Original article

Blood pressure profile and its clinico-social determinants among attendees of urban health and training center of IQ City Medical College, Durgapur, West Bengal.

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Abstract

Background: High blood pressure or Hypertension is one of the leading causes of death among the existing non communicable diseases whereas pre-hypertension is the early intervention area from where HTN can be prevented. Hypertension, pre-hypertension can lead to so many comorbidities and life threatening conditions. Blood pressure profile and its epidemio-social determinants are few, though relationship with clinical and biochemical variables are well studied by many researchers. Apart from some social determinants, sedentary lifestyle, substance abuse, obesity and unhealthy diet are some major factors that contribute in occurrence of hypertension. **Aims and objectives**: To ascertain proportion and clinico-social determinants of different blood pressure profile. **Materials and methods**: Cross-sectional study in an institution among 208 adults, drawn by systematic random sampling, interviewed and examined with a schedule and necessary instruments at exit point. Multivariate logistic regression model taken to see the relationship with different variables. **Results**: 16.8% had HTN and 43.8% had pre-HTN. 29.3% males, 19% literates, 46.4% among subjects with some form of substance abuse, 25.7% HTN among physically inactive subjects. **Conclusion**: HTN proportion was as par with other records but proportion of pre-HTN was much higher. HTN and pre-HTN was more among males, people with substance abuse, inactive people, junk food consumers.

Key words: Blood pressure, Hypertension, Pre-hypertension, Determinants of BP

Introduction:

The world has recently observed epidemiological transition where it was being observed that death due to non-communicable disease exceeded to that of death due to communicable diseases. High blood pressure or Hypertension (HTN) was one of the leading causes of death among the existing non communicable diseases[1] and pre-hypertension (pre-HTN) is the intervention area from where HTN can be prevented if managed judiciously or aggravates to HTN if no or inadequate intervention taken. Hypertension is characterized by Systolic $\geq$140 mm of Hg or diastolic BP $\geq$ 90 mm of Hg[2] and is prevalent among 10 to 30% of Indian population.[3-6] Hypertension, pre-hypertension can lead to so many comorbidities and life threatening conditions like stroke, cardiovascular diseases, renal complications if not recognized or treated adequately or risk factors are not modified. There are several proven factors that can lead to hypertension. Sedentary lifestyle, addition, obesity and unhealthy diet are some major issue. There are also some socio-demographic determinants[7] of hypertension like extreme high and low social class, literacy status, Race, Ethnicity[8] etc.

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Hypertension is a well-established fact for adverse Cardio vascular events (CV), renal function, retina changes etc., whereas other blood pressure profiles also creates unhealthy health conditions. Hypotension can cause dizziness, lightheadedness[9] or in extreme it may cause shock though generally low grade hypotension is considered as healthy. Pre-HTN can lead HTN any day.

Proportion study of different BP profile along with its clinico-social determinants were very few in West Burdwan district, particularly in Durgapur, thus a study was conducted to address proportion and clinic-social determinants of different blood pressure profile and to suggest possible health fact finding and intervention.

Materials and Methods:

An institution based observational cross-sectional study was performed among attendees of Urban health and training center, Department of Community Medicine of IQ City medical college, Durgapur, West Bengal from April to August 2017 with prior approval by the institutional ethics committee of IQ City Medical College, Durgapur. Only attendees of age $\geq$ 18 years were interviewed and examined, whereas severely ill and disagreement for consent were excluded from the study. Sample size was calculated from standard WHO guideline[10] using formula $4PQ/d^2$ .Considering Proportion(P) of HTN=10%[3], Q=(1-P), and absolute precision 5 with 95% confidence interval minimum sample size came to be 144. We continued data collection through systematic random sampling technique throughout our data collection period without deploying extra resources due to which a total of 208 participants were included. Sample interval of systematic random sampling was pre decided, based up on the previous record on patient attendance.

A predesigned, pretested, semi-structured schedule was used to interview study subjects and relevant clinical methods were applied to note waist circumference (WC), height, weight, BMI, BP etc. Blood pressure profile was taken according JNC8 guideline.[2]

Operational definition:

Substance abuse: Those who were using any form of addicting substance like alcohol consumption, tobacco use etc., within previous 3 months were considered as 'Yes' in substance abuse

Physical activity: Those who were involved in moderate to severe intensity of physical activity for at least 5 days in a week for previous 3 months were considered as physically active.

