

**ORIGINAL ARTICLE****EFFECT OF LIFESTYLE AND DIETARY MODIFICATIONS ON PREHYPERTENSIVE CASES OF LOWER SOCIOECONOMIC POPULATION IN AHMEDABAD CITY****Snehal R Patel<sup>1</sup>, Jayesh P Modi<sup>2</sup>****Author's Affiliations:** <sup>1</sup>Assistant Professor, Department of Medicine, GMERS Medical College, Valsad; <sup>2</sup>Consultant Physician, Patan, Gujarat.**Correspondence:** Dr. Snehal R Patel, Email: vibhav\_5739@yahoo.in**ABSTRACT**

**Background:** Prehypertension is associated with high blood pressure and higher cardiovascular risk, and it should be suggested to prehypertensive patients that they modify their lifestyle in order to help avoid these problems.

**Methodology:** The present study was the cross-sectional longitudinal study conducted on prehypertensive subjects of lower socio-economic group residing in Ahmedabad City. The participants were explained regarding modification in form of avoidance of entire amount of salt, morning exercise in form of brisk walking for half an hour at least three times a week and abstinence of smoking and alcohol in subjects who are habituated. Patients were instructed to attend OPD for every one month in the morning for 3 months as follow up.

**Results:** In our study, pre HTN was detected in 72 (40%) of male subjects and 70 (41.1%) of female subjects. Prehypertension was found to be more prevalent in males (54.6%) as compared to females (45.4%). Overall 81.15% of subjects who were prehypertensive were reverted to normotension within 3 months with life style modification.

**Conclusion:** It is concluded from our study that preHTN is quite prevalent affecting > 40% of urban population of lower socioeconomic class. Weight reduction, abstinence from smoking, regular exercise and salt reduction are highly effective, easy to follow and cheaper measures to control pre HTN and prevent its progression to hypertensive levels thereby also reducing cardiovascular and other complications of HTN.

**Keywords:** Prehypertension, lower socio-economic class, lifestyle modification, dietary modification

**INTRODUCTION**

Prehypertension is associated with high blood pressure and higher cardiovascular risk, and it should be suggested to prehypertensive patients that they modify their lifestyle in order to help avoid these problems.<sup>1,2</sup> "Cardiovascular risk" refers to the probability of developing cardiovascular disease within a determined time, usually 5 or 10 years. The most common methods used for estimating cardiovascular risk are based on the criteria used in the Framingham<sup>2,3</sup> and SCORE<sup>4,5</sup> studies. In addition to pharma-

cological strategies, making changes in lifestyle can help reduce cardiovascular risk and blood pressure. Positive modifications of lifestyle include increasing physical activity, changes in eating habits, and the elimination of addictions. A number of studies<sup>6,7</sup> have shown the effect of such modification on certain components of cardiovascular risk.

Majority of our patients are coming from lower socio-economic status and because of poverty, illiteracy and other factors do not seek early medical advice or regular health check up. This leads to detection of

almost all diseases including hypertension very late, most of the times with long term complications.

At the same time, the same factors of illiteracy and certain misconception about diet and smoking would also pose many major problems in compliance and strict adherence to lifestyle modifications making it rather difficult though cost effective therapeutic approach.

Considering both these aspects, we thought it worthwhile to gain first hand information and data about prevalence of prehypertension and to study early effects of short term life style modification measures.

## MATERIALS AND METHODS

The present study was the cross-sectional longitudinal study conducted in a tertiary care hospital. Subjects of lower socio-economic group residing in Ahmedabad City and visiting hospital for some other illness, paramedical staff-nurses and servants of hospital, healthy relatives of patients admitted in the hospital, employees of various organizations attending the hospital for certificates of physical fitness are randomly selected from following sample groups.

Modified Prasad's socio-economic classification has been taken as reference to consider socio-economic status. Subjects falling in class III, IV and V were included for screening. All these subjects were interviewed in detail to find out presence of any symptoms of hypertension, like headache particularly in morning, giddiness, blurred vision, tingling sensation etc. Subjects with past history of stroke or cardiac disease or transient ischemia attack were excluded from the study.

