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Research Article

**ANALYSIS OF RELATIONSHIP OF OBESITY AND DIABETES
MELLITUS IN PAKISTAN**Dr Huma Arshad¹, Dr Hira Shireen Muhammad¹, Dr Qandeel Zafar²¹DHQ Teaching Hospital Sahiwal, ²Holy family hospital Rawalpindi.**Article Received:** December 2018 **Accepted:** February 2019 **Published:** March 2019**Abstract:**

Introduction: Diabetes Mellitus a metabolic disorder arises if body is incapable to synthesize sufficient insulin for metabolism, it could be due to improper insulin secretion, improper insulin action, or both. Obesity and Type 2 Diabetes Mellitus (T2D) are serious health concerns.

Aims and objectives: The basic aim of the study is to find the relationship between obesity and diabetes in local population of Pakistan.

Material and methods: This cross sectional study was conducted at DHQ teaching hospital, Sahiwal during January 2018 to October 2018. The data was collected through a survey analysis from both genders. The sample size was 100. This data included demographic information, systolic blood pressure measurements, medical disease history, smoking history, and laboratory measures (lipid profile and fasting glucose, insulin, c-peptide, and hemoglobin A1C levels).

Results: The data was collected from 100 patients. Among adults with diabetes, there were 62 individuals with a BMI <25.0; 902 individuals with a BMI of 25.0–29.9; 10 individuals with a BMI of 30.0–34.9; 9 individuals with a BMI of 35.0–39.9; and 10 individuals with a BMI equal to 40.0. The prevalence of diabetes was lowest for the group with BMI <25.0 (8%). The prevalence of diabetes almost doubled between normal weight vs. overweight class (8% vs. 15%). The prevalence of diabetes continues to increase with the increasing class of obesity and was highest for class 3 obesity (43%).

Conclusion: It is concluded that there is a direct relationship between obesity and diabetes. Nearly one fourth of adults with diabetes have poor glycemic control and nearly half of adult diabetics are considered obese based.

Key words: Obesity, Hypertension, Diabetes, Patients

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INTRODUCTION:

Diabetes Mellitus a metabolic disorder arises if body is incapable to synthesize sufficient insulin for metabolism, it could be due to improper insulin secretion, improper insulin action, or both. Obesity and Type 2 Diabetes Mellitus (T2D) are serious health concerns. The global epidemic of obesity and T2D is worsening. According to updated World Health Organization (WHO) reports, worldwide obesity has almost doubled since 1980. In 2008, >1.4 billion adults aged >20 years were either overweight or obese. Of these, >200 million men and about 300 million women were obese [1]. The new International Association for the Study of Obesity/International Obesity Taskforce analysis (2010) estimates that approximately 1 billion adults are currently overweight (Body Mass Index [BMI] 25- 29.9 Kg/m²), and a further 475 million adults are obese. With an Asian-specific definition of obesity (BMI >28 kg/m²), global obesity prevalence in adults is estimated at >600 million [2].

The crude prevalence of total diabetes in adult's age equal to 20 years is 9.6% or 20.4 million in the US and many diabetic individuals are obese [3]. Obesity is one of the most important modifiable risk factors for the prevention of type 2 diabetes; however, obesity is an epidemic in the US [4]. Recent data from the National Health and Nutrition Examination Survey (NHANES) in 2003–2004 indicate that among adults aged 20 to 39 years, 28.5% are obese while 36.8% of adults aged 40 to 59 years and 31.0% of those aged 60 years or older are obese, defined as a body mass index (BMI) of 30.0 or higher [5]. For each kilogram of weight gained annually over a period of 10 years, there is an associated 49% increase in the risk of developing T2D in the subsequent 10 years [6]. Conversely, for each kilogram of weight lost annually over 10 years, there is an associated 33% reduction in the risk of developing T2D in the subsequent 10 years [7]. Health Technology Assessment systematic reviews showed that weight loss was beneficial for long term T2D-related outcomes and risk of developing T2D in overweight, obese and morbidly-obese participants [8].

Aims and objectives

The basic aim of the study is to find the relationship between obesity and diabetes in local population of Pakistan.

