

The Relationship between Body Mass Index and the Pervasiveness of Ischemic Heart Disease in Patients with Type 2 Diabetes

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ABSTRACT

Background: The conversion from transmissible to non-communicable diseases has taken place for numerous years in all states of the biosphere, including emerging republics. Ischemic heart disease and diabetes mellitus complications belong to the diseases of the second most important group. In current ages, there has been a renewed debate about the importance of weight gain and obesity as risk factors for both diseases.

The Aim of the Study: is to govern the association amid the body mass index and the occurrence of ischemic heart disease in patients with type 2 diabetes.

Methods: This cross-sectional study was conducted in the medicine department of Jinnah medical college Peshawar for the duration of 06 months from November 2020 to April 2021. The study was directed among 300 patients with type II diabetes mellitus. Data was collected from medical records and then analyzed using the SPSS with Chi-square method.

Results: Out of 300 patients with type-II diabetes mellitus, 120 were men and 180 were women. According to the findings of the present study, among patients with type-II diabetes mellitus, 41 (13.7%) had ischemic heart disease, of which 29 were female and 12 were male. The ischemic heart disease prevalence in youth is in 11(26.8%) middle-aged and elderly is 53.7% (22 out of 41 patients) and 19.4% (8 cases out of 41 patients) respectively.

Conclusions: Conferring to our conclusions, although the incidence of type-II diabetes in obese and overweight patients is advanced than in those with normal or low body weight, the incidence of ischemic heart complications in subjects with type 2 diabetes does not follow this trend. Varying body mass index and the incidence of coronary heart disease are higher in women than in men in the normal weight group.

Keywords: Obesity, Body mass index, ischemic heart disease and type 2 diabetes

INTRODUCTION

According to the International Diabetes Federation (IDF), there are 41.5 billion peoples with diabetes in 2016, and this is predictable to upsurge to 650 million by 2045, increasing the risk of heart disease¹⁻². Type 2 diabetes will not reduce its significant, economic cost, even in countries that meet international targets³⁻⁴. It's not just the problem of high-income regions, it has affected the poorest parts of the world as well. Cardiovascular risk was increased in type-II diabetics in comparison to non-diabetics, as in the Framingham study⁵. Diabetics are 4 folds more probable to progress cardiovascular disease than without diabetes. The most common cause is multiple morbidity in them⁶. In addition, these patients develop cardiovascular complications at a younger age and have a worse prognosis. And it is known to be modifiable for coronary heart disease. The American College of Cardiology has listed obesity as a major risk factor for CAD. A 40 cohort studies systematic review found that obese patients did not have an augmented jeopardy of overall death or death from cardiac disease⁷. These conclusions may be interpreted by the lack of discriminative influence of BMI to distinguish between lean body mass and body fat. (Gary et al., 2015) found that men are at a higher risk of complications than women. Another study from the UK found that even weight loss in men was associated with a lower risk of diabetes and therefore significant cardiac benefit in younger men⁸⁻⁹. There is currently a paradox about the role of obesity in the incidence of cardiovascular disease in diabetics, and future studies may examine this issue in more detail. Especially according to our work in this field in recent years¹⁰. The latter is limited and, in addition to increased BMI and obesity, is traditionally mentioned as a risk factor for cardiac disease and there is no indication for the existence of recently reported paradoxes, so this study examines this issue.¹¹ The aim of the study is to govern the association amid the body mass index and the occurrence of ischemic heart disease in patients with type 2 diabetes.

MATERIAL AND METHODS

This cross-sectional study was conducted in the medicine department of Jinnah medical college Peshawar for the duration of 06 months from November 2020 to April 2021. The sample included all patients with type-II diabetes mellitus registered in the family physician plan. The data of 300 patients with type-II diabetes mellitus were collected from the medicine department. The data collection tool is performed using a review of physical as well as electronic health files available in "hospital System" as well as diabetic patient care files under the title of "Diabetes Management". The individuals are subjected to anthropometric examinations, screening, diabetes care, and its complications, including ischemic heart disease, based on age, sex, and care, according to middle-aged and elderly care programs. Body mass index was considered by dividing weight into kilograms per square meter of patient height by meters and based on the criteria of the National Heart, Lung, and Blood Association (NHLBI, Lung, Heart National Institute Blood and into 6 subgroups, normal weight, and Grade 1, 2 and 3 obesities were divided. Diabetes was confirmed conferring to the criteria of the American Diabetes Association, and ischemic heart disease is diagnosed by a family physician and referred to a cardiologist according to national guidelines and approval by a specialist and sending feedback. In cases of no feedback, subjects were evaluated by observing the total case summary and evidence of myocardial ischemia including ECG, test stress and cardiac interventions such as PCI percutaneous (coronary CABG and coronary intervention) by artery bypass graft surgery. Random telephone interviews were conducted with patients and their families to ensure the validity and reliability of the information. After data collection, the data were analyzed using SPSS version 23 as quantitative analysis. Chi-square and significant level were performed with 0.005 precision.

RESULTS

Out of 300 patients with type-II diabetes mellitus, 120 were men and 180 were women. Table 1 shows the proportion of patients

with type-II diabetes mellitus in various age groups. According to the findings of the present study, among patients with type-II diabetes mellitus, 41 (13.7%) had ischemic heart disease, of which 29 were female and 12 were male.

