



## Prevalence and socio-demographic factors of hypertension among people of age 20 years and above in an urban slum area of Maharashtra

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### Abstract

**Background:** *In Urban slum areas, people having problems like poverty, un-employment, illiteracy and addiction. These all are having influence on Blood Pressure level. The objective was to estimate prevalence of hypertension among people of age 20 years and above and to study socio-demographic factors associated with hypertension.*

**Methods:** *A community based cross sectional study was carried out among the adults residing in the urban slum area, catered by U.H.C. of the Department of Community Medicine. The sample size was 1122 adults in the age group of 20 years and above. By using systematic random sampling method, every 5th household was selected and data was collected by house to house visits, clinical examination and interview of study population with a pre-designed pre-tested proforma. Chi-square test was used to analyze data.*

**Results:** *The overall prevalence of hypertension was found to be 15.15 %. Various factors associated with hypertension were age, religion, occupation, higher socioeconomic class, type of family, marital status, type of diet, smoking and alcohol intake.*

**Conclusions:** *Hypertension is not only problem in affluent society but also in slum area.*

**Keywords:** *Hypertension, Prevalence, Urban slum, Socio-demographic factors.*

### Introduction

Hypertension is a global problem. High blood pressure is one of the most important causes of premature death worldwide killing nearly 9.4 million people every year globally, and the problem is growing. Over 1 billion people are living with high blood pressure. Ageing population, rapid urbanization and transition from agrarian life to a wage-earning, modern city life are reported as major contributors to increased blood pressure in urban areas.<sup>1</sup>

In India, the trend is increasing due to changes in lifestyle.<sup>2</sup> Social determinants of health, e.g. income, education and housing, have an adverse impact on behavioural risk factors and in this way influence the development of hypertension. For example, unemployment or fear of unemployment may have an impact on stress levels that in turn influences high blood pressure. Living and working conditions can also delay timely detection and treatment due to lack of access to diagnostics and treatment and may also impede

prevention of complications. Rapid unplanned urbanization also tends to promote the development of hypertension as a result of unhealthy environments that encourage consumption of fast food, sedentary behaviour, tobacco use and the harmful use of alcohol. Finally, the risk of hypertension increases with age due to stiffening of blood vessels, although ageing of blood vessels can be slowed through healthy living, including healthy eating and reducing the salt intake in the diet<sup>3</sup>.

The enormous burden of cardiovascular disease (CVD) and its risk factors are clearly evident among slum dwellers due to increasing lifespan and rapid acquisition of adverse lifestyles.<sup>4</sup> A high prevalence of obesity, abdominal obesity, dyslipidemia, diabetes, particularly in females, is seen in people living in Indian slums.<sup>5</sup> Prevalence of risk factors like high blood pressure, obesity, diabetes, dyslipidemia, physical inactivity and unhealthy diet in slum dwellers is intermediate between rural and urban population, the latter having the worst risk factor profile.<sup>6,7</sup>

Because of the changing lifestyle, the environment, industrialization and urbanization the prevalence of hypertension in developing country is increasing constantly. In Urban slum areas, people having problems like poverty, unemployment, illiteracy and addiction. These all are having influence on Blood Pressure level. Hence the present study was undertaken in an urban slum area to define the magnitude and socio-demographic factors associated with hypertension in urban slum area for effective planning and management of the problem of hypertension.

### Objectives

1. To estimate prevalence of hypertension among people of age 20 years and above in an urban slum area
2. To study the association between socio-demographic factors and hypertension.

