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Original Research Article

FREQUENCY OF OBESITY IN PATIENTS WITH TYPE 2 DIABETES MELLITUS AT LADY READING HOSPITAL, PESHAWAR

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ABSTRACT

Background: *Obesity is a significant public health concern and a well-recognized risk factor for the development and progression of type 2 diabetes mellitus (T2DM). Assessing the prevalence of obesity among T2DM patients is essential for effective disease management and prevention of complications.* ***Objective:*** *To determine the frequency of obesity in patients with T2DM presenting to Lady Reading Hospital, Peshawar.* ***Study Design:*** *Cross-sectional study.* ***Setting:*** *Department of Medicine, Lady Reading Hospital, Peshawar.* ***Duration of Study:*** *04-October-2024 to 04-April-2025.* ***Methods:*** *A total of 119 patients with T2DM, aged 18–70 years, were enrolled using consecutive sampling. Obesity was defined as body mass index (BMI) ≥30 kg/m². Anthropometric measurements and relevant laboratory investigations were performed for all participants. Data were analyzed using descriptive statistics, with frequencies and percentages for categorical variables and mean ± standard deviation (SD) for continuous variables.* ***Results:*** *The mean age of participants was 50.25 ± 14.33 years. Of these, 57 (47.9%) were males and 62 (52.1%) were females. The prevalence of obesity was observed in 48 (40.3%) patients. The mean BMI was 28.58 ± 3.25. Hypertension was present in 69 (58.0%) patients, and 18 (15.1%) were smokers.* ***Conclusion:*** *Obesity was prevalent in 40.3% of T2DM patients in our study, highlighting the need for targeted interventions focusing on lifestyle modification and weight management to improve diabetes outcomes.*

Keywords: Type 2 Diabetes Mellitus, Obesity, Dyslipidemia, Glycemic Control, Hypertension

INTRODUCTION

Type 2 diabetes mellitus (T2DM) is a medical condition closely associated with modern civilization. According to recent data from the NCD Risk Factor Collaboration, there are 828 million people affected, with over 95% diagnosed with T2DM. Statistics indicate that the incidence of DM is expected to rise, reaching 10.8% in the US by 2050; this Figure may be overlooked due to differing current incidence estimates (1-3). T2DM is a multifaceted metabolic disorder identified by elevated blood glucose levels that arise from a gradual decrease in insulin secretion. T2DM is a prevalent and diverse condition characterized by varying degrees of beta-cell impairment and insulin resistance (4). Obesity is significantly associated with T2DM , with mechanisms affected by the central nervous system. These pathways govern food intake and energy expenditure by integrating data from peripheral organs and the environment. It is essential to point out that T2DM is not exclusively prevalent among older individuals; recent years have shown a two- to three-fold increase in the prevalence among younger populations (5-8).

Obesity refers to excessive and abnormal accumulation of fat in the body, which adversely affects health by increasing the risk of developing DM, hypertension, and hyperlipidaemia. This public health epidemic has worsened significantly over the past 50 years (9-11). Obesity is a complex disease that has a multifactorial aetiology. It ranks as the second leading cause of avoidable mortality following tobacco use. Obesity necessitates numerous treatment approaches and may demand continual management throughout life. A weight loss of 5% can markedly enhance health and decrease the economic burden for people as well as nations (10-13). Body fat distribution is a critical factor when assessing risk for cardiovascular and metabolic disease. The buildup of excess visceral fat has been linked with an elevated risk for cardiovascular disease (14, 15). A study conducted on T2MD patients found that obesity was present in 27% of cases (16).

