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**FREQUENCY OF MICROALBUMINURIA IN HYPERTENSIVE PATIENTS
PRESENTING TO A TERTIARY CARE HOSPITAL**

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ABSTRACT

Introduction: Hypertension is one of the most common cardiovascular disorders. Benign arteriolar nephrosclerosis seen in hypertensive patients (blood pressure more than 140/90 mm Hg) for an extended period may manifest as a mild to moderate elevation of serum creatinine, microscopic haematuria and/or microalbuminuria.

Objective: To determine the frequency of microalbuminuria in hypertensive patients presenting to a tertiary care hospital.

Setting: Department of Medicine, Liaquat University Hospital, Hyderabad

Duration: Six months started from 07-04-2018 to 06-10-2018

Study Design: Descriptive Cross-sectional study

Subjects and methods: All patients age 20-70 years of either gender having hypertension for at least 2 years were included. A 24 hours urine was collected and send to the institutional laboratory for albumin. Presence of 30-300mg of albumin was considered as Microalbuminuria

Results: Mean age of the patients was 62.97 ± 9.68 years. There were 52 (47.30%) males and 58 (52.70%) females. Mean weight, height and BMI of the patients was 60.21 ± 5.14 kg, 1.54 ± 0.06 m and 27.12 ± 5.17 kg/m² BMI. Rural residence was found to be higher (n=74, 67.3%) as compared to urban (36, 32.7%). Frequency of microalbuminuria was observed in 31 (28.2%) patients.

Conclusion: The frequency of microalbuminuria was found higher in hypertensive patients presenting to a tertiary care hospital.

Keywords: Microalbuminuria, Frequency, Hypertensive patients

INTRODUCTION

Microalbuminuria, an abnormal increase in the rate of urinary excretion of albumin, is recognized as an early manifestation of diabetic kidney disease and as a marker of endothelial dysfunction and atherosclerotic disease. In addition, a large number of studies suggest that microalbuminuria (MAU) is a powerful independent predictor of microvascular lesions, cardiovascular disease [1], cardiovascular mortality, and kidney disease, including end-stage renal failure. Albuminuria is an early marker of diabetic nephropathy, and previous reports described the association between albuminuria and risk of adverse cardiovascular and kidney events [2, 3]. Both the presence of microalbuminuria and its

extent became valuable instruments for risk stratification of hypertensive patients [4], since large trials showed conclusive evidence that early determination and treatment of microalbuminuria, as well as blood pressure control, can delay the onset and the complications of cardiovascular disease [5, 6].

Among the patients with hypertension microalbuminuria was noted in 12(57.14%) of these patients [7]. A large percentage (53.2%) of the hypertensive patients had microalbuminuria [8]. The overall prevalence of MAU was 42.8% in hypertensive patients [9]. The total number of patients having micro-albuminuria was 26 and the prevalence

came out to be 23.21% in patients with essential hypertension [10].

As there are wide differences regarding the microalbuminuria among hypertensive cases in different studies [7-10], therefore present study is designed to assess the actual magnitude of microalbuminuria. By virtue of this study further planning for regular screening of such cases could be initiated at regular interval and prompt treatment could prevent morbidity and mortality related to microalbuminuria.

OBJECTIVE

To determine the frequency of microalbuminuria in hypertensive patients presenting to a tertiary care hospital.

OPERATIONAL DEFINITION

- **Microalbuminuria:** presence of 30-300mg of albumin per 24 hours was considered as Microalbuminuria.
- **Hypertensive patients:** Presence of documented history of Hypertension on treatment or presence of either of the two was taken as hypertension:
 - Systolic blood pressure more than or equal to 140 mmHg
 - Diastolic blood pressure more than or equal to 90 mmHg

MATERIAL AND METHODS

Setting

Department of Medicine, Liaquat University Hospital, Hyderabad

Duration

Six months started from 07-04-2018 to 06-10-2018

Sample size

Prevalence of microalbuminuria in hypertensive patients was 23.21% [10] 95% Confidence level, margin of error 8% and the sample size required is 107 rounds off to 110 hypertensive patients.

