Section: Medicine

Original Research Article

CARDIOVASCULAR PROFILE OF PREDIABETIC FEMALE PATIENTS IN TERTIARY CARE HOSPITAL:A CROSS SECTIONAL STUDY

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ABSTRACT

Background: Prediabetes refers to a condition where glucose metabolism is disrupted. Growing evidence indicates that the hyperglycemia seen in prediabetes can cause both microvascular and macrovascular complications, even before the onset of full-blown diabetes mellitus. The aim and objective is to study of cardiovascular profile of prediabetic patients in tertiary care hospital.
Materials and Methods: A cross sectional study was conducted for a period of 6 months among all diagnosed prediabetic females attending tertiary care hospital. Prevalidated, pretested, semi structured questionnaires was used as data collection tool.
Results: Most patients were overweight (54.5%) or obese (27.3%); 13.6% had normal BMI and 4.5% were underweight. Common symptoms included headaches (34.3%), fatigue (32.3%), and palpitations (28.3%). Increased thirst and tingling/numbness each occurred in 23.2% of patients, while increased urination and dyspnea were seen in 19.2%. Increased appetite was reported in 16 cases, though the stated percentage (69.6%) seems inconsistent.
Conclusion: The study highlights a high prevalence of overweight/obesity, hypertension, and dyslipidemia among prediabetic patients, which are key risk factors for cardiovascular and metabolic diseases.
Keywords: Prediabetes, cardiovascular profile, Dyslipidemia, overweight/obesity.

INTRODUCTION

Prediabetes is a state characterized by impaired fasting glucose or impaired glucose tolerance. The prelude to diabetes is prediabetes, which can be described as a continuum from normoglycemia to worsening dysglycemia. Prediabetes is defined specifically as impaired glucose tolerance and/or impaired fasting glucose. The underlying pathophysiologic disturbances (insulin resistance and impaired β-cell function) responsible for the development of type 2 diabetes are maximally/near maximally expressed in subjects with IGT/IFG. These individuals with so-called prediabetes manifest all of the same CV risk factors (dysglycemia, dyslipidemia, hypertension, obesity, physical inactivity, insulin resistance, procoagulant state, endothelial dysfunction, inflammation) that place patients with type 2 diabetes at high risk for macrovascular complications.[1]

In addition many studies across the globe have pointed out that the risk of many co-morbidities are the same in diabetes and prediabetes and affect all age groups.[2] The known pathophysiological defects that underlie T2DM are being increasingly recognized in prediabetic state which includes insulin resistance, alpha and beta cell dysfunction, increased lipolysis, inflammation and suboptimal incretin effect.[3-6]

The natural progression of dysglycemia involves increasing insulin resistance and loss of pancreatic beta cell function.[7] Significant defects in insulin action and secretion are consistently demonstrable in the prediabic state of IGT.[8]

Recent studies have revealed that the long-term complications of diabetes manifest in some people with prediabetes;these complication include micro vascular and macrovascular disorders.[9] Assessment

of cardiovascular profile will be very much beneficial in prediabetic, in view of early diagnosis of cardiovascular complications.

Aims and Objectives

Aim: To study of cardiovascular profile of prediabetic patients in tertiary care hospital.

Objectives:

- To assess cardiovascular complications in prediabetic patients.
- To assess dyslipidemia in prediabetic patients.
- To assess obesity in prediabetic patients.

MATERIALS AND METHODS

Study Design-Cross Sectional Study was adopted for study purpose.

Study Setting-This study was conducted in OPD and IPD of General Medicine department of a tertiary care Hospital.

Study Population– All diagnosed prediabetic female patients attending tertiary care hospital

Sample Size- A period based study was conducted where all the cases fitting in my inclusion criteria were enrolled for study period of 6 months. So, we have enrolled a total of 44 females in our study.

Sample Techinque- Convenience Sampling was used.

Duration of Study: This study was conducted for a period of 6 months.

