



## ALBUMINURIA AND ITS DETERMINANTS IN MEDICAL STUDENTS- A CROSS SECTIONAL STUDY

### Biochemistry

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### ABSTRACT

Hypertension is a medical condition in which blood pressure in the arteries is persistently increased. There are several etiological factors which increase BP in which genetic pre-disposition is one of them. The main purpose of this study is to find out the association of albuminuria in normotensive 1st degree relatives of hypertension and normotensive. The study subject include all 200 student of MBBS 1st year of batch 2017-18, which is divided into 4 groups, group I (without family history of hypertension in both father and mother), group II (with family history of hypertension in both), group III (with family history in father) & group IV (with family history in mother). Data was expressed in mean  $\pm$  SD & analysed by one way ANOVA. The mean value of albuminuria of these group were 12.93 mg/l, 15.99mg/l, 15.58 mg/l & 13.89 mg/l for group I, II, III & IV respectively. It shows mean urinary albumin is higher in group II, III & IV than group I. The P-value by comparing group I to group II, III & IV was 0.39, 0.18 & 0.07 respectively. Hence it is concluded that the association of albuminuria with family history of hypertension in 1st degree relatives are statistically insignificant.

### KEYWORDS

Hypertension, Blood pressure, Albuminuria, 1<sup>st</sup> Degree relatives

### INTRODUCTION

Hypertension is a medical condition in which blood pressure in the arteries is persistently increased.<sup>[1]</sup> There are several etiological factors which leads to increase the blood pressure (BP) are obesity, insulin resistance, high alcohol intake, high salt intake (in salt sensitive patient), ageing and perhaps, sedentary life style, stress, low potassium intake & low calcium intake and also genetic pre disposition.<sup>[2,3]</sup> The prevalence for hypertension in India done by the global burden of hypertension is 20.6% of men and 20.9% in women in 2005. The overall hypertension is 29.8% in 2014.<sup>[4]</sup> Since hypertension is increasing continuously and it has become one of the major problem so it should be detected earlier. The albumin present in the urine is known to be albuminuria. Since albuminuria is one of the important risk factor for the reno-cardiovascular diseases so renal albumin handling is a major point. Nephrotic range albumin is said to filter by the glomerulus but the major fraction of this albumin is reabsorbed by the proximal tubular cells by receptor mediated endocytosis.<sup>[5]</sup> But there are other study which do not agree with this fate of reabsorbed albumin, one of the study had described that albumin in the proximal tubular cells is secreted intact in the peritubular capillaries and again there is another study which has shown that albumin is taken up by the proximal tubular cells and degraded by the tubular lysosomal enzymes.<sup>[6,7]</sup> The range of albumin in urine is 0-20  $\mu$ g/min or <30 mg/day and if there will be excretion of albumin in the range of 30-300 mg/day, in urine, called as Microalbuminuria. Higher range of albuminuria within the normal range predict hypertension.<sup>[8]</sup> The aim of our study is to see the association in albuminuria in normotensive 1<sup>st</sup> degree relatives of hypertensive and normotensive.

### MATERIALS AND METHODS:

The study was done in all 200 students of 1<sup>st</sup> year MBBS of batch 2017-18. They were asked to fill a questionnaire (with the help of telecommunication i.e. using whatsapp), mainly to elicit the family history of hypertension and the study subjects were asked to give a random urine sample for estimation of albumin. Random urine sample collected in a sterile container was subjected to centrifugation and the supernatant obtained was used for albumin estimation. The albumin concentration was measured by turbidimetric method in ERBA CHEM 7 semi-autoanalyzer.

The data obtained was analysed statistically by computing mean and standard deviation. One way ANOVA was used to access the significance of correlation & calculate the P-value. For analysis the subjects were divided into four groups. **Group I** No family history of hypertension in both parents. **Group II** History of hypertension in both parents. **Group III** History of hypertension only in father. **Group IV** History of hypertension only in mother. Data were expressed as mean  $\pm$

SD. Differences between the group I with group II, III & IV was analysed. The results were considered statistical significant  $p \leq 0.05$ . The obtained data in the study was tabulated using Microsoft Excel. A statistical analysis was done using Statistical Package for Social Sciences, version 20.0 software (IBM-SPSS).