Sampling Technique

Non-Probability Consecutive

Study Design

Descriptive Cross-sectional study

Sample Selection

Inclusion Criteria

- Age 20-70 years
- Either gender
- Hypertensive patients diagnosed as defined in operational definition
- Duration of disease ≥ 2 years

Exclusion Criteria patients with following conditions was excluded:

- Urinary Tract Infection (confirmed on urine culture)
- DM assessed on history and confirmed by physician's prescription
- Kidney failure assessed on medical record and confirmed by physician's prescription

- Chronic liver disease assessed on history and confirmed by physician's prescription
- Pregnant women assessed on history of amenorrhea

Data collection

The study was conducted post approval of College of Physicians and Surgeons Pakistan and Institutional review board of Liaquat University Hospital, Hyderabad. Patients on meeting the inclusion criteria, attending Department of Medicine, was enrolled in the study. The purpose procedure, risk and benefits of the study was explained, confidentiality was ensured and informed consent was obtained by the (PI). The PI interviewed the eligible patients to record demographics. History of duration of hypertension was noted, height was measured on stadiometer without shoes and weight was measured on standard bathroom scale in light clothes. A 24 hours urine was collected and send to the institutional laboratory for albumin. Presence of 30-300mg of albumin was considered as Microalbuminuria as per operational definition. This information as well as demographics

like age, marital status, educational status, economic status and duration of hypertension was noted and entered by the researcher into the proforma attached as annexure.

Data Analysis

Data was entered and analyzed on SPSS version 21. Age, duration of hypertension, height, weight, BMI and albumin level was presented as Mean \pm SD. Frequency and percentages was presented for gender, hypertension, residential status, marital status, educational status, economic status and microalbuminuria. Effect modifiers like age, gender, duration of hypertension, marital status, educational status, residential status and duration of hypertension was controlled through stratification. Post stratification, Chi square test was applied taken p value ≤ 0.05 as significant.

RESULTS

The mean age of the patients was 62.97 \pm 9.68 years (**Table 1**).

Majority of the patients (n=84, 76.40%) were presented with >60 years of age (**Figure 2**).

There were 52 (47.30%) males and 58 (52.70%) females (**Figure 3**).

Mean weight, height and BMI of the patients was 60.21 \pm 5.14kg, 1.54 \pm 0.06 m and 27.12 \pm 5.17kg/m² BMI (**Table 2-4**).

Majority of the patients (n=62, 56.40%) were presented with ≤ 30 kg/m² BMI (**Figure 4**).

Rural residence was found to be higher (n=74, 67.3%) as compared to urban (36, 32.7%) (**Figure 5**).

Educational status showed that majority of the patients were illiterate (n=41, 37.3%) patients followed by primary education (37, 33.6%) and more than equal to secondary (n=32, 29.1%) patients (**Figure 6**).

Socioeconomic status showed that majority of the patients (n=47, 42.7%) belonged to lower Socioeconomic status, followed by middle (n=39, 35.5%) and upper middle (n=24, 21.8%) patients (**Figure 7**).

Married patients were predominantly higher (n=85, 77.30%) as compared to unmarried (n=25, 22.70%) (**Figure 8**).

Mean duration of hypertension was found to be 7.27 ± 2.51 years (**Table 5**).

There were 62 (56.40%) patients with ≤ 7 years of duration of hypertension (**Figure 9**).

Mean albumin level was 144.26 ± 24.14 g/dl (**Table 6**).

Frequency of microalbuminuria was observed in 31 (28.2%) patients (**Figure 10**).

A significant difference of microalbuminuria was observed with education status (p-value < 0.001) whereas age (p-value 0.737), gender (p-value 0.568), BMI (p-value 0.280), residential status (p-value 0.605), economic status (p-value 0.244), and duration of hypertension (p-value 0.822) was found to be insignificant (**Table 7-13**).