### Methods

This community based cross sectional study has been carried out in the slum area (populations approximately 14,353), catered by Urban Health Center of the Department of Community Medicine. The period of study was from January 2012 to June 2013. Sampling frame consisted of total inhabited households (2860) in the slum area catered by Urban Health Center, of the Department of Community Medicine with its inhabitant adults aged 20 years and above are 8283 i.e. 59.1% of total population.<sup>8</sup> So in each house, there will be  $8283/2860 = 2.89$  adults of age 20 years and above. Sampling unit was the household having adult with an age 20 years and above. The sample size was estimated by using formula  $n = (1.96)^2 \times p \times q / L^2$  at 95% Confidence interval, Where  $p =$  prevalence of hypertension in adults in urban slum = 8.6 %,  $q = 100 - p = 91.4$ ,  $L =$  allowable error, 20% of  $p = 1.72$ .<sup>9</sup> After adding the non response errors of 10% an additional 102 subjects are included, thus 1122 minimum subjects are required for the study. Males and females 20 years and above age group and subjects willing to participate in study procedure were included in study. All population below 20 years of age, pregnant women, subjects unwilling to participate in study procedure, non availability inspite of three successive visits to their homes unusual residents i.e. those living in household for less than 6 months and permanently locked houses are excluded in study. A house to house survey was carried out by systematic random sampling method. Total 1122 persons of 20 years and above from 561 houses (considering 2 adults in each selected house) were planned to interview but 417 houses were interviewed (in some houses more than 2 adults were found). Every 5<sup>th</sup> household (total houses in slum area divided by selected number of houses. i.e.  $2860 / 561$ ) was selected in study sample. After identifying each lane, first of all the households were enlisted serially with chalk piece, then the first household i.e. (No.3) was selected randomly from the first five households. Then subsequently

by adding 5 to the previously selected household number i.e.  $3+5=8$ , then  $8+5=13$ ,  $13+5=18$  similarly the further households were selected. Then at the end of every day's interview the last home was marked as 'complete home'. On the next day enlisting was started further from previous day last home which was marked as 'complete home'. The due care was to avoid missing of the homes. At first visit the household head and other members were informed about the survey and its purpose, importance and uses for participating individuals themselves. The blood pressure readings were taken by a single observer for every individual as per guidelines by "the Sixth Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure" (1997).<sup>10</sup>

### Results

Table 1 shows that overall prevalence of hypertension was 15.15 % and prevalence of hypertension was found to be increased gradually with increasing age. The difference was found to be highly significant ( $P < 0.0001$ ).

Table 2 shows that prevalence of hypertension was slightly higher in males (15.86%) than prevalence of hypertension in females (14.51%). The difference in prevalence of hypertension in both genders was statistically not significant ( $P > 0.05$ ). Distribution of study subjects according to religion shows that prevalence of hypertension among Buddhist was found to be maximum i.e. 18.55%, followed by 16.59 % prevalence in Hindus while it was found to be minimum in Christians 5.88%. The difference was found to be significant ( $P < 0.05$ ).

Distribution of study subjects according to occupation (Table no 3) shows that hypertension was highest among individuals having professional occupation i.e. 60% followed by 38.16% in unemployed individuals, while prevalence of hypertension was least in individuals having unskilled occupation i.e. 7.69%. No student in this study is hypertensive.

The difference was found to be statistically highly significant ( $P < 0.001$ )

Table no 4 shows distribution of study subjects according to type of family and marital status. The prevalence of hypertension was maximum in individuals with three generation family i.e. 19.21% while prevalence was found to be minimum in individuals with joint family i.e. 10.37%. The difference was found to be statistically significant ( $P < 0.05$ ). The prevalence of hypertension divorcee/separated individuals was 7.41 % and in married persons, it was 14.03 %. The prevalence of hypertension was minimum in unmarried i.e. 4.61 %. The difference was found to be statistically significant ( $P < 0.001$ ).

Table no 5 shows association between tobacco chewing, smoking, alcoholism, dietary pattern and hypertension. 19.52 % of total study subjects were having habit of tobacco chewing, of these 18.72 % were having hypertension while 81.28% were not having hypertension. 80.48 % of total study subjects were not having habit of tobacco chewing, among these 14.29 % were having hypertension and 85.71 % were not having hypertension. The difference was found to be not significant ( $P > 0.5$ ). 4.01% of total study subjects were having habit of smoking, of these 28.89 % were having hypertension while 71.11% were not having hypertension. 95.99 % of total study subjects were not having habit of smoking, among these 14.58 % were having hypertension and 85.42 % were not having hypertension. The difference was found to be statistically significant ( $P < 0.5$ ). 6.33% of total study subjects were having habit of alcohol intake, of these 23.94 % were hypertensives while 76.05% were non hypertensives. 93.67 % of total study subjects were not having habit of alcohol intake, among these 14.56 % were hypertensives and 85.44 % were non hypertensives. The difference was found to be statistically significant ( $P < 0.5$ ). 88.41% of total study subjects were having mixed diet; of these 14.72 % were having hypertension while 85.28% were without hypertension. 11.59 % of total study subjects were having vegetarian diet,

among these 18.46 % having hypertension and 81.54 % not having hypertension. The difference was found to be statistically not significant (P > 0.05).

