INTRODUCTION:
Diabetes is one of the most common non communicable diseases found in our country as well as globally because of urbanization. India has been recognized as the diabetes capital of the world by the international diabetes federation with approximately around 40.9 million people affected by diabetes as of 2006. The problem of diabetes and its complications globally accounts 6.6%, in India 9% in urban population. T2DM is a non-autoimmune, complex, heterogeneous and polygenic metabolic disease condition in which the body fails to produce enough insulin, characterized by abnormal glucose homeostasis. T2DM occurs when impaired insulin effectiveness (insulin resistance) is accompanied by the failure to produce sufficient cell insulin. Type 2 diabetes is risk factor for microvascular and macrovascular disease. Microalbuminuria was predictor of renal failure in patients with diabetes mellitus.

Hypertension in the diabetic individual markedly increases the risk and accelerates the course of cardiac disease, peripheral vascular disease, stroke, retinopathy, and nephropathy. The development of diabetic nephropathy is characterized by a progressive increase in the excretion of protein, particularly albumin, an early and continuing rise in systolic blood pressure, and a late decline in glomerular filtration rate, leading eventually to end stage renal failure. Hypertension is the most important co-existing risk factor for death at a young age in patients with type 2 diabetes. Almost 75% of the cardiovascular complications in patients with diabetes can also be attributed to hypertension.

Microalbuminuria is defined as a urinary albumin excretion rate of 30 to 300 mg in 24 hour urine collection or as a urinary albumin excretion rate of 20 to 200 mg/min in a timed overnight urine collection. Increased urinary excretion of albumin ranging between 30 and 300 mg/d (i.e., microalbuminuria) has been found in a relatively large number of patients with essential hypertension. Microalbuminuria is a indicator of endothelial dysfunction and marker for cardiovascular morbidity and mortality in individuals with and without DM. American Diabetes Association recommends that patients with type 2 diabetes be tested for albuminuria at the time of initial diabetes diagnosis and yearly thereafter.

Endothelial function and chronic inflammation have been suggested as possible candidates to explain the associations between microalbuminuria and cardiovascular disease. Several studies have revealed a relationship between microalbuminuria and other cardiovascular risk factors, target organ damage and risk of cardiovascular disease, particularly in essential hypertension and even in the general population.

The present study was correlation between hypertension and microalbuminuria in type 2 diabetes women patients of central Indian population.

MATERIALS AND METHODS:
The study was performed at outdoor patients in L N Medical college and Research centre, Bhopal. We selected 133 women patient with type 2 diabetes mellitus with hypertension. The patients age range from 20-60 years. Consent was obtained from each patients. An administered questionnaire was used to collect data on: age; sex; self-reported ethnicity; Family history of T2DM; duration of T2DM; and treatment with oral hypoglycemic, insulin or both.

Blood pressure was measured with a mercury sphygmomanometer three times in the same arm after the patient was seated and at rest for a minimum of 15 min. The systolic and diastolic measurements in mercury units reported represent the mean of the three readings. Hypertension was defined as having blood pressure ≥140/90.

Body mass index was calculated as the ratio of body weight in Kg/height in square meter. Cases and controls were asked to remove heavy clothes and shoes before measurement of weight and height.

Body mass index (BMI) is derived mathematically from the height and weight measures.

\[ BMI = \frac{\text{weight (kg)}}{\text{height (m})^2} \]

Microalbuminuria was determined by measuring with the albumin excretion rate (AER) in three non consecutive first morning urine samples. Normal albumin excretion rate was < 30 mg/g creatinine and microalbuminuria was defined as AER in the range of 30 and 299 mg/g creatinine. The ACR (albumin to creatinine ratio) was calculated as follows: urinary al-

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>ABSTRACT</td>
<td>Background: Hypertension is the most important co-existing risk factor for death at a young age in patients with type 2 diabetes. Objective: The present study was correlation between hypertension and microalbuminuria in type 2 diabetes women patients of central Indian population. Methods: One hundred twenty three type 2 diabetic women patients attending the department of medicine of L N Medical college and Research Centre, Bhopal. Microalbuminuria and raised blood pressure patients were included in this study. Patients age range from 20-60 years. Results: A total of 123 subjects were studied out of these (83 microalbuminuric patients, and 50 Normoalbuminuric patients). Mean Age, BMI, duration of T2DM was statistically significant. Mean Diastolic blood Pressure (DBP), systolic blood pressure (SBP) was also statistically significant between microalbuminuria and normoalbuminuria patients. Conclusion: Central Indians type 2 diabetic women patients showed that MA having higher blood pressure as compared to NA.</td>
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<tr>
<td>KEYWORDS</td>
<td>Type 2 diabetes mellitus, Hypertension, Microalbuminuria, Normoalbuminuria, Central Indians.</td>
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bumin concen-tration (mg/liter) urinary creatinine concentra-
tion (mg/dl). The mean value of each patient's three ACRs was
used to indicate the level of albumin excretion.

Data analysis was done using the statistical package for social
sciences (SPSS) for windows version 8.

RESULTS:
The present study was carried out on 133 women patients with
type 2 diabetes mellitus. Out of these (83 microalbuminuric pa-
tients, and 50 normoalbuminuric patients).

Table 1: represent basic Characteristics of normoalbuminu-
ria and microalbuminuria patients. The mean age of NA was
52.2±8 in while in MA was 44.8. Duration ration of T2DM has
been calculated in average year from date of T2DM diagnosis.

