

## Screen Out Undiagnosed Cases of Hypertension: A Cross Sectional Study of Blood Pressure in Solapur, India

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**Abstract:** Raised BP is the biggest single contributing risk factor to global death (1) and to the global burden of disease. Hypertension is one of the most significant public health problem and a common lifestyle disease today in India. In 90% patients, the cause is idiopathic. Around 50% of the population remain undiagnosed. According to experts, Hypertension is likely to end up being an epidemic in the near future and 1/3 of the population would suffer from hypertension by the year to 2020. It is a cross-sectional blood pressure (BP) survey of volunteer adults (aged  $\geq 18$  years) who have not had their BPs measured for at least a year before the recruitment. Sitting blood pressure will be measured in triplicate according to standardized specified methods. Screenees whose BP readings are consistent with the current definition of hypertension will be provided with written dietary and lifestyle advice. Depending on local facilities they will also be provided with a referral to receive medications and/or follow up support. 210 volunteers were screened in current study. Out of 210, 120 were males and 90 females. Out of 120 male 21 (17.5%) were hypertensive's as per WHO Definition (SBP  $>140$  & DBP  $>90$ ) Out of 21, 11 were between 30 to 40 age, 2 below 30 and 5 between 40 to 50 age and 3 above 50 age. In the remaining 99 males 9 were having High normal SBP (130-139) and 12 high DBP (85-89) Out of 120 male 42 (21 hypertensive's and 21 with High BP). Excluding hypertensives as per WHO norms: Normal in males: SBP:  $113.7 \pm 20.9$  mm of Hg, DBP:  $75 \pm 16.6$  mm of Hg, Females: SBP:  $101.3 \pm 24.9$  mm of Hg DBP:  $68.1 \pm 16.3$  mm of Hg

**Keywords:** B. P, Hypertension, High Normal. Solapur, India.

## INTRODUCTION

Raised BP is the biggest single contributing risk factor to global death (and to the global burden of disease). This impact is largely mediated through increased rates of coronary artery disease, stroke and renal disease. Raised BP currently causes approximately 9.4 million deaths each year worldwide [1] and this figure is expected to rise given an expanding and aging global population. Mankind has probably never experienced such a devastating epidemic. The etiology of raised BP is largely explicable by identified environmental factors such as overweight, excessive intake of alcohol and dietary salt, and insufficient exercise [2]. Several drug classes have been shown to provide cost-effective BP lowering for the prevention of the adverse cardiovascular (CV) sequelae of raised BP. Despite the availability of these antihypertensive medications, global data suggest that

less than half of those classified as hypertensive are aware of their problem [3]. Less than a third of those who are treated for hypertension get their BPs controlled to currently recommended targets [3]. Even assuming sub-optimal treatment and control rates are maintained among those treated as 'hypertensive' [3] it is clear that a huge beneficial impact on mortality and reduction in this burden of disease can be achieved by increasing awareness through enhanced screening for raised BP. Solapur is a city in South Western Maharashtra, India governed by Municipal Corporation. As of 2011 India census, Solapur had a population of 12, 02,951. Solapur has an average literacy rate of 71.2%, higher than the national average of 65% [2]. So we decided to find despite good literacy rate how much is health awareness in citizens. We took a pilot study taking sample from medical college employee and screened them for B.P.

**Aims and Objectives**

- To screen out undiagnosed cases of Hypertension in study population
- To find normal values of Blood pressure in them

**METHODS**

Study Population: Medical College Employees and students

**Inclusion criteria**

- i. Age  $\geq$  18 years both males and females
- ii. Consent for participation given

**Exclusion criteria:**

Known Hypertensive

**Procedures**

- Providing information about the study and collecting consent for participation. All written materials to be used by screenees were used vocabulary in a language that was clearly understood at the study sites.
- Collection of basic demographic information:
  - i. All information was collected prior to BP measurements
  - ii. The following data was collected on all screenees (core-dataset)
    - 1) Date
    - 2) Time of day
    - 3) Room temperature: using a thermometer
    - 4) When your blood pressure (BP) was last measured? (MM/YYYY)
    - 5) What is your age? (estimated if necessary) What is your month and year of birth? (MM/YYYY) (if known)
    - 6) What is your sex? (M/F)
    - 7) Are you currently on blood pressure/antihypertensive treatment? yes/no
    - 8) Do you have diabetes? yes/no/don't know
    - 9) Do you smoke? yes/no
    - 10) Have you had a heart attack in the past? yes/no
    - 11) Have you had a stroke in the past? yes/no
    - 12) Do you consume alcohol? (never or rarely/<once week/regularly)
    - 13) Which arm will be used to take the blood pressure reading? Left/right
    - 14) SBP (1-3)
    - 15) DBP (1-3)
    - 16) Heart rate (1-3)
    - 17) In addition, the following variables was recorded when available/possible:

