

Prevalence and risk factors of hypertension, among adults residing in an urban area of North India

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ABSTRACT

Background: The increasing prevalence and severity of hypertension with age has acquired the status of an epidemic with long incubation period. It has been associated with various risk factors such as alcoholism, smoking, stress and obesity, which has also started to affect the young population due to modern lifestyle changes.

Objectives: To study the prevalence of hypertension and its risk factors among adults aged 20 years and above residing in an urban area.

Methodology: A cross – sectional study was done among adults aged 20 years and above with detailed history and physical examination to evaluate various risk factors associated with hypertension.

Results: Out of 957 participants, 53.5% were males, 46.5% were females. Majority (33.9%) of participants were aged 20 – 29 years and 28.4% had a positive family history of hypertension. Overall prevalence of hypertension was 14.4%. 9.5 % had hypertension stage – 1, 4.9% had hypertension stage – 2, and 11.1% had blood pressure in pre-hypertension range. Hypertension was also more prevalent in the Upper class (27.7%). Among the participants 33.9% were in the habit of consumption of alcohol, tobacco or both. 14.5 % were having mild to moderate self perceived stress.

Conclusion: Prevalence of hypertension was more in males compared to females because men have more associated risk factors like smoking, alcohol and stress. Hypertensive should be advised for regular health checkups, dietary modifications and life style changes. Regular screening and health education camp and strengthening of health care services are essential for early diagnosis.

Key words: Hypertension, prevalence, risk factors, urban.

INTRODUCTION

Hypertension is an iceberg disease. It is one of the major risk factors for cardiovascular mortality, which accounts for 20 – 50 % of all deaths¹. It became evident in the early 1970s that only about half of the hypertensive subjects in the general population of most developed countries were aware of the condition, and only about half of those aware of the problem were being treated². If this is the situation in highly developed countries with advanced medical services, the proportion treated in developing countries would naturally be far too less¹. Globally, the overall prevalence of raised blood pressure in adults aged 18 and over was around 22% in 2014, whereas, the national prevalence was approximately 20% among Indian adults^{3,4}.

Many risk factors have been identified for hypertension⁵. One of the important elements in the hypertension control is early diagnosis.

This study was conducted to find out the prevalence of hypertension and its risk factors among adults aged 20 years and above in a selected urban area.

MATERIALS AND METHODS

Study Design: A cross sectional community based study was conducted among adults aged 20 years and above residing in the catchment area of Urban Health and Training Centre (UHTC), to find out the prevalence of hypertension and its association with various risk factors, from January to June, 2013.

Sampling technique: Simple random sampling was done. In the urban area, all the lanes, sub lanes and houses were numbered. Within each lane the first household was selected randomly. All the remaining houses were visited serially till the desired sample size of 1000 adults was reached.

Inclusion criteria: Adults in the age group 20 years and above were included in the sample.

Exclusion criteria: Individuals who refused to participate and those suffering from acute illness, locked houses, etc were excluded.

Study subjects: From the surveyed sample, 957 participants aged 20 years and above were included in the study. Informed consent was obtained from the participants after explaining the purpose of study.

Method: A pre-designed interview schedule was used to collect the necessary information from the participants. Information regarding demographic, anthropometric, and dietary habits was collected. Details of major cardiovascular risk factors such as smoking, alcohol intake, physical activity, diabetes and hypertension were inquired. Physical examination included measurement of height, weight and Blood pressure (BP). Common weighing machine and measuring tape were used to record weight in kilograms and height in centimetres of all the study subjects. BP was measured using a standard mercury manometer in a seated position. Two readings at 5 minutes intervals as per World Health Organization (WHO) guidelines were recorded. If a high BP ($\geq 140 / 90$ mmHg) was noted, a third reading was taken after 30 minutes and the lowest of the three readings was taken as BP reading. Persons with known hypertension on treatment were also included in hypertension category⁶. A person, engaged in 30 minutes of moderate grade physical activity at least three times in a week, was classified as physically active. Using the Joint National Committee (JNC) VII Criteria, hypertension was diagnosed when a subject was a known hypertensive, or systolic BP was ≥ 140 mm Hg and /or diastolic BP ≥ 90 mm Hg. Hypertension Stage 1 when systolic BP 140 – 159 mm Hg and diastolic BP of 90 – 99 mm Hg. Hypertension Stage 2 when systolic BP ≥ 160 mm Hg and diastolic BP of ≥ 100 mm Hg. Systolic BP between 120 – 139 mm Hg or diastolic BP between 80 – 89 mm Hg was considered as pre-hypertension⁷. When systolic and diastolic pressure fell into different categories, higher category was recorded. Body mass index (BMI) (weight in kg / height in meters²) was calculated, and obesity was defined as BMI >30 kg/m².