Mean \pm SD	Minimum	Maximum
62.97 \pm 9.68	45	70

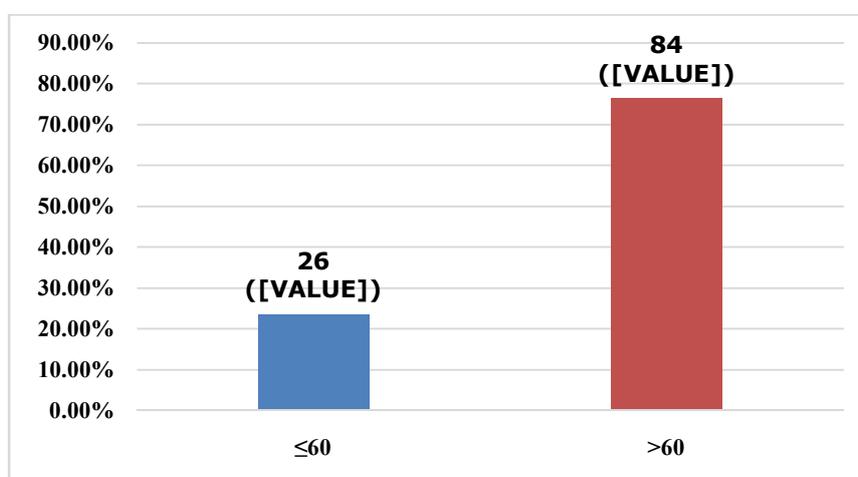


Figure 1: Age group of the patients (years) (n=110)

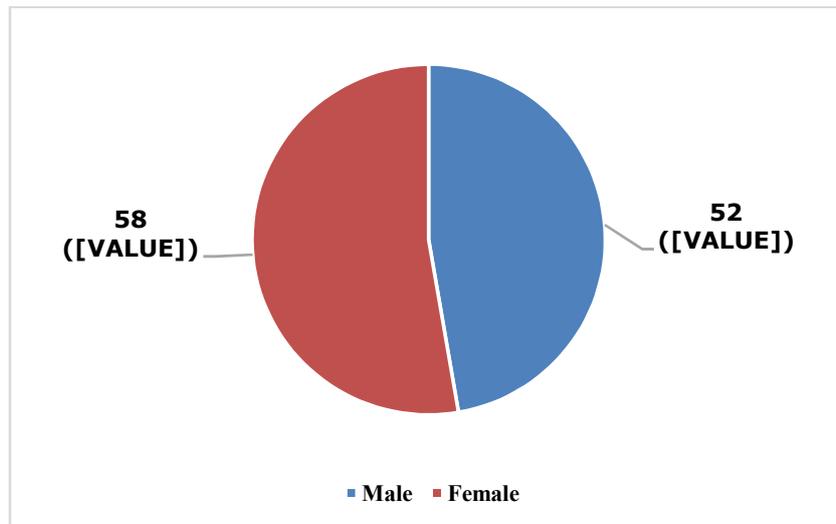


Figure 2: Gender distribution of the patients (n=110)

Table 2: Mean weight of the patients (Kg) (n=110)		
Mean \pm SD	Minimum	Maximum
60.21 \pm 5.14	53	68

Table 3: Mean height of the patients (m) (n=110)		
Mean \pm SD	Minimum	Maximum
1.54 \pm 0.06	1.51	1.63

Table 4: Mean BMI of the patients (kg/m ²) (n=110)		
Mean \pm SD	Minimum	Maximum
27.12 \pm 5.17	19.74	33.47

