (DM). Numerous research studies have emphasized that a sedentary lifestyle is a significant contributing factor to the risk of developing DM[6]. In Pakistan, one study revealed that a staggering 71.6% of the population engaged in insufficient physical activity[7]. Individuals afflicted with type 2 diabetes often experience a notable reduction in their overall quality of life. According to a report stemming from research carried out in Pakistan, individuals living with DM exhibited notably lower scores in quality of life assessments compared to those without the condition[8]. The consequences of DM can have significant repercussions on the physical, psychological, and social well-being of those affected[9].

The association among regular physical activity (PA) and quality of life (QoL) in people with type 2 diabetes (DM) has been the subject of many study studies. A thorough assessment and meta-analysis indicate that DM patients' QoL significantly improved as a result of therapies that encouraged physical activity[10]. A further study found a positive relationship between continuous physical activity and better QoL for those with diabetes[11]. Examining how these factors interact and how they affect quality of life is crucial given Pakistan's inadequate levels of physical activity and widespread incidence of hyperglycemia. This study seeks to provide information on the prevalence of DM and the level of physical activity participation among Pakistani citizens while also evaluating their combined effects on quality of life.

## METHODS AND MATERIALS:

A cross-sectional investigation has been carried out in Hyderabad, Sindh, Pakistan to determine the rate of development of type 2 DM and its associations with levels of PA and BMI. The study especially targeted people with DM Type 2 and eliminated those with a history of DM, women who were pregnant, and people who had health issues that prevented them from exercise. 350 people in all, all between the ages of 35 and 55, were enrolled in the study. During the period of Sept 2022 to Feb 2023, data was gathered by distributing a designed questionnaire. This survey was divided into three parts: the first segment collected basic demographic data, the second segment used the International Physical Activity Questionnaire (IPAQ) to assess levels of physical activity, and the third segment measured height and weight to calculate BMI.

A fasting blood glucose level below 126 mg/dl, the use of oral hypoglycemic medicines, or insulin therapy were required for the diagnosis of DM. Based on the participants' self-reported status and/or fasting blood glucose levels, DM was categorised as having been present in some of the participants[12]. The study was approved by the institutional review board (IRB) to verify its ethical conduct, and all participants gave written consent expressing their voluntary involvement in the study.

To protect the confidentiality of the participants, all data gathered during the study were treated with utmost privacy. Each participant was allocated a distinct identifier to guarantee anonymity. Subsequently, the collected data were subjected to analysis using SPSS version 25. Descriptive statistics were employed to provide a concise summary of the demographic characteristics of the study's participants. Additionally, the researchers computed the prevalence of diabetes mellitus (DM) within each age group and conducted logistic regression analysis to pinpoint the factors linked to DM, which encompassed physical activity levels and BMI.

## RESULTS:

The table presents a demographic attributes of the study population, encompassing data

concerning age, gender, and educational attainment. The study population comprises 350 individuals, among whom 182 (52%) are male, and 168 (48%) are female.

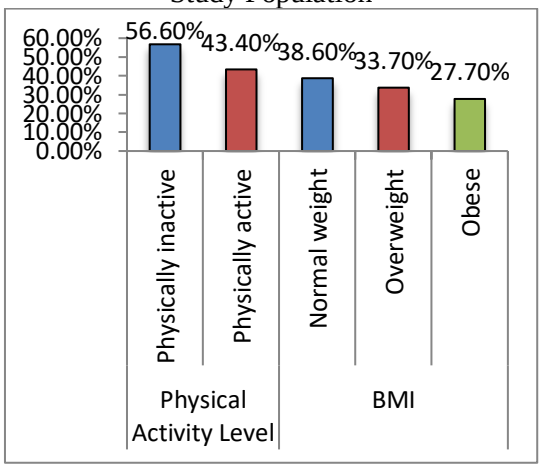
Regarding the distribution of age groups, the preponderance of study participants falls within the 40-49 age bracket, constituting 52.2% of the total sample. The remaining individuals are relatively evenly distributed between the 35-39 age group (22.9%) and the 50-55 age group (24.9%).

Educational levels are also delineated within the table. The largest segment of individuals (36.0%) has completed primary education, followed by those with no formal educational background (25.4%). Furthermore, participants with secondary education make up 29.4% of the cohort, while individuals with higher education credentials represent 9.1%.

Table 1: Characteristics of the Study Population

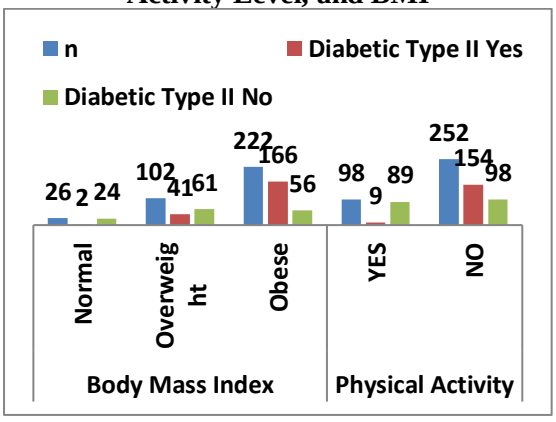
| Characteristic | *n* | (%) |
|---|---|---|
| **Age** | | |
| *35-39* | *80* | *22.)* |
| *40-44* | *95* | *27.1* |
| *45-49* | *88* | *25.1* |
| *50-55* | *87* | *24.9* |
| **Sex** | | |
| *Male* | *182* | *52* |
| *Female* | *168* | *48* |
| **Education** | | |
| *No Schooling* | *89* | *25.4* |
| *Elementary Education* | *126* | *36.0* |
| *Secondary education* | *103* | *29.4* |
| *Higher education* | *32* | *9.1* |

