

EVALUATION OF PROTEINURIA BETWEEN URBAN AND RURAL WOMEN IN SHKODRA REGION

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Abstract - The aim of this study was to determine the prevalence of proteinuria and the risk factors related to it in rural and urban women. A sample of 315 hospitalized and ambulatory patients from Shkodra region, aged 18-88 years was interviewed and the following measurements were performed: blood pressure, body mass index, glycemia and urine protein. Of these, 118 (37.5%) were from the rural areas and 197 (62.5%) from urban areas. The data of the two groups were elaborated and the obtained results were compared.

The prevalence of proteinuria in the total number of the study subjects was 32.4%. In urban locations the prevalence of proteinuria, hypertension and diabetes were 27.9, 44.2 and 14.7% while in rural locations were 39.8, 44.1, and 13.6%, respectively. So, proteinuria was more prevalent among rural women, diabetes being less prevalent in rural areas while the prevalence of hypertension was the same in rural and urban areas. We found statistically significant relation of proteinuria with age, hypertension, diabetes, obesity and elementary education in the urban areas. While in the urban areas there was a significant relationship of proteinuria only with age and diabetes.

Index Terms - proteinuria, diabetes, hypertension, renal failure.

I. INTRODUCTION

Plasma proteins are essential components of any living being. The kidneys play a major role in the retention of plasma proteins, using renal tubules to reabsorb them as the proteins pass through the glomerular filtration barrier. Normal urine protein excretion is up to 150 mg/day. Therefore, the detection of abnormal quantities or types of protein in

the urine is considered an early sign of significant renal or systemic disease.

A wide variety of conditions, ranging from benign to lethal, can cause proteinuria. Benign causes include fever, intense activity or exercise, dehydration, oxidative stress, acute illness, and exposure to cold. More causes that are serious are kidney damages, like in glomerulonephritis and multiple myeloma [1].

In people with diabetes mellitus the identification of increased urinary albumin excretion allows the diagnosis of diabetic nephropathy. Recent studies suggest that low grades of proteinuria or microalbuminuria might be associated with early renal disease even in the no diabetic population [2].

Proteinuria increases with age and the duration and severity of hypertension [3]. There is evidence that both moderately and severely increased albuminuria are more common in black people than in white people. Prevalence of moderately increased albuminuria has also been shown to increase with increasing body mass index (BMI). Data from a population screening programme in Sheffield, UK, found that the prevalence increased from 3.1% in those with BMI <25%, to 27.2% in those with BMI >30 [4].

As in other developing countries, the prevalence of diabetes, hypertension and obese in Albania has increased rapidly in recent years and is likely to continue to increase in the future [5], with important impact in prevalence of proteinuria. The prevalence of microalbuminuria and the risk factors in patients with diabetes was study in Albania by Pasko et al [6].

Preventive health check-ups are very useful in early detection of types of illnesses and risk factors. Even more in developing countries as Albania the

public awareness and the level of information for these health problems is very low. For this reasons, according to Dimitrovska et al. [7], the check-ups have an important impact for health protection and control.

II. MATERIAL AND METHODS

In the study were enrolled 315 women aged 18-88 years hospitalized and ambulatory patients. The ambulatory patients include women who underwent health screenings in the regional hospital and private clinics of Shkodra city from October 2013 to November 2014. While hospitalized patients include women from the Nephrology Department. Pregnant and menstrual women are excluded. A validated questionnaire was administered to all participants who presented for health checkup.

The questionnaire collected information about their age, education, employment, residence, health status (diabetes, hypertension, medication) and anthropometric parameters – height and weight to calculate body mass index. Most of these data are also related with health, social and environmental questions. A fresh urine and blood sample were also collected from all subjects.

For the determination of the proteinuria in the urine samples have been used the following methods based on Henry [8]: the qualitative method with sulphosalicylic acid, the semi-quantitative method using dipstick urine, and the Heller method.

Hypertension was defined by an average of systolic blood pressure ≥ 140 mmHg or diastolic blood pressure ≥ 90 mmHg and/or concomitant use of antihypertensive medications by self-report (known hypertensive) [9]. The body mass index (BMI) was calculated from weight and height measures as weight (kg) divided by the square of height (m^2) and was categorized as not obese (< 25), overweight (25–29.9) or obese (≥ 30) according to the 2000 WHO criteria [10]. Diabetes was ascertained either by self-reported physical diagnosis or by a measure of fasting blood sugar ≥ 126 mg/dl. Serum glucose level in the study subjects was measured through the methods described by Trinder [11]. On the basis of education level, subjects were divided into three categories elementary, middle and high school. Another division was also according to the residence, in rural and urban areas.