Previous studies have investigated obesity in patients with T2DM, but limited data are available specifically in our region. Furthermore, there is variability in the reported results of previous studies, which highlights the need for further research to accurately determine the frequency of obesity in patients with T2DM in our specific region. Therefore, the purpose of our study is to investigate the frequency of obesity in patients with T2DM at Lady Reading Hospital in Peshawar, Pakistan. The results of this study will provide valuable information on the prevalence of obesity in T2DM patients in our region. They will help to identify potential risk factors for obesity in this population. This information can be used to inform the development of effective prevention and management strategies for obesity and T2DM, which will ultimately improve the overall health outcomes for individuals with T2DM in our region.

METHODOLOGY

This cross-sectional study was conducted in the Department of Medicine at Lady Reading Hospital, Peshawar, from 04/October/2024 to 04/April/2025. The research adhered to the ethical principles outlined in the Declaration of Helsinki, and the institute issued an ethical certificate. A consecutive sampling technique (non-probability) was employed to recruit patients, with a calculated sample of one hundred and nineteen patients. This was determined assuming 27%[16] prevalence of obesity in T2DM patients with a 95% confidence level and 8% margin of error.

Eligible participants included adults aged 18 to 70 years with a confirmed diagnosis of T2DM for at least one year, regardless of gender. The diagnosis of T2DM was established using American Diabetes Association (ADA) criteria, which included a fasting plasma glucose level ≥126 mg/dL, HbA1c ≥6.5% or random plasma glucose ≥200 mg/dL in the presence of classic hyperglycemic symptoms. Patients with type 1 diabetes, pregnant women, or those with a history of bariatric surgery or major surgical procedures within the preceding six months were omitted.

Consent was taken from all patients. Data collection was performed using a structured proforma to record demographic details such as age, gender, clinical information, including smoking status and comorbidities. Anthropometric measurements were obtained by

trained research assistants following standardized protocols. Height was measured without shoes using a stadiometer, while weight was recorded using a calibrated scale. Waist circumference was measured at the level of the iliac crest, and hip circumference was taken at the widest point of the hips, both using a non-stretchable measuring tape. Body mass index (BMI) was calculated as weight in kilograms divided by height in meters squared, with obesity defined as BMI ≥30 kg/m².
Laboratory investigations were conducted after an 8-hour fasting period. Venous blood samples were collected for analysis of fasting blood glucose, HbA1c, and lipid profile, including total cholesterol, HDL, LDL, and triglycerides. All biochemical analyses were performed in the hospital's clinical laboratory using standardized procedures. To ensure confidentiality, personal identifiers were removed from the dataset before analysis.
Statistical analysis done with SPSS version 25. Mean ± standard deviation were computed for age, anthropometric measures, and laboratory investigations. Gender, comorbidities, smoking, and obesity were evaluated using frequency and percentages. Obesity was stratified with gender, age, smoking, and comorbidities using chi-square tests with a p-value ≤0.05 considered statistically notable.

RESULTS

The study had 119 patients with a mean age of 50.25±14.33 years. The sample had 57 (47.9%) males and 62 (52.1%) females. Anthropometric measurements revealed a mean waist circumference of 95.20±8.12 cm, while the mean hip circumference was 95.57±3.04 cm. The average body mass index (BMI) was 28.58±3.25 kg/m² (Table 1).
Laboratory investigations showed a mean fasting blood glucose level of 147.33±5.24 mg/dL and a mean HbA1c of 8.17±0.59%. Lipid profile analysis is presented in Table 2.
Among the cases, 18 (15.1%) were smokers. Hypertension was prevalent in 69 (58.0%) cases, whereas cardiovascular diseases were reported in 11 (9.2%) cases (Table 3). Obesity was present in 48 (40.3%) participants, while 71 (59.7%) were non-obese (Table 4). Table 5 presents the stratification of obesity with various parameters.