Graph I: Physical Activity Level and BMI of Study Population




The data presented in the graph indicates that a substantial portion of the study population exhibits low levels of physical activity, and there is a noteworthy prevalence of individuals classified within the overweight or obese BMI classifications. This data holds relevance in the context of identifying potential health hazards linked to both insufficient physical activity and elevated BMI values within this study cohort. To gain a more comprehensive understanding of the intricate connections between physical activity levels, BMI, and the overall health outcomes in this population, further in-depth analysis and investigation are warranted.

**Graph 2: Association between DM, Physical Activity Level, and BMI**




The graph gives a quick summary of Type II Diabetes prevalence, categorizing participants based on their BMI and Physical Activity (PA)

levels. It emphasizes a definite link between raised BMI and the incidence of Type II Diabetes, emphasizing the significant role of obesity in this context. Conversely, engaging in physical activity is associated with a lower prevalence of Type II Diabetes. Among participants with normal BMI, 7.7% had Type II Diabetes, rising to 40.2% for overweight individuals and a substantial 74.7% for those classified as obese. In contrast, only 9.2% of physically active participants had Type II Diabetes, whereas 61.1% of those not engaged in physical activity were affected.

These results illustrate a clear association between higher BMI and the prevalence of Type II Diabetes, with obesity being particularly impactful. Furthermore, engaging in physical activity appears to be associated with a lower prevalence of Type II Diabetes.

**DISCUSSION**

Because of its increasing prevalence and large impact on sickness and mortality rates, DM represents an important global health issue. The outcomes of this study highlight the link between levels of PA and greater BMI with a higher rate of DM in the study sample. This finding is significant since it agrees with other studies that were conducted in a variety of individuals, emphasising the relationships' significance on a global level.

An Indian study that highlighted the importance of physical exercise as a prevention measure in this context found a significant correlation between a lack of PA and a higher chance of DM in middle-aged and older persons[12]. The incidence of DM and physical activity obviously have a negative association, according to study done in China[13]. This finding implies that regular physical activity may help lower the risk of acquiring diabetes. The mechanisms that underlie the intricate connection between physical activity and diabetes mellitus (DM) remain multifaceted and not yet fully comprehended. Nevertheless, several potential pathways have been posited, encompassing the enhancement of insulin sensitivity and glucose uptake, the mitigation of inflammation, and the improvement of lipid profile[14]. Consistently engaging in physical activity has demonstrated the capacity to augment insulin sensitivity, thereby promoting more effective glucose uptake by muscle tissues, consequently reducing the risk of hyperglycemia and the onset of insulin resistance[15]. Furthermore, physical activity has exhibited its ability to alleviate inflammation, a factor closely associated with the development of insulin resistance and DM[16]. Additionally, it has been observed that physical activity exerts a favorable influence on lipid profile by reducing levels of triglycerides and low-density lipoprotein (LDL), both of which are well-established risk factors for cardiovascular disease and DM[17].

Furthermore, an array of studies has consistently demonstrated the robust relationship between higher BMI and an elevated risk of diabetes mellitus (DM). For instance, a study conducted in Iran identified a significant correlation between being overweight or obese and an increased likelihood of DM, reinforcing the importance of weight management as a crucial element in both the prevention and management of DM[18]. Similarly, research carried out in Japan substantiated this association, revealing a positive link between BMI and the incidence of DM[19]. These findings collectively emphasize the imperative role of weight control in addressing DM.

The current investigation reaffirmed that individuals with limited physical activity levels displayed a heightened prevalence of DM when compared to their more physically active counterparts. This observation harmonizes with the outcomes of a meta-analysis encompassing prospective cohort studies, which uncovered a robust correlation between physical activity and the susceptibility to developing DM[20]. Moreover, a study conducted within the United States reinforced this connection by illustrating that engaging in physical activity was linked to a diminished risk of DM[21]. An alternative hypothesis suggests that physical activity may contribute to the reduction of persistent low-grade inflammation, a pivotal factor in the genesis of type 2 diabetes[22]. This assertion is supported by evidence indicating that physical activity can lower pro-inflammatory cytokine levels while simultaneously elevating anti-inflammatory cytokine levels[23]. Furthermore, physical activity possesses the potential to facilitate either weight loss or the maintenance of a healthy weight, which remains of

paramount importance in mitigating the risk of DM. Excessive body weight, particularly in the abdominal region, continues to be a substantial risk factor for the development of type 2 diabetes[24]. Additionally, physical activity has the capacity to enhance cardiovascular health, a critical element in minimizing the risk of complications associated with DM[25].

**CONCLUSION:** The study furnishes substantial evidence supporting the strong association between physical inactivity and elevated BMI levels with an increased prevalence of diabetes mellitus (DM). Moreover, our findings emphasize that physical inactivity serves as a notable risk factor for the onset of DM, particularly among middle-aged and older individuals.

**ETHICS APPROVAL:** The ERC gave ethical review approval

**CONSENT TO PARTICIPATE:** written and verbal consent was taken from subjects and next of kin

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