Persons with systolic BP between 120-139 mmHg and diastolic BP between 80-89 mmHg were diagnosed as prehypertension and included for the study. The detailed information regarding their habits of smoking, diet, exercise and other risk factors were gathered from the participants. They were explained regarding modification in form of avoidance of entire amount of salt in salad and foods, pickles and papad, morning exercise in form of brisk walking for half an hour at least three times a week and abstinence of smoking and/or alcohol in subjects who are habituated.

On the basis of BMI, our study group was labeled as normal, overweight or obese. Patients were in-

structed to attend OPD for every one month in the morning for 3 months. On every follow up visit, again BP was recorded and detail interrogation was done to check for compliance in adherence to life style modification instructions. In all patients base line investigations for Hypertension like blood sugar, chest x-ray, RFT, ECG were done. All findings of each patient were recorded in a separate Performa for each patient as follow and finally a master chart listing all the patients' findings was prepared.

## RESULTS

We screened 350 (180 males and 170 females) subjects over the age of 18 years. Out of these, 90 (25.71%) were detected as hypertension (i.e. BP > 140/90 mmHg) while 118 (33.71%) as normotensive (i.e. BP 120/80). Both these groups were excluded from the study. The remaining 142 (40.57%) subjects having their systolic BP between 120-139 mmHg and diastolic between 80-89 mmHg were included in the study.

In our study, pre HTN was detected in 72 (40%) of male subjects and 70 (41.1%) of female subjects. During follow-up 2 male and 12 female subjects did not turn up. Thus, findings from 128 prehypertensive subjects were considered for results.

The age range of subjects taken for this study was from 18 to 86 years. Prehypertension was found to be more prevalent in males (54.6%) as compared to females (45.4%). In both sexes, maximum incidence was observed in age group of 46-60 years. Prehypertensive males with obesity or overweight slightly outnumber females in a ratio of 1.3:1.

**Table 1: Age and gender distribution of cases**

Age (in yrs)	Male (%)	Female (%)	Total
18-30	5 (3.9)	4 (3.2)	9 (7.1)
31-45	16 (12.5)	10 (7.9)	26 (20.4)
46-60	24 (18.7)	18 (14.0)	42 (32.7)
61-75	15 (11.7)	18 (14.0)	33 (25.8)
75-90	10 (7.8)	8 (6.3)	18 (14.1)
Total	70 (54.6)	58 (45.4)	128 (100.0)
<b>BMI</b>			
18.5-24.99	31 (52.5)	28 (47.5)	59 (46.1)
25.0-29.99	30 (57.7)	22 (42.3)	52 (40.6)
30.0 and above	9 (52.7)	8 (47.1)	17 (13.3)
<b>Smoking</b>			
Smoker	32	6	38 (29.7)
Non-smoker	38	52	90 (70.3)

**Table 2: Age wise distribution of isolated systolic preHTN, preHTN and combined preHTN**

Age (in yrs)	Systolic PreHTN		Diastolic PreHTN		Combined PreHTN	
	M	F	M	F	M	F
18-30	1	1	1	1	3	2
31-45	4	2	2	3	10	5
46-60	8	6	2	2	14	10
61-75	4	4	3	3	8	11
>76	3	3	0	0	7	5
Total	20	16	8	9	42	33

M=Male, F=Female

**Table 3: Patients becoming normotensive at the end of each month**

Variable	First month	Second month	Third month
Male	9	20	27
Female	14	14	20
Total	23 (17.96)	34 (26.56)	47 (36.72)

**Table 4: Patients with persistent prehypertensive after 3 months of lifestyle modification**

Age (in years)	PreHTN	Persistent PreHTN (after 3 months)		Total
		Male	Female	
18-30	9	0	0	0
31-45	26	1	1	2 (7.7)
46-60	42	5	1	6 (14.3)
61-75	33	5	4	9 (27.3)
>75	18	3	4	7 (22.2)
Total	128	14	10	24 (18.7)

After 3 months, it was found that all but one male and one female subject failed to quit their habit of smoking. In all remaining smokers who claimed to have left smoking it was observed that their BP were also reverted to normotensive levels.