Table 1: Anthropometric measurements

Anthropometric Measurements	N	Mean±SD
Height (Meter)	119	1.72±0.03
Weight (Kg)	119	84.45±9.32
Waist circumference (cm)	119	95.20±8.12
Hip circumference (cm)	119	95.57±3.04
BMI	119	28.58±3.25

Table 2: Laboratory investigations

Laboratory investigations	N	Mean±SD
Fasting blood glucose (mg/dL)	119	147.33±5.24
HbA1c (%)	119	8.17±0.59
Cholesterol (mg/dl)	119	258.71±26.02
HDL level (mg1dl)	119	47.25±4.75
LDL level (mg/dl)	119	119.86±5.71
Triglycerides (mg/dl)	119	238.41±35.90

Table 3: Clinical data

Clinical data		n	%
Gender	Male	57	47.9%
	Female	62	52.1%
Smoking	Yes	18	15.1%
	No	101	84.9%
Hypertension	Yes	69	58.0%
	No	50	42.0%
Cardiovascular diseases	Yes	11	9.2%
	No	108	90.8%

Table 4: Frequency of obesity

Obesity	n	%
Yes	48	40.3%
No	71	59.7%

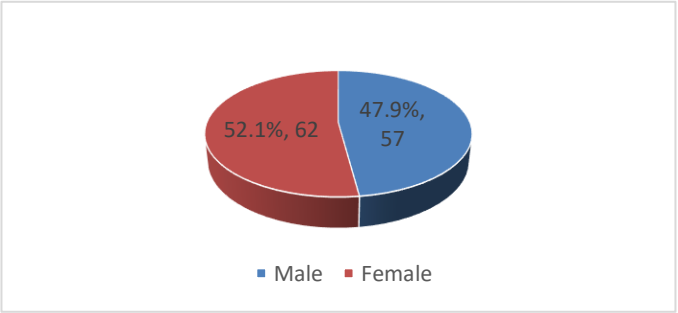

Figure 1: Gender distribution

Table 5: Association of obesity with various factors

Factors		Obesity				P value
		Yes		No		
		n	%	n	%	
Age distribution (Years)	18 to 35	13	27.1%	11	15.5%	0.30
	36 to 50	11	22.9%	19	26.8%	
	> 50	24	50.0%	41	57.7%	
Gender	Male	23	47.9%	34	47.9%	0.99
	Female	25	52.1%	37	52.1%	
Smoking	Yes	6	12.5%	12	16.9%	0.51
	No	42	87.5%	59	83.1%	
Hypertension	Yes	34	70.8%	35	49.3%	0.02
	No	14	29.2%	36	50.7%	
Cardiovascular diseases	Yes	7	14.6%	4	5.6%	0.09
	No	41	85.4%	67	94.4%	

DISCUSSION

Obesity and T2DM are two prevalent chronic conditions that notably contribute to global health burdens, particularly due to their association with cardiovascular diseases and metabolic disorders. The frequency of obesity in T2DM patients has become a critical area of research as both conditions share common risk factors such as insulin resistance and poor lipid metabolism. Understanding the relationship between obesity and T2DM, especially in terms of lipid profiles and body fat distribution, is crucial for developing effective management

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strategies to mitigate the long-term health complications associated with these conditions.

In our study, we found that 40.3% patients were obese in our cohort of diabetic patients. Ahmed et al. reported metabolic syndrome in 76% diabetic patients with a notable female predominance (17). Furthermore, Alawainati et al documented that obesity was prevalent in 47.5% of diabetic patients, particularly among females and those with poor glycemic control (18). Another study by Khan et al observed that 53.9% of their study population was obese, reinforcing the strong association between obesity and T2DM (18).

Zeb et al. in their research documented that approximately 20% of males and 25% of females had obesity (20). Mugharbel et al in their cohort of diabetic patients reported that 39.9% patients were obese. These findings collectively advocate that obesity is strongly linked with diabetes.

The mean age of participants in the current study (50.25±14.33 years) was comparable to that reported by Khan et al. 56±9 years (19). Alawainati et al. reported 58.4±11.3 years (18). We found that obesity was more prevalent in patients aged or older. These findings suggest that middle-aged to older adults constitute the primary demographic affected by obesity-related diabetes.

