STUDY OF BLOOD PRESSURE PATIERN AND SCREENING FOR GYLCOSURIA IN URBAN AND RURAL POPULATION- A PILOT STUDY

Pages with reference to book, From 138 To 141

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Abstract

One thousand one hundred and ten subjects (686 urban and 424 rural) were screened to study the blood pressure levels among various age groups and to detect the prevalence of hypertension and glycosuria. The urban group comprised 451 females and 23 5 males and the rural group 258 females and 166 males.

The results show a gradual rise of both systolic and diastolic blood pressure with age in both the study groups. The mean systolic blood pressure in urban and rural groups was comparable uptil the ge of 30, after which it rose more significantly in the urban group. The mean diastolic blood pressure in the urban males between the ages of 40-60 years was significantly higher as compared to the rural males. The mean diastolic blood pressure was significanly higher in the same age group in urban females as compared to their rural counterparts.

The systo.ic and diastolic blood pressure showed a negative correlation with ponderal index. The prevalence of hypertension (styso-lic B.P. > 150 mm of Hg and diastolic B.P. > 90 mm of Hg) in the males of urban and rural origin was 4.681% and 3.614% respectively and in the ruban and rural females 7.539% and 4.264% respectively.

Glycosuria was detected in 2.553 % urban and 0.602 % rural males and in females of urban and rural origin it's frequency was 2.439% and 1.163% respectively. (JPMA 31:138,1981).

Introduction

Hypertension and diabetes mellitus are well known risk factors for cardiovascular morbidity. In view of a high prevalence of these conditions, they are regarded as public health problems. Hypertension, in particular has been the locus of attention in recent years and epidemiological methods have been applied to unmask and identify the causal factors in hypertension in various populations.

In hypertension no single etiological factor has been identified. There is some evidence to show an association with factors such as heredity, age, sex, obesity and sodium ingestion (Smith, 1977). Hypertension manifests an interesting dif-feience in its biological behaviour in various communities. It is more serious in the American Negroes than in their white counterparts.

In Pakistan, with its changing socio- economic pattern chronic diseases like hypertension, diabetes mellitus and ischaemic heart disease, are likely to emerge as important health problems in decades to follow. If environmental factors are important in the genesis of hypertension, then a difference in the pattern of blood pressure in the rural and urban communities may offer interesting features for comparison.

In this pilot study, the results of blood pressure pattern in various age groups in selected urban and rural groups has been reported. The study also included a check for glycosuria as a tentative indicator of the prevalence of diabetes mellitus in these groups.

Material and Methods

One thousand one hundred and ten subjects (686 urban and 424 rural) above the age of 12 years were studied. For rural population, Rural Health Centre of Lilliani and for urban, residents of Lawrence Road Lahore were selected. Only the members of a family present at the time of visit were studied. Various parameters on a precoded proforma included age, sex, family size, monthly income, family history of diabetes mellitus and hypertension and personal history which included height, weight and smoking habits.

Investigations carried out on the spot included urine examination for sugar and measurement of blood pressure. Blood pressure was measured by mercury sphygmomanomenter in sitting position and two readings were taken at 5 minutes intervals; the second reading being taken as representative. Diastolic blood pressure was taken at 4th phase (muffling of the sound).

Urine for sugar was tested with Benedict's solution standardized before use. In case an individual was found to be hypertensive (BP > 150/90)or if glycosuria was detected, it was confirmed by rechecking at next visit.

Results

Of 1110 subjects, 709 were females (451 urban and 258 rural) and 401 males (235 urban and 166 rural). Majority of the subiects were between the ages 12 and 50 years (Table I).

Table I:-Age and Sex Distribution of the Urban and Rural Subjects Screened for Detection of Glycosuria and Study of B.P. Pattern (1110 Subjects).

Age (years)	*Urban n=686*		*Rural n=424*	
	Female n=451	*Male n=235*	*Female n=258*	*Male n=166*
12—20	128	64	68	47
21—30	113	61	68	30
31—40	76	35	50	19
41—50	71	27	33	28
51—60	40	28	24	19
61 and above	23	20	15	23

Table II: Comparison of the Mean Values of Ponderal Index and Age in the Rural and Urban Groups of Population Screened (Total 1110)

Variables	Urban n=686	Rural n=424	Statistical significance
	Mean ± S.D.	Mean ± S.D.	
Ponderal index			
Males	12.549 ± 0.8134	12.602 ± 0.7571	N.S.*
Females	12.212 ± 0.5993	12.301 ± 0.6071	N.S.*
Age (yrs)			
Males	33.543 ± 16.369	36.163 ± 17.893	N.S.*
Females	32.196 ± 15.009	32.477 ± 15.028	N.S.*

N.S.* Not significant.

