



EVALUATION OF LEVELS OF PROTEINURIA IN ELDERLY PATIENTS OF CHRONIC HYPERTENSION ASSOCIATED WITH OTHER HORMONAL DISORDERS LIKE DIABETES AND THYROID

Community Medicine

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ABSTRACT

Background: Elevated BP leads to the risk of stroke and coronary heart disease, heart failure, peripheral vascular disease, renal impairment, retinal haemorrhage, and visual impairment. Proteinuria is a marker of renal and cardiovascular disease and mortality in diabetic and nondiabetic hypertensive patients. **Aims and Objectives:** (i) To estimate the levels of proteinuria in elderly patients with chronic hypertension associated with other hormonal disorders like diabetes and thyroid. (ii) To determine risk factors associated with the disease. **Settings And Design:** A cross-sectional study was conducted from April to June 2021 among 200 elderly patients attending General Medicine OPD at Katuri Medical College and Hospital with a history of chronic hypertension in association with diabetes and thyroid disorders. Mid-stream urine samples were collected by simple random technique from the patients and examined using the dipstick method for spot albuminuria. Data analysis was done using SPSS software version 20. **Results:** Out of 200, 168 showed a positive result to urine dipstick and were sent for microalbuminuria estimation. There is a statistically significant association between smoking and proteinuria; alcohol and proteinuria with p values of 0.043 and 0.039 respectively. There is no positive correlation between BMI & proteinuria. **Conclusion:** There is a raise in the trend of proteinuria in hypertensive patients with associated hormonal disorders.

KEYWORDS

proteinuria, hypertension, diabetes, thyroid, dipstick test

INTRODUCTION:

Hypertension is a major public health problem due to its high prevalence all around the globe^[1]. Around 7.5 million deaths or 12.8% of the total of all annual deaths worldwide occur due to high blood pressure^[2]. Elevated BP is positively correlated with the risk of stroke and coronary heart disease. Overall, the prevalence of hypertension was higher in men (34.6%) than in women (30.8%). However, after the age of 60 years, hypertension was more prevalent in females than in males.^[3]

Changes in lifestyle and diet habits following urbanization are indeed greatly contributing to increased obesity, diabetes, and dyslipidemia.^[4] These global changes are now expected to increase also the potential health burden of kidney damage.^[5] The common risk factors shared by kidney damage and cardiovascular diseases support the focus on diabetes and hypertension as an adequate strategy to deal with kidney damage also in developing countries^[6]. In addition to kidney function, the severity of CKD is also defined by urine protein excretion. It is reported that proteinuria may cause urinary loss of thyroid hormones bound to the various binding proteins such as thyroxine-binding globulin (TBG), albumin, prealbumin, and transthyretin^[6], which result in the reduction of the serum thyroid hormone levels.^[7]

The prevalence of diabetes continues to increase which leads to an increase in the development of diabetic nephropathy (DN)^[8]. As one of the main microvascular complications of diabetes, DN is the leading cause of end-stage renal disease (ESRD), which contributes to a significant increase in morbidity and mortality in diabetic patients^[9]. One of the characteristics of DN is the development of albuminuria, which is followed by a progressive decline in kidney function. When persistent albuminuria occurs, conventional therapies (such as smoking cessation, and improved glycemic and blood pressure control) may not be able to fully terminate the progression of DN^[10]. Hence this study is mainly intended to evaluate the levels of proteinuria in hypertensive individuals associated with other disorders like diabetes and thyroid in order to identify the risk factors and to monitor its progression, which will improve the treatment efficacy and reduce individual and socioeconomic burdens of the disease.

Aim:

To evaluate the levels of proteinuria in elderly patients with chronic hypertension associated with other hormonal disorders like diabetes and thyroid.

Objectives:

- To estimate the levels of proteinuria in elderly patients with chronic hypertension, chronic hypertension with diabetes, chronic hypertension with diabetes and thyroid (hypothyroidism), chronic hypertension and thyroid (hypothyroidism)
- To determine risk factors associated with the disease.

