

TYPE 2 DIABETES MELLITUS; DETERMINATION OF FREQUENCY AND PATTERN OF HYPERTENSION IN PATIENTS

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ABSTRACT... Objectives: Determine frequency of hypertension in type 2 diabetics. Determine pattern of hypertension in type 2 diabetics. **Study design:** Cross sectional survey. **Setting:** The study was conducted in the out patient department of Combined Military Hospital, Lahore. **Duration of study:** Study was carried out over a period of 01 year from July 2010 to July 2011. **Material and methods:** Total 700 cases were recruited in this study. Blood pressure of all the patients was recorded in a sitting position with a mercurial sphygmomanometer 4–6 hours apart. It was interpreted as prehypertension, stage 1 and stage 2 according to operational definitions. **Results:** Out of total 700 patients, 490 (70.0%) were hypertensive. Pattern of hypertension showed 100 (20.4%) pre-hypertension, 160 (32.6%) stage-I and 230 (47.0%) stage-II. Majority of the patients i.e. 245 (50.0%) were between 41-50 years and minimum 9 patients (1.8%) were 20-30 years old with mean age of 55.9 ± 3.7 . Out of 700 patients, 350 (50.0%) were male while remaining 350 (50.0%) were females. Married patients were 400 (57.1%) and unmarried 300 (42.9%). **Conclusions:** Patients with diabetes mellitus have increased risk of developing hypertension than normal population.

Key words: Hypertension, type 2 diabetes, pattern of hypertension.

INTRODUCTION

Hypertension is common among patients with type 2 diabetes mellitus. Micro and macrovascular complications of diabetes are increased when the two conditions occur together¹. Major epidemiological studies came from the Framingham and the Multiple Risk Factor Intervention Trial (MRFIT) Diabetic Cohort. The MRFIT Cohort showed that cardiovascular mortality was increased by a factor of 2-4 in diabetic patients, and there was a clear association between systolic blood pressure and complications, therefore a lower value of blood pressure diabetics (130/85 mmHg) than for non-diabetics (140/90 mmHg) is proposed³.

This study would help determine the actual magnitude of the problem in our setup; this would in turn help increase awareness about early detection of hypertension in type 2 diabetics. Prompt treatment of raised blood pressure would undoubtedly reduce the risk of developing both micro and macrovascular complications associated with the disease.

Objectives

Objectives of the study were to:

- Determine frequency of hypertension in type 2 diabetics

- Determine pattern of hypertension in type 2 diabetics

OPERATIONAL DEFINITIONS

Type 2 diabetes

- Fasting plasma glucose > 126 mg/dl (> 7.0 mmol/L).
- Random plasma glucose > 200 mg/dl (> 11.1 mmol/L).

Pattern of Hypertension

Presence of any of the following patterns were labeled as hypertension, on two readings 4–6 hours apart.

Pre hypertension: systolic 120-139 mmHg, diastolic 80-89 mmHg.

Stage-1

140-159 mmHg, diastolic 90-99 mmHg

Stage-2

Systolic >160 mmHg, diastolic >100mmHg

MATERIAL AND METHODS

Study Design

Cross sectional survey

Setting

The study was conducted in the out patient department of Combined Military Hospital, Lahore.

Duration of Study

Study was carried out over a period of six months from July 2010 to July 2011

Sample Size

The calculated sample size is 700 cases with 2.5% margin of error, 95% confidence level, taking expected percentage of stage 2 hypertension in type 2 diabetics i.e. 12.9%.

Sampling technique

Non probability purposive sampling

SAMPLE SELECTION**Inclusion Criteria**

All male and female patients meeting the operational definition of diabetes mellitus who are not diagnosed as case of hypertension and are not taking any anti hypertensive medication.

Exclusion Criteria

- Unwilling patients
- Patients with chronic renal failure (serum creatinine level >2mg/dl).
- Prolonged users of non steroidal anti inflammatory drugs.

Data Collection

Total of 700 patients fulfilling inclusion and exclusion criteria were enrolled from medical out patient department and after taking informed consent. History of use of non-steroidal anti inflammatory drugs was recorded. Blood pressure of all the patients was recorded in a sitting position with a mercurial sphygmomanometer 4–6 hours apart. It was interpreted as prehypertension, stage 1 and stage 2 according to operational definitions. All of this information was recorded in a pre-designed proforma (attached). Blood pressure was recorded by the researcher herself with a calibrated sphygmomanometer.