Statistical analysis: Data from the interview schedule was transferred to a computer. The SPSS Data Editor Software version 19 was used for analysis of the data. Chi-square test was performed and p value ≤ 0.05 were considered statistically significant.

RESULTS

Among the 957 participants, 53.5% were males, 46.5% were females. Majority (33.9%) of study subjects were aged 20 – 29 years, and 7.8% of them were 60 years and above (Figure 1). 9.1% had a positive personal history of hypertension and 28.4% had a positive family history of hypertension (Figure 2). 76.2% were taking mixed diet and 23.8% were vegetarians. Fruits were consumed by 33.2% daily. Oily foods were consumed by 25.3% and pickle was consumed by 31.9% everyday. 7.5% of participant took junk food daily (Table 1). 33.9% were in the habit of consuming alcohol, tobacco or both. 14.5 % were having mild to moderate self perceived stress. 30.5% were performing physical exercise for more than 30 minutes daily. 23.9% were overweight and 9.2% were obese (Figure 3).

Prevalence of hypertension was 14.4%. 9.5 % had hypertension stage – 1, 4.9% had hypertension stage – 2, and 11.1% had blood pressure in pre-hypertension range (Figure 4). Significant association ($p < 0.001$) was found between age and hypertension. Among those aged 60 years and above, 40% were hypertensive. 15.8% of males and 12.8% of females were hypertensive.

Hypertension was also more prevalent in the Upper class (27.7%). Significant association ($p < 0.001$) was found between BMI and hypertension. Among the overweight 14% were having pre-hypertension and 13.9% were hypertensive. Among the obese, 33% were hypertensive (Table 2).

Hypertension was more prevalent (18.2%) among sedentary, than those who were exercising for more than 30 minutes daily, which was significant. 22% of participants added extra salt to their diet which had significant relationship ($p = 0.005$) with hypertension (Table 3).

| Food items consumed | Frequency of Consumption of food items | | | | | | | | Total | |
|---------------------|--|------|----------------|------|--------------|------|------|------|-------|-----|
| | Daily | | Once in a week | | Occasionally | | None | | | |
| | N | % | N | % | N | % | N | % | N | % |
| Vegetables | 909 | 95.0 | 12 | 1.3 | 36 | 3.8 | 0 | 0 | 957 | 100 |
| Fruits | 318 | 33.2 | 359 | 37.5 | 158 | 16.5 | 122 | 12.7 | 957 | 100 |
| Oily Food | 242 | 25.3 | 385 | 40.2 | 330 | 34.5 | 0 | 0 | 957 | 100 |
| Pickle | 305 | 31.9 | 265 | 27.7 | 307 | 32.1 | 80 | 8.4 | 957 | 100 |
| Junk Food | 72 | 7.5 | 192 | 20.1 | 475 | 49.6 | 218 | 22.8 | 957 | 100 |

N = Number of participants.

