

# A Comparative Study Of Microalbuminuria Between Prehypertensive And Normotensive Individuals

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## Abstract

*Background:* prehypertension is asymptomatic and yet a warning sign that the patient may develop hypertension and its complications in his near future. Micro-albuminuria in these cases is a predictor of higher risk of cardiovascular and renal dysfunction and hence early detection will help us to control the development of htn and its complications.

*Aim:* to evaluate the presence of microalbuminuria between pre hypertensive and normotensive individuals and to explain its presence with complications development

*Material and method:* it is a comparative study, the subjects are divided into 2 groups.

*Results:* the study found the presence of microalbuminuria in most of the prehypertensive patients.

*Conclusion:* the presence of microalbuminuria in prehypertensive patients significantly than in normotensive patients and that will also associated with hypertension complications.

**Keywords:** prehypertensive, microalbuminuria, complications

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Date of Submission: 16-10-2024

Date of Acceptance: 26-10-2024

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## I. Introduction

Today Hypertension is the most important public health problem and if left untreated, it increases the incidence of stroke, coronary events, heart failure and renal failure. Prehypertension is asymptomatic and yet a warning sign that the patient may develop hypertension and its complications in his near future. The prevalence of prehypertension in India has been found to be 32% among urban population. Micro-albuminuria in these cases is a predictor of higher risk of cardiovascular and renal dysfunction and hence early detection will help us to control the development of HTN and its complications. This study was undertaken to find out if there is a significant difference in presence of microalbuminuria and to look for other end organ damage such as diastolic dysfunction and fundus changes.

## II. Materials And Methods

**Study Design:** Comparative Study

**Study period:** 12 months (June 2023 to May 2024)

**Place of Study:** Maharajahs institute of medical sciences

**Sample size:** 100 individuals

**Subject And Selection Criteria:** Pre hypertension was detected as per Joint National Committee (JNC) VIII. Prehypertensive group: It includes individuals with systolic BP of 120-139mmHg and a diastolic BP of 80-89mmHg. Normotensive group: It includes individuals with systolic BP of <120 mmHg and a diastolic BP of <80mmHg.

**Statistical Analysis:** The statistical analysis was performed using students 't' test to compare mean values of variables in control and different groups of diabetes mellitus. The correlations were assessed by Pearson rank correlation coefficient. Differences were considered statistically significant when  $p < 0.001$ .

**Inclusion Criteria:** Healthy volunteers, mostly patient's attenders above the age of 30 years and below 60 years.

**Exclusion Criteria:** History of Diabetes, History of Hypertension, History of Intake Of Drugs (aspirin, steroids, antihypertensives), History of urinary tract infection, History of Acute/ Chronic Kidney Disease, Pregnancy

## III. Results

Sex Distribution

- Out of the 50 prehypertensives, 36 of them are males and 14 are females out of which 10 and 5 among each group had microalbuminuria.
- Normotensives has almost equal sex distribution.

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SEX	NORMOTENSIVES		PREHYPERTENSIVES	
	TOTAL	(+)	TOTAL	(+)
MICROALBUMINURIA				
Male	26	0	36	10
Female	24	0	14	5
Total	50	0	50	15

Age Distribution

- Out of 50 prehypertensive and normotensive group, a majority belong to the age group of 30 to 50 years.
- However there is increasing frequency of microalbuminuria according to age in pre hypertensive group.

AGE	NORMOTENSIVES	PREHYPERTENSIVES	
		TOTAL	WITH MICROALBUMINURIA
31-40	18	25	4 (8%)
41-50	25	23	10 (43%)
51-60	7	2	1 (50%)
TOTAL	50	50	15

Distribution Of Smokers In Both Groups:

- Both the groups have almost equal number of smokers.
- A higher percentage of microalbuminuria was noticed in smokers of prehypertensive group

MICROALBUMINURIA	NORMOTENSIVES		PREHYPERTENSIVES	
	TOTAL	(+)	TOTAL	(+)
SMOKERS	11	0	10	4 (40%)
NON SMOKERS	39	0	40	11 (27%)
TOTAL	50	0	50	15

Distribution Of Alcoholics In Both Groups:

- As of smokers, the number of persons who consume alcohol is equal in both the groups.
- A higher percentage of microalbuminuria was noticed in alcoholics of prehypertensive group.

MICROALBUMINURIA	NORMOTENSIVES		PREHYPERTENSIVES	
	TOTAL	(+)	TOTAL	(+)
ALCOHOLICS	12	0	12	4(33%)
NON ALCOHOLICS	38	0	38	11 (28%)
TOTAL	50	0	50	15

Urine Albumin

Around 22% of prehypertensive individuals had albumin in urine

- 4% had a 1+
- 18% had trace albumin

URINE ALBUMIN	NORMOTENSIVES	PREHYPERTENSIVES
NIL	50	39
TRACE (15 – 30 mg/dl)	0	9
+1 (30 – 100 mg/dl )	0	2
TOTAL	50	50

Urine Albumin/ Creatinine Ratio:

- In the method of measurement, 2% of normotensives and 28% of prehypertensives had microalbuminuria.
- P value calculated was < 0.001 which was highly significant.

URINE ALBUMIN/CREATININE RATIO	NORMOTENSIVES	PREHYPERTENSIVES
<0.3	49	36
>0.3 - 3	1	14

Fundus Findings In Both Groups:

- Out of 100 subjects, only 2 individuals had generalized arteriolar constriction which falls under grade 1 hypertensive retinopathy.
- Though this is statistically insignificant still the presence of arteriolar changes in those individuals needs to be addressed.

FUNDUS - RETINOPATHY GRADING	NORMOTENSIVES	PREHYPERTENSIVES
GRADE 1	0	2
NORMAL	50	48
TOTAL	50	50

Diastolic Dysfunction In Both Groups:

- In our study population, around 32% of them had a grade I diastolic dysfunction. All belonged to the prehypertensive group.
- The p value is calculated was 0.004 which was highly significant.

DIASTOLIC DYSFUNCTION	NORMOTENSIVES	PREHYPERTENSIVES
GRADE 1	0	16
NORMAL	50	34
TOTAL	50	50

#### IV. Discussion

In our study, 24 hour urine for micro-albuminuria estimation was done by Immune Turbidimetric assay. An early morning urine sample for spot urine albumin creatinine ratio (ACR) is performed. Fundus examination was done and retinopathy was classified according to Keith Wagner- Barker Classification. Echocardiographic screening was done to detect diastolic dysfunction in all participants. Urinary albumin leakage serves as a sign of widespread vascular damage associated with hypertension. Microalbuminuria (MA), defined as urinary albumin excretion (UAE) between 30 and 300 mg over 24 hours, is recognized as a significant prognostic marker across various clinical scenarios. It has been linked to heightened cardiovascular risk and ongoing renal injury. In individuals with hypertension, MA is identified as a key indicator of cardiovascular complications and a dependable predictor of ischemic heart diseases. Both left ventricular hypertrophy and increased carotid artery intima-media thickness—subclinical cardiovascular conditions—are correlated with MA in those at an elevated risk for cardiovascular disease, particularly when their blood pressure readings exceed normal levels. It is also associated with other complications like simultaneous development of retinopathy and diastolic dysfunction.

#### V. Conclusion

Presence of microalbuminuria is more common in prehypertensives by 28% it is significant. Retinopathy is more common in prehypertensives by 4% though it is statistically insignificant in this study. Diastolic dysfunction is more common in the prehypertensive group by around 32% evidenced by significant p value. The percentage of end organ damage increased as the age progressed.

Males had a more percentage of end organ damage when compared to females and is more common in smokers and alcohol consumers.

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