Data Analysis

All this information was recorded on a pre designed Proforma attached as annexed. It was computer based. Data was analyzed using SPSS version 10.0 software. Qualitative variables such as sex, occupation was presented as frequency and percentage of the patients were determined. Quantitative variables such as age was presented as mean and standard deviation. Frequency and percentage of various patterns of hypertension (prehypertension, stage 1, stage 2 hypertension) was calculated.

RESULTS

Out of total 700 patients, 490 (70.0%) were hypertensive (Table-I).

Pattern of hypertension showed 100 (20.4%) pre-hypertension, 160 (32.6%) stage-I and 230 (47.0%) stage-II (Table-II).

Majority of the patients i.e. 245 (50.0%) were between 41-50 years and minimum 9 patients (1.8%) were 20-30 years old with mean age of 55.9 ± 3.7 (Table-III).

Out of 700 patients, 350 (50.0%) were male while remaining 350 (50.0%) were females (Table-IV).

Married patients were 400 (57.1%) and unmarried 300 (42.9%) (Table-V).

DISCUSSION

According to our study carried out on 700 diabetic patients; 490 patients that is 70% had hypertension with 50/50 distribution amongst both sexes. Regarding the marital status 400 patients were married so the frequency of hypertension was higher in the married population. The frequency of hypertension was highest in the age group between 41-50 years and it was 50% followed by patients in the age group of >50 out of whom 30% had hypertension. 18.2% of patients had hypertension in the age group of 31-40 years at and the frequency of hypertension was lowest that is 1.8% in the age group of 20-30 year. Regarding occupation it was difficult to interpret as combined military hospital deals primarily with the military personal and their families so it was difficult to determine the frequency of hypertension

Table-I. Distribution of cases by hypertensive patients

Hypertension	No. of patient	%age
Yes	490	70.0
No	210	30.0
Total	700	100.0

Table-II. Distribution of cases by pattern of hypertension (n =490)

Pattern of Hypertension	No. of patient	%age
Pre hypertension	100	20.4
Stage I	160	32.6
Stage II	230	47.0
Total	490	100.0

Table-III. Distribution of hypertensive cases by age

Age	No. of patients	%age
20-30	09	1.8
31-40	89	18.2
41-50	245	50.0
>50	147	30.0
Total	490	100.0
Mean \pm SD	55.9 \pm 3.7	

Table-IV. Distribution of cases by sex

Sex	No. of patients	%age
Male	350	50.0
Female	350	50.0
Total	700	100.0

Table-V. Marital status of the patients under study

Marital status	No. of patents	%age
Married	400	57.1
Unmarried	300	42.9
Total	700	100.0

in different occupations. According to Joffres et al study the mean age of patients was 66 years, 50% were females, 64% of the patients had hypertension⁴. The prevalence rate of hypertension in diabetics was 31.95%⁵, while according to my study out of 700 patients 490 patients had hypertension, prevalence rate was 70%. Out of 490 hypertensive patients, 100 patients had Pre-hypertension (20.4%), 160 patients had stage-1 hypertension (32.6%), 230 patients had stage-2 hypertension (47%). In another study 50% of the patients had stage-1⁶.

In a study by Ashraf and Basir, 49% of diabetics had hypertension and 56% had systolic hypertension (stage 2)^{5,6}. In another study comparing the frequency of hypertension in diabetes mellitus the frequency of hypertension was higher in type 2 diabetics that is 47%⁷. Another study showed that diabetics had mean age of 56.4 years and the frequency of hypertension was 37.3% in diabetics⁸. In another study comparing the association of between diabetes mellitus and hypertension over a period of 10 years in 1992 type 2 diabetes mellitus was associated with hypertension in 37.5 % of patients while in 2002 type 2 diabetes was associated with hypertension in 57.2% of patients¹⁰. To summarize about 35-60% of diabetic patients have hypertension especially systolic hypertension that is stage 2¹¹. There is so diversity in percentages in different studies because a lot of factors are to be taken into consideration like the duration of diabetes, as the longer duration of disease increases the chances of hypertension by promoting atherosclerosis, causing changes in the glomerular capillaries. There is an increased risk of hypertension in patients with long standing diabetes mellitus as compared to newly diagnosed diabetics. Other factors also play role as age of patient, abdominal obesity and higher fasting blood glucose¹². There are a no of implications of our study which agree with findings of earlier studies. According to our study most of patients had either stage 1 or stage 2 hypertension and only 20.4% of patients had pre hypertension implying that > 75% of the diabetics fall in high blood pressure category or most of the patients don't get their blood pressure checked until they have symptoms like headache etc or even if they do they don't seek medical attention for it.