| Risk Factors | | Normal | Pre Hypertension | Hypertension Stage 1 | Hypertension Stage 2 | Total |
|--|--------------|-------------|------------------|----------------------|----------------------|------------|
| Age (in years) | 20 – 29 | 276 (85.2%) | 36 (11.1%) | 12 (3.7%) | 0 (0%) | 324 (100%) |
| | 30 – 39 | 222 (77.1%) | 36 (12.5%) | 24 (8.3%) | 6 (2.1%) | 288 (100%) |
| | 40 – 49 | 108 (62.1%) | 23 (13.2%) | 30 (17.2%) | 13 (7.5%) | 174 (100%) |
| | 50 – 59 | 62 (64.6%) | 11 (11.5%) | 11 (11.5%) | 12 (12.5%) | 96 (100%) |
| | ≥ 60 | 45 (60%) | 0 (0%) | 14 (18.7%) | 16 (21.3%) | 75 (100%) |
| $\chi^2 = 1.270$; df = 12; p < 0.001 | | | | | | |
| Socio Economic Status | Upper Class | 65 (52.8%) | 24 (19.5%) | 21 (17.1%) | 13 (10.6%) | 123 (100%) |
| | Upper Middle | 124 (67.8%) | 24 (13.1%) | 30 (16.4%) | 5 (2.7%) | 183 (100%) |
| | Middle Class | 208 (76.2%) | 23 (8.4%) | 29 (10.6%) | 13 (4.8%) | 273 (100%) |
| | Lower Middle | 184 (82.5%) | 29 (13.0%) | 5 (2.2%) | 5 (2.2%) | 223 (100%) |
| | Lower Class | 132 (85.2%) | 6 (3.9%) | 6 (3.9%) | 11 (7.1%) | 155 (100%) |
| $\chi^2 = 80.569$; df = 12; p < 0.001 | | | | | | |
| BMI | Under Weight | 66 (79.5%) | 5 (6.0%) | 7 (8.4%) | 5 (6.0%) | 83 (100%) |
| | Normal | 455 (81.7%) | 37 (6.6%) | 42 (7.5%) | 23 (4.1%) | 557 (100%) |
| | Over Weight | 165 (72.1) | 32 (14.0%) | 20 (8.7%) | 12 (5.2%) | 229 (100%) |
| | Obese | 27 (30.7%) | 32 (36.4%) | 22 (25.0%) | 7 (8.0%) | 88 (100%) |
| $\chi^2 = 1.187$; df = 9; p < 0.001 | | | | | | |

BMI = Body Mass Index; χ^2 = Chi-Square test; df = degree of freedom. $p < 0.05$ was considered as statistically significant.

| Table-3: Association of hypertension with dietary excess salt, physical activity and self perceived stress | | | | | | |
|--|------------------|-------------|------------------|----------------------|----------------------|------------|
| Risk Factors | | Normal | Pre Hypertension | Hypertension Stage 1 | Hypertension Stage 2 | Total |
| Dietary excess salt | No | 561 (75.2%) | 70 (9.4%) | 73 (9.8%) | 42 (5.6%) | 746 (100%) |
| | Yes | 152 (72.0%) | 36 (17.1%) | 18 (8.5%) | 5 (2.4%) | 211 (100%) |
| $\chi^2 = 12.808; df = 3; p = 0.005$ | | | | | | |
| Physical activity | No or < 30 min | 450 (67.7%) | 94 (14.1%) | 81 (12.2%) | 40 (6.0%) | 665 (100%) |
| | ≥ 30 min | 263 (90.1%) | 12 (4.1%) | 10 (3.4%) | 7 (2.4%) | 292 (100%) |
| $\chi^2 = 53.844; df = 3; p < 0.001$ | | | | | | |
| Self perceived stress | No | 668 (81.7%) | 75 (9.2%) | 54 (6.6%) | 21 (2.6%) | 818 (100%) |
| | Mild to Moderate | 45 (32.4%) | 31 (22.3%) | 37 (26.6%) | 26 (18.7%) | 139 (100%) |
| $\chi^2 = 1.703; df = 3; p < 0.001$ | | | | | | |

χ^2 = Chi-Square test; df = degree of freedom. $p < 0.05$ was considered as statistically significant.