### RESULTS

The data was expressed in mean  $\pm$  SD. Data was divided into 4 groups; Group I, Group II, Group III & Group IV, for analysis as mentioned in the methodology. Difference between Group I with other three Groups was analysed by one way ANOVA by using the SPSS is given in Table 1.

**Table No. 1: Baseline characteristic of the four groups.**

Variables	Total (n=200)	Group I (n=140)	Group II (n=5)	Group III (n=37)	Group IV (n=18)	
Gender	M	83(41.5%)	55(39.29%)	1(20%)	21(56.76%)	7(38.89%)
	F	117(58.5%)	85(60.71%)	4(80%)	16(43.24%)	11(61.11%)
Mean Age (Years)	18.99	18.91	19.00	19.13	19.33	
Mean Age (Years)	Father	50.9	50.3	50	50.8	52.8
	Mother	46	45.5	46.8	46.7	47.7
Urinary Albumin (mg/L)	12.97 $\pm$ 6.20	12.93 $\pm$ 6.39	15.99 $\pm$ 4.16	15.58 $\pm$ 7.25	13.89 $\pm$ 4.44	
p-Value		0.392 NS*	0.181 NS	0.07 NS		

The mean value of albuminuria of these groups was 12.93 mg/l, 15.99mg/l, 15.58 mg/l & 13.89 mg/l for Group I, Group II, Group III & Group IV respectively. It shows mean urinary is higher in group II, III & IV than group I. According to this table it shows that there is no significant association between the Group I to Group II, III & IV. The p-value given for Group I to II, Group I to III and Group I to IV were 0.39, 0.18 & 0.07 respectively.

### DISCUSSION AND CONCLUSION

The study was done to see the association of urinary albumin in the 1<sup>st</sup> degree relatives of hypertension. The random urine sample was collected and urinary albumin was measured. The values obtained were used to see the urinary albumin association with family history of hypertension. The P-value of urinary albumin were 0.39, 0.18 and 0.07 for Group II, III & IV respectively when compared with Group I so the values were not statistically significant.

There are some studies done to see for the association of albuminuria normotensive subjects with family history of hypertension. The study done by John P. Forman in pre-menopausal and post-menopausal

women where median age was 44 years and 65 years who were normotensives with no history of diabetes to seen for the association of albuminuria in urine with family history of hypertension. The study did not show significant association. The P-value for pre-menopausal study was 0.610 and P-value for post-menopausal was 0.290.<sup>[8]</sup> This study supports in accordance to our study. There are some other studies which also support our study. The study done by Joel M. Neutel in subjects with normal blood pressure who had a family history of hypertension where he found that albumin excretion rate ( $3.2 \pm 0.3 \mu\text{g}/\text{min}$  vs  $2.6 \pm 0.3 \mu\text{g}/\text{min}$ ;  $p = 0.1$ ) did not show any significant change, which is similar to our study. Although albumin excretion rate is higher but it shows insignificant.<sup>[9]</sup> In our study also urinary albumin in normotensive subjects with the family history of hypertension in father, mother and in both father and mother is higher as compared to the subjects without family history of hypertension, but is statistically insignificant. In a Indo-Asian population cohort study where they follow-up 920 participants for 2 years and analyze the high normal levels of albuminuria and risk of hypertension where family history of hypertension show insignificant association with urinary albumin estimated as ACR when the baseline parameters were taken.<sup>[10]</sup> There are certain limitation of this study i.e. Sample size (small) and sampling technique (not applied). Investigating albuminuria (mg/l) is less precise than using the albumin excretion rate per min in urine.<sup>[11]</sup> Also, we used only 1 urine sample to classify our individuals with an intra-individual day to day variability in albumin excretion of 25 to 40%.

In conclusion, higher ranges of albuminuria observed in normotensive subjects with family history of hypertension were not statistically significant. To see for the association, prospective study in a larger sample size needs to be done.

#### ACKNOWLEDGEMENTS

I would like to thank our Head of Department, faculty's members, my postgraduate colleagues of the department of Biochemistry, J. N. Medical College, Belagavi and special thanks to Dr. Anuradha B. Patil for her entire support.

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