Table II shows the mean values of ponderal index and age in male and female subjects of urban and rural groups. Mean ponderal index of urban males was 12.549±0.8134 and of rural males 12.602±0 7571, the difference being statistically nonsignificant. Similarly, in the ruban and rural females the mean ponderal index was 12.212+-0.5993 and 12.301 ±0.6071 respectively showing-no significant difference between the two groups.

Table I:-Age and Sex Distribution of the Urban and Rural Subjects Screened for Detection of Glycosuria and Study of B.P. Pattern (1110 Subjects).

Mean age in years of the urban males was 33.543 ± 12.369 and of the rural males 36.163 ± 17.893 while that of urban and rural females, 32.196+15 009 and 32.477±15.028 respectively. The difference in the mean ages of urban and rural groups was statistically insignificant.

An age matched comparison of systolic and diastolic blood pressure between males of rural and urban groups is shown in Table III.

Table III: Comparison of the Mean Blood Pressure among the 401 Urban and Rural Male Subjects in Different Age Groups

Age Groups (years)	SYSTOLIC B.P. (mm of Hg)			DIASTOLIC B.P. (mm of Hg)		
	Urban n=235	Rural n=166	Statistical significance	Urban n=235	Rural n=235	Statistical significance
11—20	112.290±11.973	111.104±15.025	N.S.*	67.855±12.196	69.938±10.999	N.S.*
21—30	118.082±10.853	113.655± 9.933	N.S.*	78.492± 7.991	70.897± 7.871	P<0.015
31—40	119.156±11.865	107.611±15.549	P<0.05	81.375±25.126	72.777±15.662	N.S.*
41—50	124.875±20.514	111.815±17.982	P<0.05	82.708± 8.814	74.370±14.765	P<0.05
51—60	139.555±27.621	112.666±10.432	P<0.05	85.555±11.389	71.286± 8.678	P<0.05
61 and above	145.105±23.725	126.048±31.446	P<0.05	83.632±11.927	75.809±12.948	N.S.*

N.S.*—not significant.

After the age of 30 years the systolic blood pressure showed significantly higher mean values in the urban as compared to rural groups.

The urban males after the age of 40 years had significantly higher levels of mean diastolic blood pressure as compared to their rural counterparts. The diastolic blood pressure levels did not differ significantly in the two groups below the age of 40, except in the age group of 21-30 years.

The mean systolic and diastolic blood pressure levels of different age groups in rural and urban females are shown in Table IV.

Table IV: Comparison of Mean Blood Pressure Among the 709 Urban and Rural Female Subjects in Different Age Groups

Age Group (years)	SYSTOLIC B.P. (mm of Hg)			DIASTOLIC B.P. (mm of Hg)		
	Urban n=451	Rural n=258	Statistical significance	Urban n=451	Rural n=258	Statistical significance
11—20	111.123±11.086	109.585±14.117	N.S.*	69.815±10.533	69.815±10.912	N.S.*
21—30	115.743±11.316	113.373±17.818	N.S.*	76.681±10.538	71.896±10.599	P<0.05
31—40	124.872±24.761	115.980±22.779	P<0.05	82.577±12.385	71.627±12.508	P<0.05
41—50	133.081±27.555	115.794±21.081	P<0.05	84.270±14.218	73.939±12.116	P<0.05
51—60	148.45 ±29.608	124.458±27.081	P<0.05	87.30 ±14.522	78.125±13.359	P<0.05
61 and above	154.625±27.497	141.571±34.393	N.S.*	89.958±13.533	85.35 ±14.737	N.S.*

N.S.*—not significant.

It is observed that mean systolic blood pressure in urban females between 30 60 years of age were significantly higher as compared to age matched rural groups. The mean diastolic blood pressure was significantly higher in the urban females after the age of 20 years and the trend persisted uptil the age of 60 years.

Table V: Results of Correlation Between Blood Pressure and Ponderal Index (P.I.) Among Urban and Rural Groups.