There has been an alarming increase in the frequency of hypertension in diabetics in recent years¹³. It can be due to increasing incidence of diabetes mellitus, better diagnostic facilities, increasing awareness amongst the population about hypertension and diabetes. Early assessment of hypertension in diabetic patients at an uncomplicated stage¹⁴. As hypertension is very common amongst diabetics it is of extreme importance to have adequate blood pressure control in order to prevent the micro and macro vascular complications [15]. The target blood pressure in diabetics should be 130/80mmhg or lower¹⁵. The blood pressure can be controlled by life style modification like exercise, dietary control and by drugs. Regarding future research our study emphasizes the fact that we need to address the increasing trend of hypertension in diabetics in recent years by creating awareness amongst the diabetics about the various complications due to uncontrolled hypertension, the need to have regular follow up of their blood pressure even if they have no symptoms.

CONCLUSIONS

Patients with diabetes mellitus have increased risk of developing hypertension than normal population. Patients with co-existing hypertension and diabetes are at increased risk of developing micro and microvascular complications. These patients should be identified at earliest and treatment should be initiated to minimize the development and progression of complication.

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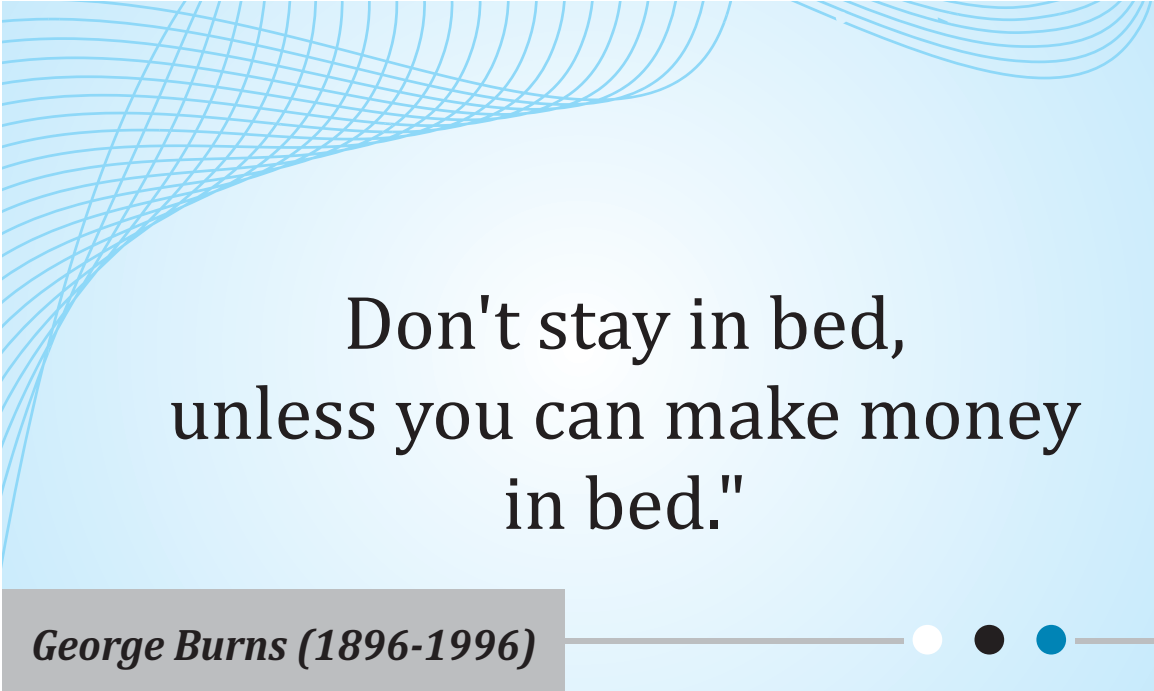
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unless you can make money
in bed."

George Burns (1896-1996)