DOI Number: 10.5958/2320-608X.2019.00081.7

A Comparative Study of Systolic Blood Pressure, Diastolic Blood Pressure, Mean Arterial Pressure and Pulse Pressure between Urban and Rural Population

Asra Tayyab[1], Deepthi Kammili[2], K.Amrutha Kumari[3], Chandrasekhar Chikatapu[4]

[1]Assistant Professor, Dr. VRK Women's Medical College Hyderabad Telangana, [2]Tutor Dr.VRK Women's Medical College, [3]Professor and HOD Dr. VRK Women's Medical College, [4]Biostatistian Novartis Gacchibowli Hyderabad

Abstract

Hypertension is a commonest cardiovascular disorder affecting more than 30% of the adult population in many countries. It is considered to be one of the important risk factor for cardiovascular disease, diabetes , stroke and CKD. It is projected that by the year 2020 it will cause a global burden.[17] It is seen that death and disability from coronary heart disease and CKD are increasing so quickly that the public health authorities are facing a challenge in controlling it. New research has shown that the risk of brain lesions was higher in people with higher average systolic pressure. Researchers discovered increased biomarkers for Alzheimer's in the brains of older patients with high blood pressure. [21]. Obstructive sleep apnea [3] is also associated with hypertension. The M.A.P and P.P both are associated with ischemic stroke [4] . MAP is a critical hemodynamic factor in the regulation of blood pressure, an inadequate flow to organs may cause syncope and shock. It is seen that rise in blood pressure has become a major risk factor for premature disability and death worldwide. Taking into consideration all of the above factors and the different life styles of the urban and rural population this study was under taken . A total of 200 subjects were included in the present study. In this study we measured the S.B.P , D.B.P, M.A.P and P.P. It was noticed that there was a significant rise in systolic and diastolic blood pressure as well as the mean arterial pressure and the pulse pressure in the urban population compared to the rural population.

Key words: *SBP systolic blood pressure, DBP diastolic blood pressure, M.A.P mean arterial pressure. P.P pulse pressure, CKD chronic kidney disease*

Introduction

The National high blood pressure education program me (NHBPEP) showed that high blood pressure was a major unsolved but solvable mass public health problem. The new WHO-ISH classification [6] of hypertension is that between 130/80 -140/90 mm Hg. above is considered a high blood pressure. The increase in cardiac output increases the systolic pressure, where as an increase in the peripheral resistance increases the diastolic pressure. An important cause of the systolic pressure rise is the decreased distensibility of the arteries and at the same level the cardiac output. The positive association between the systolic and the diastolic pressure [7] and the risk of cardiovascular disease is a well established factor. The pulse pressure represents the blood pressure variation and is effected by large artery stiffness and left ventricular ejection which is estimated by mean arterial pressure [19]. There is a strong association between overweight and hypertension[9]. High fad diets leads to obesity [10, 12]. Men who have waist circumference more than 102 cm have a strong likelihood of developing several disorders, including hypertension.[14] In obese persons plasma insulin and leptin concentrations increase and insulin is a determinant of hypertension[11]. The polycystic ovarian syndrome is associated with hypertension, insulin resistance, and increased activity of the sympathetic nervous system[5]. Diabetic renal disease has the most important influence [20] on blood pressure. Taking into consideration the differences in the life

Corresponding author:
Dr. Asra Tayyab
Assistant Professor Dr. VRK Women's Medical College Hyderabad Telangana, Email-drasratayb@gmail.com

styles of the urban and rural population it was found that the adoption of western lifestyle and quickening pace of change as well sedentary habits, less physical[2] exercise , unhealthy food habits like consumption of processed and junk food with less fiber, smoking, alcohol ,obesity and mental stress[1] which are important predisposing factors for hypertension are found to be more prevalent in the urban population.

Materials and Method

The study involves 200 subjects out of which there are fifty males and fifty females both from urban and rural areas .This study was done in Charminar area of Hyderabad and in the Jalpally village which is about 250 km from the Hyderabad city independently by the authors. After getting ethical clearance, the subjects were selected in the age group of 20 to 60 years [6] this was done in accordance to Joint National Committee guidelines . The subjects were supposed to be healthy with no history of any other relevant diseases and were not on any other therapy. The subjects whom we have selected are non- smokers , non-alcoholic and non-hypertensive. Data on demographic characteristics, medical history , and habits was obtained with the use of standard questionnaire administered by a trained technologist. The subjects were put on a questionnaire regarding their life style ,food habits, salt intake alcohol ,smoking, exercise, sleeping, drinking, education employment divorce was asked to each participant. The consent of the subjects was taken. The following parameters were measured; AGE, HEIGHT, WEIGHT ,SBP,DBP,M.A.P. and P.P. Measurements were done between 8-10 AM , and the blood pressure was recorded using Littman's stethoscope and mercury manometer in sitting posture. Measurements were taken three times . Care was taken to give five minutes rest to the subject prior to the first measurement .The second measurement was taken after 30 minutes. The average of the three readings was taken as the blood pressure of the individual. The PP is calculated as the difference of SBP and DBP. The MAP is calculated as DBP plus one third of PP. Statistical analysis was done and data obtained was analyzed for comparison of two groups urban and rural by using F test .

