ISOLATED SYSTOLIC HYPERTENSION AMONG THE BHOTIA OF UTTARANCHAL

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ABSTRACT

Prevalence of isolated systolic hypertension (ISH) was examined among the Bhotia of Chamoli district, Uttaranchal. Occurrence of ISH was found to be 4.92% among the Bhotia. This prevalence was 2.5% in men and 2.42% in women. The study revealed an increasing trend of occurrence of ISH with increasing age. The determinants like age, abdominal obesity, tobacco chewing and education of the subjects emerged as important risk factors of ISH among the Bhotia of Uttaranchal.

Key Words: *Isolated systolic hypertension, Bhotia, abdominal obesity, tobacco chewing*

INTRODUCTION

Isolated systolic hypertension (ISH) is characterized with raised systolic pressure but normal diastolic pressure, is originally because of aging and, like essential hypertension, benign (Wilkinson et al., 2000; c.f. Midha et al. 2010). However, there is now compelling evidence from cross-sectional, longitudinal and randomized controlled trials that ISH confers a substantial cardiovascular risk. One of the key messages of the Seventh Report of the Joint National Committee (JNC- 7) on prevention, detection, evaluation and treatment of high blood pressure (Chobanian et al., 2003; c.f. Midha et al. 2010) is that in those older than 50 years, systolic blood pressure greater than 140 mmHg, is a more important cardiovascular disease (CVD) risk factor than diastolic blood pressure. ISH has been identified as an entity since long. It leads to risks of cardiovascular accidents and risk of myocardial infarction (Chou, 1992). Studies on the prevalence of ISH in developing countries like India are very scanty (Gupta et al. 2006, Midha et al. 2010).

This study is an attempt to estimate the prevalence of ISH in a sample of Bhotia population in Uttaranchal.

MATERIAL AND METHODS

Data of the present study were collected by one of us (C.M.) from the Bhotia, inhabiting in Chamoli district of Uttaranchal. Bhotia adults of both sexes were considered. Field investigation was conducted during April – August, 2004. Anthropometric measurements were obtained in accordance with the techniques recommended by Weiner and Lourie (1981). According to JNC – 7, ISH was defined as a systolic blood pressure (SBP) $\geq$140 mmHg and a diastolic blood pressure (DBP) <90 mmHg. A standard mercury sphygmomanometer was used for measuring blood pressure. Before the measurement was recorded the subject was seated comfortably for at least 5 minutes. Two readings were taken in 5 minutes intervals and mean BP of two readings was taken as BP of the individual. Total of 1279 subjects were studied. The study consists of 627 men (49.02%) and 652 women (50.98%).

RESULTS

The prevalence of ISH was found to be 4.92%. This prevalence was 2.5% in men and 2.42% in women (Table 1).

Table – 1: Prevalence of ISH

Population	ISH			Non ISH		
Bhotis	Male	Female	Total	Male	Female	Total
No.	32	31	63	627	652	1279
%	2.50	2.42	4.92	49.02	50.98	100.00

Determinants of isolated systolic hypertension

For the analysis of association of ISH and various determinants, subjects having ISH were compared with total. In this connection altogether 8 determinants (age, abdominal obesity, BMI, smoking, tobacco chewing, alcohol intake, pulse rate and educational status) were taken into consideration.

1. Age: There exists a significant association of ISH and age as shown in Table 2. Prevalence was highest in $\geq$60 year's age group (21.21%) and lowest in 20-29 years age group (2.23%). Prevalence was 33.19% in 30-39 years age group followed by 6.27% in 40-49 years age group and 8.49% in 50-59 years age group. Thus an increasing trend of prevalence with advancement in age was perceptible.

Table – 2: Age of the respondents in relation to ISH

Age (years)	ISH (n=63)	Total (n=1279)	% of ISH
20-29	10	449	2.23
30-39	9	282	3.19
40-49	19	303	6.27
50-59	18	212	8.49
≥60	7	33	21.21

$\chi 2$ = 34.50; Significant (p values <0.05)

2. Abdominal obesity: Abdominal obesity was assessed measuring waist circumference of the subjects (Men >102 cm; women > 88 cm). It reveals from Table 3 that prevalence of ISH was much higher among the subjects with abdominal obesity (10.45%) than that of the subjects without abdominal obesity (4.62%). A significant association is found between ISH and abdominal obesity.

Table – 3: Abdominal obesity in relation to ISH

Abdominal obesity	ISH (n=63)	Total (n=1279)	% of ISH
Yes	7	67	10.45
No	56	1212	4.62

$\chi 2$ = 4.60; Significant (p values <0.05)

3. Body mass index: Prevalence of ISH was found to be highest among the obese individual (14.28%), whereas this prevalence was 4.68% among the normal weight and 4.85% among the overweight (BMI: 25-29.9) individuals. However, no such association is found in application of chi^2 (Table 4).