Figure no 1 shows prevalence of hypertension was maximum among socioeconomic class I i.e. 28% while prevalence of hypertension was minimum among socioeconomic class IV i.e. 12.41% and socioeconomic class V i.e. 12.42%. The prevalence of hypertension was increased gradually with higher socioeconomic class. The

difference was found to be statistically highly significant (P < 0.05).

Figure no 2 shows distribution of study subjects according to literacy status. Hypertension was highest among individuals educated up to postgraduate i.e. 31.25 % Prevalence of hypertension was minimum in illiterate individuals i.e. 9.04 %. The prevalence of hypertension also increased significantly with the increase in literacy status (p < 0.05).

**Table No. 1:** Age wise prevalence of hypertension among study subjects

Age group in years	Hypertensives (%)	Nonhypertensives (%)	Total (%)	Rows with * were clubbed for chi square test $\chi^2 = 248.31$ , d.f.= 5, P < 0.001; highly significant
20-29	5 (1.29%)	383 (98.71%)	388 (34.58%)	
30-39	19 (8.37%)	208 (91.63%)	227 (20.23%)	
40-49	37 (17.21%)	178 (82.79%)	215 (19.16%)	
50-59	32 (21.05%)	120 (78.95%)	152 (13.55%)	
60-69	46 (50.55%)	45 (49.45%)	91 (8.11%)	
70-79*	24 (61.54%)	15 (38.46%)	39 (3.48%)	
≥ 80*	7 (70%)	3 (30%)	10 (0.89%)	
Total	170 (15.15%)	952 (84.85%)	1122 (100%)	

**Table no 2:** Distribution of study subjects according to gender and religion

Gender	Hypertensives (%)	Nonhypertensives (%)	Total (%)	$\chi^2 = 0.39$ , d.f.= 1, P > 0.05; not significant
Male	85 (15.86%)	451 (84.14%)	536 (47.77%)	
Female	85 (14.51%)	501 (85.49%)	586 (52.23%)	
Total	170 (15.15%)	952 (84.85%)	1122 (100%)	
Religion				
Hindu	74 (16.59%)	372 (83.41%)	446 (39.75%)	$\chi^2 = 6.56$ , d.f.= 2, P < 0.05; Significant
Muslim	54 (12.33%)	384 (87.67 %)	438 (39.04%)	
Buddha*	41 (18.55%)	180 (81.45%)	221 (19.69%)	
Christian*	1 (5.88%)	16 (94.12%)	17 (1.52%)	
Total	170 (15.15%)	952 (84.85%)	1122(100%)	

**Table No. 3:** Distribution of study subjects according to occupation

Occupation	Hypertensives (%)	Nonhypertensives (%)	Total (%)	Rows with * were clubbed for chi square test $\chi^2 = 25.9$ , d.f. = 4, P < 0.001; Highly significant
Professional*	3 (60%)	2 (40%)	5 (0.45%)	
Managerial (Executive)*	8 (33.33%)	16 (66.67 %)	24 (2.14%)	
Clerical & skilled*	21 (9.59%)	198 (90.41%)	219 (19.52%)	
Semi-skilled	67 (13.45%)	431 (86.55%)	498 (44.38%)	
Unskilled	13 (7.69%)	156 (92.31%)	169(15.06%)	
Unemployed	58 (38.16%)	94 (61.84%)	152 (13.55%)	
Student	0 (0%)	55 (100%)	55 (4.9%)	
Total	170 (15.15%)	952 (84.85%)	1122 (100%)	

