ORIGINAL ARTICLE

BLOOD PRESSURE AWARENESS AMONG GENERAL POPULATION: A RURAL WEST BENGAL EXPERIENCE WITH LOGISTIC REGRESSION

Sanjoy Kumar Sadhukhan[1], Swati Khan[2]

[1]Associate Professor (Public Health), All India Institute of Hygiene & Public Health, 110 C. R. Avenue, Kolkata,
[2]Associate Professor, Department of Community Medicine, Rohilkhand Medical College & Hospital, Bareilly, UP

Correspondence:
Dr. Swati Khan,
Department of Community Medicine,
Rohilkhand Medical College & Hospital, Bareilly-243006, UP.
Email: drswatikhan@gmail.com

ABSTRACT

Objectives: The study was conducted with an objective to find out the awareness of self blood pressure in a rural community of West Bengal and factors associated with it.
Methods: A community based cross-sectional study on self BP awareness among adults (≥18 years) was carried out in a rural community of West Bengal through house to house visits. Total study subjects were1201 (Male=598; Female=603) of which 132 (11%) were hypertensive.
Results: Only 17.2% of all study subjects were aware of their own BP readings with no male-female difference. This awareness was significantly associated with age, education, economic status and hypertension, which remained significant, even after multiple logistic regressions. Even among hypertensives, only 38% were aware of their self BP. Nearly 67.11% of the study subjects had no knowledge about complications of hypertension. About 86.92% of the study subjects were ignorant about the life style changes required to prevent hypertension. Regarding hypertension control/treatment, 72.85% of study subjects were unaware. In general, males had better knowledge compared to females,although not always statistically significant.
Conclusion: Self BP awareness among this study population was very poor even among the hypertensives leading to a high risk of cerebrovascular accidents and coronary heart diseases. Interpersonal communication in medical facilities as well as other strategies like group-discussions (general and focal), mass media and general education system can be utilized to improve the situation.

Keywords: Blood Pressure; Awareness; Hypertension; Complication;Prevention; Control; Logistic Regression

INTRODUCTION

Every person has Blood Pressure (BP), the lateral pressure exerted by the flowing blood on arterial wall,but probably few are aware of it unless needed. The most common cardiovascular ailment is hypertension, a very important *preventable* cause of cerebrovascular accidents (CVAs) and coronary heart diseases (CHDs), responsible for mortality exceeding about 50% of total deaths in some industrialized countries. Hypertension is classically an "*iceberg disease*"- even in most developed countries, only half of the hypertensive persons are aware of their condition**.[1]** Obviously the submerged portion is much more in a developing country like India with poor literacy, awareness and medical services. The only way to check it is to "Know your own BP and control it if raised throughout your life." Our civilization demands it for a healthy/active adult and geriatric population. Awareness of one's own BP reading is essential for this.

Here is an experience gathered from a study of awareness of self-BP among *general population* in a rural community of West Bengal (WB).

MATERIALS AND METHODS

A cross-sectional study on hypertension was undertaken in a village (Dearah) of Singur Block, Hoogly District, WB.It was a randomly selected convenient village out of about 30 villages in Singur Rural Health Unit & Training Centre (RHU&TC), the field practice area of All India Institute of hygiene & public health (AIIH&PH), Kolkata-73. The study was conducted by house-to-house visit, contacting each and every adult person (Census) of the village ≥ 18 years (Total 1201, Male=598 & Female=603). Persons < 18 years were excluded from the study. A pre-tested semi-structured schedule was used to collect data regarding awareness of self-BP readings, complications,

prevention and control of hypertension. Blood pressure of every adult was measured by Mercury manometer using standard technique.[2-4] Pre-treatment Blood pressure was recorded for those who were on treatment. Data collected, were tabulated and analyzed using standard statistical methods (frequency distribution table, proportion) and suitable statistical tests (Z, Chi-square) applied as applicable.

Important variables studied were *age* (10 years grouping done as 18-27, 28-37……., the last group being 68+), *sex* (male and female), *education* [categorized as illiterate, primary (class I-IV), middle school (class V-VIII), secondary & higher secondary (class IX-XII) and graduate/post graduate], *family asset score* (NFHS- National Family Health Survey)- an indirect estimate of economic status of the family depending on varying family assets with a total score of 29 [categorized as 0 (score 0-5), I (score 6-15) and II (score >15)] and hypertension (Systolic BP $\geq$ 160 mm Hg. and/or Diastolic BP $\geq$ 95 mm Hg. or on anti-hypertensive drugs) Unifactorial analyses (1:1) were done to identify the factors having significant association with self-BP awareness. Then **a** multiple logistic regression analysis was done (using SPSS statistical package) with those significant factors to determine the *independent* role of these variables influencing self-BP awareness of each individual.