**iii. BP measurements**

- a) BP was measured by a conventional Mercury sphygmomanometer using a stethoscope.
- b) The first and fifth Korotkoff sounds (the appearance and disappearance of sounds) will correspond to the systolic and diastolic BP.
- c) BP was measured on the upper-arm
- d) The circumference of the arm (at the mid arm level) was measured to ensure that the correct size of arm cuff is used
  - For arms with circumference < 32 cm, regular cuff used
  - For arms with circumference 32-42 cm, large cuff used
  - For arms with circumference >42 cm, extra-large cuff used
  - For arms with circumference <20cm paediatric cuff used
- e) The cuff was placed at the heart level
- f) The patient's arm being used for the measurement should rest comfortably on a table
- g) BP was measured on one arm only, preferably left, and the arm used was recorded

**iv. Prior to measurement**

- The participant was seated with their backs supported and with their legs resting on the ground and in the uncrossed position for 5 min
- Participants should not have smoked immediately before or during the measurement
- i) Three (3) BP readings were taken with 1 min between readings.
- j), the heart rate was measured during the 1 minute after each BP reading
- l) Definition of hypertension:

As Per Indian Hypertension Guidelines

- being on at least one antihypertensive medication taken for raised BP or
- the average SBP (mean of the last 2 of 3 readings)  $\geq$  140 mmHg and/or
- the average DBP (mean of the last 2 of 3 readings)  $\geq$  90 mmHg

High Normal B.P

Systolic B. P 130-139 mm of Hg

Diastolic B. P 85-89 mm of Hg

**RESULTS**

**Table-I: Normal Values of B.P in mm of Hg**

Sample size		SBP	DBP
210	Overall	110.8 $\pm$ 32.5	74.4 $\pm$ 11.9
90	Female	101.3 $\pm$ 24.9	68.1 $\pm$ 16.3
120	Male	117.8 $\pm$ 30.3	79.1 $\pm$ 23.6

**Table-II: Percentage of Hypertensives and High B.P**

	Sample size	SBP >140 & DBP >90 mm of Hg	SBP 130 -139 mm of Hg	DBP 85 TO 89 mm of Hg
Female	90	NIL		1
Male	120	21	9	12

**Table- III: Values of Normal B.P Excluding hypertensive**

	Sample size	SBP mm of Hg	DBP mm of Hg
Overall	189	108.9 ± 25.8	71.6 ± 8.9
Male	90	113.7 ± 20.9	75 ± 16.6
Female	99	101.3 ± 24.9	68.1 ± 16.3

Out of 120 male 21(17.5%) were hypertensives as per Indian Hypertension Guidelines and 21(17.5%) were with High BP i.e Systolic B.P 130 to 139 mm of Hg and Diastolic between 85 to 89 mm of Hg. Indicating almost 35 % males unaware of their High B.P and at risk of Cardiovascular complications.

Out of 21, 11 were between 30 to 40 age, 2 below 30 and 5 between 40 to 50 and 3 above 50 .Indicating 50% hypertensives are young. Out of 120 male 9 were having High normal SBP (130-139) and 12 high DBP (85-89)

Excluding hypertensives as per WHO norms

Normal in males:

SBP: 113.7 ± 20.9 mm of Hg

DBP: 75 ± 16.6 mm of Hg

Females:

SBP: 101.3 ± 24.9 mm of Hg

DBP: 68.1 ± 16.3 mm of Hg

Only 5 % were smokers, but all of them were having high Diastolic B.P  
3% were known Diabetic and were on treatment  
5% were regular alcoholics and all were having high Systolic B.P  
16% were consuming alcohol in less than a week.  
There was no incidence of Stroke or Heart attack in study population

**DISCUSSION**

Hypertension is a major contributing factor to the current epidemic of cardiovascular disease in India and many other low and middle-income countries. The global burden of hypertension was estimated to be close to 1 billion adults in 2000, and predicted to increase to 1.56 billion by 2025. Worldwide, in excess of 7 million deaths annually may be attributable to hypertension [4] which is the third most important cause of the global burden of disease. There is marked variation in levels of mean systolic blood pressure between countries.

