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Study of Undiagnosed Hypertension and Proteinuria In The Region Of Northern Part Of India

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Abstract
Background- *We conducted free medical examination and screening for evaluation of the magnitude of undiagnosed hypertension and proteinuria.*
Methods- *Present study was conducted from August-2020 to April-2021 at Department of General Medicine PDU Medical College, Churu , Rajasthan. Participants were taken through a brief medical history and had their socio-demographic data taken. Weight and height were measured and body mass index (BMI) calculated. Blood pressure (BP) was measured using a mercury sphygmomanometer and urinalysis was done with the aid of dipstick test.*
Results- *The BMI ranged between 16.2 and 44.36 kg/m2 (Mean ± SD; 26.12 ± 6.16 kg/m2). 111 participants (22.2%) had proteinuria while only 38 (7.6%) had glycosuria. A significantly higher percentage of participants with stage-1 and stage-2 hypertension had proteinuria compared with non-hypertensive subjects. Similarly a significantly higher percentage of participants with stage-1 hypertension had glycosuria compared with non hypertensive participants.*
Conclusion- *This study demonstrated the high prevalence of undiagnosed hypertension and proteinuria in our population. Age significantly correlated with BP. Therefore, community screening for these potentially disabling non-communicable diseases as well as institution of lifestyle modifications should be encouraged.*
Keywords- *Hypertension, Kidney Disease, Proteinuria.*

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I. Introduction

Hypertension, diabetes and proteinuria have enormous public health significance in both developed and developing countries because these conditions are associated with increased risks of developing complications, such as cardiovascular disease (CVD) and chronic kidney disease.[1]

Non-communicable diseases (NCD) account for nearly 60% of all deaths. According to a recent report from the World Health Organization (WHO), India has a high burden of hypertension among the adult population in rural areas, with an estimated prevalence of 25%. [2]

Proteinuria commonly occurs in concert with hypertension in people with chronic kidney disease (CKD). The spectrum of albuminuria, from microalbuminaria (>30 but <300 mg per day) to macroalbuminuria (proteinuria) (>300 mg per day) is associated with a linear increase in risk of cardiovascular events.[3] Microalbuminuria correlates with the magnitude of C-reactive protein (CRP) elevations and has also been associated with a failure of nocturnal drops in arterial pressure, insulin resistance, as well as abnormal vascular responsiveness to a variety of stimuli.[4] Thus, its presence indicates abnormal responses by vascular tissue, perhaps because of underlying inflammatory responses. Together, these data support the concept that microalbuminuria is associated with increased cardiovascular risk and that proteinuria represents even higher cardiovascular risk with high risk for progression to end-stage kidney disease.

Whereas most studies focus on the association between baseline proteinuria and kidney disease progression, others have concentrated on the impact of proteinuria and associated changes in vascular compliance. However, these later studies have focused on microalbuminuria rather than higher levels of proteinuria. In one study of 70 newly diagnosed patients with hypertension demonstrated higher values of carotid-femoral pulse wave velocity (PWV) in those with microalbuminuria. This difference remained statistically significant, even after correction for 24-hour systolic and diastolic blood pressure (BP), and body mass index. Moreover, a tight correlation was found between urinary albumin excretion and carotid-femoral PWV.[5, 6]

II. Material And Methods

All participants (500 subjects) were recruited August-2020 to April-2021 at Department of General Medicine PDU Medical College, Churu , Rajasthan, after an informed consent. They were taken through a medical history and had their socio-demographic data recorded.

The BP was measured on the left arm using a mercury sphygmomanometer at heart level using appropriate cuff size. The subjects were allowed to relax for 3-5 minutes in a sitting position before assessment of BP.

Hypertension was defined as a systolic blood pressure ≥140 mmHg or diastolic blood pressure ≥ 90 mmHg and/or commitant use of antihypertensive medications by self report.[7] Blood Pressure was categorized according to the Seventh Joint National Committee Report on Detection, Evaluation and treatment of High Blood pressure.[7]

The categories were as follows;

Normal: systolic BP (SBP) <120 and diastolic BP (DBP) <80 mm of Hg, prehypertensive: SBP 120-139 or DBP 80-89 mm of Hg, stage-1: SBP 140-159 or DBP 90-99 mm of Hg and stage-2:SBP≥160 and DBP ≥110 mm of Hg.