OBSERVATIONS

A total of 132 persons (11%) were found to be hypertensive (i.e. Systolic BP $\geq$ 160 mm Hg. and/or Diastolic BP $\geq$ 95 mm Hg. or on anti-hypertensive drugs[5]) in that village with little higher prevalence in females (12.4% vs. 9.5%). With more liberal criteria[6] of $\geq$ 140/90 mm Hg, the prevalence was 25.9% (26.3% for females & 25.5% for males). These differences were statistically insignificant ($p \geq 0.05$).

Awareness of self-BP reading- The awareness regarding own BP reading was present amongst 17.2% of study subjects with almost no sex difference (17.4% for female and 16.9% for male). Regarding various **factors** influencing this awareness, Table 1 shows the result of unifactorial analyses (1:1) of self-BP awareness with different factors studied. It reveals that except sex, all

the factors studied have significant association with self-BP awareness. ($p<0.01$)

Table 1: Factors Associated with self-BP awareness: Unifactorial Analyses (N=1201)

Factors	n	Aware (%)	P value
Age (yr)			
18-27	328	39 (11.9)	.001
28-37	349	50 (14.3)	
38-47	226	47 (20.8)	
48-57	125	32 (25.6)	
58-67	84	15 (17.9)	
68+	89	23 (25.8)	
Sex			
Female	603	105 (17.4)	.870
Male	598	101 (16.0)	
Education			
Illiterate	311	33 (10.6)	.000
Class I-IV	201	35 (17.4)	
Class V-VIII	366	52 (14.2)	
Class IX-XII	231	57 (24.7)	
≥Graduate	92	29 (31.5)	
Asset Score			
0-5	89	2 (2.2)	.000
6-15	822	119 (14.5)	
>15	290	85 (29.3)	
Hypertension			
Present	132	48 (36.4)	.000
Absent	1069	158 (14.6)	
Total	**1201**	**206 (17.2)**	

Multiple logistic regression analysis (Table 2) shows that all the factors studied have significant *independent* contribution towards the self-BP awareness of an individual. ($p< 0.01$ for all) Multiple adjusted Odd's ratios (i.e. the Odd's ratio of having self BP awareness when all other factors are constant) show that for every 10 years increase in age, the self-BP awareness increases by about 1.20 times. Similarly, for every one category increase in education this awareness increases by 1.40 times, for one category increase in asset score this increases by 2.10 times and for hypertensives this increases by 2.85 times. So age, education, economic status and hypertension all have independent and positive contribution towards self-BP awareness.

Table 2: Factors influencing self-BP awareness; The Logistic Regression Result

Factors	Co-efficient (β)	Wald	Significance	Exp (β)(= Multiple adjusted Odd's Ratio)	95% CI for Exp (β) Lower	95% CI for Exp (β) Upper
Age	0.181	9.31	0.002	1.198	1.067	1.346
Education	0.339	21.81	0.000	1.403	1.217	1.617
Asset score	0.740	20.54	0.000	2.097	1.532	2.870
Hypertension	1.047	20.30	0.000	2.848	1.806	4.491
Constant	-4.861	130.11	0.000	0.000		

Awareness about complications of hypertension- 67.11% of the study subjects were ignorant about the complications of hypertension, significantly more in

females compared to males ($p<0.001$) [Table 3]. Regarding two important complications e.g. Cerebro-vascular accidents (CVAs) and cardiovascular

emergency (Myocardial infarction-MI), only 27.8% and 5.9% of the study subjects were aware respectively. Here again, males had significantly better awareness compared to females (p<0.001)

Awareness regarding the role of life style changes to prevent hypertension- 86.92% of the study subjects were not aware of the role of any life style changes in preventing hypertension (Table 3). Females were significantly less aware (p<0.001). Among the principal ways of stated life style changes- exercise, diet/fat control, salt restriction and stress control came in order of preference. Males were significantly more aware about exercise (p<0.01) and stress control (p<0.05) but others were insignificant. So the study subjects in general had very poor awareness regarding prevention of hypertension, even poorer among females.