Methodology:

Study Design: Cross-sectional study

Study Period: April to June 2021

Place Of Study: Katuri medical college and Hospital, Guntur

Study Population: elderly patients with chronic hypertension associated with other hormonal disorders like diabetes and thyroid.

Study Tool:

- spot albuminuria by dip stick method
- micro- albuminuria using micro- albuminuria kit

Sample Size: 200

Sampling Technique: simple random technique

Inclusion Criteria:

- Elderly patients with chronic hypertension of at least nearly 3-4 years, and other hormonal disorders like diabetes and thyroid of at least 1 year.
- Patients who gave their consent.

Exclusion Criteria:

- Patients with acute hypertension (suffering for below 1 year).
- Patients with other nephrotic disorders and other diseases that cause proteinuria.
- Patients who are suffering from urinary tract infections and bladder disorders.

Sampling Scheme:

Mid-stream urine samples were collected from the patients attending General Medicine OPD and examined using the dipstick method for spot albuminuria by taking their consent. The reports are collected and examined. The final results were differentiated into different categories as mentioned according to the objectives.

Data Analysis:

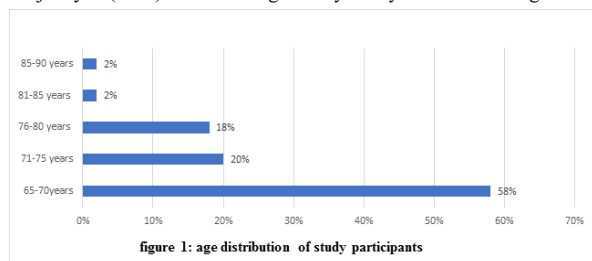
Data was collected and entered into Microsoft excel. Further, the data was analyzed by appropriate statistical tests (Chi-square test, Pearson Correlation test, ANOVA) using SPSS software version 20.

Ethical Clearance:

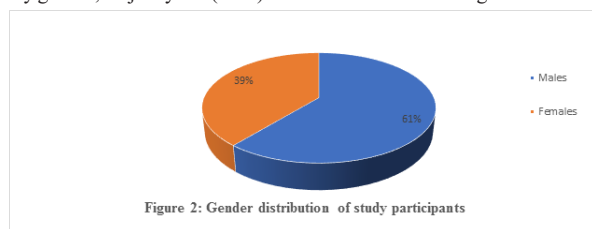
Ethical clearance was obtained from the Institutional Ethical Committee of Katuri medical college and Hospital, Guntur.

RESULTS:**Section 1: Socio-demographic profile**

Out of 200 sample sizes, 168 showed a positive result for urine dip sticks and were sent for microalbuminuria estimation. By age, Majority 97(58%) were in the age of 65yrs-70yrs as shown in fig 1.



By gender, majority 103(61%) were males as shown in fig 2.



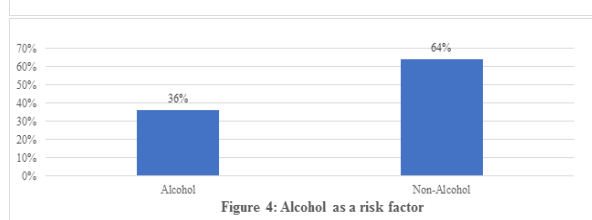
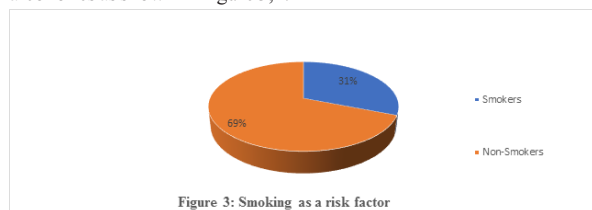
The mean $\pm$ S.D values of proteinuria among males and females were found to be 341.17 ± 68.79 and 312.98 ± 56.13 respectively. There is a statistically significant association found between gender of study participants and proteinuria as shown in table 1.

Table 1: Gender

Gender	Count	Proteinuria (Mean $\pm$ SD)	P-Value
Males	103 (61%)	341.17 ± 68.79	0.003
Females	65(39%)	312.98 ± 56.13	

Section 2: Associated Risk factors:

Out of total 168 patients, 52(31%) were smokers, 62(36%) were alcoholics as shown in Figure 3,4.