Table – 4: BMI of the respondents in relation to ISH

BMI	ISH (n=63)	Total (n=1279)	% of ISH
<18.5	7	157	4.46
18.5-24.9	30	641	4.68
25-29.9	22	453	4.85
≥30	4	28	14.28

$\chi 2$ = 5.38; Not significant

4. Smoking habit: Occurrence of ISH was found to be comparatively higher among the Bhotias who smoke regularly (5.42%) than that of individuals who do not smoke (3.31%). Association of smoking habit with ISH prevalence was found to be non-significant (Table 5).

Table – 5: Smoking habit in relation to ISH

Smoking habit	ISH (n=63)	Total (n=1279)	% of ISH
Smoker	53	977	5.42
Non-smoker	10	302	3.31

$\chi 2$ = 2.20; Not significant

5. Tobacco chewing: Frequency of ISH was found to be higher among the individual with tobacco chewing habit (7.75%) than that of the individual without tobacco chewing habit (4.17%). In application of Chi^2 statistical significant difference was found (Table 6) in case of this determinant.

Table – 6: Tobacco chewing in relation to ISH

Tobacco chewing	ISH (n=63)	Total (n=1279)	% of ISH
Yes	21	271	7.75
No	42	1008	4.17

χ2 = 5.85; Significant (p values <0.05)

6. Alcohol intake: Like tobacco chewing in case of alcohol intake also no significant association was found with ISH (Table 7). However, occurrence of ISH is higher among the individuals who consume alcohol regularly (5.51%) than that of the individuals who do not consume (4.78%).

Table – 7: Alcohol intake in relation to ISH

Alcohol intake	ISH (n=63)	Total (n=1279)	% of ISH
Drinker	14	254	5.51
Non-drinker	49	1025	4.78

χ2 = 0.23; Not significant

7. Pulse rate: It can be observed from Table 8 that persons with high pulse rate (6.14) are affected more due to ISH than the persons with normal pulse rate (4.59). Chi^2 test showed no significant statistical association.

Table – 8: Pulse rate in relation to ISH

Pulse rate	ISH (n=63)	Total (n=1279)	% of ISH
Normal (≤ 72)	46	1002	4.59
High (72+)	17	277	6.14

χ2 = 1.11; Not significant

8. Education: Table 9 revealed a significant association between occurrence of ISH and educational status of the subjects. Occurrence of ISH was highest among the illiterate (7.71%), whereas it was minimum among the high school and above level educated individuals. However, it is interesting to note that occurrence was more among the high school educated individuals (5.38%) than that of the primary level educated individuals (4.04%).

DISCUSSION

Occurrence of ISH was found to be 4.92% among the Bhotia of Uttaranchal. This prevalence was 2.5% in men and 2.42% in women, which is much lower than that of the findings of Gupta et al. (2006) but similar to Midha et al. (2010). ISH was found to be

7.78% (7.96% in males and 6.7% in females) among the individuals in Shimla town (Gupta et al., 2006). This was found to be 4.3% (5.1% in males and 3.6% in females) among the individuals in Lucknow district (Midha et al., 2010). The findings of the

Table – 9: Education of the respondents in relation to ISH

Educational status	ISH (n=63)	Total (n=1279)	% of ISH
Illiterate	26	337	7.71
Primary	13	322	4.04
High school	15	279	5.38
High school & above	9	341	2.64

$\chi 2$ = 10.06; Significant (p values <0.05)

present study revealed an increasing trend of occurrence of ISH with increasing age. The determinants like age, abdominal obesity, tobacco chewing and education of the subjects emerged as important risk factors of ISH among the Bhotia of Uttaranchal.

Table – 10: Pearson product-moment correlation coefficient in ISH and non-ISH groups

Variables	ISH group	Non ISH group
Age	0.3659	0.3828
Pulse rate	0.0761	0.6016
Height	0.0223	-0.1730
Weight	0.2505	0.0106
Chest girth	0.3370	-0.0783
Upper arm circumference	0.1227	0.0754
Calf girth	0.1558	-0.0012
Tricep skinfold	0.1866	0.1732
Bicep skinfold	0.2083	0.1747
Sub-scapular skinfold	0.2645	0.2168
Supra-iliac skinfold	0.1818	0.0518
Waist circumference	0.3436	0.1865
Hip circumference	0.2523	0.1802
Education	-0.1435	-0.4240
Alcohol consumption	0.2290	0.1588
Smoking habit	0.1434	-0.0447
Tobacco chewing	-0.0012	-0.0567
Occupation	-0.0862	-0.0621

Note: Dependent variable: Systolic blood pressure

For a clear view of the situation Pearson product-moment correlation coefficient values are calculated considering systolic blood pressure as dependent and other variables as independent. The findings are furnished in Table 10. It appears that the variables like education, tobacco chewing and occupation maintain an inverse relation with systolic blood pressure in ISH group, whereas in non-ISH group height, chest girth, calf girth, education, smoking habit, tobacco chewing and occupation maintain an inverse relation with systolic blood pressure. This also reveals that individuals age, weight, chest girth,

sub-scapular skin fold, waist circumference, hip circumference and alcohol consumption show considerable strength of correlation with systolic blood pressure among the ISH individuals. In turn, among the non-ISH individuals considerable strength of correlation is perceptible in case of variables like age, pulse rate and education.

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