

Original Research Article

Blood pressure trait in rural Bengal- impact of hard labour, poor economic condition and poor diet

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ABSTRACT

Background: The aim of the present study was to observe the blood pressure trait of male population of rural Bengal, India as a part of community work. Physical characteristics and blood pressure of 699 adult male from a rural area of West Bengal, India were studied. Participants were from poor socioeconomic status, who do hard different manual works on the field for earning to feed their families for survival.

Methods: Blood pressure was measured with manual sphygmomanometer in the morning. Physical characteristics were measured for predicting nutritional status in terms of BMI.

Results: Nutritional status of 85% male villagers was either underweight or normal. Only 4.6 % were obese. Most of villagers possessed either optimal or normal blood pressure. Very few had hypertension. More than 99% of male villagers were without hypertension. Calorie intake of the villager were nominal due to poverty but had to work hard for economic survival. Nominal intake of calories along with hard labour might be the reason behind optimal or normal blood pressure.

Conclusions: It could be concluded that survival efforts of the rural people make them less hypertensive.

Keywords: Blood pressure, Dog BMI, Hypertension, Nutritional status

INTRODUCTION

Cardiovascular diseases causes one-third of all deaths annually worldwide, of which hypertension is one of the main factor behind it. Globally CVD causes nearly 6 million deaths every year.¹ Of these, around 53% deaths are due to hypertension oriented CVD. Different studies also showed the hypertension as a key risk factor for CVD.^{2,3} By the year 2030, prevalence of hypertension is projected as 33% globally which was 26% in the year 2000.^{3,4} The number of hypertensive adults across the world increased from 594 million to 1.13 billion within 41 years from 1975 to 2015.⁴ WHO (2021) also reported that around 1.28 billion adults aged 30-79 years have hypertension across the world, most of them are living in low and middle income countries like India. Thus, hypertension is a major public health problem now-a-days

irrespective of any socio-economic status, population and areas and it became a major cause of premature death worldwide.⁴ In India, around 25% villagers of rural areas are hypertensive though one tenth of rural people are with their blood pressure under control compared to 33% of hypertensive urban people.⁵ Besides other factors, some common factors which causes hypertension are low physical activities, improper diet, food habits including food intake, access alcohol consumption, obesity, overweight and smoking. As a whole hypertension or elevated blood pressure is a serious medical condition that significantly increases the CVD risk factors.

Keeping in mind about the seriousness of hypertension, the aim of the present study was to observe the blood pressure trait of male population of rural Bengal, India as a part of community work.

METHODS

Participants

699 adult male aged from 18 to 74 year were studied for their height, weight, systolic and diastolic blood pressure. All the villagers were from Belda, a rural area of West Medinipur District of West Bengal.

Self-reported information and data

Information on life style and annual household income were collected by verbal questionnaires. All the villagers were from poor economic class and most of them were under BPL scheme (a scheme of Government of India for the people from below poverty line, BPL). The main activities of the villagers were farming and daily labour job. The daily activity pattern of all participants was very similar except few but intensity and volume of work were different according to age and availability of job.

Anthropometric measurements

Stretched height and body weight of each individual were measured according to standard methods followed by International Society for the Advancement of Kinanthropometry.⁶ Height was measured to nearest 1 mm with a stadiometer (Seca, Germany) and weight was measured with an electronic weighing scale (Avery, India).

Clinical measurements (blood pressure)

Blood pressure was measured with a manual sphygmomanometer. Systolic and diastolic pressure were recorded in a local clinic where they came voluntarily. Blood pressure was measured after a 30 min rest in the clinic in lying position. Standard protocol according

American Heart Association Statement was followed to measure the blood pressure.⁷

Grade of hypertension was classified according to West Bengal State Government 2019 report for gradation of Hypertension as shown in the Table 1.

Table 1: Blood pressure category according to West Bengal Government State NCD cell department.

Category	Systolic BP (mmHg)	Diastolic BP (mmHg)
Optimal	<120	<80
Normal	120-129	80-84
High normal	130-139	85-89
Grade 1 hypertension	140-159	90-99
Grade 2 hypertension	160-179	>100-109
Grade 3 hypertension	180	110
Isolated systolic hypertension	140	<90

Grade of hypertension

Grade of hypertension was categorized according to West Bengal State Government 2019 report for gradation of Hypertension as shown below (West Bengal Government State NCD cell, Health and Family Welfare Department, 2019, Government of West Bengal, India).

RESULTS

Table 2 shows physical characteristics, BMI and blood pressure of 619 male villagers of Belda, West Bengal according to their age group from 19 to 79 year.

Table 2: Physical characteristics, BMI and blood pressure of 619 male villagers according to age group.

