

# Frequency of Microalbuminuria in Patients with Metabolic Syndrome

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## ABSTRACT

**Background:** Microalbuminuria is an early marker of chronic kidney disease (CKD) and vascular dysfunction, and is associated with a higher risk of renal function loss, cardiovascular events and all-cause mortality. Microalbuminuria is relatively common in patients with metabolic disorders, such as type 2 diabetes mellitus, and has been incorporated into definition of the metabolic syndrome of WHO.

**Aim:** To determine the frequency of microalbuminuria in patients with metabolic syndrome presenting in a tertiary care hospital.

**Study Design:** Cross sectional study.

**Duration of study:** Six months from: June 2013 to December 2013

**Setting:** All the medical wards of Mayo Hospital Lahore.

**Results:** In our study, 72(43.64%) were between 30-50 years, and 93(56.36%) were between 51-80 years of age, mean±sd was calculated as 50.95±11.31 years, 57(34.55%) were male and 108(65.45%) were females, frequency of microalbuminuria in patients with metabolic syndrome was recorded in 43(26.06%) while 122(73.94%) had no findings of the morbidity.

**Conclusion:** The frequency of microalbuminuria is higher and in accordance with other studies among patients with metabolic syndrome. It is significantly prevalent in female gender as compare to male.

**Keywords:** Metabolic syndrome, microalbuminuria, frequency

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## INTRODUCTION

Metabolic syndrome (MetS) is a combination of medical disorders which increase the risk of developing cardiovascular disease, stroke and type II diabetes<sup>1</sup>. Some studies have shown the prevalence in the USA to be an estimated 25% of the population, and prevalence increases with age<sup>2</sup>. The prevalence of MetS in Asia may range from 8-13% in men and from 2-18% in women, depending on the population and definitions used<sup>3,4</sup>.

Microalbuminuria is an early marker of cardiovascular events and all-cause mortality<sup>5,6</sup>. It has been incorporated into the definition of the MetS of the WHO<sup>7</sup>. The recent harmonized international criteria for the definition of the MetS included blood pressure, waist circumference, fasting plasma glucose, serum triglycerides, and HDL cholesterol, but excluded microalbuminuria<sup>8,9</sup>.

Nonetheless, several recent studies investigated the relationship of microalbuminuria with MetS<sup>10,11,12</sup>. One study reported that the frequency of microalbuminuria in patients with MetS was 32.2%<sup>13</sup>. But another study reported that there were only 12% patients of MetS had microalbuminuria<sup>14</sup>.

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We planned to determine the frequency of microalbuminuria in patients with metabolic syndrome presenting in a tertiary care hospital. Literature has evidence that microalbuminuria is significantly present in cases of MetS but there are also controversies present that showing low rate of mic

## MATERIAL AND METHODS

This cross sectional study conducted in the Department of Medicine, Mayo Hospital, Lahore during six months period from June 2013 to December 2013 on 165 cases. Patients having age range 30-80 years of either gender fulfil the criteria for metabolic syndrome, selected from Outpatient Department with minor complaints as upper respiratory tract infection, fever etc were included in the study.

### Exclusion criteria:

- Patients with previous history of MI (assessed on past medical record).
- Patients with liver problems (ALT>40IU, AST>40IU).
- Patients with renal insufficiency (serum creatinine >1.2mg/dl).
- Patients with medical record of rheumatic disease, UTI, positive urine dip stick test for haemoglobin, glucose, leukocytes or nitrites (through laboratory investigations).
- Patients on lipid lowering therapy (on history and medical record).

**Data collection procedure:** One hundred and sixty five patients who fulfill the inclusion and exclusion criteria were enrolled in the study from outpatient department of Mayo hospital Lahore. Informed consent was obtained. All basic demographic information of each patient (name, age, sex, address and contact) was also noted. Urine sample was obtained and sent to laboratory of the hospital for assessment of urine albumin-to-creatinine ratio. Microalbuminuria was labeled (as per operational definition) after assessing laboratory reports.

**Data analysis procedure:** The collected data was analyzed statistically by using SPSS version 12. Quantitative variables like age and albumin to creatinine ratio was presented in form of mean ± S.D. Qualitative variables like gender and microalbuminuria (yes/no) was presented in form of frequency and percentage. Data was stratified for both genders (male / female).