Fig. 1: Distribution of participants according to age and sex

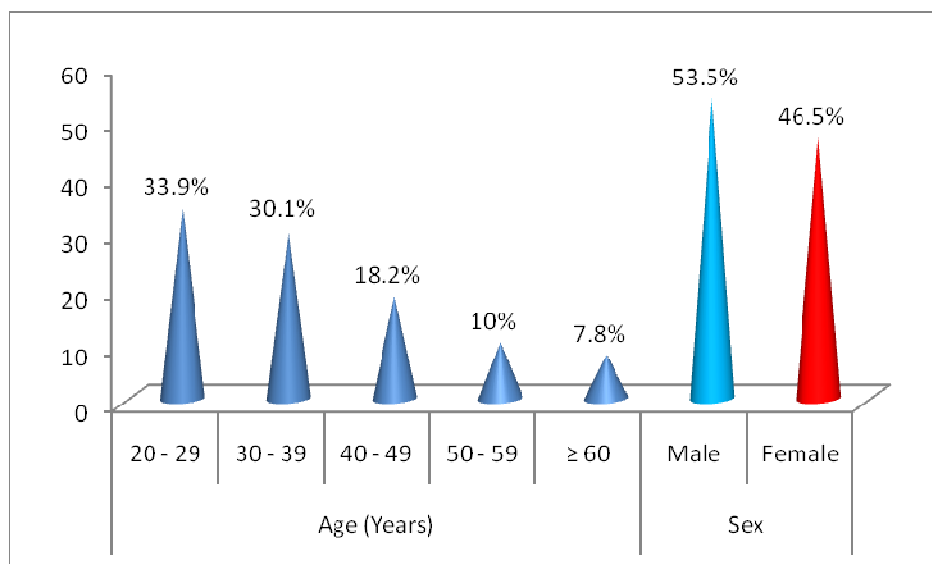


Fig. 2: Distribution of participants, according to family and personal history

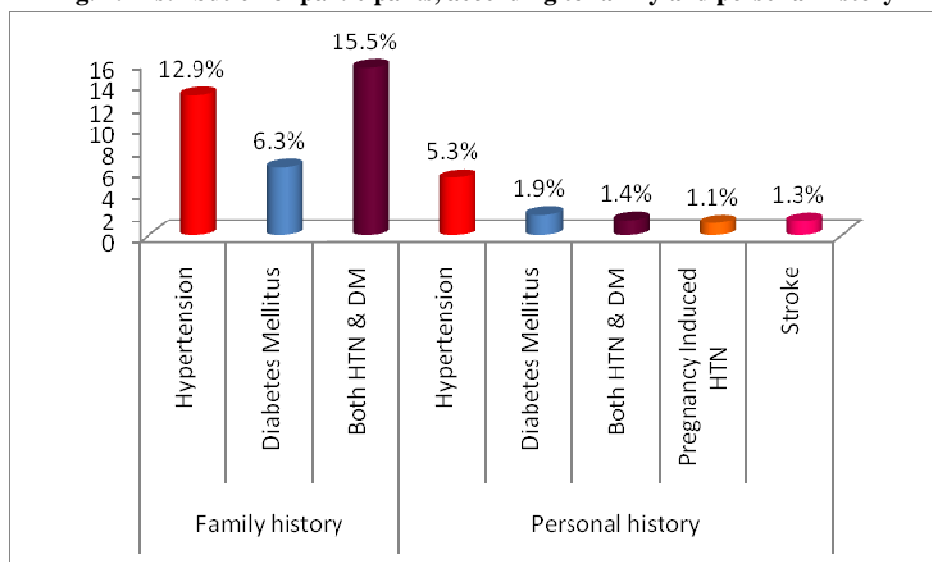


Fig. 3: Distribution of participants according to risk factors

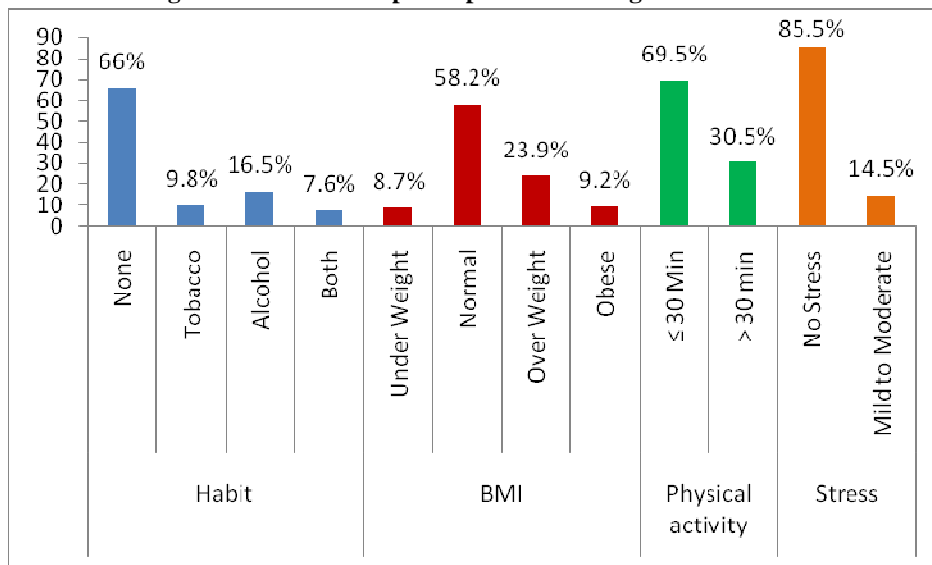
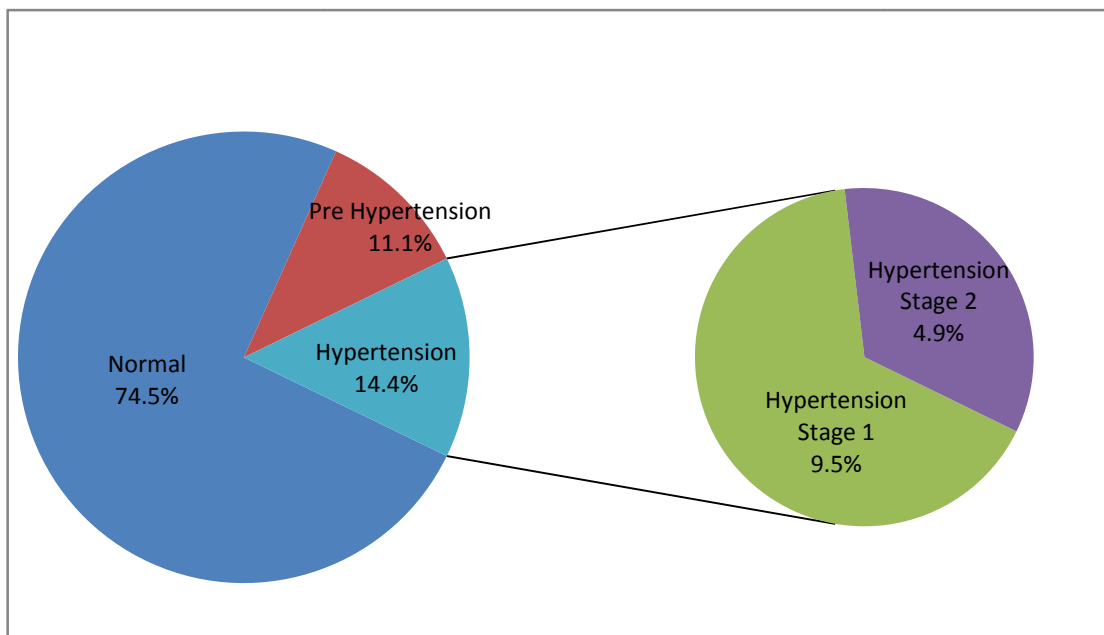


Fig. 4: Distribution of participants according to blood pressure



DISCUSSION

In the present study the prevalence of hypertension was found to be 14.4%. It has been reported that prevalence of hypertension varied from 17 – 21% in India¹. Globally, the overall prevalence of raised blood pressure in adults aged 18 and over was around 22% in 2014³. Another study in urban city of Orissa revealed 36% prevalence of hypertension⁸. A few other studies have also reported a higher prevalence⁹⁻¹¹. The present study showed that males had a higher prevalence (15.8%) of hypertension than females (12.8%). Similar finding were noted in slums of Tirupati, where males had higher prevalence¹². In all WHO regions, men have slightly higher prevalence of raised BP than women³. In our study the prevalence of hypertension was high among participants aged 30 years and above, and the association between age and hypertension was found to be statistically significant ($p < 0.001$). Similar findings were also noted in studies done in Tirupati, Orissa and Kerala^{8,12,13}. Out of the total cases of hypertension detected in our study, 63% were previously diagnosed and 37% were newly detected.

Hypertension is related to obesity, excess salt intake, stress and physical activity¹. In the present study, stress and BMI were significantly associated with hypertension ($p < 0.001$). Chennai urban population study and WHO Hypertension Study Group reported a higher BMI with increased risk of hypertension^{14,15}.

In the present study, it was found that sedentary people had higher prevalence (18.2%) in comparison to those who were physically active (5.8%) and this difference was found to be statistically significant ($p < 0.001$). A study done in East Delhi also had similar findings⁹. Several risk factors such as high socio-economic status, sedentary lifestyle, tobacco use and diabetes were shown to have significant association with hypertension in a study done in rural area of central India¹⁶. Therefore, lifestyle intervention strategies such as weight loss and low intake of dietary salt could help in the primary prevention of hypertension⁷.

Among the previously diagnosed hypertensive, 26.4% were not taking any treatment, 28.7% were not adequately treated and only 44.8 % were taking adequate treatment and had their BP in normal range. In Tirupati, 83.7% were aware of their hypertension status, and 41.7% had satisfactory control of their hypertension⁸. In Raichur, 50% of the hypertensive had their B.P. in normal range¹⁷.