MATERIAL AND METHODS:

This cross sectional study was conducted at DHQ teaching hospital, Sahiwal during January 2018 to October 2018. The data was collected through a survey analysis from both genders. The sample size was 100. This data included demographic information, systolic blood pressure measurements, medical disease history, smoking history, and laboratory measures (lipid profile and fasting glucose, insulin, c-peptide, and hemoglobin A1C levels). Height and weight were measured using standardized protocols. Participants were considered to have diabetes mellitus if they were told by their doctor they have diabetes, had a fasting plasma glucose concentration of 125 mg/dL, had a hemoglobin A1C level of 6.0%, or use anti-diabetic medication(s) such as insulin or oral hypoglycemic agents. We categorized adults with diabetes according to increasing weight classes and also analyzed the levels of fasting glucose, insulin, c-peptide, and hemoglobin A1C across the classes of obesity.

Statistical Analysis

Statistical analysis (Anova Test and Post Hoc) was performed using the SPSS software program (17.0). All results were expressed as the mean \pm standard deviation (SD). As P value <0.05 was considered to be statistically significant.

RESULTS:

The data was collected from 100 patients. Among adults with diabetes, there were 62 individuals with a BMI <25.0; 902 individuals with a BMI of 25.0–29.9; 10 individuals with a BMI of 30.0–34.9; 9 individuals with a BMI of 35.0–39.9; and 10 individuals with a BMI equal to 40.0. The prevalence of diabetes was lowest for the group with BMI <25.0 (8%). The prevalence of diabetes almost doubled between normal weight vs. overweight class (8% vs. 15%). The prevalence of diabetes continues to increase with the increasing class of obesity and was highest for class 3 obesity (43%).

Table 01: Demographic characteristics of patients

| | Weight Classes | | | | | | Overall diabetic | Non-diabetic |
|-----------------------------|----------------|------------|-----------------|-----------------|-----------------|---------------|------------------|--------------|
| | Normal weight | Overweight | Obesity class 1 | Obesity class 2 | Obesity class 3 | | | |
| No. of adults with diabetes | 9 | 62 | 10 | 9 | 10 | <i>N</i> = 62 | <i>N</i> = 38 | |
| Prevalence of diabetes (%) | 8 | 15 | 23 | 33 | 43 | 13.6 | | |
| Age (years) | 62 ± 0.9 | 62 ± 0.6 | 59 ± 0.7 | 56 ± 0.7 | 51 ± 1.0 | 59 ± 0.5 | 44 ± 0.3 | |
| Gender | | | | | | | | |
| Male | 311 | 526 | 342 | 176 | 108 | 1,463 | 8,662 | |
| Female | 258 | 376 | 368 | 223 | 206 | 1,431 | 9,649 | |
| Diabetic medication (%) | 61 | 69 | 71 | 72 | 71 | 68 | – | |

DISCUSSION:

The major finding of this study is the clear association between obesity and diabetes in a large, representative sample of the Pakistani population. In this cross-sectional survey of adults with diabetes, the lowest prevalence for diabetes was found in individuals with normal weight (BMI <25.0). The prevalence of diabetes increased throughout the range of obesity classes. Nearly a quarter of adults with diabetes have poor glycemic control and nearly half of the individuals with diabetes are considered obese [9].

The prevalence of diabetes from our study is similar to the findings from Cowie and colleagues who reported the crude prevalence of total diabetes in adults age = 20 years was 9.6% with another 3.5% of adults at high risk for diabetes with hemoglobin A1C between 6.0% and 6.5% [1]. The prevalence of obesity among diabetic in our study is much higher than the reported prevalence of obesity in the general US adult population. In our study, the prevalence of obesity among adults with diabetes was 49.1% while Flegal and colleagues reported the prevalence of obesity was 32.2% among US adult men and 35.5% among adult women [10]. In this study, we also found the mean fasting glucose and HbA1c levels were highest for diabetics with BMI <25.0, suggesting a state of higher severity of disease. Mean insulin and c-peptide levels were highest for diabetics with BMI equal to 35.0, suggesting a state of insulin resistance [11]. These results may suggest that more diabetics within normal weight range have type 1 classification and diabetes in the obese are mostly type 2 with associated insulin resistance. Type 2 diabetes account for 90–95% of those with diabetes and encompasses individuals who have insulin resistance and usually have relative insulin deficiency [12].

CONCLUSION:

It is concluded that there is a direct relationship between obesity and diabetes. Nearly one fourth of adults with diabetes have poor glycemic control and nearly half of adult diabetics are considered obese based.

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