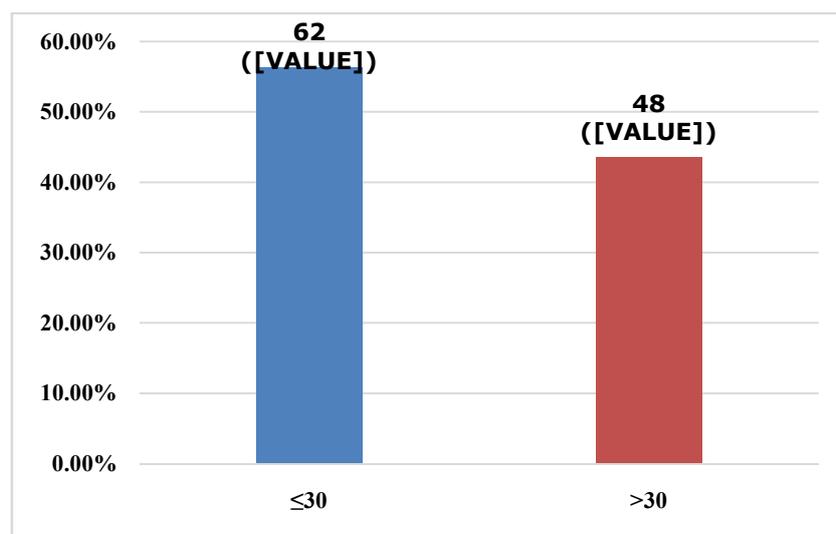


Figure 3: BMI distribution of the patients (kg/m²) (n=110)

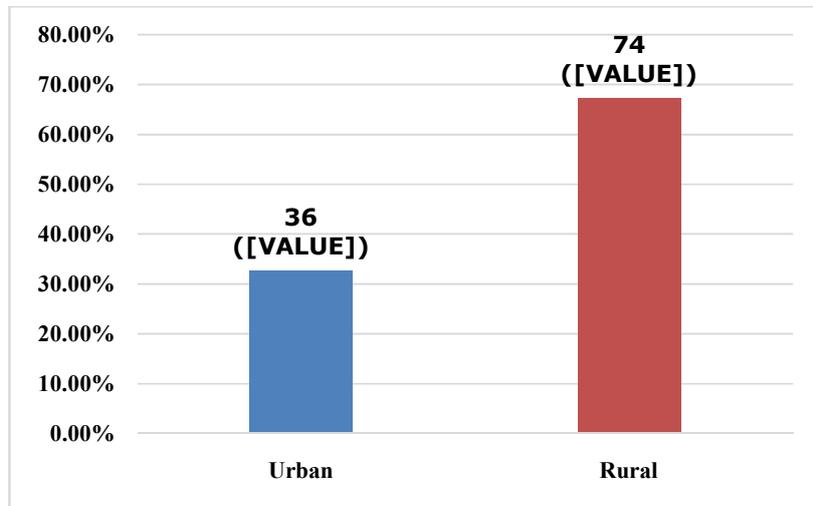


Figure 4: Residential status of the patients (n=110)

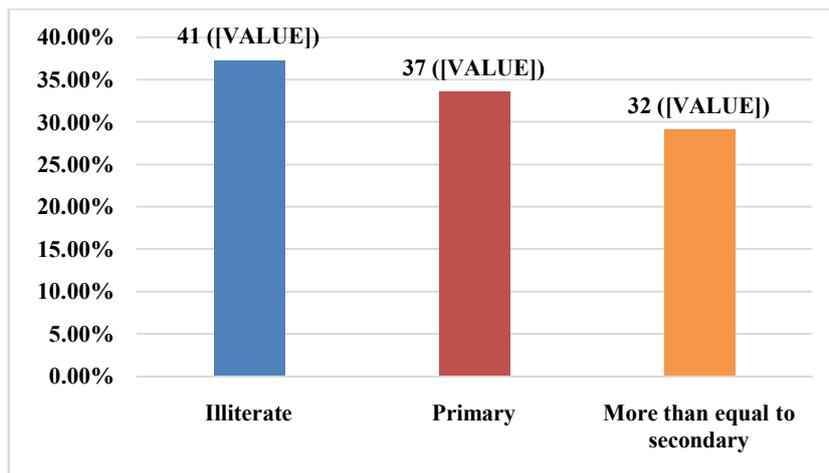


Figure 5: Educational status of the patients (n=110)