Table 1: Age comparison of type 2 diabetic patients

Range	Youth	Middle aged	Elderly	P value
Type-II diabetic patients	42	147	111	P 0.003

Table 2: Number and percentage of ischemic heart disease prevalence in type 2 diabetic patients according to body mass index

BMI	Under normal weight	normal weight	Overweight	Grade 1 obesity	Grade 2 obesity	Grade 3 obesity	Total
IHD patients	3(7.3%)	5(12.2%)	7(17.1%)	10(24.4%)	12(29.3%)	4(9.8%)	41

Table 3: Prevalence of ischemic heart disease among men and women with type 2 diabetes at different BMIs

BMI	Under normal weight	normal weight	Overweight	Grade 1 obesity	Grade 2 obesity	Grade 3 obesity	Total
Type-II diabetic females	38(21.1%)	24(13.3%)	54(30%)	29(16.1%)	18(10%)	17(9.4%)	180(100%)
IHD in type-II diabetic women	4(13.8%)	2(6.9%)	6(20.7%)	8(27.6%)	5(17.2%)	4(13.8%)	29(100%)
Type-II diabetic males	8(10%)	14(17.5%)	21(26.3%)	19(23.8%)	7(8.8%)	11(13.8%)	80(100%)
IHD in type-II diabetic males	1(8.3%)	1(8.3%)	3(25%)	2(16.7%)	2(16.7%)	3(25%)	12(100%)

Table-3 shows the findings of the present study on the number and percentage of patients with type-II diabetes mellitus with ischemic heart disease in men and women in terms of six groups of body mass index in general and in groups.

DISCUSSION

In this study, the prevalence of type 2 diabetic patients with overweight and obese was 25% and 33.7%, respectively, which is higher than their prevalence in the study of bankers and their colleagues in Mashhad, it was 21 and 25.7%¹⁰⁻¹¹. In the study of Safaei et al., This rate was 42.5 and 27.2%, respectively, which is close to the present study in terms of overweight, but is lower in terms of the prevalence of obesity and obesity in the study of al-Rahwi et al. In 2015 in Oman was 38.9 in both cases¹²⁻¹³. Based on the findings of the present study, the ischemic heart disease prevalence in patients with type 2 diabetes is 13.7%. In the rhoedic study, IHD was 9.4% (18).

In this study, the prevalence was 9.6% among women, which is more common than men, in which it is 4%. In addition, the prevalence of ischemic heart disease between the two sexes in middle age and old age is also different and in type 2 diabetic women, the prevalence of ischemic heart disease in middle age and old age is almost the same. In the present study, although ischemic heart disease is the most common in patients with overweight, but its prevalence in normal weight people is not only low but slightly lower than the prevalence in patients with grade 1 obesity and in patients with grade 2 and obesity. The findings of the present study are more in line with the findings of recent studies, which are mainly conducted in developed countries¹⁴⁻¹⁵. An example in Asia is a study conducted in 2013 by Nagawa et al. In Japan and found that the cardiovascular disease prevalence in non-obese subjects (BMI under 25 in their study) with visceral fat, similar to obese patients (BMI) In a public study of diabetic patients, according to Arhawi, the univariate inverse association of obesity with cardiovascular disease in patients is an interesting finding in contrast to another relevant studies¹⁶⁻¹⁷. And co-workers reported that diabetic patients with a BMI above 26 were in better physical condition than those with normal weight and consequently had lower mortality rates¹⁸⁻¹⁹.

As shown in Table 3, the overall distribution of ischemic heart disease in middle age in different BMI groups is almost plateau and in normal-weight individuals is overweight and obese. While in the elderly, its prevalence is significantly higher in overweight people and in grade 1 obesity (p = 0.003). Also, the ischemic heart disease distribution in males and females with type 2 diabetes is dissimilar in groups with dissimilar BMI. It is noteworthy that the prevalence of ischemic heart disease in women with a normal body mass index was 6.9% and 8 out of 29 ischemic heart disease equals grade 1 obesity and more than 5 women with grade 2 obesity and more, respectively.

The ischemic heart disease prevalence in youth is in 11(26.8%) middle-aged and elderly is 53.7% (22 out of 41 patients) and 19.4% (8 cases out of 41 patients) respectively. Table 2 shows the number and percentage of patients with type-II diabetes mellitus with ischemic heart disease in different BMI groups (p = 0.004).

However, in both men and women, the ischemic heart disease prevalence in overweight patients was higher than in normal weight patients. The prevalence of ischemic heart disease, according to the findings of the present study in men at higher levels of BMI than women, is similar to that in 2015. It is the United States, with the difference that in diabetic men under the present study, the prevalence of ischemic heart disease is not low in normal underweight people²⁰⁻²¹.

CONCLUSION

The type 2 diabetes prevalence in obese or overweight people is advanced than in normal weight or underweight people, but the ischemic heart disease prevalence is not consistent with this trend and its prevalence in normal weight people is higher. Not only is it not low but it is slightly less than its prevalence in patients with grade 1 obesity and is much higher than patients with grade 2 and 3 obesity. This conclusion is in stripe with the results of recent studies, mostly conducted in developed countries, and reflects the recent fact that obesity plays a role, at least as an independent factor, in the development of IHD in patients with type 2 diabetes, especially in women. We suggest further studies, especially in the primary care unit. To ensure continuous monitoring of type 2 diabetes mellitus and ischemic heart disease with high mortality, morbidity and barrage in the health of the global community, the higher the angles, the better the leading angles of the method.

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