Inclusion Criteria

- Females with Age >18 Years.
- Prediabetic patient as per criteria.
    1. Impaired fasting glucose (IFG) of 100-125 mg/dl
    2. Impaired glucose tolerance (IGT) 140-200 mg/dl
    3. A Glycated hemoglobin(A1C) of 5.7% to 6.4%
- Willingness to participate in the study

Exclusion Criteria

- Type 1 and Type 2 diabetes
- Malignancy
- Pregnancy
- HIV patient

Data Collection Tool

Prevalidated, pretested, semi structured questionnaires was used as data collection tool Prediabetic patients as per predefined criteria was considered for study. They had undergone thorough clinical history and examination. Examination includes following investigations BMI,FBS,Blood pressure, HBA1C, LIPID PROFILE, 2DECHO, TMT, coronary angiography whenever required.

RESULTS

Table 1: Age wise distribution of patients

Age group(years)	No. of patients	%age
18-30	02	4.5
31-40	05	11.4
41-50	19	43.2
51-60	15	34.1
>60	03	6.8
Total	44	100.0

The table presents the age-wise distribution of 44 patients included in the study. The highest number of patients (19 individuals, 43.2%) were in the 41–50 years age group, followed by 15 patients (34.1%) in the 51–60 years group. A smaller proportion of patients belonged to the 31–40 years group (5 patients, 11.4%) and the >60 years group (3 patients, 6.8%). The lowest representation was observed in the 18–30 years age group, comprising only 2 patients (4.5%).

Table 2: Distribution of patients according to symptoms

Symptoms	No. of patients	%age
Dyspnea	19	19.19
Palpitations	28	28.28
Increased micturition	19	19.19
Increased thirst	23	23.23
Increase in appetite	16	69.56
Headache	34	34.34
Swelling of extremities	07	7.7
Fatigue	32	32.32
Leg Pain	07	7.7
Tingling/Numbness in hands & feet	23	23.23

Multiple symptoms noted

Headaches were reported by 34 patients (34.34%), fatigue was seen in 32(32.32%), while palpitations were noted by 28 (28.28%). Symptoms like increased thirst and tingling or numbness in the hands and feet each affected 23 patients, corresponding to 23.23%, and increased micturition and dyspnea were each reported by 19 patients, or 19.19%. Increased appetite was listed for 16 patients, but its associated percentage (69.56%) appears inconsistent with that figure. Less prevalent symptoms included swelling of

extremities and leg pain, each reported in 7 cases, representing around 7.7% each.

Table 3: distribution of patients according to BMI

BMI	No. of patients	%age
Under weight (<18.5)	02	4.5
Normal Weight (18.5-24.99)	06	13.6
Overweight (25-30)	24	54.5
Obese(>30)	12	27.3
Total	44	100.0

The majority of patients (54.5%) were classified as overweight (BMI 25–30), followed by 27.3% who were obese (BMI >30). A smaller proportion of patients had a normal BMI range (18.5–24.99), accounting for 13.6% of the total, while only 4.5% of the patients were underweight (BMI <18.5).

Table 4: distribution of patients according to blood pressure

Blood Pressure Status	No. of patients	Percentage
Normal	06	13.6
Prehypertensive	12	27.3
Stage 1 Hypertension	21	47.7
Stage 2 Hypertension	05	11.4
Total	44	100.0

A majority of the patients (47.7%) were found to have Stage 1 hypertension, while 27.3% were classified as prehypertensive, indicating a risk of progression to overt hypertension if not managed appropriately. Stage 2 hypertension, representing a more severe elevation in blood pressure, was observed in 11.4% of patients. Only 13.6% of the study population had normal blood pressure levels.