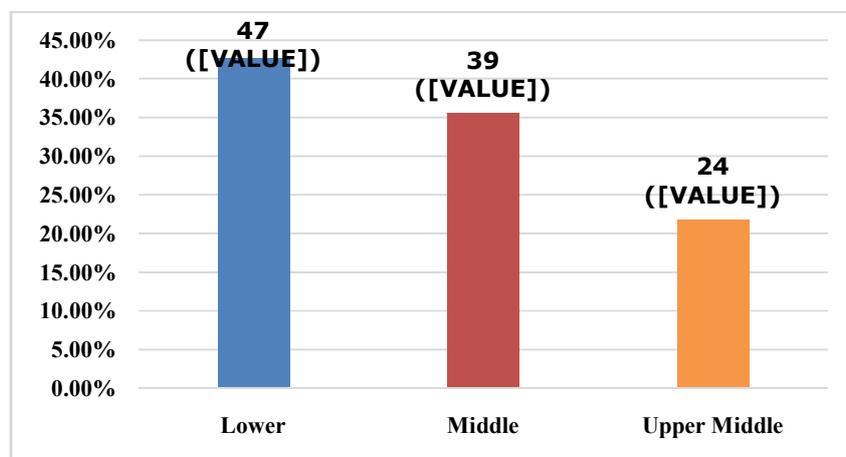


Figure 6: Economical status of the patients (n=110)

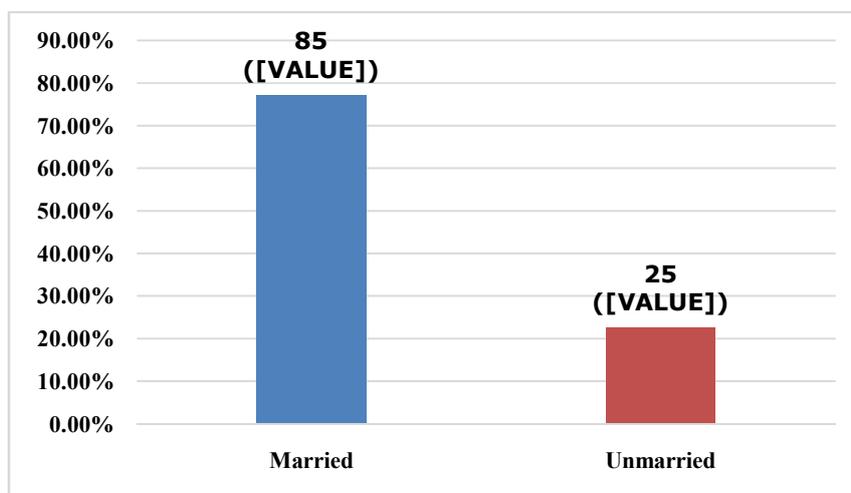


Figure 7: Marital status of the patients (n=110)

