

THE FREQUENCY OF MICRO-ALBUMINURIA IN PRE-HYPERTENSIVE PATIENTS

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ABSTRACT:

Objective: To determine the frequency of microalbuminuria in pre-hypertensive patients.

Material and method: This was a descriptive cross sectional study conducted at Lady Reading Hospital Peshawar for a duration of 6 months. Total of 465 patients were observed through non probability consecutive sampling technique for sample collection. The frequency of micro-albuminuria was measured in patient with pre-hypertension. Patients with blood pressure(BP) of 130-139/80-89 at three outdoor visits, were defined as pre-hypertension.

Results: In this study, 23% patients were in age range 25-35 years, 47% patients were in age range 36-45 years, 30% patients were in age range 46-55 years. Mean age was 40 years, with SD \pm 10.26 yrs. 62% patients were male and 38% patients were female. The frequency of microalbuminuria in pre-hypertensive patients was 4%.

Conclusion: Pre-hypertension should not be considered innocent. Microalbuminuria association with pre-hypertension is the tip of an ice berg. Its association with other target organ damage needs more correlation studies and continuous struggle in a targeted approach.

Key words: Frequency, microalbuminuria, pre-hypertensive.

INTRODUCTION

The urinary protein called albumin is increasingly recognized as the earliest sign of vascular damage in both the kidney and the heart. The phenomenon of albuminuria has been recognized for more than 200 years, and its association with kidney disease dates to the epochal insights of Richard Bright in 1827¹.

Microalbuminuria (defined as urinary albumin excretion 30 - 300 mg /day, or 20-200 μ g/min, or 30-300mg/l)² does not directly cause cardiovascular events. It serves as a marker for identifying those, who may be at increased risk.

Microalbuminuria has been shown to be associated with an increased risk of cardiovascular^{3,4} and progressive kidney disease⁵⁻⁸ not only in diabetes but also in nondiabetic subjects. In addition, treatment aimed to reduce albuminuria levels have been shown to reduce the risk for cardiovascular events⁹ as well as kidney disease progression¹⁰.

In hypertensive subjects, microalbuminuria has now been considered as an essential component in the assessment of subclinical organ damage because its detection is easy and relatively inexpensive¹¹

Microalbuminuria can be detected earlier using a relatively inexpensive urine test. It is recommended that every diabetic receive the test at least once per year. Dipstick for albuminuria is easy and inexpensive, and

remains the most practical way to identify subjects at risk. In Asia especially in Pakistan, local studies regarding the frequency or prevalence of microalbuminuria in pre-hypertensives are very limited masking the huge population at risk of future hypertension with renal and cardiovascular complications. Thus the frequency or prevalence of microalbuminuria in pre-hypertensive's in our population needs to be ascertained to give us a clear picture of the Iceberg that we might face in future¹²⁻¹³

MATERIAL AND METHOD

This was a descriptive cross sectional study conducted at outpatient clinic, Lady Reading Hospital, Peshawar, for a duration of 6 months. Total of 465 patients were observed through non probability consecutive sampling technique for sample collection. Blood Pressure readings were taking in a relaxed environment; with the patient back supported in sitting position and with appropriate cuff size. Three measurements were taken and if comes in pre-hypertensive stage were tested for albuminuria with albu-sticks. Which were provided by the researcher.

All patients with pre-hypertension were intended to include in this study. Those who were Diabetic, Hypertensive, Chronic Kidney Disease, Urinary tract infections, increased uric acid levels, who are on anti-hypertensive medications and pregnant ladies were excluded from this study.

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RESULTS

Total of 465 patients were observed for the frequency of microalbuminuria in pre-hypertensive patients and the results were analyzed.

Age distribution among 465 patients was, 107(23%) patients were in age range 25-35 years, 219(47%) patients were in age range 36-45 years, and 139 (30%) patients were in age range 46-55 years. Mean age was 40 years with SD \pm 10.26. Table 1.

Gender distribution among 465 patients was analyzed as, 288(62%) patients were male and 177(38%) patients were female. Table 2.

Frequency of microalbuminuria among 465 patients was analyzed as, 19(4%) patients had microalbuminuria. While 446(96%) patients didn't had microalbuminuria. Table 3. Stratification of microalbuminuria with age and gender is given in table 4, 5.