The mean BMI of NA was 23.12 in while in MA was 26.9. The
positive family history of NA was 35 % and in MA was 51 %. While
negative family history of NA was 15 % and MA was 32 %.

TABLE NO:1 BASIC CHARACTERISTICS OF NORMOABLU-
MINURIA AND MICROALBUMINURIA

<table>
<thead>
<tr>
<th>Variables</th>
<th>Normoalbuminuria (NA) (50 women patients)</th>
<th>Microalbuminuria (MA) (83 women patients)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>52.2±8.13.2</td>
<td>44.8±11.8</td>
<td>0.0009*</td>
</tr>
<tr>
<td>BMI</td>
<td>23.12 ± 3.3</td>
<td>26.9 ± 4.1</td>
<td>0.0001*</td>
</tr>
<tr>
<td>Family History</td>
<td>Positive (35%)</td>
<td>51 (61.4%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Negative (15%)</td>
<td>32 (38.5%)</td>
<td></td>
</tr>
<tr>
<td>Duration of T2DM</td>
<td>7.1 ± 4.3</td>
<td>5.6 ± 3.6</td>
<td>0.0325*</td>
</tr>
</tbody>
</table>

*Statistically significant (P<0.001), # Non significant (p>0.005).

TABLE NO:2 BLOOD PRESSURE BETWEEN NORMOABLU-
MINURIA AND MICROALBUMINURIA WOMEN PATIENTS.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Normoalbuminuria (NA) (50 women patients)</th>
<th>Microalbuminuria (MA) (83 women patients)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systolic Blood Pressure</td>
<td>140.2±17.3</td>
<td>147±15.4</td>
<td>0.005*</td>
</tr>
<tr>
<td>Diastolic Blood Pressure</td>
<td>85.9 ± 10.4</td>
<td>92±4±12.3</td>
<td>0.002*</td>
</tr>
</tbody>
</table>

*Statistically significant (P<0.001), # Non significant (p>0.005).

Table no -2 results represent that MA mean Diastolic blood
Pressure (DBP) higher than NA, that is statistically significant.
Similarly mean MA mean systolic blood pressure (SBP) high-
er than NA, that is also statistically significant. These result
showed that MA having higher blood pressure as compared to
NA.

DISCUSSION:
In the present study observed that microalbuminuria detection is
a first-line tool for identifying hypertensive patients who are
at higher cardiovascular risk15. Previous studies showed that mi-
croalbuminuria to be an important cardiovascular risk factor in
patients with or without diabetes and/or hypertension16-17. Our
result reported that the mean age was statistically significant
correlation found between NA and MA. Bhoomika et al18 no
significant correlation found between age and microalbuminu-
ria as compared to normoalbuminuria.

In this study, it was found that mean BMI was statistically sig-
nificant compared between MA and NA. No correlation was
found between the BMI and albumin excretion (r2 = 0.0271)
even though it is reported that microalbuminuria is more pre-
valent in obese hypertensive12. The high value of BMI in MA
patients indicated that obesity to be a potential risk factor for
albuminuria19. Few studies reported that a strong corre-
lation between the severity of UAE and duration of diabetes
of diabetes and obesity are found to be risk factors for mi-
croalbuminuria. In present observation the duration of diabete
statistically significant between NA and MA. Afkhani et al22
found that a good statistically significant correlation was
found between microalbuminuria and duration of diabetes.

Increase of cardiovascular diseases that primarily accounts for
the increase in morbidity and mortality seen in patients with dia-
betes24. T2DM is becoming the main reason for patient to
start renal disease25. Our study the mean value of SBP and
DBP was statistically significant. albuminuria is a powerful
predictor of renal and cardiovascular risk in patients with type
2 diabetes and hypertension. Nishijo et al concluded that uri-
nary albumin was significantly related to systolic and diastolic
blood pressure in a manner independent of other factors such
as BMI and plasma insulin26. United Kingdom prospective dia-
betes study (UKPDS) explain reducing the incidence of chronic
complications was significantly associated with the amplitude
of systolic blood pressure decrease, the lowest risk corre-
sponding to a systolic blood pressure below 120mmHg.

Few authors opinion that hypertension occurs in 50% of
patients with Diabetes and results in a sevenfold increase in
mortality27. Similarly Arkedani et al23 reported a good statis-
tical correlation between the prevalence of microalbuminuria
and the diastolic blood pressure. Alia Ali et al28 also found a
significant statistical correlation between hypertension and mi-
croalbuminuria. In this finding was also strongly associated
with poor glycemic control. Bruno et al reported high blood
pressure levels among MA patients. Bhoomika et al18 report-
ed that high percentage of hypertensive patients (58.3%) had
microalbuminuria and significant correlation found between
microalbuminuria and blood pressure.

The present study reported specially in women patients with
hypertension and diabetes. The results of the study was good
statistically significant correlation was found between micro-
albuminuria and diabetes. No one is discuses about females pa-
tients in central India.

Conclusion:
Our study suggested according to above findings in women
patients with type 2 diabetes mellitus and microalbuminuria
BMI, duration of diabetes, family history of diabetes was sig-
nificant compared with patients with type 2 diabetes mellitus
and noralbuminuria. Patients suggest that hypertension is as-
sociated with microalbuminuria. Increased albumin excretion
rate is related to diabetes and high blood pressure.

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