

Frequency of Microalbuminuria in Essential Hypertension in tertiary care hospital in Southern District of Khyber Pakhtunkhwa.

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ABSTRACT

Objective: To evaluate the frequency of microalbuminuria in essential hypertensive patients in a tertiary care hospital.

Study Design: Descriptive cross sectional study.

Place and Duration: Pathology Department, Khalifa Gul Nawaz Teaching Hospital Bannu, from 1st October, 2019 to 30th September, 2020.

Methodology: In this study Ichroma Fluorescence Immunoassay method was used for the quantitative detection of microalbuminuria in patients with essential hypertension. Inclusion criteria was patients with essential hypertension of both gender with age range of 31-80 years. Exclusion criteria was secondary hypertension, macroalbuminuria or other associated chronic diseases like Diabetes Mellitus, Rheumatoid Arthritis, dyslipidemia, chronic alcoholism etc. To find out the frequency of microalbuminuria, twenty hours urine sample was used for quantitative estimation in milligram per 24 hours.

Results: A total of 210 patients of essential hypertension were tested for microalbuminuria. Microalbuminuria was found in 17.62% patients of essential hypertension. The age range was from 31-80 years with mean age of 42.55±19.16 years. Amongst these 125 were male and 85 were females, male to female ratio was 1.47:1. The commonest age group was 71-80 years with all 100% patients were suffering from microalbuminuria followed by age group 61-70 years with 65.21%, 51-60 years with 12.96% and of 41-50 years with 1.78%, whereas none of the patient suffered microalbuminuria in age group of 31-40 years.

Conclusion: This study show that frequency of microalbuminuria in hypertension increases with increasing age. Therefore it is essential to evaluate hypertensive patients especially of increasing age for this valuable marker to manage target organ damage.

Keywords: Essential Hypertension, Atherosclerosis, Microalbuminuria, Cardiovascular, Diseases, Chronic Renal Failure, Mortality.

How to Cite This:

Khattak MS, Shah NUR, Khan MS, Haq lu, Hussain S, Pervez N. Frequency of microalbuminuria in essential hypertension in tertiary care hospital in Southern District of Khyber Pakhtunkhwa. *Isra Med J.* 2021; 13(4): 261-264.

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INTRODUCTION

Microalbuminuria is defined as presence of urine albumin in range of 30 to 300 mg in 24 hours urine specimen, whereas macroalbuminuria is urinary albumin of more than 300 mg/24 hour. Proteinuria in general contain about 20–70% of albumin in urine.¹ Microalbuminuria is a powerful predictor of cardiovascular diseases in hypertensive, diabetics as well general population. Hypertension and diabetes mellitus usually causes early physico-chemical changes in endothelial cells leading to increased vascular endothelial stress due to increased friction rub of endothelium with high blood pressure or raised glucose level.^{2,3} This stressed endothelium releases vasomotor substances causing endothelial damage in coronary vessels leading to atherosclerotic changes with subsequent cardiovascular diseases.⁴ Also increased excretion of albumin in glomerular capillaries causes damage to nephrons with subsequent renal diseases.⁵ Microalbuminuria is one of early marker of vascular endothelial dysfunction caused by hypertension, diabetes mellitus, glomerulonephritis, obesity, metabolic syndromes etc.⁶ The term microalbuminuria is a relatively misnomer meaning small size but actually it is

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Received for Publication: February 09, 2021

1st Revision of Manuscript: April 28, 2021

2nd Revision of Manuscript: November 14, 2021

3rd Revision of Manuscript: November 16, 2021

Accepted for Publication: December 02, 2021

presence of small quantity of albumin present in urine which is below the capacity of normal routine detection by boiling or dipstick test.⁷ This increased albumin excretion is a strong risk factor of cardiovascular as well as renal diseases. Studies have reported that patients treated for macroalbuminuria have better cardiovascular and renal prognosis. On the other hand patients with increasing age have increased risk of developing microalbuminuria, need attention to be evaluated and managed properly to prevent target organ damage. Studies show that microalbuminuria is an important predictor of cardiovascular and renal disease, but still insufficient data is available regarding the role of treatment for microalbuminuria to reduce cardiovascular and renal diseases risk, any how this study will create an awareness regarding these inevitable complications.⁸ This study was conducted with an objective to find out the frequency of microalbuminuria in patients suffering from essential hypertension.

METHODOLOGY

This descriptive cross sectional study was conducted in Pathology Department of Khalifa Gul Nawaz Teaching Hospital Bannu. The duration of this study was one year (from 1st October, 2019 to 30th September, 2020). Inclusion criteria was patients with essential hypertension of both gender in the age range of 31-80 years, as essential hypertension is rare in lower age groups. Patients were divided in different age groups for the purpose of estimation of frequency of microalbuminuria in these groups. Exclusion criteria was patients of macroalbuminuria, secondary hypertension or association with other chronic diseases like Diabetes Mellitus, Autoimmune diseases, dyslipidemia, chronic alcoholism, smoking, obesity, macroalbuminuria etc. Patients' data was collected in predesigned proforma with essential information after informed verbal consent of each patient. Twenty four hour urine sample was collected in sterile bottle. The urine was subjected to quantitative estimation of microalbumin by expert laboratory technologist using Ichroma II equipment. The test procedure was adapted by using sealed cartridge for this purpose. The detection buffer in tube already provided was loaded with 10 micro liter of urine sample and mixed for 10 minutes. The cartridge was loaded with 75 micro liter of sample mixture and left at room temperature for 10 minutes, now the sample is ready to scan and record the result from screen.