In present study isolated systolic preHTN (120-139 mmHg) was detected in 28.13% of subjects, isolated diastolic preHTN (80-89 mmHg) in 13.28% and combined preHTN (systolic + diastolic) in 58.59% participants.

At the end of 3 months follow up, all subjects who had isolated systolic preHTN or isolated diastolic Pre HTN reverted to normotensive level. Also the majority of subjects having both systolic as well as diastolic preHTN were reversed to normal. Thus we observed reduction of both systolic as well as diastolic blood Pressure with adoption of healthy life style modifications.

Overall 81.15% of subjects who were prehypertensive were reverted to normotension within 3 months with life style modification. We did not observe any subject progressing to hypertension. Weight reduction in the range of 2 to 3 kg was noticed in many subjects but significant weight loss occurred in 6 subjects only, who previously were in overweight or obese category. 3 overweight subjects became normal weight and 3 obese had reduced to overweight category of BMI. It was also noticed that after 3 months, their level of BP also came down to normotensive range.

**DISCUSSION**

Paul Whelton et al<sup>8</sup> reported lifestyle intervention more likely to be successful and the absolute reduction in risk of hypertension are likely to be greater when targeted in older persons and those who have a higher risk of developing hypertension compared to younger or lower risk population.

Control of hypertension is a primary prevention measures for coronary heart disease, a worldwide known and accepted fact. This requires detection of prehypertension and its management. In our study though with a smaller sample size, we did find an overall 40.6% of urban lower socio-economic class of persons having preHTN and 25.71% silent HTN signifying this as an important health issue requiring public as well as health professional’s attention. Similar results have also been reported in other Studies. Chocklingam et al<sup>9</sup> reported 47% urban Indian population to be having pre HTN as against 34% having HTN.

There is a substantial evidence to suggest that weight reduction reduces BP in overweight individuals.<sup>10</sup> In our study, we could not establish accurate relationship between weight reduction and BP reduction because of short duration of 3 months. Still from the observation, we could conclude that weight reduction reduces BP in over weight and obese individuals. It has been observed by other researchers that there is substantial evidence to suggest that weight reduction reduces BP in overweight individuals. Jiang He et al<sup>10</sup> reported that 18 months weight loss intervention was significantly associated with 77% reduction in incidence of HTN.

In our study, isolated systolic Pre HTN was recorded in 36 (28.13%), while in 17 (13.28%) isolated diastolic pre HTN, recorded. Majority of subjects (58.6%)

had both (systolic + diastolic) preHTN. Shyamal Das et al<sup>11</sup> reported pre-hypertensive levels of systolic blood pressure among 35.8% of participants while 47.7% of participants had diastolic pre HTN while combined systolic + diastolic pre HTN was found 58.7%.

We did observe that in 81.2% of preHTN subjects, BP did revert to normotensive levels within 1 to 3 months only. So it was evident that very simple, minor and easy to follow modification even for a shorter duration in life style can have a significant impact on BP levels in prehypertension. Chockalingam et al<sup>9</sup> also concluded that sustained life style changes may be considered a cost effective method to control HTN risk in developing countries.

Though there were many limitations in our study, like limited sample size, shorter duration and lack of standardization and hence, we do look forward to another longer duration, study with more complex study design to establish all these facts which we did observe in limited time duration.

## CONCLUSION

It is concluded from our study that preHTN is quite prevalent affecting > 40% of urban population of lower socioeconomic class. The prevalence is almost equal in both male and female genders above the age of 45 years. Weight reduction, abstinence from smoking, regular exercise and salt reduction are highly effective, easy to follow and cheaper measures to control pre HTN and prevent its progression to hypertensive levels thereby also reducing cardiovascular and other complications of HTN. Hence, these measures should be promoted by health professionals for all class of population even though found to be apparently healthy.

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