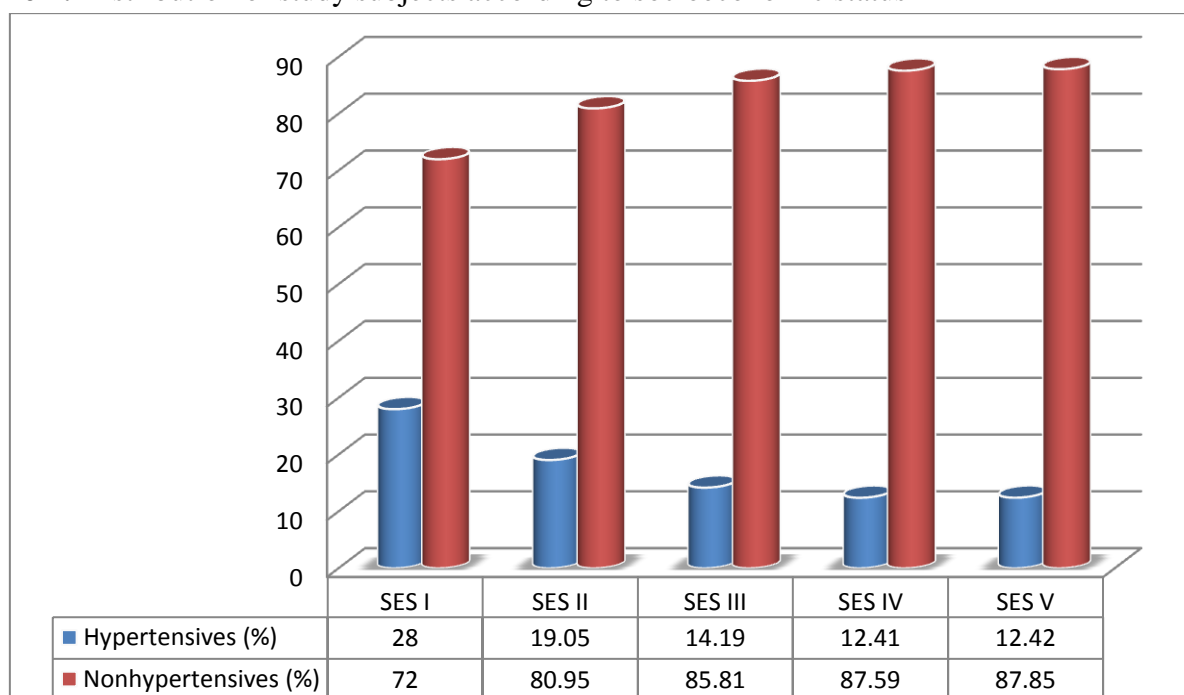
**Table no 4:** Distribution of study subjects according to type of family and marital status

Type of family	Hypertensives (%)	Nonhypertensives (%)	Total (%)	$\chi^2 = 9, d.f. = 2, P < 0.05; \text{Significant}$
Nuclear	79 (15.08%)	445 (84.92%)	524 (46.7%)	
Three generation	63 (19.21%)	265 (80.79%)	328 (29.24%)	
Joint family	28 (10.37%)	242 (89.63%)	270 (24.06%)	
<b>Total</b>	<b>170 (15.15%)</b>	<b>952 (84.85%)</b>	<b>1122(100%)</b>	
<b>Marital status</b>				
Married	117 (14.03%)	717 (85.97%)	834 (74.33%)	$\chi^2 = 69.14, d.f. = 2, P < 0.001; \text{Highly significant}$
Unmarried	7 (4.61%)	145 (95.39%)	152 (13.55%)	
Widowed*	44 (40.37%)	65 (59.63%)	109 (9.71%)	
Divorcee/ Separated*	2 (7.41%)	25 (92.59%)	27 (2.41%)	
<b>Total</b>	<b>170 (15.15%)</b>	<b>952 (84.85%)</b>	<b>1122 (100%)</b>	

