Title: Prevalence of Undiagnosed Hypertension in Type 2 Diabetes Mellitus patients of the Rural Communities in Pakistan – A Retrospective Cohort Analysis

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Background

Hypertension and Diabetes are taken as parallels; it is the microscopic vascular complications that bridge the two. (1) Collective mechanisms, such as upregulation inflammation, activation of the immune system, oxidative stress, and renin-angiotensin-aldosterone system is most likely responsible for the domino effect of symptoms between the two. (2) Characterized by the rapid development of non-enzymatic advanced glycosylation products causes vascular rigidity and resultantly hypertension. (2) The influence of hypertension is masked in people with diabetes, portraying either an amplified reciprocity to insulin resistance or a complex etiological inevitability. (2) (3)

Aims

The aim of the study is to identify the patients of diabetes suffering from hypertension. Secondarily the study aims to follow the progress of the patients on hypertensive medication on management of the disease.

Methods

Informed consent was obtained from all participants. Adults aged 35-65 years at the primary care centers in Gharo, Thatta were randomly selected for health screening. They were examined for diabetes mellitus (via HbA1C) and hypertension (periodic monitoring for three days using a sphygmomanometer) from February 2021 to August 2022. Hypertension was diagnosed either if diastolic blood pressure was consistently grater than 90 mm Hg OR systolic blood pressure was greater than 140 mm Hg OR both systolic and diastolic were greater than 140 and 90 mm Hg respectively.(4) Patient's suffering from other comorbidities and loss of follow up were excluded from the study.

Results

During the 19 months period, a total of 597 individuals (39.7% males, 60.3% females) were screened for diabetes. About 41.2% showed undiagnosed prediabetes and 24.1% had undiagnosed diabetes. Of the 94 individuals enrolled for hypertension screening, 51.1% had undiagnosed hypertension(*Table1*). The prevalence of hypertension was much higher in females compared to males (77.1% vs. 22.9%)(*Table2*). Age distribution showed a greater prevalence in the 41 to 50 years (40%)(*Figure 1*). (Paired sample T-test was conducted that reported a p-value of <0.05 signifying an association between undiagnosed diabetes and hypertension. At each follow up, with the aid of antihypertensives, about 13% fall in hypertension was observed (*Figure2*).

Table 1 Progress of Hypertensive Diabetics per four month follow up for 19 months.

	1st visit	2nd visit	3rd visit	4th visit	5th visit
ONLY Sys >= 140	1	4	3	0	0
ONLY dias >=90	25	15	9	4	2
Both Sys>=140 & dias >=90	22	16	12	7	6
Total hypertensives based on criteria	48	35	24	11	8
%hypertensives	51.1	37.2	25.5	11.7	8.5

Table 2 Gender distribution of Hypertensive Diabetics per four month follow up for 19-month period.

	1st visit		2nd visit		3rd visit		4th visit		5th visit	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
ONLY Sys >= 140	0	1	0	4	0	3	0	0	0	0
ONLY dias >=90	6	19	3	12	3	6	0	4	0	2
Both Sys>=140 & dias >=90	5	17	3	13	2	10	1	6	2	4
Subtotal	11	37	6	29	5	19	1	10	2	6
Total	48		35		24		11		8	

Figure 1

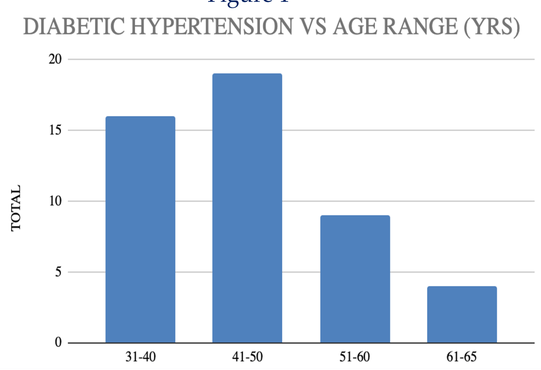
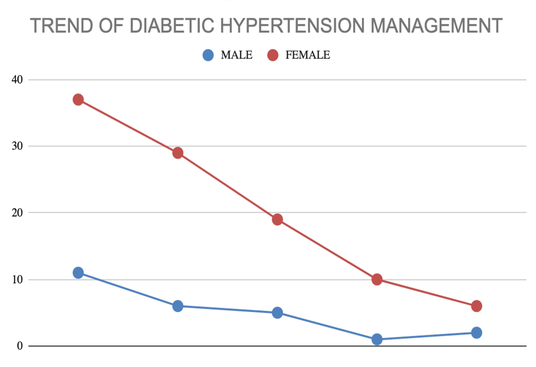


Figure 2



Conclusion

There is an immediate need to create a health program to screen undiagnosed diabetic patients for hypertension, as the prevalence is very high in the rural communities of Pakistan. This will help curb the chances of chronic life-threatening complications in these communities; which is contributing to a high disease burden in Pakistan. Similarly, counseling sessions should be set up, particularly for hypertensive patients to help them understand the dire need to curb the progress of the disease. As masked by diabetes it could result in increased morbidity and mortality.

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