Junk food consumers: Those who were consuming junk foods like carbonated beverage, roadside oily food, pastries etc., for twice in a week for previous 3 months were considered as junk food consumers

After collection, data were entered in Microsoft Excel Sheet and was analyzed with IBM SPSS software version 20. Results were presented in forms of tables, mean value. Chi-square tests were done for categorical data and Multinomial (Multivariate) logistic regression was done to find relationship between Blood pressure profiles with different variables.

Table1. Distribution of study subjects according to different categorical variables (n=208)

Variables		Frequency	Percentage (%)
Blood Pressure Profile	Hypertensive	35	16.8
	Pre-HTN	91	43.8
	Normotensive	82	39.4
Gender	Male	92	44.2
	Female	116	55.8
Education	Literate	147	70.7
	Illiterate	61	29.3
Addition	Yes	56	26.9
	No	152	73.1
Junk Food habit	Yes	134	64.4
	No	74	35.6
Physical Activity	No	70	33.7
	Yes	138	66.3
	Total	208	100

Table 2. Distribution of study subjects according to different numerical variables (n=208)

	Mean	Std. Deviation
AGE (in years)	37.81	13.385
BMI (kg/m^2)	22.144	3.1254
WC(in cm)	79.98	9.897

Table 3: Distribution of Blood pressure profile among different categorical variables

Variables		BP			Chi-square value	P Value
		HTN	Pre-HTN	Normal		
Gender	Male Female	27(29.3) 8(6.9)	43(46.7) 48(41.4)	22(23.9) 60(51.7)	25.773	0.000
Substance abuse	Yes No	26(46.4) 9(5.9)	19(33.9) 72(47.4)	11(19.6) 71(46.7)	49.201	0.000
Education	Literate Illiterate	28(19.0) 7(11.5)	55(37.4) 36(59.0)	64(43.5) 18(29.5)	8.219	0.016
Junk Food	Yes No	17(12.7) 18(24.3)	67(50.0) 24(32.4)	50(37.3) 32(43.2)	7.625	0.022
Physical Activity	No Yes	18(25.7) 17(12.3)	15(21.4) 76(55.1)	37(52.9) 45(32.6)	21.798	0.000

Figures in parentheses indicates percentages

Results:

Dataset of 208 study subjects were analyzed. Table 1 revealed that 16.8% of the populations were diagnosed as having Hypertension whereas a large proportion of the study subjects were suffering from Pre-hypertension (43.8%). The study also revealed that major proportion of the study subjects were female (55.8%) and maximum of the population were Literate (70.7%). 66.3% of them were physically active and 73.1% of the study people were devoid of any substance abuse though consumption of junk food (64.4%) was high among them. Mean age of the study population as shown in table 2, was 37.81 years. Mean waist circumference was 79.98 cm.

It can be seen from table 3 that Males had more proportion of HTN (29.3%) and Pre-HTN (46.7%). The same table also revealed that HTN was more among people with substance abuse (46.4%). 19% of Literates and 11.5% of Illiterates were suffering from HTN whereas 59% of Illiterates were having Pre-HTN. Table 3 also revealed 50% of junk food consumers were suffering from pre-HTN and only 12.7% of them had HTN. 25.7% of inactive study population had HTN.

Table 4 showed multinomial logistic regression model where Normotensives were counted as reference category and in some category were considered as '0' due their redundancy in regression model.

Model fitting information: Chi-square value at df 18 was 161.3 which was statistically significant (p=0.000). Independent variables could explain 5.40 to 6.19% variation of dependent variable as revealed from cox and snell pseudo r^2nagelkerke R square statistic. Per-capita income and substance abuse was independent risk factors for HTN (p value <0.05) whereas age, male gender, substance abuse, physical inactivity and junk food consumers were independent risk factors for pre-HTN (p value <0.05)

Discussion:

The study revealed a very common and matching result in terms of proportion of HTN i.e., 16.8% which was as par with many studies[3-6] but the study revealed another interesting result regarding proportion of pre-HTN. Pre-HTN was surprisingly high (43.8%) in this study as compared to 35% by Wang R et al[11]. Very soon, if no intervention provided or taken may be converted to HTN in a large proportion and there are very few studies existing that revealed proportion of pre-HTN. Proportion of HTN & pre-HTN were statistically more among males, few other studies reported similar results[11-12]. It might be due to the more risk factors among males like substance

Table 4: Multinomial logistic regression showing relationship between BP profile and rest variables.

