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ORIGINAL ARTICLE

Prevalence of Class II and III Obesity with Diabetes Type II and Associated Factors

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ABSTRACT

Background: Obesity is related to Type II Diabetes (T2DM), affecting health-related quality of life. Body mass index (BMI) is a standardized screening tool used for Obesity. Gaining weight is highly associated with developing certain metabolic disorders, such as T2DM, which may worsen the quality of life. Among the general Pakistani population prevalence of overweight individuals is 25%, and obesity is 10.3%.
Aim: To find out the prevalence of class II and III obesity with T2DM and associated factors
Methods: This cross-sectional study was carried out at different clinics of Sindh. The study duration was six months, from February 2022 to July. Through a purposive sampling technique, 200 overweight males and females were selected. BMI was calculated by weight (kg) and Height (inches). Self-structured questionnaire for demographic and related associate factors.
Results: The most subjects were fall into the age range above 46 years (67%) majority were male, 143(71.2%), most subjects were lies in class III obesity (65.5%) and 121(60.5%) were chronic smokers. The prevalence of T2DM among people aged ≥46 years was 58.2%. Outcomes on the gender bases showed that T2DM was higher at 73(51.1%) among males than females at 25(43.86%). The incidence of Diabetes was comparatively high among obese class III 81(61.8%) than class II individuals.
Practical Implications: The Overweight individuals with type 2 diabetes face a chronic, developing disease that leads to complications that profoundly affect both quality of life and longevity. Diet recommendations to prevent T2DM should focus more on the quality of fat and carbohydrate in the diet than quantity alone, in addition to balancing total energy intake with expenditure to avoid obesity.
Conclusion: It is concluded that the high prevalence of T2DM with obesity class III and chronic smokers among participants.
Keywords: Associated factors, BMI, Diabetes, Obesity, Prevalence Smokers

INTRODUCTION

Approximately 463 million individuals are diabetic in the world, whom 90% have T2DM[1]. According to World Health Organization (WHO), comparing the Underweight with Obesity, later is more lethal for individuals these days[2]. Obesity is related to many non-communicable diseases like cardiovascular disease, T2DM, High blood pressure, coronary heart disease, or certain cancers. Moreover, it is also related to diverse psychological problems or physical disabilities. According to WHO, being overweight and obese contribute to forty four percentage of diabetes patient, twenty three percentage of cardiac issues, and around 7–41% of some cancers[3]. The International Diabetes Federation highlighted that most of the subjects with Diabetes are obese[4].

When energy intake repeatedly exceeds energy expenditure, obesity occurs. The exact cause is idiopathic, but several factors like endocrine, metabolic, genetic, psychological, and cultural contributions to it[1].

Obesity is rising to the epidemic, with a prevalence of 33% in adults in the United States, with 13% of Saudi males and 20.26% of females. In the Canadian population prevalence of Obesity is 14.9%. In India and Pakistan, 10 -28% population is obese, which is more common in females and upper socioeconomic class. Five socioeconomic status seems to be one of the contributing factors of Obesity. In developed countries, it seems to be more common among the population[6].

According to the American Diabetes Association (ADA), fasting plasma glucose (FPG) or 75gm OGTT level is required for the diagnosis of Diabetes. But this testing criteria is time-consuming, involves fasting, and may not always be reproducible[7,8]. In 2009, the international expert committee on Diabetes formulated new diagnostic criteria which were based on HbA1c (glycated hemoglobin), and this standard gold test tells about chronic glucose exposure[9].

The proposed diagnostic threshold of 6.5% (48mmol/mol) was based on retinopathy risk at different levels of HbA1c as with FPG and OGTT. This report was followed by a recommendation from the ADA that an HbA1c level of 6.5% (48mmol/mol) be used as the diagnostic cut-off for the diagnoses of Diabetes (this has not been validated in Pakistan)[10]. According to a large multicenter study adopting the "The Diabetes Prevention Program," which includes eating healthy food with low calories and exercise," can prevent T2DM[11].

The preventive study was conducted by Finnish, reducing weight in overweight individuals with compromised glucose tolerance, averaging just 3-4Kg over four years, led to a 58% decrease in diabetic cases[12]. Another study showed that similar results were achieved by the diabetes prevention program in the US, according to that lifestyle modification, i.e., regular physical activity and nutritional changes in individuals with impaired glucose intolerance, reduced the incidence of Diabetes by 58%[13].

When reviewing the existing literature, we found that studies of this association in Sindh populations were lacking, despite this population presenting an increased prevalence of class II and III obesity with T2DM over the last decade.

The objective of the present study was to find out the prevalence of class II and III obesity with T2DM and associated factors.