Data analyses and calculation were performing by using the Statistical Package for the Social Sciences (SSPS for windows, version 21). The categorical data were interpreted using percentages, and continuous variables by mean \pm standard

The main purpose of the study was to detect the prevalence of proteinuria in rural and urban women and it's relation with hypertension, diabetes, obesity and education in both locations.

deviation. Chi-squared test was used to determine the association between categorical variables. Student t-test was used for association of continuous variables. The p-value of less than or equal to 0.05 was considered significant.

III. RESULTS AND DISCUSSION

A total of 315 patients participated in the study. Of these, 202 (64.1%) were ambulatory patients and 113 (35.9%) were hospitalized patients. The prevalence of proteinuria in the total number of the study subjects was 32.4% (Table 1). This prevalence resulted 7.9% in ambulatory patients and 76.1% in hospitalized patients and the difference was statistically significant ($p < 0.05$).

Of 118 rural women 47 (39.8%) developed proteinuria while from 197 urban women 55 (27.9%) developed proteinuria. So, proteinuria was more prevalent in rural than in urban residents (Table1). This difference in prevalence observed between rural and urban areas may reflect differences in lifestyle and nutrition.

In the Table 2 are shown some characteristics of rural and urban patients. The age, BMI, hypertension, diabetes level, education and residence of the rural and urban patients are expressed as number and percentage. About 53 % of the study subjects in urban but also in rural were over 50 years. The proteinuria was more prevalent among women aged over 50 years compared with those in younger age. This is found in urban and rural areas.

We observed a statistically significant difference between prevalence of proteinuria and body mass index (BMI) in the urban areas. So, proteinuria was more common among obese women (42.5%) and overweight (28.9%) compared with those with normal body mass index (BMI) (19.8%). Proteinuria was more common also among obese and overweight rural women compared with those with normal body mass index but with no significant difference ($p = 0.368$).

The prevalence of hypertension in rural areas (44.1%) resulted to be almost the same as the urban areas (44.2%). We found statistically significant relation between prevalence of proteinuria and hypertension in the urban areas. The prevalence of proteinuria was about three times higher among

hypertensive urban women (43.7 %) compared with non hypertensive urban women (15.5%).

TABLE 1. THE DATE ABOUT THE PREVALENCE OF PROTEINURIA

	Total n (%)	Proteinuria n (%)		p
		Negative	Positive	
Ambulatory	202 (64.1)	186 (92.1)	16 (7.9)	0.000
Hospitalized	113 (35.9)	27 (23.9)	86 (76.1)	
Residence				0.029
Rural	118 (37.5)	71 (60.2)	47 (39.8)	
Urban	197 (62.5)	142 (72.1)	55 (27.9)	
Total	315	213(67.6)	102(32.4)	

In the study the prevalence of diabetes was found to be high among rural women (14.7%) compared with urban women (13.6%). Regarding the relation between the prevalence of proteinuria and diabetes, it was higher among diabetic women compared with non diabetic women. This is found in urban and rural areas with significant difference.

The prevalence of proteinuria in urban and rural areas was reduced by increasing the level of education, being more frequent among women with elementary education, common among those with

middle education and lowest among those with high education.

Our study generated data regarding the mean values of anthropometric and laboratory parameters of the study subjects (Table 3.4). Some statistically significant differences between women with and without proteinuria were observed. So, women who developed proteinuria were older in both rural and urban areas (mean 55.5±16.6 vs. 47.5±13.2 and 56.8±15.7 vs. 47.2±14, respectively).

TABLE 2. CHARACTERISTICS OF RURAL AND URBAN POPULATION

	RURAL				URBAN			
	Total n (%)	Proteinuria n (%)		p	Total n (%)	Proteinuria n (%)		p
		Negative	Positive			Negative	Positive	
Age group (years)								
<50	56 (47.5)	42 (75)	14 (25)	0.002	93 (47.2)	77 (82.8)	16 (17.2)	0.002
≥50	62 (52.5)	29 (46.8)	33 (53.2)		104 (52.7)	65 (62.5)	39 (37.5)	
BMI (kg/m ²)								
normal	47 (38.8)	31 (66)	16 (34)	0.368	81 (41.1)	65 (80.2)	16 (19.8)	0.031
overweight	48 (40.7)	30 (62.5)	18 (37.5)		76 (38.7)	54 (71.1)	22 (28.9)	
obese	23 (19.5)	10 (43.5)	13 (56.5)		40 (20.3)	23 (57.5)	17 (42.5)	
Hypertension								
Yes	52 (44.1)	27 (51.9)	25 (48.1)	0.104	87 (44.2)	49 (56.3)	38 (43.7)	0.000
No	66 (55.9)	44 (66.7)	22 (33.3)		110 (55.8)	93 (84.5)	17 (15.5)	
Diabetes								
Yes	16 (13.6)	6 (37.5)	10 (62.5)	0.046	29 (14.7)	11 (37.9)	18 (62.1)	0.000
No	102 (86.4)	65 (63.7)	37 (36.3)		168 (85.3)	131 (78)	37 (22)	