Results

1. In table no:1-the test parameters of all subjects are shown.

2. In table no:2-the systolic blood pressure of both rural and urban population is compared using F test and a p value of 0.42 is obtained.

3. In table no:3-the diastolic blood pressure of both rural and urban population is compared and analyzed by using F test and we got a p value of 0.0025

4. in table no:4-the pulse pressure of both rural and urban population is compared by F test which shows a p value of 0.037

5.In table no:5-the mean arterial pressure of both rural and urban population is compared by using F test where we got a p value of 0.0003

Table no:1

	RURAL SBP	URBAN SBP	RURAL DBP	URBAN DBP	RURAL PP	URBAN PP	RURAL MAP	URBAN MAP
N	60	100	60	100	60	100	60	100
MEAN	121.8	136.69	77.18	88.84	43.66	47.99	91.52	105.24
S D	101.12	9.93	5.67	7.99	8.61	8.31	6.41	9.72
S E	1.30	0.993	0.73	0.79	1.11	0.83	0.82	0.972
MAX	140	180	90	130	70	70	103.3	146.9
MIN	100	110	60	80	30	30	73.3	73.2
CL 95.0%	2.61	1.97	1.46	1.58	2.22	1.65		

Table No:2 F-Test Two-Sample for Variances (SBP)

	Rural	Urban
Mean	121.0833333	136.69
Variance	102.450565	98.66050505
Observations	60	100
Df	59	99
F	1.038415168	
P(F<=f) one-tail	0.428004279	
F Critical one-tail	1.454002295	

Table No:3: F-Test Two-Sample for Variances (DBP)

	Variable 1	Variable 2
Mean	77.18333333	88.84
Variance	32.2539548	63.91353535
Observations	60	100
Df	59	99
F	0.504649831	
P(F<=f) one-tail	0.002511158	
F Critical one-tail	0.672974585	

Table No. 4: F-Test Two-Sample for Variances (P.P)

	Rural	Urban
Mean	43.66666667	47.79
Variance	74.15819209	69.19787879
Observations	60	100
Df	59	99
F	1.071683025	
P(F<=f) one-tail	0.375552981	
F Critical one-tail	1.454002295	

Table No. 5: F-Test Two-Sample for Variances (MAP)

	R_MAP	U_MAP
Mean	91.52166667	105.2547
Variance	41.14511582	94.57648173
Observations	60	100
Df	59	99
F	0.435045955	
P(F<=f) one-tail	0.000355248	
F Critical one-tail	0.672974585	

Discussion

The Blood pressure problem involves most of the population. A greater potential exists for improved health and longevity through control of blood pressure .Its realization requires a strategy combining population wide and high risk approaches. Emotion for example, increases the cardiac output and it is difficult to obtain a truly resting blood pressure in an exited or tensed individual. In general, increase in cardiac output increases the systolic pressure where as an increase in the peripheral resistance increases the diastolic pressure. According to the WHO and ISH lifestyle measures for reducing hypertension include stopping of smoking [18],limiting alcohol consumption, reducing salt intake, eating healthier food ,taking more exercise, and maintaining normal bodyweight as larger weight losses are associated with larger blood pressure reductions[13] , and learning to cope with stress. Smoking cessation is single most powerful lifestyle measure for the prevention of cardiovascular diseases in hypertensive patients .Maintaining mental and functional abilities into older age is greatly facilitated by healthy habits. Active ageing is maintaining both health and creativity throughout the lifespan and especially into later years. Early detection and treatment will lead to a decrease in morbidity and mortality associated with hypertension [15].

Conclusion

Obese and overweight population is significantly more in the urban area compared to the Rural area. The urban population have a significantly higher S.B.P.,D.B.P, M.A.P and P.P than the rural population. There is increased incidence of hypertension in the urban males and females compared to rural males and females. This clearly indicates that the urban population are at increased risk of cardiovascular disease. This shows the effect of westernization16 of dietary habits and life style on the blood pressure of individuals. The diet of people living in metros has undergone a tremendous change. They have shifted from traditional food to fast food, which has excess salt and less fiber. The urban people have better socioeconomic status, which is also responsible for their affluent lifestyle. Compared to the urban population the rural population is more hard working doing more physical activity than the urban population who lead a sedentary life. The sleeping quality of the rural residents is better than the urban people. It is observed that the urban people are more stressed than the rural people.