CONCLUSION AND RECOMMENDATIONS

Prevalence of hypertension is more in males compared to females because men have more associated risk factors like smoking, alcohol and stress. Large numbers of hypertensive have family history of hypertension which shows a genetic predisposition to this disease. Other predisposing factors noted are obesity, stress and sedentary lifestyle in urban areas. Severity and prevalence of hypertension with increasing age can be considered as an epidemic with long incubation period. Therefore, strengthening of health services is recommended in the form of regular screening and health education camps which is essential for early diagnosis of even the submerged part of the hypertension iceberg. Also, it is recommended that hypertensive should be encouraged for regular health checkups, dietary modifications and life style changes in order to control this problem of rising epidemic.

REFERENCES

1. Park K. Park's Textbook of Preventive and Social Medicine, 23rd Ed., Banarasidas Bhanot Publishers, Jabalpur, 2015, p. 372-377.
2. World Health Organization. *WHO Chronicle*, **28**:11 (1974)
3. World Health Organization. Global Health Observatory (GHO) data. Available from: http://www.who.int/gho/ncd/risk_factors/blood_pressure_text/en/. Last accessed on April 12, 2015.
4. World Health Report – 2002. Reducing Risks, Promoting Healthy Life. Chapter 4, p-12. Available from: http://www.who.int/whr/2002/en/whr02_ch4.pdf. Last accessed April 04, 2015.
5. World Health Organization. *Tech. Rep. Ser.*, No. 686 (1983)
6. Gupta, R. Sharma, A.K. Gupta, V.P. Bhatnagar, S. Rastogi, S. and Deedwania, P.C. Increased variance in blood pressure distribution and changing hypertension prevalence in an urban Indian population. *J Hum Hypertens*, **17**: 535-540 (2003)
7. Chobanian, A.V. Bakris, G.L. Black, H.R. Cushman, W.C. Green, L.A. Izzo, J.L. Jr, et al; National Heart, Lung, and Blood Institute Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure; National High Blood Pressure Education Program Coordinating Committee. The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure: the JNC 7 report, *JAMA*, **289**: 2560-2572 (2003)
8. Prasad, D.S. Zubair, K. Dash, A.K. and Das, B.C. Prevalence and predictors of adult hypertension in an urban eastern Indian population. *Heart Asia*, **4**: 49-52 (2012)
9. Bhasin, S.K. Chaturvedi, S. Gupta, P. and Aggarwal, P. Status of physical exercise and its association with obesity and hypertension in two urban assembly constituencies of East Delhi. *J Indian Med Assoc*, **99**: 631-633 (2001)

10. Hazarika, N.C. Biswas, D. Narain, K. Kavita, H.C. and Mahanta, J. Hypertension and its risk factors in tea garden workers of Assam. *Natl Med J India*, **15**: 63-68 (2002)
11. Chadha, S.L. Radhkirshnan, S. Ramachandran, V. Kaul, U. and Gopinath, N. Prevalence, awareness and treatment status of hypertension in urban populations of Delhi. *Indian J Med Res*, **92**: 233-240 (1990)
12. Reddy, S.S. and Prabhu, G.R. Prevalence and Risk Factors of Hypertension in Adults in an Urban Slum, Tirupati, A.P., *Indian J Community Med*, **30**: 84-87 (2005)
13. Kalavathy, M.C. Thankappan, K.R. Sharma, P.S. and Vasana, R.S. Prevalence, awareness, treatment and control of hypertension in an elderly community based sample in Kerala, India. *National Medical Journal of India*, **13**: 9-15 (2000)
14. Shanthirani, C.S. Pradeepa, R. Deepa, R. Premalatha, G. Saroja, R. and Mohan, V. Prevalence and risk factors of hypertension in a selected South Indian population. The Chennai Urban Population Study. *J Assoc Physicians India*, **51**: 20-27 (2003)
15. Hypertension Study Group. Prevalence, awareness, treatment and control of hypertension among elderly in Bangladesh and India. *WHO Bulletin*, **79**: 490-500 (2001)
16. Kokiwar, P.R. and Gupta, S.S. Prevalence of hypertension in a rural community of Central India. *Int J Biol Med Res*, **2**: 950-953 (2011)
17. Javali, R. Kirte, R. and Muddaraddi, R. Prevalence of hypertension and its risk factors among staff of Raichur Institute of Medical Sciences, Raichur. *International Journal of Medical Science and Public Health*, **3**: 1470-1473 (2014)