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TO DETERMINE THE PRE-DIABETES AND DIABETES PREVALENCE AMONG HYPERTENSIVE PATIENTS

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Abstract:

Objective: Hypertension and diabetes may co-occur in patients. While the hypertension prevalence is 1.6-2.1 times higher in patients with diabetes than without diabetes, nearly 1/3rd of individuals with hypertension advance to diabetes. In this study, prediabetes and diabetes prevalence were examined in hypertensive patients and associated risk factors.

Study Design: A cross sectional study.

Place and Duration: In the Medicine Unit II of Services Hospital, Lahore for six months duration from January 2019 to June 2019.

Methods: After the approval of the institutional ethics committee, cases of hypertension, disease duration, drug treatment, family history, symptoms of comorbidities and fasting and postprandial blood glucose, oral glucose tolerance, lipid profile, serum creatinine, uric acid and SGPT were evaluated. It was investigated to determine.

Results: Of 100 hypertensive patients, 52 were female and 48 were male. 43% were prediabetic and 16% were diabetic.

Conclusion: Prediabetes and diabetes are common among people with known hypertension.

Keywords: prediabetes, glucose intolerance, hypertension, impaired fasting glucose, diabetes.

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INTRODUCTION:

Diabetes mellitus and hypertension, two of the world's leading death risks, are rapidly increasing in developing countries[1]. In Pakistan, 62.3 to 77.1 million individuals have prediabetes (PD) and diabetes mellitus (DM), according to 2012 assessments testified by the Pakistani medical research-diabetes working council in Pakistan[2-3]. By 2030, the burden of diabetes in Pakistan is estimated to be around 87 million people. In addition, there is a growing hypertension prevalence in Pakistan, mainly in city areas[4]. High blood pressure has been associated with peripheral vascular diseases, ischemic heart disease, myocardial infarction, renal failure and stroke. The diabetes and hypertension are significant risk factors for cardiovascular disease[5]. Successful understanding and management of diabetes and hypertension may be key to decrease mortality rate in Pakistan due to cardiovascular diseases, given the growing rates of coronary artery disease in Pakistan, mainly at an early age.

Hypertension and diabetes may co-occur in patients. While the hypertension prevalence is 1.6-2.1 times higher in patients with diabetes than without diabetes, nearly 1/3rd of individuals with hypertension advance to diabetes. This increases the risk of coexistence and may hasten vascular complications[6-7]. Hypertension and diabetes are controllable health issues and can be managed by, exercise, diet and medical intervention[8]. In addition, periodic surveillance of pre-diabetes and prehypertension parents may allow delay disease progression and early intervention. Although studies have been conducted to determine the diabetes prevalence among hypertensive patients in recent years[9]. In this study, we present the findings on the prevalence of pre-diabetes and diabetes in hypertensive patients and associated risk factors. The aims of this analysis were as follows.

To govern the prevalence and early diagnosis of prediabetes and diabetic status in hypertensive patients;
To determine the relationship between the duration of hypertension leading to prediabetes and diabetic status;
To know the relation of impaired plasma glucose levels with serum uric acid, lipid profile, SGPT and co-morbidities.

MATERIALS AND METHODS:

This is a cross-sectional study of patients participating in OPD of Medicine Unit II Services Hospital, Lahore for six months duration from January 2019 to June 2019. The consent from the institutional authorities and institutional ethics committee (IEC) was taken for the study, known hypertensive patients who met the criteria of inclusion and those who gave written informed consent (n = 100) were selected for this study.).

Inclusion criteria:

Patients older than 40 years have been diagnosed and treated for hypertension cases and has developed diabetes and pre diabetes.

Exclusion criteria:

Patients under 40 years of age, known cases of DM and secondary hypertension, pregnant women, and patients with thiazide diuretics or beta blockers.
Demographic data, history of hypertension, drug treatment, family history and comorbidity were recorded. Patients were examined for fasting and postprandial plasma glucose, lipid profile, serum uric acid, serum glutamate pyruvate transaminase (SGPT) and serum creatinine levels. In addition, patients underwent oral glucose tolerance test (OGTT).

Patients who had not previously reported diabetes with an OGTT level of more than 200 mg / dl (2 h) were considered as new cases of diabetes mellitus (DM).

Statistical analysis:

Categorical data were presented as percentage and continuous data as standard and mean deviations. The significance of the variations in parameters was calculated using the Chi Square test at 95% confidence interval (p <0.05). SPSS version 18.0 was used for data analysis

RESULTS:

Of every 100 hypertensive patients, 52 were female and 48 were male. These patients were pre-diabetic in 43% and diabetic in 16%. 58% of pre-diabetic patients were female and 42% were male. In diabetic patients, 44% were female and 56% were male. The demographic details of the demography and the examinations of the patients are given in Table 1.

Table 1: Hypertensives – demographic profile and blood parameters.