Education level								
Elementary	65 (55.1)	37 (56.9)	28 (43.1)	0.295	59 (30)	35 (59.3)	24 (40.7)	0.010
Middle	42 (35.6)	25 (59.5)	17 (40.5)		80 (40.6)	58 (72.5)	22 (27.5)	
High	11 (9.3)	9 (81.8)	2 (18.2)		58 (29.4)	49 (84.5)	9 (15.5)	

TABLE 3. ANTHROPOMETRIC AND LABORATORY DATA FOR URBAN PATIENTS

	Total ± SD	Proteinuria ± SD		p
		Negative	Positive	
Age (years)	49.7 ± 15.1	47.2 ± 14.1	56 ± 15.7	0.000
Height (cm)	1.63 ± 0.06	1.63 ± 0.06	1.63 ± 0.05	0.908
Weight (kg)	69.8 ± 12.5	67.9 ± 11.6	74.6 ± 13.6	0.001
BMI (kg/m ²)	26.3 ± 3.4	25.5 ± 3.9	28.1 ± 5.2	0.000
Systolic BP (mmHg)	123.2 ± 16.3	120 ± 13.7	131.5 ± 19.6	0.000
Diastolic BP (mmHg)	76.3 ± 8.8	74.2 ± 7.9	81.6 ± 8.7	0.001
Glucose (mg/dl)	106 ± 36.2	98.2 ± 21.9	126.1 ± 54.1	0.001

TABLE 4. ANTHROPOMETRIC AND LABORATORY DATA FOR RURAL PATIENTS

	Total ± SD	Proteinuria ± SD		p
		Negative	Positive	
Age (years)	50.7 ± 15.1	47.5 ± 13.2	55.5 ± 16.6	0.004
Height (cm)	1.63 ± 0.06	1.63 ± 0.06	1.63 ± 0.06	0.85
Weight (kg)	70.5 ± 12.1	69 ± 11.5	72.8 ± 12.8	0.097
BMI (kg/m ²)	26.5 ± 3.99	25.9 ± 3.7	27.4 ± 4.3	0.044
Systolic BP (mmHg)	129.2 ± 18.4	124.2 ± 16.7	136.8 ± 18.5	0.000
Diastolic BP (mmHg)	79.7 ± 10.5	77.1 ± 10	83.6 ± 10	0.001
Glucose (mg/dl)	112.7 ± 53.4	99.9 ± 25.7	132.2 ± 75	0.001

The mean value of the weight for the urban women was 69.8±12.5 and had a significant difference in the mean value of the weight among women with and without proteinuria. While for the rural women the mean value of the weight was 70.5±12.1 and had no significant difference between women with and without proteinuria. In this study the

mean value of the length for the women with proteinuria was found to be no significant comparing with those without proteinuria. Subject with proteinuria had significantly higher SBP, DBP, BMI and glucose in both urban and rural women.

Age is recognized risk factor for renal disease [12]. This is attributed partly to glomerular

obsolescence and decreased renal vascular flow [13]. Our finding that age of ≥ 50 years was significantly associated with proteinuria is consistent with published studies. Several studies already demonstrated the relationship between hypertension and proteinuria. For examples in prospective studies, such as Multiple Risk Factor Intervention Trial (MRFIT), each 9-mmHg increase in DBP was associated with an OR of 1.37 for the presence of changes similar to those observed in diabetic nephropathy [17].

In both type 1 and type 2 diabetes, the albumin in the urine is one of the first signs of deteriorating kidney function. As kidney function declines, the amount of albumin in the urine increases. The United Kingdom Prospective Diabetes Study (UKPDS) also showed that a reduction in blood pressure from 154/87 to 144/82 mm Hg was associated with an absolute risk reduction of developing microalbuminuria of 8% over six years in patients with type 2 diabetes.

IV. CONCLUSION

Our study provides interesting information about the prevalence of proteinuria, in urban and rural areas examining a variety of independently factors. Through elaboration of the data we have reached clear conclusions regarding the objective assessment of proteinuria control.

The groups with higher risk: women over 50 years old, diabetic, hypertensive and obese needs to undertaken awareness campaigns to sensitize them on the importance of the systematic control of urine analysis for the detection proteinuria. This enables a more efficient management of patient health status.

Given that the presence of proteinuria can dramatically increase the level of morbidity and mortality from chronic diseases shows that it is an issue of concern to public health, and it must take measures to reduce its prevalence.

V. REFERENCES

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