Age group (years)	N		Height (cm)	Weight (kg)	BMI kg/m ²	Blood pressure mmHg	
						Systolic	Diastolic
19-<60	629	Mean	167.4	60.9	21.8	111.8	73.8
		Sd	7.2	10.1	4.0	7.1	4.7
		Min	150.2	38	13.3	80	50
		Max	182.9	95	35.6	180	90
19-29	399	Mean	167.4	60.4	21.6	111.7	73.9
		Sd	7.1	10.1	4.0	7.2	4.7
		Min	150.2	38	13.9	80	55
		Max	182.9	95	35.2	180	90
30-39	138	Mean	167.1	61.8	23.2	111.3	73.3
		SD	7.7	10.4	4.3	5.1	4.2
		Min	150.5	38	13.3	100	60
		Max	182.9	86	35.6	130	90
40-49	65	Mean	168.4	60.8	21.5	112.5	74.3
		Sd	7.1	9.7	3.8	7.3	5.9
		Min	155.4	43	14.2	100	50
		Max	182.9	86	35.6	150	90

Continued.

Age group (years)	N		Height (cm)	Weight (kg)	BMI kg/m ²	Blood pressure mmHg	
						Systolic	Diastolic
50-59	9	Mean	166.8	61.3	22.0	111.3	72.5
		SD	4.0	8.5	2.3	3.5	3.8
		Min	161.5	47	17.5	105	70
		Max	173.7	73	24.2	115	80
≥60	9	Mean	166.7	56.8	21.2	118.2	75.6
		SD	8.3	15.2	5.1	18.2	6.3
		Min	153	42	14.7	100	70
		Max	179.8	86	28.8	160	90

Table 3: Nutritional status of 619 male villagers.

Category	Number	Percent
Under weight	144	23.3
Normal	382	61.7
Pre obese	64	10.4
Obese	29	4.6

Table 3 shows nutritional status of 619 male villagers.

Table 4: Systolic blood pressure categories in 619 male villagers.

Age group	Category	Range	n	Percent
19-<60	Optimal	Below 120	556	89.8
	Normal	120-129	59	9.5
	High normal	130-139	3	0.5
	Grade 2 hypertension	160-179	1	0.2
	Optimal	<120	359	90.0
19-29	Normal	120.-129	38	9.5
	High Normal	130.-139	1	0.25
	Grade 3 hypertension	>180	1	0.25
30-39	Optimal	<120	128	92.8
	Normal	120-129	09	6.5
	High normal	130-139	1	0.7
40-49	Optimal	<120	62	95.4
	Normal	120-129	03	04.6
50-59	Optimal	<120	9	100
<60	Optimal	<120	7	72.8
	High normal	130-139	1	11.1
	grade 2 hypertension	160-179	1	11.1

*n= number of participants

Table 4 shows systolic blood pressure categories observed in 619 male villagers.

Table 5 shows diastolic blood pressure categories observed in 619 villagers.

Table 5: Diastolic Blood pressure categories in 619 villagers.

Age group	Category	Range	n	Percent
19 -<60	Optimal	<80	528	85.3
	Normal	80-84	69	11.1
	High normal	85-89	15	2.4
	Grade hypertension	90-99	7	1.1
19-29	Optimal	<80	338	84.7
	Normal	80-84	47	11.8
	High normal	85-89	11	2.8
30-39	Grade 1 hypertension	90-99	03	0.7
	Optimal	<80	123	89.2
	Normal	80-84	13	09.4
40-49	High normal	85-89	1	0.7
	Optimal	<80	53	81.5
	Normal	80-84	08	12.3
50-59	High normal	85-89	02	3.1
	Grade 1 hypertension	90-99	02	3.1
	Optimal	<80	08	88.9
>60	Normal	80-84	01	11.1
	Optimal	<80	07	77.8
	Normal	80-84	01	11.1
	Grade 1 hypetension	90-99	01	11.1

DISCUSSION

In the present study, average age of the studied male villagers was 29.9±8.8 years with a range of 19-79 years. Height and weight in averages were 167.4 9±7.2 cm and 60.9±10.1 kg respectively (Table 2). Average height of the present study was very close to other studies on Bengali population of rural areas but average body weight was less than other studies on Bengali male population of rural areas.^{8,9} Average BMI of the present study was 21.8±4.0 kg/m² with a range of 13.3-35.6 kg/m² (Table 2) which fell under normal according to WHO guidelines (2019).

Systolic blood pressure is a major risk factor for CVDs. Different studies observed the changing pattern of blood pressure as age increased. Systolic blood pressure continues to increase throughout the life in contrast to diastolic pressure. This trend of rise in systolic pressure continues till the person reached approximately 50 years of age and tends to level off over more than next around 12 years and may remain same or fall later in life. On the other hand, diastolic hypertension elevates either alone or in combination with systolic pressure several years before the age reaches at 50. Systolic hypertension increases with age and it represents the hypertension in common form. Similarly diastolic pressure is also more potent CVD risk factor than systolic pressure until fifty years of age, after that systolic blood pressure turn into a potent CVD risk factor.^{2,4,10-14}