Subjects were instructed on modality of collecting midstream urine specimen. Menstruating females were excluded from urinalysis. The participants thereafter provided urine samples which were tested using urinary medi-test Combi 2 test strips (Macherey-Nagel, Germany). Blood glucose was not assessed as the majority of participants had taken breakfast before the screening.

Weights were taken using bathroom scale (Hana Weighing Scale, China) after removal of shoes and heavy clothings, while the heights were recorded using stadiometer. The body mass index (BMI) was calculated from the measured weight (in kilograms) and height (in meters).

Data analysis

Data was analyzed using SPSS package version 20. Results are presented as frequencies and proportions or mean ± SD. Chi-square and Fishers exact tests were used for comparison of data where appropriate. Bivariate linear regression analysis was used to determine the association between anthropometric parameters and hypertension. P-value <0.05 indicates statistical significance.

III. Results

A total of 500 participants were screened. Their age ranged between 14-85 years (mean ± SD; 50.21 ± 16.32 Yrs). There was female preponderance with 320 of participants (64.00%) being females. The BMI ranged between 16.2 and 44.36 kg/m2 (Mean ± SD; 26.12 ± 6.16 kg/m2). 111 participants (22.2%) had proteinuria while only 38 (7.6%) had glycosuria. A significantly higher percentage of participants with stage-1 and stage-2 hypertension had proteinuria compared with non-hypertensive subjects. Similarly a significantly higher percentage of participants with stage-1 hypertension had glycosuria compared with non hypertensive participants.

Table 1: Distribution of proteinuria and glycosuria according to blood pressure category

Test		**Normal (n=350)**	**Stage I HT (n=92)**	**Stage II HT (n=58)**	**p-value**
proteinuria	+	43	34	34	0.001
	_	307	58	24	
Glycosuria	+	22	18	4	0.04
	_	328	74	54	

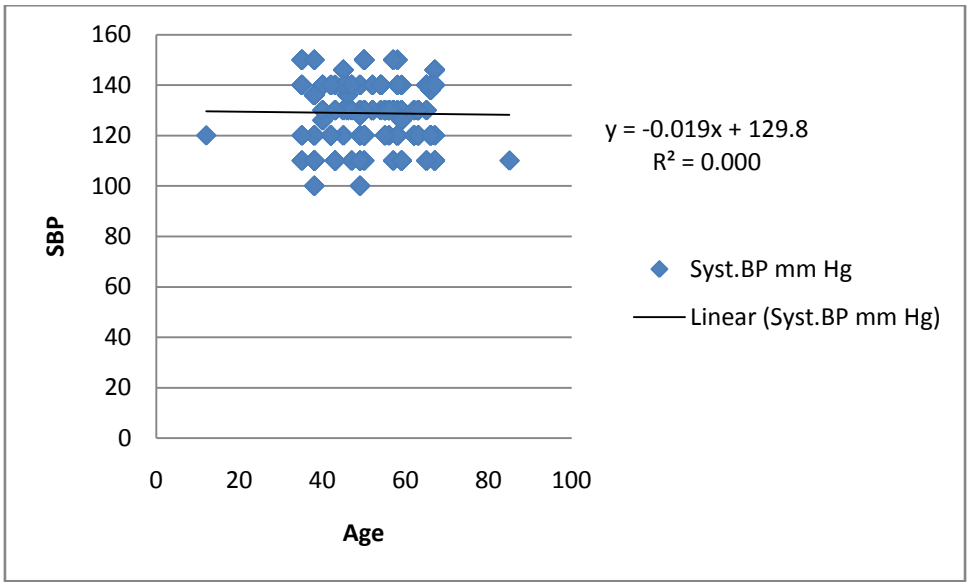

Figure 1: Correlation between age (years) and systolic BP (mmHg)