HTN[a]		B	Std. Error	Wald	df	Sig.	Exp(B)
Hypertensive	Intercept	-7.720	3.113	6.151	1	.013	
	AGE	.073	.041	3.169	1	.075	1.076
	PERCAPITAINOME	-.001	.000	6.647	1	.010	.999
	BMI	-.074	.121	.377	1	.539	.928
	Waist Circumference in cm	.077	.051	2.249	1	.134	1.080
	Male	.801	.807	.985	1	.321	2.227
	Female	0[b]	.	.	0	.	.
	Literate	.115	.769	.022	1	.881	1.122
	Illiterate	0[b]	.	.	0	.	.
	Substance abuse Yes	1.707	.853	4.000	1	.046	5.512
	Substance abuse- No	0[b]	.	.	0	.	.
	Junk food Yes	.668	.847	.623	1	.430	1.951
	Junk food No	0[b]	.	.	0	.	.
	Physical activity No	-.960	.779	1.520	1	.218	.383
	Physical activity Yes	0[b]	.	.	0	.	.
Pre-HTN	Intercept	-4.961	2.578	3.703	1	.054	
	AGE	.100	.025	16.031	1	.000	1.106
	Per capita income	.000	.000	3.036	1	.081	1.000
	BMI	-.005	.083	.004	1	.953	.995
	WC(cm)	.007	.031	.053	1	.818	1.007
	Male	1.570	.553	8.071	1	.004	4.805
	Female	0[b]	.	.	0	.	.
	Literate	-.520	.578	.808	1	.369	.595
	Illiterate	0[b]	.	.	0	.	.
	Substance abuse Yes	-.941	.671	1.968	1	.161	.390
	Substance abuse- No	0[b]	.	.	0	.	.
	Junk food Yes	3.449	.666	26.814	1	.000	31.453
	Junk food No	0[b]	.	.	0	.	.
	Physical activity No	-3.106	.561	30.685	1	.000	.045
	Physical activity Yes	0[b]	.	.	0	.	.

* The reference category is: Normotensive.

[b] This parameter is set to zero because it is redundant.

abuse. Result may be because of geographical and cultural variation between the two study countries. 70.7% of the study population was Literate which was a bit less than national standard (74%) [13]. 19% of literates and 11.5% of illiterates were suffering from HTN whereas in case of pre-HTN, illiterates were more sufferers which were statistically significant. It was seen that 64.4% of the study population were consuming any kind of junk food. Though HTN was only 12.7% among them it should be considered that many more will be in that zone in very near future as proportion of pre-HTN was very high among them (50%). Junk food mainly contains trans fat and more salts, which are proven risk factors[14-15] for proportion of pre-HTN. Proportion of HTN was quite high among people with substance abuse (46.4%) which was similar to a study finding by a study by Puddey et al[16] which showed impact of Alcohol in Blood pressure, only hope was that maximum study people were devoid of any substance abuse (73.1%). HTN was relatively low among physically active study subjects which was as par with many studies[17-18]

Multivariate logistic regression model revealed that Per-capita income and substance abuse was independent risk factors for HTN whereas age, male gender, substance abuse, physical inactivity and junk food consumers were independent risk factors for pre-HTN.

Conclusion:

Proportion of HTN was high among attendees of UHTC but proportion of pre-HTN was even much higher. Age, per capita income, gender, substance abuse, junk food consumption and physical inactivity had an impact on proportion of HTN and pre-HTN.

Recommendation:

Special awareness generation initiative programme should be undertaken to address junk food consumption, Substance abuse control, lifestyle changes. Government, NGO and individual level approach at solo patient care center and community care setting should be very aggressive to detect HTN and Pre-HTN at earliest.

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