Gender distribution in the present study (47.90% males, 52.10% females) was similar to findings by Khan et al., who documented 50.8% males and 49.2% females (19). Upon stratification, although not statistically notable, we observed that females had a higher frequency of obesity than male patients. Alawainati et al also documented a similar pattern in their study, where they documented higher obese female patients (18).

The elevated fasting blood glucose (147.33±5.24 mg/dL) and HbA1c (8.17±0.59%) in our cohort indicate suboptimal glycemic control, which can lead to higher obesity rates.[18] Dyslipidemia, characterized by high triglycerides (238.41±35.90 mg/dL) and low HDL (47.25±4.75 mg/dL), was also a prominent feature, aligning with Ahmed et al., who reported low HDL in 84.2% of obese diabetic patients (17).

Hypertension was quite prevalent in our diabetic patients 58.00%, We observed that hypertension was notably associated with obesity in our study. This aligns well with Alawainati et al and Khan et al, as they reported hypertension's association with obesity (18, 19).

CONCLUSION

We conclude that obesity had a higher prevalence in T2DM patients in our study, which was 40.3%. Hypertension in our research was notably associated with obesity.

DECLARATIONS

Data Availability Statement

All data generated or analysed during the study are included in the manuscript.

Ethics approval and consent to participate

Approved by the department Concerned. (IRB-740/LRH/MTI)

Consent for publication

Approved

Funding

Not applicable

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTION

HIRA ANWAR (Trainee Medical Officer)

Data Collection, Development of Research Methodology Design, Review of manuscript, Review of Literature, Manuscript drafting, and final approval of manuscript.

INAYAT ULLAH (Assistant Professor)

Conception of Study, Critical Input, and Final Approval of Manuscript.

REFERENCES

1. Zhou B, Rayner AW, Gregg EW, Sheffer KE, Carrillo-Larco RM, Bennett JE, et al. Worldwide trends in diabetes prevalence and treatment from 1990 to 2022: a pooled analysis of 1108 population-representative studies with 141 million participants. Lancet. 2024;404(10467):2077–93. https://doi.org/10.1016/S0140-6736(24)02317-1

2. Ong KL, Stafford LK, McLaughlin SA, Boyko EJ, Vollset SE, Smith AE, et al. Global, regional, and national burden of diabetes from 1990 to 2021, with projections of prevalence to 2050: a systematic analysis for the Global Burden of Disease Study 2021. Lancet. 2023;402(10397):203–34. https://doi.org/10.1016/S0140-6736(23)01301-6

3. Boyle JP, Thompson TJ, Gregg EW, Barker LE, Williamson DF. Projection of the year 2050 burden of diabetes in the US adult population: dynamic modeling of incidence, mortality, and prediabetes prevalence. Popul Health Metr. 2010;8:29. https://doi.org/10.1186/1478-7954-8-29

4. Lascar N, Brown J, Pattison H, Barnett AH, Bailey CJ, Bellary S. Type 2 diabetes in adolescents and young adults. Lancet Diabetes Endocrinol. 2018;6(1):69–80. https://doi.org/10.1016/S2213-8587(17)30186-9

5. Abel ED, Gloyn AL, Evans-Molina C, Joseph JJ, Misra S, Pajvani UB, et al. Diabetes mellitus—Progress and opportunities in the evolving epidemic. Cell. 2024;187(15):3789–820. https://doi.org/10.1016/j.cell.2024.06.029

6. Strati M, Moustaki M, Psaltopoulou T, Vryonidou A, Paschou SA. Early onset type 2 diabetes mellitus: an update. Endocrine. 2024;85(3):965–78. https://doi.org/10.1007/s12020-024-03772-w

7. Galicia-Garcia U, Benito-Vicente A, Jebari S, Larrea-Sebal A, Siddiqi H, Uribe KB, et al. Pathophysiology of type 2 diabetes mellitus. Int J Mol Sci. 2020;21(17):6275. https://doi.org/10.3390/ijms21176275