In the present study, average systolic blood pressure of 619 male villagers was 111.8 ± 7.1 mmHg and that of Diastolic pressure was 73.8 ± 4.7 mmHg (Table 2) which were optimal according to West Bengal State Specific standard, 2019 (Table 1). The values were very similar to rural people of India but values were less than the average systolic and diastolic pressure observed for rural villagers by the other studies.^{10,11,15-17} In the present study, when systolic pressure status were analysed individually, 89.8% male were with optimal systolic pressure, 9.5% with normal systolic pressure and 0.5% with high normal systolic pressure. Only 0.2% was with grade 1 hypertension (Table 4). Average diastolic pressure of 619 male villagers of the present study was 73.8 ± 4.7 mmHg with a range of 50-90 mmHg (Table 2). Thus the 619 villagers were with optimal diastolic pressure in average (Table 2). Diastolic pressure of 85.3% villagers was optimal and 11.1% were normal. Only 2.4% men were with high normal and 1.1% was with grade 1 diastolic hypertension. Thus a good number of male villagers were in either optimal or normal range of blood pressure both in systolic and diastolic.

Optimal pressure were observed both in systolic and diastolic pressure for all age groups of 19-29, 30-39, 40-49, 50-59 and ≥ 60 (Table 2). An average systolic pressure of 111.7 ± 7.2 mmHg with a range of 80-180 mmHg was observed for the 19-29 years age group. For the same age group, average 73.9 ± 4.7 mmHg with a range of 55-90 mmHg was observed for diastolic pressure which was also optimal. For 30-39 years age group, average systolic pressure was 111.3 ± 5.1 with an average diastolic pressure of 73.3 ± 4.2 mmHg, both were optimal blood pressure (Table 2). Very similar average value was observed for the age group of 40-49 years, where average systolic pressure was 112.5 ± 7.3 mmHg and diastolic pressure was 74.3 ± 5.9 mmHg, both were in optimal blood pressure, though the range was slightly wide in systolic pressure. Similar average value was also observed in the group 50-59 years, where average systolic pressure was 111.3 ± 3.5 mmHg with an average diastolic pressure of 72.5 ± 3.8 mmHg. In this group of 50-59 years, the minimum and maximum range in systolic as well as in diastolic pressure

were less than all other groups (Table 2). The findings were different from other studies where blood pressure both in systolic and diastolic pressure increases gradually as age group goes up.^{10,11,18}

The blood pressure trait of the male villagers above 60 years was slightly higher than all other groups, though the both systolic and diastolic pressure in average were in optimal level. Average 118.2 ± 18.2 mmHg was observed for systolic pressure and average 75.6 ± 6.3 mmHg was observed for the diastolic pressure (Table 2). The pressure range of this group (≥ 60 years) was between 100 and 160 mmHg for systolic and 70-90 mmHg for diastolic pressure. Group wise, 90% of the male from 19-29 years group were with optimal pressure and 9.5% were with normal pressure. Hence, 99.5% men from 19-29 years group were either with normal or optimal pressure except 0.25% who were with grade 3 hypertension besides 0.25% with high normal (Table 4). Similarly, 84.7% were with optimal diastolic pressure and 11.8% were with normal diastolic pressure in same age group. Hence, 96.5% male were either normal or optimal systolic pressure (Table 5). Similarly, 99.3% of total population of age group 30-39 years were either normal or optimal of which 92.8% were within optimal and 6.5% with normal pressure when systolic was considered (Table 4). Similar observation was observed in diastolic pressure for this group where 89.2% with optimal pressure and 9.4% were with normal pressure. Only 0.7% men were with grade 1 hypertension (Table 5). 100% of male villagers of age group 40-49 years were with optimal and normal blood pressure, of which 95.4% were with optimal pressure and rest 4.6% were with normal group when systolic pressure was considered (Table 4). But diastolic pressure of 81.5% male were in optimal range and 12.3% were in normal with a total of 93.8% were either in normal or optimal range of the same group. Grade 1 hypertension was observed only in 3.1% (Table 4). All members of the age group 50-59 years were with optimal systolic pressure (Table 4) and diastolic pressure was either optimal or normal (Table 5). Hypertension in both systolic and diastolic pressure were observed only in 11% villagers from ≥ 60 age group. Rest were with either optimal, normal or high normal blood pressure (Table 4 and 5).

Thus from the above discussion, it was observed that most of villagers possessed either optimal or normal blood pressure. Very few had hypertension. More than 99% of male villagers were without hypertension. The reason may be due to underweight or normal nutritional status of the villagers with low body weight in terms of BMI where average BMI was 21.8 ± 4.0 kg/m² (Table 2). 85% male villagers were either underweight or normal nutritional status. Only very few were obese (4.6%). (Table 3). This may be due to low food consumption and calorie intake. Rural people in India including West Bengal are deprived from adequate nutrition and subsequent calorie intake due to poor supply of food grain and poor economic condition.¹⁹⁻²⁷ As all the villagers of the present study were from poor economic class, average

intake of calories was not sufficient to raise BMI. Moreover, most of the villagers were engaged with hard labour job on the field for their earnings which kept them active. Thus nominal intake of calories along with hard labour helped them to keep their cardiovascular fitness high which in turn turned the blood pressure either optimal or normal. The survival efforts of the rural people make them less hypertensive.

CONCLUSION

It could be concluded that survival efforts of the rural people make them less hypertensive.

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