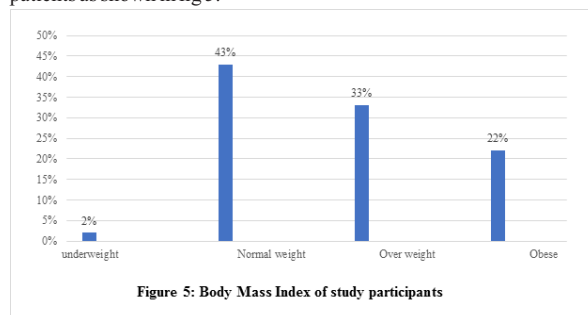


There is a statistical association between smoking and proteinuria with significant p value 0.043 and between alcohol and proteinuria with significant p value of 0.039 as shown in table 2.

Table 2: Associated Risk Factors

Risk Factors	Count	Proteinuria (Mean $\pm$ SD)	P-Value
Smokers	52(31%)	352.26 ± 66.62	0.043
Non-Smokers	116(69%)	327.87 ± 68.82	
Alcohol	62(36%)	348.62 ± 68.47	0.039
Non-Alcoholic	106(64%)	322.78 ± 66.82	

BMI: Out of 168 patients, majority 72(43%) were normal weight patients as shown in fig 5.



The mean $\pm$ S.D of proteinuria among underweight, normal weight, overweight, obese patients was found to be 377.80 ± 104.41 , 326.23 ± 65.80 , 334.62 ± 65.98 , 326.37 ± 58.80 respectively as shown in table 3.

Table 3: Mean values of BMI of study participants

BMI	Study participants	Proteinuria (Mean $\pm$ S.D)
underweight	3(2%)	377.80 ± 104.41
Normal weight	72(43%)	326.23 ± 65.80
Overweight	56(33%)	334.62 ± 65.98
Obese	37(22%)	326.37 ± 58.80

There is a no positive correlation found between BMI and proteinuria as shown in table 4.

Table 4: Correlation between BMI (Body Mass Index) and proteinuria:

Body Mass Index		Under weight	Normal Weight	Over Weight	Obese
	Proteinuria (Mean $\pm$ S. D)	377.80 ± 104.41	326.23 ± 65.80	334.62 ± 65.98	326.37 ± 58.80
Underweight		1.0	1.103	0.18	0.096
Normal Weight		1.103	1.0	0.438	0.991
Over Weight		0.18	0.438	1.0	0.507
Obese		0.096	0.991	0.507	1.0

Section 3: Disease category:

Out of 168 patients, 55(33%) were hypertensives, 76(45%) were hypertensives with diabetes, 24(14%) were hypertensives with diabetes and thyroid, 13(8%) were hypertensives with thyroid as in table 5.

Table 5: Percentage Of Disease Category

Disease category	Percentage%
Hypertensives	55(33%)
Hypertensives with Diabetes	76(45%)
Hypertensives with Diabetes and Thyroid	24(14%)
Hypertensives with Thyroid	13(8%)

The 168 patients are divided into four different categories: (a) Hypertensives with maximum and minimum values of 298mcg and 211mcg of proteinuria respectively, (b) Hypertensives and diabetes with maximum and minimum values of 376mcg and 295mcg of proteinuria respectively, (c) Hypertensives with diabetes, thyroid with maximum and minimum values of 456 mcg and 320 mcg of proteinuria respectively, (d) Hypertensives with thyroid with maximum and minimum values of 345mcg and 246mcg of proteinuria respectively. The mean $\pm$ S.D of proteinuria among hypertensives, hypertensive with diabetes, hypertensive with diabetes and thyroid, hypertensive with thyroid was found to be 262.52 ± 26.70 , 364.26 ± 21.46 , 401.38 ± 51.72 , 293.12 ± 34.05 respectively. There is also a statistical association among disease categories and proteinuria among study participants as shown in table 6.