Table 1: Age distribution. (n=465)

Age	Frequency	%
25-35 years	107	23%
36-45 years	219	47%
46-55 years	139	30%
Total	465	100%

Table 2: Gender distribution. (n=465)

Gender	Frequency	%
Male	288	62%
Female	177	38%
Total	465	100%

Table 3: Frequency of micro-albuminuria. (n=465)

Micro-albuminuria	Frequency	%
Yes	19	4%
No	446	96%
Total	465	100%

Table 4. Stratification of micro-albuminuria with age. (n=465)

Micro-albuminuria	25-35 years	36-45 years	46-55 years	Total
Yes	4	9	6	19
No	103	210	133	446
Total	107	219	139	465

Table 5. Stratification of micro-albuminuria with gender. (n=465). p value 0.003

MICROALBUMINURIA	Male	Female	Total
Yes	12	7	19
No	276	170	446
Total	288	177	465

DISCUSSION

The frequency of microalbuminuria has been reported within from 4.7% to 40% by Bigazzi et al and 32% by Grandi et al. According to Stephen P Glasser et al, in his study REAGARDS, the prevalence of pre-hypertension increased with age, varied in different racial groups, and increased with Diabetes, Microalbuminuria and those with heavy alcohol consumption. Similar studies in Chinese¹⁴ and Korean¹⁵ population revealed significant association between microalbuminuria and pre-hypertension. Microalbuminuria was found in 4.0% of normotensive subjects (n=4819) and in 7.9% of pre-hypertensive subjects (n=1952)¹⁶.

Microalbuminuria in Thai, nondiabetic, hypertensive patients with a prevalence of 16.6% and independently associated with obesity and certain classes of antihypertensive medication¹⁷. A number of other studies, evaluated the prevalence of microalbuminuria in HTN patients has been published, which is varied from 16% in the USA¹⁸, 11.5% to 30% in Europe¹⁹, and 14.4 to 26.2% in Asian populations²⁰.

In a study in Korea, subjects with high normal BP (BP: systolic, 130-139 mmHg or diastolic, 85-89 mmHg) have higher cardiovascular risks compared with individuals with normal BP (systolic BP, 120-129 mmHg or diastolic BP, 80-84 mmHg). Of 2,678 pre-hypertensive subjects with no history of diabetes or hypertension. The prevalence of microalbuminuria in the high normal BP group was higher than in the normal BP group (4.9% vs 2.8%, p=0.009)¹⁵. This finding is similar to our study.

Associations between Urinary albumin to creatinine ratio (UACR) and pre-hypertension was analyzed in China. The risks of pre-hypertension increased with increasing UACR levels²¹.

In an another study, total of 16,567 adults in the National Health and Nutrition Examination Survey (NHANES) from 1999 through 2006 were categorized according to JNC 7 BP definitions. Prevalence of microalbuminuria was 4.5% for normal BP, 6.3% for pre-hypertension, 12.4% for stage 1 hypertension, 25.3% for stage 2 hypertension, and 11.3% among those with treated, controlled hypertension. Participants with hypertension and prehypertension had a higher likelihood of microalbuminuria than those with normal BP, especially ethnic minorities, suggesting greater target organ damage²². Our observations suggest that further

research is necessary to determine whether microalbuminuria can be used as a screening tool in adults with pre-hypertension, to identify adults at highest risk for cardiovascular disease or decline in renal function.

Another prospective cohort study was carried out in 1,703 white-collar workers without preexisting CKD, were followed for an average of 54 months by annual examinations. The glomerular filtration rate (GFR) was estimated using the Modification of Diet in Renal Disease study equation modified by the Chinese coefficient. During the follow-up, 194 incidences of CKD were recorded. It was found that 2.4 % in participants with CKD incidences could be described as excessive incidence attributable to pre-hypertension²³. Prehypertension was significantly associated with CKD in a Chinese urban population. Though our study did not look into such associations. Which is an important aspect to be consider for future studies. But the association of albuminuria with pre-hypertension is reaffirmed in our study.

Variations might be due to type of study-base (i.e, community versus hospital-base), patient characteristics, urine sample collection, and the methods of tests used. In Thailand, a study at Siriraj hospital had reported a prevalence of microalbuminuria, assessed by antibody based dipstick, of 18.6%. However, it should be kept in mind that prevalence of microalbuminuria by dipstick screening in this study was 32.7% using the same cut off value at 20 mg/L. There had been a study showing that screening of microalbuminuria by Micral test strips had a low positive predictive value of 69%²⁴.

Results of most of the studies shown above are comparable to our study, though some differences are noted. Which may be due to ethnic differences, methods of albuminuria assessment, type of the study and the age of the population included. Further large and community based studies are suggested on this topic.

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