**Table no 5** Association between tobacco chewing, smoking, alcoholism, dietary pattern and hypertension

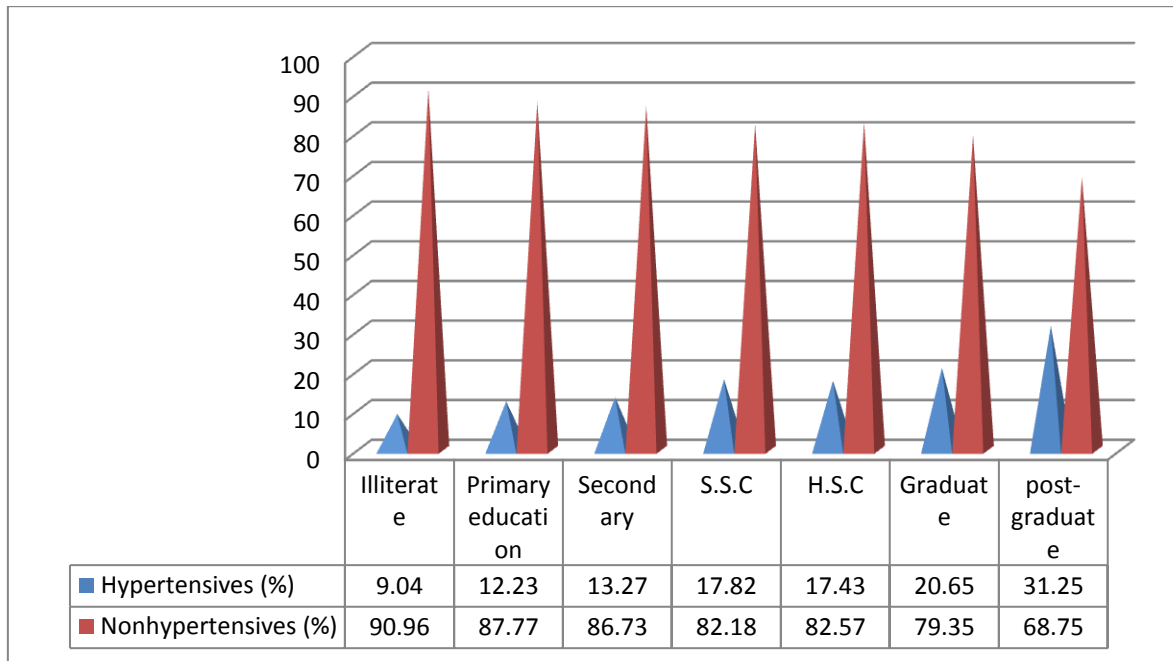
Tobacco chewing	Hypertensives (%)	Nonhypertensives (%)	Total (%)	$\chi^2 = 2.69, d.f. = 1, P > 0.5, \text{not significant}$
Yes	41 (18.72%)	178 (81.28%)	219 (19.52%)	
No	129 (14.29%)	774 (85.71%)	903 (80.48%)	
<b>Total</b>	<b>170 (15.15%)</b>	<b>952 (84.85%)</b>	<b>1122 (100%)</b>	
<b>Smoking</b>				
Yes	13 (28.89%)	32 (71.11%)	45 (4.01%)	$\chi^2 = 6.88, d.f. = 1, P < 0.05, \text{Significant}$
No	157 (14.58%)	920 (85.42%)	1077 (95.99%)	
<b>Total</b>	<b>170 (15.15%)</b>	<b>952 (84.85%)</b>	<b>1122 (100%)</b>	
<b>Alcoholism</b>				
Yes	17 (23.94%)	54 (76.05%)	71 (6.33%)	$\chi^2 = 4.56, d.f. = 1, P < 0.05, \text{Significant}$
No	153 (14.56%)	898 (85.44%)	1051 (93.67%)	
<b>Total</b>	<b>170 (15.15%)</b>	<b>952 (84.85%)</b>	<b>1122 (100%)</b>	
<b>Dietary pattern</b>				
Mixed	146 (14.72%)	846 (85.28%)	992 (88.41%)	$\chi^2 = 1.25, d.f. = 1, P > 0.05, \text{not significant}$
Vegetarian	24 (18.46%)	106 (81.54%)	130 (11.59%)	
<b>Total</b>	<b>170 (15.15%)</b>	<b>952 (84.85%)</b>	<b>1122 (100%)</b>	