Mean \pm SD	Minimum	Maximum
7.27 \pm 2.51	4.01	12.18

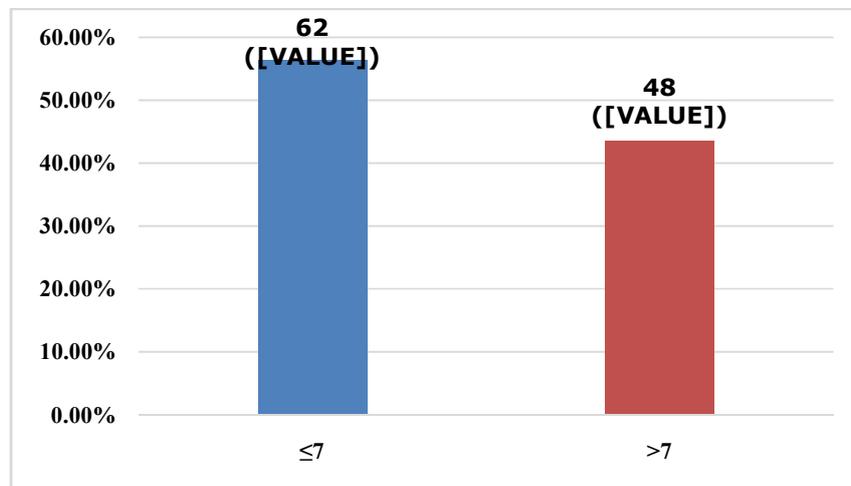


Figure 8: Duration of hypertension in years (n=110)

Mean \pm SD	Minimum	Maximum
144.26 \pm 24.14	4.08	284.52

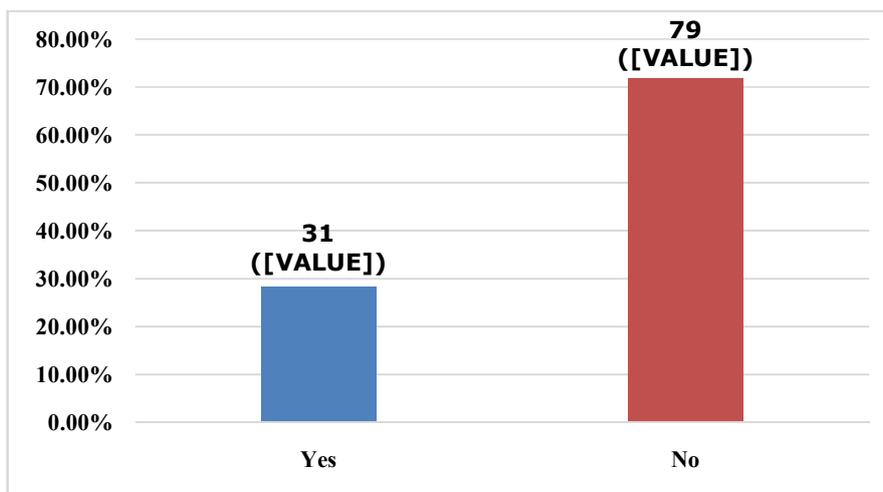


Figure 10: Frequency of microalbuminuria (n=110)

Table 7: Comparison of microalbuminuria with age of the patients (n=110)

Age, years	Microalbuminuria		Total	p-value
	Yes	No		
≤60	8 (30.8)	18 (69.2)	26 (100)	0.737
>60	23 (27.4)	61 (72.6)	84 (100)	
Total	31 (28.2)	79 (71.8)	110 (100)	

Table 8: Comparison of microalbuminuria with gender of the patients (n=110)

Gender	Microalbuminuria		Total	p-value
	Yes	No		
Male	16 (30.8)	36 (69.2)	52 (100)	0.568
Female	15 (25.9)	43 (74.1)	58 (100)	
Total	31 (28.2)	79 (71.8)	110 (100)	

Table 9: Comparison of microalbuminuria with BMI of the patients (n=110)

BMI	Microalbuminuria		Total	p-value
	Yes	No		
≤30	20 (32.3)	42 (67.7)	62 (100)	0.280
>30	11 (22.9)	37 (77.1)	48 (100)	
Total	31 (28.2)	79 (71.8)	110 (100)	

Table 10: Comparison of microalbuminuria with residential status of the patients (n=110)

Residential status	Microalbuminuria		Total	p-value
	Yes	No		
Urban	9 (25)	27 (75)	36 (100)	0.605
Rural	22 (29.7)	52 (70.3)	74 (100)	
Total	31 (28.2)	79 (71.8)	110 (100)	

Table 11: Comparison of microalbuminuria with educational status of the patients (n=110)