In our study we tried to screen out undiagnosed junk of Hypertension and High blood pressure. We observed no hypertensive in females of reproductive

age group. But in males 17.5% were undiagnosed hypertensive and 17.5% with High normal Blood pressure.

Dietary and lifestyle information provided to ‘hypertensive’ patients to include

- a) Reduce salt intake
- b) Reduce alcohol intake
- c) Engage in regular physical exercise for at least 30 minutes on most of the days of the week
- d) Have at least 5 portions of fruit and vegetables per day
- e) Reduce your weight aiming for a BMI target < 25 kg/m<sup>2</sup>
- f) Other locally relevant advice...

A generic package of advice will be provided centrally for local adaptation and translated as required.

According to study by Raghupathy Anchala [3] Overall prevalence for hypertension in India was 29.8%.Of these, 25% rural and 42% urban Indians are aware of their hypertensive status. Only 25% rural and 38% of urban Indians are being treated for hypertension. One-tenth of rural and one-fifth of urban Indian hypertensive population have their BP under control. Similarly Kath et al., [4] in 2014 found age-standardised prevalence of hypertension was 23% in men. In a study in Chennai by Mohan V et al., [5] in 2007 Chennai Urban Rural Epidemiology Study (CURES) is one of the largest epidemiological studies on diabetes carried out in India Hypertension was present in 20% [men:23.2% vs. women:17.1%, p<0.001] of the study population.According to Shyamal Kumar Das et al., [6] study conducted in West Bengal malda district in 2005 Overall prevalence of hypertension with a cut off mark of 140/90 mm of Hg is 24.9%.

Hypertension rarely causes symptoms in the early stages and many people go undiagnosed. Those who are diagnosed may not have access to treatment and may not be able to successfully control their illness over the long term. There are significant health and economic gains attached to early detection, adequate treatment and good control of hypertension [9].

In our study almost 35 % males unaware of their High B.P despite the fact that Solapur has good literacy rate in India. This indicates a high need of public awareness regarding awareness of once own blood pressure and starting for corrective measures at early so that complications such as Acute Myocardial Infarction, Stroke or Heart failure can be prevented

Several trials [8, 6, 7] have shown that, in patients with diabetes, reduction of diastolic blood pressure to about 80 mmHg and of systolic blood pressure to about 130 mmHg is accompanied by a further reduction in cardiovascular events or diabetes-related microvascular complications ,in comparison with patients with less stringent blood pressure control [7-9]. In patients with high or very high cardiovascular risk, including diabetes or established vascular or renal disease, therefore, blood pressure should be reduced to 130/80 mmHg or less.

Treating the complications of hypertension entails costly interventions such as cardiac bypass surgery, carotid artery surgery and dialysis, draining individual and government budgets [10]. The increasing prevalence of hypertension is attributed to population growth, ageing and behavioral risk factors, such as

unhealthy diet, harmful use of alcohol, lack of physical activity, excess weight and exposure to persistent stress.

The adverse health consequences of hypertension are compounded because many people affected also have other health risk factors that increase the odds of heart attack, stroke and kidney failure

**CONCLUSION**

As per Association of Physicians of India it is possible that the risk of cardiovascular events in Asian Indians is higher at relatively lower levels of blood pressure (BP), in the absence of any such data from India Indian Hypertension Guidelines II defines Hypertension above 140/90 mm of Hg .Our Data shows Normal values of B.P are quite lower in solapur population compared to international norms for defining normal B.P And screening of normal population showed a big number 17.5 % undiagnosed cases of Hypertension and 17.5% with High normal B.P in population .So its high time for us to have Big data of B.P in Indian population and to screen out population at risk for cardiovascular event.

**Indian Hypertension Guidelines**

**Table 1: Classification of blood pressure for adults age 18 and older<sup>\*3,9</sup>**

Category	Systolic (mm Hg)		Diastolic (mm Hg)
Optimal**	<120	and	<80
Normal	<130	and	<85
High-normal	130-139	or	85-89
<b>Hypertension***</b>			
Stage 1	140-159	or	90-99
Stage 2	160-179	or	100-109
Stage 3	≥180	or	≥110
<b>Isolated systolic hypertension</b>			
Grade 1	140-159	and	<90
Grade 2	≥160	and	<90

**Conflict Of Interest**

We declared that we don't have any conflict of interest

**Medical Writer**

There is no contribution of Medical Writer

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