Data Analysis: The data collected was analyzed by SPSS version 20. Quantitative variable like age were calculated as mean with standard deviation and qualitative variable like gender and microalbuminuria was calculated for frequency with percentages. P value for different age groups was calculated by using student "T" test.

RESULTS

A total of 210 patients of essential hypertension were tested for microalbuminuria. Microalbuminuria was found in 37(17.62%) patients of essential hypertension. The age range was from 31-80 years with mean age of 42.55±19.16 years. Amongst these 125 were male and 85 were females, male to female ratio was

1.47:1. Maximum number of patients of essential hypertension 112(53.33%) were in the age range of 41-50 years followed by 54(25.41 %) in the age group of 51-60 years, 23(10.95%) in age group of 61-70 years, 13(6.19%) in the age group of 70-80 years and 08(3.80%) were in the age group of 31-40 years. All 13/13(100%) patients in the age group of 71-80 years were suffering from microalbuminuria followed by 15/23(65.21%) in age group of 61-70 years, 07/54(12.96%) in the age group of 51-60 years and 2/112(1.78%) were in the age group of 41-50 years, whereas none of the patient of essential hypertension in age group of 31-40 years was having suffered from microalbuminuria.

Table – I: Frequency of microalbuminuria in essential hypertension. (N=210)

Status of microalbuminuria	No. of patients	Percentage
Present	37	17.62%
Absent	173	82.38%
Total	210	100%

Table – II: Frequency of microalbuminuria in different age groups. (N=210).

Age group in years	No. of patients	With MAU	Without MAU	p-Value
31-40	08	00(00%)	08(100%)	< 0.05
41-50	112	02(1.78%)	110(98.21%)	< 0.05
51-60	54	07(12.96%)	47(87.04%)	< 0.05
61-70	23	15(65.22 %)	08(34.78%)	< 0.05
71-80	13	13(100%)	00(00%)	< 0.05
Total	210	37(17.62 %)	173(82.38%)	<0.05

DISCUSSION

Microalbuminuria is one of early prognostic marker of cardiovascular risk in hypertensive and diabetic patients. It is associated with increased risk of myocardial infarction as well as chronic renal failure⁹. The original definition of microalbuminuria is a challenge when looking into the risk of death due to cardiovascular or renal diseases. Different studies have shown disparities in frequency of microalbuminuria. Microalbuminuria is present in early vascular damage and its detection can be a marker of onset and progression of end organ damage like heart and kidneys.¹⁰

In this study the age range is from 31-80 years with mean age of 42.55±19.16 years. In a study conducted by Maggon et al¹¹ the age range is 16-80 years with mean age of 51.82±10.17 years. Another study conducted by Pondel et al¹² the age range is 25-65 years. Almost same age groups are studied in these studies with little differences.

Male to female ratio in this study is 1.47:1. In study conducted by Maggon et al¹¹ the male to female ration is 1.27:1, another study conducted by Pondel et al¹² the ratio is 1.41:1. Other studies conducted by Marques et al¹³ and Bhole et al¹⁴ stated male to female ratio as 0.89:1 and 1.18:1 respectively. All these studies show mild male dominance of disease with exception of

one study conducted by Bhole et al.¹⁴

In this study maximum number of patients of essential hypertension 112(53.33%) are in the age range of 41-50 years followed by 54(25.41 %) in the age group of 51-60 years, 23(10.95%) in age group of 61-70 years, 13(6.19%) in the age group of 70-80 years and 08(3.80%) are in the age group of 31-40 years. In a study conducted by Bhole et al¹⁴ most of the patients 31.66% are in the age group of 40-49 years followed by 27.5% in the age group of 60-69 years. Microalbuminuria was present in 100% patients of age group of 71-80 years, followed by 65.22% in age group of 61-70 years, 12.96% in age group of 51-60 years, 07% in age group of 41-50 years, where is no patient of essential hypertension suffered microalbuminuria in age group of 31-40 years, thus show high frequency of microalbuminuria with increasing age is noted in this study.

There is large range of variation in frequency of microalbuminuria from 16% to 57.7% in different studies conducted in different countries. This study show 17.21% frequency of microalbuminuria and studies conducted by Maggon et al,¹¹ Pondel et al¹² Marques et al,¹³ Bhole et al¹⁴ Taleska et al,¹⁵ show very high frequency of microalbuminuria ranging from 40.0%, 43.0%, 44.0%, 51.8% and 57.5% respectively, whereas other studies conducted by Catena et al,¹⁶ Louzada et al,¹⁷ and Visaria et al¹⁸ show almost similar results ranging from 11.0%, 16.0% and 17.2% respectively.

The reason behind may be differences in selection of patients of essential hypertension with different criteria. In this study the patients were selected of essential hypertension excluding associated diseases. All the above studies have used different criteria for selection of patients of essential hypertension. To see the clear picture of microalbuminuria in uniformity of results, it is suggested to frame/use same criteria for selection of patients in different studies at different location/countries.

CONCLUSION

This study show that frequency of microalbuminuria in hypertension increases with increasing age. Therefore it is essential to evaluate hypertensive patients especially of increasing age for this valuable marker to manage target organ damage.

AUTHOR'S CONTRIBUTION

Khattak MS: Conceived idea, Designed methodology, Manuscript writing, Data collection and analysis, Literature review

Shah NR: Literature review, Data analysis, Final critical review of manuscript

Khan MS: Data collection and analysis, Literature review

Haq I: Manuscript drafting, Data compilation and analysis

Hussain S: Data collection, Literature review

Pervez N: Manuscript writing, Literature review

Disclaimer: None.

Conflict of Interest: None.

Source of Funding: None

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