Table 4: distribution of patients according to lipid profile

Parameters	Mean value	Percentage
Total cholesterol (mg/dL)	210.6	10.4
Triglyceride (mg/dL)	155	15.0
VLDL (mg/dL)	31.3	2.84
LDL (mg/dL)	154.4	30.1
HDL (mg/dL)	34.33	12.4
LDL/HDL ratio	5.4	
Cholesterol/HDL ratio	7.10	
Triglyceride/HDL ratio	5.30	

The mean total cholesterol level was 210.6 mg/dL, with a corresponding proportion of 10.4% of patients showing elevated levels. Similarly, 15.0% had raised triglycerides with a mean value of 155 mg/dL, while 30.1% had elevated LDL cholesterol (mean: 154.4mg/dL).

The mean HDL cholesterol level was 34.33mg/dL, and only 12.4% of patients had reduced HDL, which is considered a cardiovascular risk factor. The calculated ratios — LDL/HDL (5.4), Cholesterol/HDL (7.10), and Triglyceride/HDL (5.30) — provide additional insight into the atherogenic risk of the population.

DISCUSSION

In the present study, the highest prevalence of patients was observed in the 40–50 years and 50–60 years age groups, with a combined 77.3% of total cases. This finding is consistent with Singh et al. (2020) 9, who reported that most individuals with metabolic and cardiovascular risk factors tend to be middle-aged, with a sharp rise in incidence after the fourth decade of life. Similar age trends were noted in study by Patel et al. (2021).[10] In our study, fatigue (84.1%), increased micturition (52.3%), and increased thirst (47.7%) were the most prevalent symptoms. These symptoms are commonly associated with metabolic disturbances such as diabetes mellitus and chronic kidney disease. A study by Smith et al,[11] (2019) found that increased thirst and fatigue were among the most frequently reported symptoms in patients with undiagnosed metabolic disorders, including prediabetes and early-stage diabetes.

The findings from this study show that 54.5% of patients were overweight, and 27.3% were obese. These results align with a large body of literature that has documented the increasing prevalence of overweight and obesity in patients with cardiovascular and metabolic diseases.

Hypertension was a major concern in our study, with 47.7% of patients classified as Stage 1 Hypertension and 27.3% in the prehypertensive range. Similar trends have been reported by Brocklebank et al. (2001),[12] who found that 45.6% of their study participants had Stage 1 hypertension, while 31.4% were prehypertensive. This suggests a high prevalence of early-stage hypertension and prehypertension in populations at risk for

cardiovascular diseases, reflecting the global rise in hypertension prevalence, particularly in middle-aged and older adults. Mannan (2019),[13] also reported a high prevalence of hypertension (42%) among obese individuals, reinforcing the strong link between elevated BMI and blood pressure abnormalities.

The mean total cholesterol level was 210.6 mg/dL, with a corresponding proportion of 10.4% of patients showing elevated levels. Similarly, 15.0% had raised triglycerides with a mean value of 155 mg/dL, while 30.1% had elevated LDL cholesterol (mean: 154.4mg/dL). The mean HDL cholesterol level was 34.33mg/dL, and only 12.4% of patients had reduced HDL, which is considered a cardiovascular risk factor.

These results are consistent with findings from Schreiber et al. (2020), who observed similarly high levels of total cholesterol (25%) and LDL (30%) among patients with metabolic syndrome. However, Meena et al,[14] (2023) reported that 40% of their patients had elevated triglycerides, slightly higher than our cohort, indicating regional or cohort-based variations in lipid abnormalities. Furthermore, Çakmaklı et al,[15] (2023) found that 29% of their study population had reduced HDL levels, which correlates with our finding of 8.3% of patients having low HDL levels, highlighting the role of dyslipidemia in cardiovascular risk.

CONCLUSION

The findings from this study are in line with those from previous research, reinforcing the significant burden of hypertension, obesity, and dyslipidemia among prediabetics. The comparison with existing studies underscores the importance of early intervention strategies, including lifestyle modifications, pharmacological treatments, and regular screening, to manage these risk factors and reduce the incidence of cardiovascular diseases among prediabetics.

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