MATERIALS AND METHODS

A cross sectional study was conducted in Tando Muhammad khan district, Sindh, through a purposive sampling technique. The study duration was six months, from February 2022 to July 2022. The

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inclusion criteria were both males and females from other age group from 40 to above 46 years with a BMI of >25 to >30 or higher. Exclusion criteria were any physical disability, mental retardation, and endocrine disorder. Ethical approval was taken from Institutional Review Board (IRB). The Anthropometric measurements, such as the BMI of the study population, were calculated weight in (Kg) which is measured by weight machine and Height in feet assess through inch tape. The status of Diabetes type II was assessed by fasting blood glucose level using Glucometer. And the self-structured questionnaire was designed to determine the associated factors like Obesity and smoking. After taking consent from each participant, data was collected and analyzed statistically on SPSS 25.

RESULTS

A total number of 200 individuals were included in his study among them 66 (33%) were age range of 40-45 years and 134(67%) individuals were from other age group (above 46 years). the ratio of male population was 143(71.2%) and female was 57(28.8%). The subjects were lies in obesity class II 69(34.5%) and obesity class 131(65.5%). The results revealed that 121(60.5) chronic and 79(39.5) were former. The most subjects were fall into the age range above 46 years (67%) majority were male, 143(71.2%), most subjects were lies in class III obesity (65.5%) and 121(60.5%) were chronic smokers. The prevalence of T2DM among people aged ≥46 years was 58.2%. Outcomes on the gender bases showed that T2DM was higher at 73(51.1%) among males than females at 25(43.86%). The incidence of Diabetes was comparatively high among obese class III 81(61.8%) than class II individuals and also more common in current smokers 71(58.7%) than in former smokers 57(70.21%).

Graph I: Gender based distribution

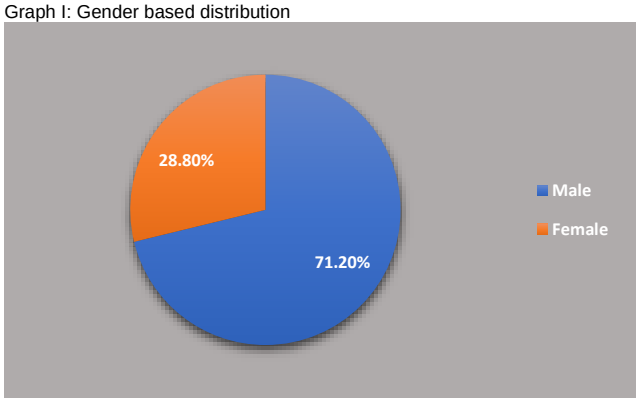

Table 1: Descriptive Data with Obesity and Diabetic (Type II)

Variable		N (200)	Diabetic Type II	
			Yes	No
Age	40-45years	66(33%)	30(45.45%)	36(54.55)
	Above 46year	134(67%)	78(58.2%)	56(41.8%)
Gender	Male	143(71.2%)	73(51.1%)	70(48.9%)
	Female	57(28.8%)	25(43.86%)	32(56.14%)
Obesity	Class II	69(34.5)	39(56.5%)	30(43.5%)
	Class III	131(65.5%)	81(61.8%)	50(38.2%)
Smoking status	Chronic	121(60.5%)	71(58.7%)	50(41.3%)
	Former	79(39.5%)	57(70.21%)	22(27.84%)

DISCUSSION

Overall, 200 individuals were occluded in this study. The prevalence of T2DM (58.2%) peaked at the age of above 46 years. Most were male (51.1%), mostly class III obese, and chronic Smokers (53.75%) were more prone to T2DM. The current study contributes to T2DM and Obesity Class II and III and its association with T2DM individuals.

In this study, the prevalence of T2DM was 51.82% in class II and III obese individuals. The old study results show this population has a high prevalence of T2DM (40%)[1]. Another previous study revealed that T2DM was strongly associated with Obesity, with 90% of individuals with T2DM having a BMI in the overweight or obese level[14]. Interestingly, a latest study proposed that obesity may be a causative factor to the developing incidence of DM[15].

Adults with higher BMI are more likely at risk of DM. The primary reason could be insulin resistance; however, the exact relationship is still undefined. Among individuals with OWOB, the quantity of non-esterified fatty acids is related to insulin resistance development, and it is a leading cause of the enhancement of DM[16]. Obesity causes dysfunction of B cells leading to Diabetes[17]. Therefore, by preventing OWOB this is possible to avoid Diabetes. Poor eating habits, physical inactivity, and sedentary lifestyles contribute to OWOB. Weight loss can lessen the risk of developing Diabetes because, in this way, insulin action can be enhanced, and the concentration of fasting glucose can be reduced[18]. This study showed that chronic smokers are more prone to develop type 2 DM. A literature study revealed that smoking increases the risk of T2D by 30-40% for active smokers compared to non-smokers[19].