**Figure no 1:** Distribution of study subjects according to socioeconomic status



$\chi^2 = 15.52, d.f. = 4, P < 0.005; \text{Highly significant}$

Figure no 2 Distribution of study subjects according to literacy status



$\chi^2 = 17.18, d.f. = 6, P < 0.05$ ; Significant

**Discussion**

The overall prevalence of hypertension in study subject was found to be 15.15%. The prevalence of hypertension was increased gradually with increasing age (table no. 1). The difference was found to be highly significant ( $P < 0.0001$ ). Prevalence of hypertension in urban area was reported different in different studies. Pooja et al<sup>11</sup> reported the overall prevalence of hypertension was 38.5% in an Urban Area of Uttarakhand. Chandwani H et al<sup>12</sup> reported prevalence of 24% among adults in the urban area of Jamnagar, Gujarat. Similar finding of statistically significant increase in prevalence of hypertension with increasing age was observed in other studies like Gupta M et al<sup>13</sup> and Mahmood S E et al<sup>14</sup>. The above findings are comparable with these studies. Statistically insignificant difference was observed in prevalence of hypertension between males and females (table no. 2). Similar findings were also reported by Reddy SS et al<sup>9</sup>. He reported that proportion of hypertension in males was slightly higher (9.6%) compared to that in females (7.6%) but the difference was however not statistically significant. Undhad AM et al<sup>15</sup> also found that sex was not significantly associated with prevalence of hypertension

Distribution of study subjects according to religion shows (table no. 2) that prevalence of hypertension among other religion (Buddhist and Christian) was found to be maximum i.e. 17.65%, followed by 16.59 % prevalence in Hindus while it was found to be minimum (12.33%) in Muslims. The difference was found to be significant. But Kalavathy MC et al<sup>16</sup> reported that religion did not influence the hypertension status of men or women. Mahmood SE et al<sup>17</sup> also found insignificant association of hypertension with religion. He found that a higher prevalence of hypertension was found among Muslims (44.7%) as compared to that among Hindus (43.0%) ( $P$ -value  $> 0.05$ ).

Table no. 3 shows that the difference in prevalence of hypertension among individuals having professional occupation (60%) and prevalence of hypertension among individuals having unskilled occupation (7.69%) was found to be statistically highly significant ( $P < 0.001$ ). Kannan L et al<sup>18</sup> found greater prevalence of hypertension was observed in unemployed (31.3%) and unskilled (31.8%) category of occupation followed by professional (22.05%), semiprofessional (20.0%) and skilled labourers (18.7%) of the selected population. The higher

prevalence in the unemployed and unskilled category is statistically significant as compared to the other three categories of the study population. Table no. 4 showing the difference in prevalence of hypertension in individuals with three generation family (19.21%) and prevalence in individuals with joint family (10.37%) was found to be statistically significant ( $P < 0.05$ ), the possible reason for higher prevalence of hypertension among subjects with three generation family could be economical stress (as one or two adult earning with more dependents) and conflicts between mother in law and daughter in law. Similar finding of significant association between type of family and prevalence of hypertension was observed by Rajasekar VD et al<sup>19</sup>. Similarly Midha T et al<sup>20</sup> found significant association of isolated systolic hypertension with the type of family ( $p=0.031$ ). Distribution of study subjects according to marital status shows that prevalence of hypertension was maximum in widowed individuals i.e. 40.37 % and the prevalence of hypertension was minimum in bachelors i.e. 4.61 %. The difference was found to be statistically significant ( $P < 0.001$ ), the possible reason for higher prevalence of hypertension among widowed subjects could be combined effect of tension due to loss of spouse and stress of familial problems on single parent. Similar significant increased risk of hypertension in subjects not living with spouse was observed by Hazarika NC et al<sup>21</sup>. Also Mandal PK et al<sup>22</sup> found that marital status was significantly associated with hypertension ( $p < 0.011$ ).