Educational status	Microalbuminuria		Total	p-value
	Yes	No		
Illiterate	6 (14.6)	35 (85.4)	41 (100)	<0.001
Primary	7 (18.9)	30 (81.1)	37 (100)	
More than equal to secondary	18 (56.3)	14 (43.8)	32 (100)	
Total	31 (28.2)	79 (71.8)	110 (100)	

Economic status	Microalbuminuria		Total	p-value
	Yes	No		
Lower	12 (25.5)	35 (74.5)	47 (100)	0.244
Middle	9 (23.1)	30 (76.9)	39 (100)	
Upper middle	10 (41.7)	14 (58.3)	24 (100)	
Total	31 (28.2)	79 (71.8)	110 (100)	

Duration of hypertension (in years)	Microalbuminuria		Total	p-value
	Yes	No		
≤7	18 (29)	44 (71)	62 (100)	0.822
>7	13 (27.1)	35 (72.9)	48 (100)	
Total	31 (28.2)	79 (71.8)	110 (100)	

DISCUSSION

Albuminuria is an early marker of diabetic nephropathy, and previous reports described the association between albuminuria and risk of adverse cardiovascular and kidney events.^{2,3} Both the presence of microalbuminuria and its extent became valuable instruments for risk stratification of hypertensive patients [4], since large trials showed conclusive evidence that early determination and treatment of microalbuminuria, as well as blood pressure control, can delay the onset and the complications of cardiovascular disease [5, 6].

The finding of this study showed that the frequency of microalbuminuria was observed in 31 (28.2%) patients with hypertension. Previous studies reported that among the patients with hypertension microalbuminuria was noted in 12(57.14%) of these patients [7]. A large percentage (53.2%) of the hypertensive patients had microalbuminuria

[8]. The overall prevalence of microalbuminuria was 42.8% in hypertensive patients [9]. The total number of patients having micro-albuminuria was 26 and the prevalence came out to be 23.21% in patients with essential hypertension [10].

The frequency of microalbuminuria found in this sample of hypertensive patients in a cardiological outpatient setting indicates that this cardiovascular risk factor is very common in clinical cardiology (67.83%). It was furthermore, substantially higher than found in studies on unselected persons in the general population, [11, 12] and patients in primary care. The HYDRA study in primary care, for example, [13, 14] has documented a prevalence of 21.2% of patients with hypertension and 37.8% of patients with both hypertension and diabetes. The global DEMAND study has documented a prevalence of MAU and hypertension of 39% in general practice [15].

Explanations for the higher prevalence of microalbuminuria in i-SEARCH may be as follows: the study population was older than in most previous studies, and 27.5% of the enrolled hypertensive patients were diabetic, whereas in other studies [16, 17], diabetic subjects were excluded. Patients with known albuminuria were also not excluded as was the case in the DEMAND study [18]. This and the high-risk cardiovascular population attending a cardiologist in comparison to those seeking primary care may account for the observed differences and the higher prevalence reported in the present study.

Comparing the Moroccan results to the global ones, it is apparent that the prevalence of microalbuminuria is higher in Morocco (67.83 vs 58.4%). Despite this, the estimated true prevalence by physicians in their patient cohort, its assessment and the use of this marker for therapeutic decisions is low. This finding has also been documented for general practitioners (HYDRA) [19]. It reflects a discrepancy between physician awareness of the prognostic importance of microalbuminuria and actual screening for microalbuminuria in cardiology practice.

Microalbuminuria was associated with a number of cardiovascular risk factors and disease in the present study. This observation is in line with previous data stemming from

population-based studies [20] and primary care [21, 22]. It indicates that microalbuminuria is common in patients referring to cardiology departments and is associated with a number of other cardiovascular risk factors. This association was previously described in clinical studies for males [23] and older patients [24], those with diabetes [25], obesity, smoking, insulin resistance syndrome, left ventricular hypertrophy, and left ventricular dysfunction.

CONCLUSION

The frequency of microalbuminuria was found higher in hypertensive patients presenting to a tertiary care hospital.

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