Table 6: Statistical association among disease categories and

proteinuria among study participants

Disease Category	Minimum value	Maximum value	Mean±S.D of proteinuria	P value
Hypertensives	211	298	262.52±26.70	0.001
Hypertensives with Diabetes	295	376	364.26±21.46	
Hypertensives with Diabetes and thyroid	320	456	401.38±51.72	
Hypertensives with thyroid	246	345	293.12±34.05	

Duration Of Hypertension

Out of 168 patients, majority 58(34.5%) were with hypertension since 6yrs-10yrs as shown in figure 6.

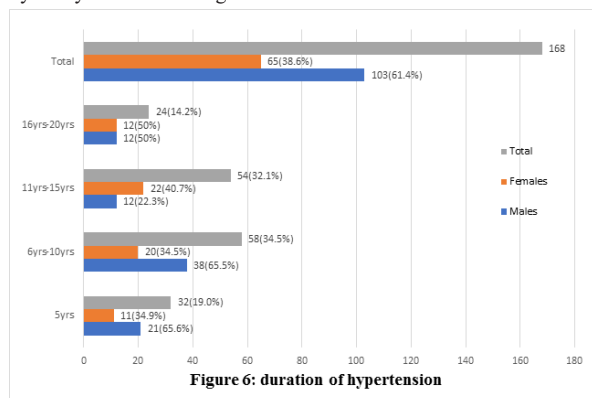


Figure 6: duration of hypertension

DISCUSSION:

In the present study, out of 200 patients, 168 showed a positive result for urine dipstick and were sent for Microalbuminuria estimation. Out of 168, 103(61%) were males, 65(39%) were females. 52(31%) were smokers, 62(36%) were alcoholic. There is a marked association observed between proteinuria and diseased patients with risk factors like smoking and alcohol. There is also a statistical association between disease categories and proteinuria among study participants.

Similar findings were also found in a study done by Sabharwal RK et al showed out of 174 urine dipstick-negative hypertensives, 58 (33.3%) patients were found to have urinary albumin excretion. The prevalence of microalbuminuria in males and females was found to be 34% and 30.7% respectively. No correlation was found between the Body Mass Index (BMI) and albumin excretion ($r^2 = 0.0271$) and between the duration of hypertension and microalbuminuria ($r^2 = 0.0042$). The prevalence of microalbuminuria in non-smokers and non-alcoholic hypertensives was 20%. The prevalence in alcoholics, smokers, and both smokers and alcoholics was found to be 35%, 42%, and 41% respectively.^[10]

A study by Gupta RK et al found that the microalbuminuria excretion rate corresponds to the number of cigarettes smoked per day. Individuals who smoked <20 cigarettes/day and individuals who smoked >20 cigarettes/day, respectively, showed a dose-dependent association between smoking and high urine albumin excretion (relative risk: 1.33 and 1.98) and microalbuminuria (relative risk: 1.92 and 2.15).^[11]

In the present study, there was no positive correlation found between Body Mass Index and proteinuria. Contrast findings were noted in a study conducted by Erman O et al stated that the relation between proteinuria and albuminuria is not a straight line. Proteinuria at a range of 162-300 mg/24 hours was found to be linearly and significantly correlated to urinary albumin excretion ($P < 0.001$, $r = 0.58$). Proteinuria cut off, based on albuminuria cut off of 30 mg/24 hours, was found to be 160.5 mg/24 hr. Body mass index (BMI) was the sole predictor of proteinuria above 160.5 mg/24 hr.^[12] A study by Battaglia Y et al stated that proteinuria was present in 14.8, 13.8, 14.7, and 14.7% of all normal weight, overweight, obese, and all subjects, respectively.^[13]

CONCLUSION:

There is a raise in the trend of proteinuria in hypertensive patients associated with other hormonal disorders. There is no positive correlation observed between Body mass index and proteinuria. Health Education regarding preventive measures, lifestyle

modification, and proper medication can help to reduce disease progression and further complications. In regard to all the above-mentioned aspects, there is a need to encourage research in this field considering many other parameters as non-communicable diseases like hypertension, diabetes, and thyroid are on the raising trend of occurrence in the world without a proper cure.

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