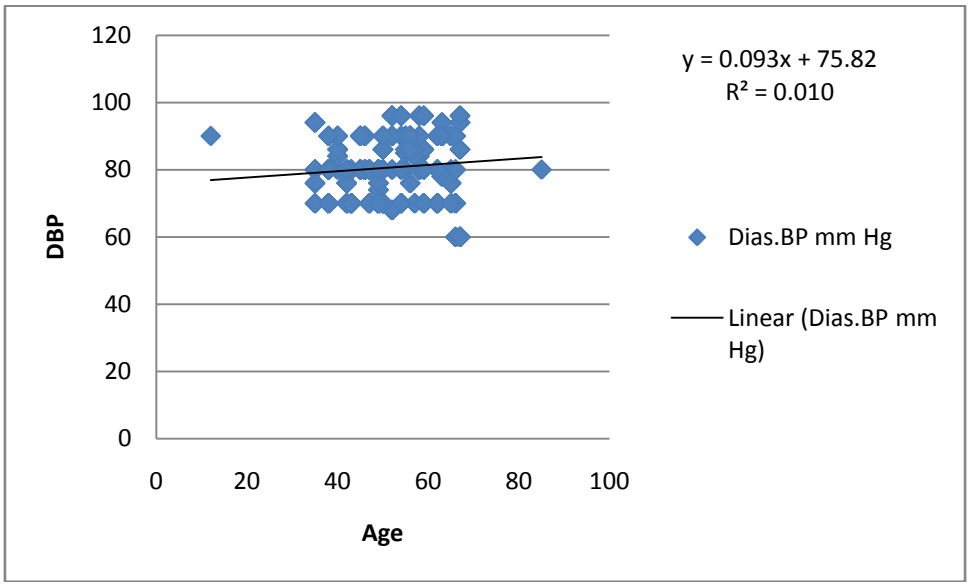

Figure 2: Correlation between age (years) and diastolic BP (mmHg)

IV. Discussion

Hypertension and CKD are assuming epidemic proportions globally and both contribute significantly to cardiovascular morbidity and mortality in developed and developing economies.[2,3]

Prevalence of hypertension in India varies between 11 and 35.00% in available data sources and one third of hypertensive subjects are unaware of their hypertensive status. [7,8] About 30.00% of participants in this study had hypertension which was severe in 11.6%. Our findings are in agreement with the findings of Ulasi et al [7] who found a prevalence of hypertension of 32.8% in their population based survey. These figures are higher than earlier reports from this environment and this may probably be a consequence of the high prevalence of overweight and obese subjects in both study populations. The National non-communicable disease survey conducted about 18 years ago revealed a prevalence of 12% which is significantly lower than the prevalence found in this study.[9]

A number of factors have been shown to be associated with CKD, these include, ageing, hypertension, impaired glucose tolerance or diabetes mellitus, dyslipidemia, obesity and smoking. [10] An interventional approach that would prevent the development and progression of CKD at a community level would thus involve the control of all these factors simultaneously, the so called multi-hit hypothesis.

The prevalence of HT has been increasing in India, both in rural and urban regions. Prevalence rate of HT was found to be 25.2 percent in a study of rural population in Tamil Nadu. The prevalence of HT in the urban population of West Bengal, representing eastern India, was reported to be 24.9%. The prevalence of HT

among the urban population of Trivandrum city in Kerala in the south western India was reported to be 33.5% in the age groups between 45 and 64 years. [11,12] Sheikh again shows higher prevalence of HT i.e. 25.97%. The association between prevalence of HT among those with different population is also found to be statistically significant. In present study overall men show higher i.e. 18.47% than women which shows prevalence percentage of 17.64% but the difference was not statistically significant. This could be possibly because of the increased prevalence of risk factors of HT in men. Gupta et al. and Guang Hui Dong et al. also found it more in men. [13,14] But Hazarika NC et al. reports lower prevalence of HT among men. [15]

Most of the studies agree with the fact that prevalence of HT increased with age. But in Manipur a slightly different observation could be seen. Since highest number of DM and HT was found in the age group of (40–60) years. This could be due to less number individuals suffering from diabetes and HT to survive. Chi-square test shows age is not significantly associated with the HT prevalence. The prevalence of HT in rural areas of Tamil Nadu in the age group of 45 – 60 years was 33%.[16]

V. Conclusion

This study demonstrated the high prevalence of undiagnosed hypertension and proteinuria in our population. Age significantly correlated with BP. Therefore, community screening for these potentially disabling non-communicable diseases as well as institution of lifestyle modification should be encouraged.

Conflict of interest: There is no conflict of interest between authors.

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