		Duration of hypertension (years)		
		<1 year	1-5 year	>5 year
Age	21-40	11	2	1
	41-60	22	27	17
	>60	4	7	9
Gender	Female	20	18	14
	Male	17	18	13
Family history of hypertension	No	34	33	26
	Yes	3	3	1
Serum Triglycerides	Normal	18	23	16
	Increased	19	13	11
Serum cholesterol	Normal	25	24	21
	Increased	12	12	6
Serum LDL	Normal	30	25	19
	Increased	7	11	8
Serum creatinine	Normal	34	33	25
	Increased	3	3	2
Serum uric acid	Normal	32	27	19
	Increased	5	9	8

The details of diabetics and pre-diabetics are given in Table 2 and Table 3.

Table 2: Serum parameters normal and raised fasting plasma glucose.

		Fasting plasma glucose (mg/dl)		
		<100	<125	>125
Family history of diabetes mellitus	No	50	29	15
	Yes	2	4	0
Serum creatinine	Normal	49	29	14
	Increased	3	4	1
Serum LDL	Normal	39	25	10
	Increased	13	8	5
Serum cholesterol	Normal	36	22	12
	Increased	16	11	3
Serum triglycerides	Normal	33	16	8
	Increased	19	17	7
Serum uric acid	Normal	39	25	14
	Increased	13	8	1

Table 3: Serum parameters -normal and raised plasma glucose after 2 hour OGTT.

		2 hours OGTT plasma glucose (mg/dl)		
		<140	<200	>200
Serum LDL	Normal	39	26	9
	Increased	13	8	5
Serum creatinine	Normal	48	33	11
	Increased	4	1	3
Serum cholesterol	Normal	37	22	11
	Increased	15	12	3
Serum triglycerides	Normal	29	20	8
	Increased	23	14	6
Serum uric acid	Normal	36	29	13
	Increased	16	5	1

DISCUSSION:

The prevalence of pre-diabetes was 25% in patients with high BP. This is described by Giovindarajan et al. The range reported by is 25-47%. Shrestha et al. Reported 43% prevalence among hypertensive patients in urban areas of Nepal. Mills and Grant reported that 25% of the population had a relative insulin resistance prior to type 2 DM and a prevalence of 3.5% in primary care patients with disease in Canada and 40% of women with polycystic ovary syndrome[10]. However, 25% of US adults were pre-diabetic, only 4% knew it. Consciousness was not evaluated in this study. However, not knowing the presence of prediabetes in an individual makes it necessary to determine the situation in the general population. Impaired fasting glucose (IFG) 15% was more common among patients than impaired glucose tolerance (5%). This is contrary to the report of Shobha et al., Which recorded a prevalence of 9.7% for IFG and 15.6% for IGT in American adults aged 40 to 74 years[11]. Among overweight subjects aged 45 to 74 years, the combined IFG and IGT prevalence in Penghu islets of Taiwan was found to be 14.7% and 30.7% in men and women aged 40 years. -49 years and 50-59 years respectively[12].

IGT was reported to be more sensitive than IFG in detecting early release. It reflects hepatic gluconeogenesis and slower absorption of glucose from blood into skeletal muscles and adipose tissue after a meal. It is also independently associated with conventional microvascular complications of

diabetes. However, IGT patients will not always progress to diabetes because it is a dynamic and reversible condition[13]. Some will return to normo-glycemia, but a higher percentage may persist. Both IFG and IGT were impaired in six patients (6%). Thus, 11 patients had IGT in this study (only 5 IGT and 6 IGT plus IFG) and were at greater risk of progressing to type 2 DM and developing cardiovascular disorders. Many patients (14%) had unreported DM. This highlights the need for regular screening of hypertensive patients for DM. The mean HOMA-IR (evaluation of homeostasis model for insulin resistance) of patients, (5.1 + 4.5), PD (4.3-5.2) is strictly between the reported values for DM, 8.3-9.5, depending on the presence of unreported DM subjects. HOMA-IR of control subjects was outside the reported values for white Americans[14]. The prevalence of PD among patients did not exceed the reported value range, but the percentage of undeclared DM was high. Reasons can be ignorance and lack of affordable health care. The lack of correlation between anthropometric and laboratory parameters indicates that it is not possible to estimate PD based on the knowledge of previous parameters. The patients did not show a significant difference in body mass index (BMI) from the control, but did not differ in high waist circumference and waist / hip ratios. Differences in the following parameters are reflected in significantly high fasting and postprandial plasma glucose within 2 hours of patients[15]. This indicates that BMI is not a good obesity index in this patient group. Normal fasting insulin levels in hypertensive patients indicate that most patients are able to secrete sufficient insulin to maintain a normo-glycemic state in the absence of insulin resistance, as indicated by the normal insulin resistance index. The study emphasized the importance of detecting PD in hypertensive patients in the study area.

CONCLUSION:

Prediabetes and diabetes are quite common among people with known hypertension. The risk of diabetes and prediabetes is increased in long-term hypertension. The study emphasized the importance of detecting prediabetes and diabetes, especially among hypertensive patients in the study area, so that early initiation of treatment measures and prevention of additional complications were possible.

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