There are numerous kinds of stressors found among the urban population like their work , travelling long distances to their work place ,traffic problems, long hours of work, due to which cordial relationship at home are suffering and leading to increase in the divorce rates among the urban population. As stress in any stimulus experienced consciously or unconsciously is potentially harmful or threatening to any individual, The stressors that are prevailing in urban population may be due to social, psychological, financial, cultural and physical conditions and they have a profound long term blood pressure elevating effect. Finding the cause based on multiple factors and treating hypertension with various options which include medications and adjustments in lifestyle , and proper counselling may solve this problem to a large extent.

Ethical Clearance: Taken from Institutional Ethical Committee, Dr. VRK Women's Medical College Teaching Hospital & Reasearch Centre.

Conflict of Interest- There is no conflict of interest by all the authors.

Source of Funding- Self

References

1. Pearson LG , Lindster K, Lingfors H et al. Cardiovascular risk during early adult life. Risk Markers among participants in Live for life. Health promotion in Sweden. J Epidemiol Community Health 1998; 52(7): 425-32
2. Dyer AR, liu K, Walsh M et al. Ten –year incidence of elevated blood pressure and its predictors. J.Hum Hypertens.1999; 13(1):13-21.
3. Gerald F Di Bona .Sympathetic Nervous system and Hypertension.2013; 61:556-560.
4. Liqiang Zheng MD ,Zhaoqing Sun MD, Jue Li,MD PhD, Xingang Zhang MD, Shuangshuang Liu MD, Jiajin Li MD, Changlu Xu MD, Dayi HuMD PhD ,Yingxian Sun MD PhD. Pulse pressure and mean arterial pressure in relation to ischemic stroke among patients with uncontrolled hypertension in rural areas of china.2008; 39: 1932-37.
5. Schlaich MP, Straznicky N, Grima M,et al. Renal denervation ,a potential new treatment modality for polycystic ovary syndrome .j hypertens. 2011;29:991-996.
6. The Seventh Report of the joint Joint National Committee on prevention, detection evaluation and treatment of high blood pressure. Making sense of the US Hypertension Guideline in 2018. https:// www.acponline.org chapters el…
7. Fishers CM . The ascendancy of diastolic blood pressure over systolic. The Lancet 1985 Dec ;1349-1350.
8. Staessen J, Obrien E, Atkins N et al. The increase in blood pressure with age and body mass index is overestimated by conventional sphygmomanometry. Am J Epidemiol . 1992;136:450-9.
9. Stamler R, Stamler J, Riedlinger WF et al. Weight and blood pressure. Findings in hypertension screening of 1 million Americans. JAMA 1978; 240: 1607-1610.
10. Nirmala A, Redy PC, Reddy KN. Influence of adiposity on blood pressure in Andhra population . J Ind Anthrop Soc 1993; 28:139-145.
11. Fournier AM, Gadia MT, Kubrusly DB et al. Blood pressure, insulin and glycemia in non diabetics. Am J 1986; 80:861-64.
12. Doll S , Paccaud F, Bovet P et al. Body Mass Index , abdominal adiposity and blood pressure consistency of their association across developing and developed countries. Int J Obes 2002;26: 48-57.
13. Cohen N , Flamenbaum A . Obesity and hypertension demonstration of a Floor effect Am J E pidemiol 1981; 113: 276-84.
14. Lean ME, Han TS, Seidell JC. Impairment of health and quality of life in people with large waist circumference, Lancet 1998; 351: 853-56.
15. Trapti Saxena, Rajeev KH. Prevalence of hypertension in a rural community of costal Karnataka :A cross sectional study. Int journal of Community medicine and public health. 2017 ; (8): 2774-2777.
16. Pavan L, Casiglia E , Pauletto P et al. Blood pressure serum cholesterol and nutritional state in Tanzania and in Amazon comparison with an Italian population.J Hypertens 1997; 15(10):1083-90.
17. Chalmers Jet.al WHI-ISH hypertension guidelines committee 1999 WHO-ISH hypertens j 1999; 17:1151-183.
18. Wang J, Sun W, Wells GA, LiZ , LiT , Wu j et al. Differences in the prevalence of hypertension and

associated risk factors in urban and rural residents of northeastern region of People's Republic of China, A cross -sectional study . 2018; PloS ONE 13(4): e0195340. https://doi.org//10.1371/journal.pone:0195340

19. Howard D Sesso,Charles Hennekens J Micheal Gaziano. Jo Ann and Manson Robert J. Glynn.
20. Teuscher A, Egger M, Herman JB. Diabetes and hypertension Arch Intern Med 1989 ;149:1942-45.
21. Alex Keown .High blood pressure linked to brain lesions and Alzheimer's in new research. jul 12, 2018; https://www.biospace.com.>article.