Table 3: Awareness of the study subjects (N=1201) regarding complications, prevention and control of hypertension (Multiple responses)

	Male (n=598) (%)	Female (n=603) (%)	Total (N=1201) (%)
Complications			
Some knowledge:			
Stroke/CVA/Paralysis	203 (33.9) ***	131 (21.7) ***	334 (27.80)
Heart attack/MI	49 (8.20) ***	22 (3.65) ***	71 (5.90)
Reeling of head	16 (2.68)	23 (3.81)	39 (3.24)
Headache	5 (0.84)	14 (2.32)	19 (1.58)
@Others	10 (1.67)	16 (2.65)	26 (2.16)
No knowledge:	**370 (61.9) *****	**436 (72.3) *****	**806 (67.11)**
Prevention(Measures)			
Some knowledge:			
Exercise:	49(8.20)**	25 (4.14)**	74 (6.16)
Diet/Fat control	41(6.86)	26 (4.31)	67 (5.57)
Salt restriction	31(5.18)	23 (3.81)	54 (4.49)
Stress control	26(4.35)*	14 (2.32)*	40 (3.34)
© Others	6 (1.00)	0 (0.00)	6 (0.50)
$ Specific food item	4 (0.67)	0 (0.00)	4 (0.33)
No knowledge:	**500 (83.61)*****	**544 (90.21) *****	**1044 (86.92)**
Control (Measures)			
Some knowledge:			
Salt restriction	128(21.40)	112(18.57)	240(19.98)
Temporary medications	95 (15.90)	86 (14.26)	181(15.07)
Regular medications	74 (12.37)	58 (9.62)	132(11.00)
Diet/Fat control	13 (2.17)	5 (0.83)	18 (1.49)
Exercise	7 (1.17)	0 (0.00)	7 (0.58)
No knowledge:	**423(70.73)**	**452(74.96)**	**875(72.85)**

[Total no. of responses are more than 'N' (n) due to multiple responses.]
* p<0.05   ** p<0.01   *** p<0.001
@ Others include Dyspnoea, Diabetes mellitus and Death.
© Others include Wt. Reduction and Good sleep
$ Specific food items include Plantain stem and Fenugreek

Awareness regarding control of hypertension- The awareness of the study subjects regarding control (treatment) of hypertension was seen to be very poor (Table 3). About 72.85% of the study subjects had no knowledge about control of hypertension and it was almost equal for males and females (p≥0.05). As per opinion of the study subjects, the important ways of controlling hypertension were salt restricted diet, temporary medication i. e. when pressure rises, regular medication, diet/fat control and exercise. Regarding all these responses, no statistically significant male-female differences were observed (p≥0.05) One point of concernis that the opinion of using short-term medications as and when necessary was more (15%) than the opinion of using regular medications (11%), a dangerous fact indeed.

DISCUSSION

Present study revealed that as a whole 17.2% of all study subjects were aware of their own BP reading, similar for males and females. It also revealed that this awareness was significantly contributed by age, education, economic status and hypertension of the study subjects. Similar rural community based studies in India with logistic regression analysis are not readily available for comparison. In the United States, this general awareness was estimated to be 66.6%.[7]

The definite hypertensive persons (≥ 160/95 mm Hg. or on treatment) were significantly more aware of their own BP reading compared to the non-hypertensives (36.4% vs. 14.8%, p< 0.001), which *remains even after multiple logistic regression analysis.* Similar awareness

(ranging from 4.9% to 25%) among hypertensives in the rural areas were noted by many workers in India and abroad.[8-12] Nevertheless, 62% of the hypertensives were not aware of their BP reading, leaving them at risk of developing CVAs and CHDs. At every medical contact with a subject, BP should be measured and informed to the person including education regarding the necessity of regular check-up. Community based hypertension detection programme is a reasonable but costly solution.

Present study also revealed that awareness regarding complications and measures for prevention and control of hypertension are very poor. About 67.11% of the study subjects were ignorant about complications of hypertension and regarding two important complications of stroke and myocardial infarction, only 27.8% and 5.9% respectively had knowledge. 86.92% of study subjects were ignorant about preventive measures of hypertension; the commonly known measures are exercise, diet/fat control, salt restriction and stress control. Similarly 72.85% were ignorant about treatment/control measures. Common control measures stated are salt restriction, temporary medications, _more than_ regular medications, diet/fat control and exercise. In general men had better knowledge compared to women. (although not always statistically significant) Higher literacy among males (about 82% vs. 66%) in that village might explain these male-female differences. Sometimes this ignorance about some important issue (temporary medication) might precipitate dangerous complications (CVAs and CHDs). All these could not be compared, as comparable studies were not readily available. To improve this awareness level of the population, interpersonal communication with medical facilities as well as other strategies like group-discussions (general and focal), mass media and general education system can be utilized.

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