This study has a few limitations, including that data was not collected on a larger scale. Many participants showed poor cooperation in questionnaire filling. This happened because of a lack of awareness in public about research. Therefore public health promotion seminars and programs can be proven helpful in changing people's lifestyles, preventing higher BMI, and reducing Diabetes.

CONCLUSION

It is concluded that this study provides further evidence of the increasingly high prevalence of T2DM among participants with obesity class III and chronic smokers. Diabetes, Obesity, and smoking are correlated with each other. This study will be proven helpful in putting a positive impact on providing education and information. Furthermore, other studies with increased sample sizes, different age and population groups should be conducted to understand the topic better.

Conflict of interest: Nil

REFERENCES

1. Silveira EA, de Souza Rosa LP, de Carvalho Santos ASEA, de Souza Cardoso CK, Noll M. Type 2 Diabetes Mellitus in Class II and III Obesity: Prevalence, Associated Factors, and Correlation between Glycemic Parameters and Body Mass Index. Int J Environ Res Public Health. 2020 Jun 2;17(11):3930.
2. WHO Obesity and Overweight. Fact sheet No.311. 2016.
3. Fried M, Yumuk V, Oppert JM, Scopinaro N, Torres AJ, Weiner R, Yashkov Y, Frühbeck G, European Association for the Study of Obesity. International Federation for the Surgery of Obesity - European Chapter Interdisciplinary European guidelines on metabolic and bariatric surgery. Obes Facts. 2013;6:449–468.
4. International Diabetes Federation Diabetes Atlas, 2nd ed. Brussels, International Diabetes Federation, 2003.
5. Kiyani KA, Ahmad SI, Saeed A, Rashid R, Abrar K. Evaluation of obesity with identification of comorbidities and risk status. J Rawal Med Coll 2002;6:82-90.
6. Kastorini CM, Lykou A, Yannakoulia M, Petralias A, Riza E, Linos A. The influence of a school-based intervention programme regarding adherence to a healthy diet in children and adolescents from disadvantaged areas in Greece: the DIATROFI study. J Epidemiol Community Health. 2016 Jul 1;70(7):671-7.
7. American Diabetes Association. Diagnosis and classification of diabetes mellitus. Diabetes Care 2014;**37**:S81–90.doi:10.2337/dc14-S081
8. Overview of epidemiologic studies of diabetic retinopathy. Ophthalmic Epidemiol 2007;**14**:179–83.doi:10.1080/09286580701396720
9. International Expert Committee. International Expert Committee report on the role of the A1C assay in the diagnosis of diabetes. Diabetes Care 2009;**32**:1327–34.doi:10.2337/dc09-9033

10. American Diabetes Association. Diagnosis and classification of diabetes mellitus. Diabetes Care 2010;**33**(Suppl 1):S62–9.doi:10.2337/dc10-S062
11. Knowler WC, Barrett-Connor E, Fowler SE, et al. Diabetes Prevention Program Research Group; Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. N Engl J Med. 2002;**346**:393-403.
12. Tuomilehto J, Lindstrom J, Eriksson JG, Valle TT, Hamalainen H, IlanneParikka P, Keinanen-Kiukaanniemi S, et al. Finnish Diabetes Prevention Study Group. Prevention of type 2 diabetes mellitus by changes in lifestyle among subjects with impaired glucose tolerance. N Engl J Med 2001;344:1343-50.
13. Diabetes Prevention Program Research Group. Reduction of the incidence of type 2 diabetes with lifestyle intervention or metformin. N Engl J Med 2002;346:393-403.
14. Public Health England, Adults obesity and Type 2 Diabetes PHE 2014.
15. Buzzetti R, Zampetti S, Pozzilli P. Impact of obesity on the increasing incidence of type 1 diabetes. Diabetes Obes Metab. 2020 Jul;22(7):1009–1013.
16. Al-Goblan AS, Al-Alfi MA, Khan MZ. Mechanism linking diabetes mellitus and obesity. Diabetes Metab Syndr Obes 2014;7:587.
17. Hossain MB, Khan JR, Das Gupta R. Role of hypertension in the association of overweight and obesity with diabetes among adults in Bangladesh: a population-based, cross-sectional nationally representative survey. BMJ Open. 2021 Jul 30;11(7):e050493.
18. Maddatu J, Anderson-Baucum E, Evans-Molina C. Smoking and the risk of type 2 diabetes. Transl Res. 2017 Jun;184:101-107.
19. The Health Consequences of Smoking-50 Years of Progress: A Report of the Surgeon General. Atlanta (GA): 20.