## RESULTS

A total of 165 cases fulfilling the inclusion/exclusion criteria were enrolled to determine the frequency of microalbuminuria in patients with metabolic syndrome presenting in a tertiary care hospital. Age distribution of the patients was done which shows that 72(43.64%) were between 30-50 years, and 93(56.36%) were between 51-80 years of age, mean±sd was calculated as 50.95±11.31 years (Table 1). Gender distribution of the patients was done which shows that 57(34.55%) were male and 108(65.45%) were females (Table 2). Mean albumin to creatinine ratio was calculated as 24.55±2.22mg/g (Table 3). Frequency of microalbuminuria in patients with metabolic syndrome was recorded in 43(26.06%) while 122(73.94%) had no findings of the morbidity (Table 4).

Table 1: Age distribution (n=165)

Age(in years)	n	%age
30-50	72	43.64
51-80	93	56.36

Mean±SD: 50.95±11.31

Table 2: Gender distribution (n=165)

Gender	n	%age
Male	57	34.55
Female	108	65.45

Table 3: Albumin to Creatinine Ratio (n=165)

Mean Creatinine Ratio	24.55±2.22
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Table 4: Frequency of Microalbuminuria in Patients with Metabolic Syndrome (n=165)

Microalbuminuria	n	%age
Yes	43	26.06
No	122	73.94

## DISCUSSION

Micoralbuminuria is an early marker of chronic kidney disease (CKD)<sup>15</sup> and vascular dysfunction<sup>16</sup> and is associated with a higher risk of renal function loss<sup>15</sup> cardiovascular events<sup>15,17</sup> and all-cause mortality<sup>17</sup>. Microalbuminuria is relatively common in patients with metabolic disorders, such as type 2 diabetes mellitus<sup>18</sup> and has been incorporated into the definition of the metabolic syndrome of the World Health Organization<sup>19</sup>. However, whether microalbuminuria should be an essential component of the metabolic syndrome remains controversial.

Several studies in Eastern Asians confirmed the association between microalbuminuria and the metabolic syndrome, but produced inconsistent results on the association between microalbuminuria and the metabolic syndrome components. However, we planned this study that may help to solve the controversy and to know that including microalbuminuria in the clinical practice as part of diagnostic criteria of MetS may help in early detection of patients who are at risk of developing serious complications of MetS.

In our study, 72(43.64%) were between 30-50 years, and 93(56.36%) were between 51-80 years of age, mean+sd was calculated as 50.95±11.31 years, 57(34.55%) were male and 108(65.45%) were females, frequency of microalbuminuria in patients with metabolic syndrome was recorded in 43(26.06%) while 122(73.94%) had no findings of the morbidity. The findings of the study are in agreement with a study reported that the frequency of microalbuminuria in patients with MetS was 32.2%<sup>13</sup> and in contrast with the study reported that there were only 12% patients of MetS had microalbuminuria<sup>14</sup>.

Another study by Anvari MS and co-workers sought to examine the relationship between microalbuminuria and MetS and recorded that microalbuminuria was detected in 32.2% of the MetS individuals<sup>20</sup>.

Orluwen CG and co-workers determined the association between metabolic syndrome and gross renal derangement through possible detection of microalbuminuria in patients with metabolic syndrome and concluded that the metabolic syndrome has been found to be positively associated with microalbuminuria. Microalbuminuria may be one of the components of the metabolic syndrome in obese type 2 diabetes also<sup>21</sup>.

Another study investigated whether microalbuminuria was associated with the metabolic syndrome by comparing the strength of the association between microalbuminuria and the syndrome as a whole and its individual components and concluded that microalbuminuria and metabolic

syndrome are associated in a large, representative cohort, possibly due to early renal effects of hypertension, and it may be useful to consider microalbuminuria as a component of the metabolic syndrome<sup>22</sup>.

The mechanism for the closer relationship of microalbuminuria with diastolic blood pressure and hyperglycemia is not entirely understood. However, microalbuminuria is a marker of endothelial dysfunction and vascular damage. The metabolic syndrome is basically a disorder in the metabolism of glucose and lipids. However, recent studies suggest that the metabolic syndrome can also be a disease in arterioles.

However, the results of this study determined 26.06% frequency of microalbuminuria in patients with metabolic syndrome presenting in a tertiary care hospital in our country and it is suggestive that it may be included in the diagnostic criteria of metabolic syndrome. Including microalbuminuria in the clinical practice as part of diagnostic criteria of MetS will be help in early detection of patients who are at risk of developing serious complications of MetS.

## CONCLUSION

The frequency of microalbuminuria is higher and in accordance with other studies among patients with metabolic syndrome. It is significantly prevalent in female gender as compare to male. So, it is recommended that every patient who present with metabolic syndrome, should be sort out for microalbuminuria. However, it is also required that every setup should have their surveillance in order to know the frequency of the problem.

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