Insignificant association between tobacco chewing and hypertension ( $P > 0.05$ ) was seen in table no 5. Similar insignificant association was reported by Mahanta TG et al<sup>23</sup> and Hazarika NC et al<sup>21</sup>. But Mandal CR et al<sup>24</sup> and Mahmood SE et al<sup>14</sup> found significant association of prevalence of hypertension with tobacco chewing which is in contrast with our finding. Association between smoking and hypertension was found to be statistically significant ( $P < 0.05$ ) in table no 5. Similar significant association was observed in

study done by Tiwari RR<sup>25</sup> and Gupta S et al<sup>26</sup>. Contrast findings have been reported on smoking and hypertension (insignificant association) by Undhad AM et al<sup>15</sup> and Mandal CR et al<sup>24</sup>. Also difference in prevalence of hypertension among study subjects with habit of alcohol intake (23.94 %) and prevalence in study subjects not having habit of alcohol intake (14.56 %) was found to be statistically significant ( $P < 0.05$ ). Similar findings of significant association between hypertension and alcohol intake were reported by various studies like Sagare SM et al<sup>27</sup> and Chandwani H<sup>12</sup>. While Kokiwar PR<sup>28</sup> and Chandra Sekhar K<sup>29</sup> reported no significant association between alcohol intake and hypertension. Association between dietary pattern and hypertension was found to be statistically not significant ( $P > 0.05$ ). Prevalence of hypertension did not differ significantly between non vegetarians and vegetarians was reported in other studies by Mahmood SE et al<sup>14</sup> and Undhad AM et al<sup>15</sup> But contrast finding of significant association between type of diet and hypertension was observed by Gupta M et al<sup>13</sup> and Sugasri S et al<sup>30</sup>.

Figure no.1 shows the prevalence of hypertension was increased gradually with increasing social class. The difference was found to be statistically highly significant ( $P < 0.005$ ). Similar findings were observed in study done by Khadilkar HA et al<sup>31</sup>. He found that the prevalence of hypertension increased significantly with increase in socioeconomic status ( $p < 0.05$ ). Similar significant association between socioeconomic status and prevalence of hypertension found in study done by Rajasekar VD et al<sup>19</sup>. In other studies done by Mahmood SE et al<sup>17</sup> and Kalavathy MC et al<sup>16</sup>, insignificant association between prevalence of hypertension and socioeconomic status was found.

Figure no 2 shows that prevalence of hypertension was highest among individuals educated up to postgraduate i.e. 31.25 % while prevalence of hypertension was minimum in illiterate individuals i.e. 9.04 %. The prevalence of hypertension also increased significantly with the

increase in literacy status ( $P < 0.05$ ). The reason for higher prevalence of hypertension among highly educated people could be the related stress and tension due to sophisticated job. Similar findings were reported by Khadilkar HA et al<sup>31</sup>. He observed that the prevalence of hypertension also increased significantly with the increase in literacy status as prevalence of hypertension was highest (33.33 %) among postgraduate and least (3.38%) among Illiterate. In contrast to our findings, Manimunda SP et al<sup>32</sup> found that increasing trend in the prevalence of hypertension with decreasing educational status.

### Conclusion

The overall prevalence of hypertension was found to be 15.15 %. Various factors associated with hypertension were age, religion, occupation, higher socioeconomic class, type of family, marital status, type of diet, smoking and alcohol intake.

### Recommendation

'High risk' screening programmes should be implemented, especially targeting at individuals at risk of developing hypertension like elderly people, smokers, alcoholic etc. Awareness campaign through good quality Information Education and Communication (I.E.C) activities should be carried out to sensitize the hidden hypertensives to get themselves examined and get detected as hypertensives. People with higher socio-economic status, high educational status and living in families with distorted relations should be kept under surveillance for early detection of hypertension. Prompt and timely use of educational approach and strict legal enforcement approaches should be done for smoking alcohol consumption prevention and control.

### Acknowledgement

Authors are thankful to the Department of Community Medicine, Dr V.M.G.M.C. Solapur, Maharashtra, India for their support and guidance during the course of the study.

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