8. Bellary S, Kyrou I, Brown JE, Bailey CJ. Type 2 diabetes mellitus in older adults: clinical considerations and management. Nat Rev Endocrinol. 2021;17(9):534–48. https://doi.org/10.1038/s41574-021-00512-2

9. Saalbach A, Anderegg U. Thy-1: more than a marker for mesenchymal stromal cells. FASEB J. 2019;33(6):6689–96. https://doi.org/10.1096/fj.201802224R

10. Kozlov AI. [Carbohydrate-related nutritional and genetic risks of obesity for indigenous northerners]. Vopr Pitan. 2019;88(1):5–16. Russian. https://doi.org/10.24411/0042-8833-2019-10001

11. Gowd V, Xie L, Zheng X, Chen W. Dietary fibers as emerging nutritional factors against diabetes: focus on the involvement of gut microbiota. Crit Rev Biotechnol. 2019;39(4):524–40. https://doi.org/10.1080/07388551.2019.1576025

12. Holly JMP, Biernacka K, Perks CM. Systemic metabolism, its regulators, and cancer: past mistakes and future potential. Front Endocrinol (Lausanne). 2019;10:65. https://doi.org/10.3389/fendo.2019.00065.
13. Akinkuotu AC, Hamilton JK, Birken C, Toulany A, Strom M, Noseworthy R, et al. Evolution and outcomes of a Canadian pediatric bariatric surgery program. J Pediatr Surg. 2019;54(5):1049–53. https://doi.org/10.1016/j.jpedsurg.2018.06.019
14. Chen GC, Arthur R, Iyengar NM, Kamensky V, Xue X, Wassertheil-Smoller S, et al. Association between regional body fat and cardiovascular disease risk among postmenopausal women with normal body mass index. Eur Heart J. 2019;40(34):2849–55. https://doi.org/10.1093/eurheartj/ehz343
15. Sparrow D, Borkan GA, Gerzof SG, Wisniewski C, Silbert CK. Relationship of fat distribution to glucose tolerance: results of computed tomography in male participants of the Normative Aging Study. Diabetes. 1986;35(4):411–5. https://doi.org/10.2337/diab.35.4.411
16. Tino S, Mayanja BN, Mubiru MC, Eling E, Ddumba E, Kaleebu P, et al. Prevalence and factors associated with overweight and obesity among patients with type 2 diabetes mellitus in Uganda—a descriptive retrospective study. BMJ Open. 2020;10(11):e039258. https://doi.org/10.1136/bmjopen-2020-039258
17. Ahmed N, Ahmad T, Hussain SJ, Javed M. Frequency of metabolic syndrome in patients with type-2 diabetes. J Ayub Med Coll Abbottabad. 2010;22(1):139–42.
18. Alawainati MA, Ayoob ZA, AlQari AA, Makhlooq F, Naser HS, Bukamal F. Prevalence and characteristics of obesity in patients with type-2 diabetes mellitus in primary care centers in Bahrain: a cross-sectional study. J Fam Community Med. 2023;30(2):109–15. https://doi.org/10.4103/jfcm.jfcm_9_23
19. Khan S, Ubaid M, Wazir Z, Khan S, Khan IA. Frequency of obesity in patients with type 2 diabetes mellitus. J Med Sci. 2024;32(2):126–30. https://doi.org/10.52764/jms.24.32.2.2
20. Zeb F, Pervez S, Kaleemullah M, Wahab A, Khan B, Salih N. Frequency of obesity in type II diabetes mellitus patients. Med Forum. 2023;34(4):70–72. medicalforummonthly.com
21. Mugharbel KM, Al-Mansouri MA. Prevalence of obesity among type 2 diabetic patients in Al-Khobar primary health care centers. J Fam Community Med. 2003;10(2):49–53.