Variables	RURAL GROUP N=424		URBAN GROUP N=686	
	Male n=166	Female n=258	Male n=235	Female n=451
P.I. with diastolic B.P.	r=—0.2684 P<0.05	r=—0.2497 P<0.05	r=—0.3184 P<0.05	r=—0.3211 P<0.05
P.I. with systolic B.P.	r=—0.2879 P<0.05	r=—0.3213 P<0.05	r=—0.3081 P<0.05	r=—0.2891 P<0.05

Table V shows the correlation between ponderal index and systolic and diastolic blood pressure in rural and urban groups. All groups shows a significant negative correlation between ponderal index and systolic as well as diastolic blood pressure.

Table VI: Frequency of Hypertension and Glycosuria in the Urban and Rural Groups.

	MALES N=401			FEMALES N=709		
	Urban n=235	Rural n=166	Statistical significance	Urban n=451	Rural n=258	Statistical significance
Hypertension	11 (4.681%)	6 (3.614%)	N.S.*	36 (7.539%)	11 (4.264%)	N.S.*
Glycosuria	6 (2.553%)	1 (0.602%)	N.S.*	11 (2.439%)	3 (1.163%)	N.S.*

N.S.*—Not significant.

Table VI shows the percentage prevalence of hypertension (systolic blood pressure 150 mm Hg and diastolic 90 mm Hg) and glycosuria among urban and rural subjects.

Hypertension was observed in 11 (4.681%) urban and 6(3.614%) rural males. Similarly blood pressure in hypertensive range was recorded in 36 (7.539%) and 11(4.264%) females of urban and rural groups respectively. Statistically there is no significant difference in the prevalence of disease among the

groups of rural and urban areas.
The frequency of glycosuria (diabetes ?) amongst the males of urban and rural groups was 2.553% and 0.602% respectively. Amongst the urban and rural females, the prevalence of glycosuria was 2.439% and 1.163% respectively. The difference in the prevalence of glycosuria amongst rural and urban groups was statistically insignificant.

Discussion

This pilot study was done on a limited scale. The areas were selected on the basis of convenience of approach and there were numerous difficulties in making contact with a large section of the residents. Thus, there is room for caution in the interpretation of the results. Inspite of the limitations, the data obtained shows some interesting features.
There is a gradual rise in both the systolic and diastolic blood pressure with age which is more marked in the urban groups. The elevation of blood pressure with advancing age has previously seen reported (National Health Examination Survey, United States, 1964). A survey in United States showed that mean systolic pressure rose slightly during early to mid-adult life and more rapidly after the age of 40. The mean diastolic pressure, on the other hand showed a steady rise upto the age of 60 years and then some what declined,
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In this study, the mean blood pressure was similar in rural and urban communities upto the end of the second decade. However, during the third decade and thereafter, the mean blood pressure both systolic and diastolic showed a trend towards relatively higher values in the urban population than their rural counterparts. The reason for this is not very clear due to the limited nature of the study. The two important variables suh as age and ponderal index were evenly matched in the two groups. Whether environmental factors such as dietary salt intake and hardness or softeness of water play a part, is difficult to ascertain. It can be postulated increasing use of salt contaning commercial cities diets may influence blood pressure levels These factors are likely to start exerting their influence in the early stages of life, but this aspect remains inconclusive. The role of psychological stress to which the ruban populations are presently more exposed may be relevant.
The association of obesity and hypertension has been the subject of inquiry and some studies have shown a positive correlation between weight and high blood pressure (Kannel et al., 1967; Johnson et al., 1973; Miall et al., 1968). In this series ponderal index had an inverse relationship with blood pressure in both the urban and rural groups. However, this does not always indicate that all obese individuals are hypertensive.
Blood pressure is considered as a continuous biological variable with no 'cut off' points separating the normal from the abnormal. However, from the point of view of management of individuals some criteria for separating from the general population those with high risk are desirable. For this purpose the World Health Organisation has recommended criteria for normal and hypertensive ranges which are being used in various epidemiological studies (WHO Technical Repoit, 1959). Using these criteria, a recent report of urban study in American Population shows that 15% of the whites and 27% of the blacks have hypertension (National Health Examination Survey, 1964).
In this study the prevalence of hypertension was less than 10%.
The presence of glycosuria is a rather crude index to assess the presence of diabetes mellitus but was

used for the sake of convenience. The prevalence rate observed was not entirely unexpected.

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