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Association of Physiological Parameters (MAP AND PP) with Ageing in Population Residing in Western Parts of Madhya Pradesh

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Abstract

The study's goals are to identify and assess the general health status of the 65+ population in Indore and to get baseline data on physiological markers for the Western region of Madhya Pradesh. The current study is intended to be conducted on those 65 years of age and older who visit Index Medical College, Indore, as well as those who live in and surrounding these locations. We evaluated the subjects' dietary status and physiological parameters such as MAP and PP biochemical parameters. Therefore, we have chosen to include study participants who are older than 65. There will be a total of 1000 study participants, equally divided between the sexes. We shall measure the health status of elderly aging.

Results: The result of our study showed highly positive significant association and correlation of MAP and PP with age.

Keywords: Blood Pressure, Cardiovascular, Hypertension, Tissues

Introduction

Studies on physiological declines in various systems among older adults are quite recent. The main objective of the Geriatric Society is to promote collaboration among professionals from various medical fields to focus on the biological and physical elements of aging. While social and psychological elements are important as well, this study will not focus on them.

The slow accumulation of random molecular defects in cells and tissues is referred to as aging. Aging leads to physiological alterations in every organ system. Researchers have exclusively detailed age-related

alterations in the cardiovascular system, such as a reduced heart rate, diminished oxygen extraction, stiffening of arteries, increased vasoconstriction, raised systolic blood pressure, thickening of the myocardium, lower diastolic filling rate, modified rhythmic rates, and extended action potential.[1]

Growing older has typically been linked to decreased heart rate (HR) and accelerated normal systolic and diastolic blood pressure (SBP and DBP). Older hypertensive and normotensive participants have been found to exhibit additional fluctuation for blood pressure in studies utilizing intra-arterial and non-invasive ambulatory tracking techniques.[2,3,4] The age-associated changes in variability are related to changes inside the baro reflex and sympathetic or parasympathetic control of the cardiovascular system. BP variability has been discovered to be an independent chance issue for cardiovascular morbidity and the rate and severity of target-organ damage.[5,6]

The "physiological" age-related increase in blood pressure can be a confounding element in the determination of age consequences on blood pressure variability. Definitely, incidence of hypertension with a conservative definition of blood pressure above 140/90mm Hg in patients above aged 65 years is higher than 40%.[7,8]

Numerous studies have demonstrated that the peak exercising heart rate for coronary health decreases as one gets older.[9,10] Aging is linked to changes in pacemaker tissue, diminished responsiveness of autonomic cardiovascular reflexes, a reduction in intrinsic heart rate, and lowered sensitivity of adrenergic receptors.[11-14] Findings from cross-sectional studies indicate that as people age, blood pressure rises. Both systolic and diastolic blood pressure generally increase as one ages. The rise in blood pressure as one gets older is not a fundamental aspect of aging.[15-17]

Currently, the older rapidly expanding segment of the population is influencing the circumstances surrounding cardiovascular research.[18] Similar to hypertension, aging has been demonstrated to raise blood pressure variability.[19,20] Conversely, coronary heart rate variability diminishes as age and blood pressure rise. As people age, blood pressure tends to increase.[21,22]

Aims and Objectives

1. To have base line data(MAP and PP) for 65+ population in Western part of Madhya Pradesh state of India.
2. To identify and grade overall health status of 65+ population in Western part of Madhya Pradesh state of India.
3. To identify weakest and most vulnerable group of older population and recommend policy for better care.

Material and Method

This cross-sectional study was conducted on individuals aged 65 years and older in the western region of Madhya Pradesh. World population data sheet 2002 indicates that 41.9 million people in India are aged over 65 years. In the Indian context, an individual over the age of 60 is considered elderly. It aligns with the retirement age in the government sector. However, the majority of developed nations have recognized the age of 65 years as a benchmark for defining “elderly” or “older person.”[23] Thus, we have chosen to include participants aged over 65 years in our study. The study will include a total of 1000 participants, with an equal distribution of both genders. This figure is statistically important for drawing a conclusion. We will assess the health condition of aging seniors.

The present study is proposed to be undertaken on 65 years age and above population those who visit Index Medical College, Indore, Out Patient Department (OPD) and and those who are residing in and around these areas. We will assess physiological parameter, biochemical parameter and nutritional status of the subjects.

This study was taken 24 months

Inclusion Criteria

- Aged population 65 and above, clinically fit and with symptoms, signs related to frailty that is weight loss, weakness, slow walking speed, low level of activity and feeling of fatigue
- 65 and above individuals on medication for idiopathic hypertension, visual and hearing deficits, bronchial asthma, diabetes mellitus but well controlled with medication and clinically healthy.

Exclusion Criteria

- All the subjects 65 and above, with sign and symptoms because of disease, on medication but clinically not healthy.

Procedure

Blood pressure – Palpatory method (mmHg) and Auscultory method (mmHg). Systolic and diastolic blood pressure, Mean Atrial Pressure and pulse pressure shall be recorded in mm of Hg by using sphygmomanometer and stethoscope.

In Auscultatory method involves the balancing of pressure in a bag, that is air pressure against the pressure of the blood in an artery. The air pressure is estimated by means of mercury or air (aneroid) manometer. The manometer of a sphygmomanometer consist of broader limb is the reservoir for mercury and narrow limb is graduated from 0 to 300mm, with the smallest division corresponding to a reading of 2mmHg. In palpatory method radial pulse and rubber bag inflate to increase the pressure up to 20 – 30mmHg above the point at which the radial pulse will disappear at the wrist. After that slowly deflate the cuff by releasing the pressure @ 2–3mmHg/ Sec, lowering the pressure, keep palpating the radial artery and reading is taken just when pulse starts reappearing.

- Pulse Pressure (PP) - It is the difference of systolic blood pressure and diastolic blood pressure. Systolic blood Pressure—Diastolic Blood Pressure
- Mean Atrial Pressure (MAP) – It is the average pressure throughout the cardiac cycle and computed as Diastolic Blood Pressure +1/3 pulse pressure.

Result

Physiological Parameter (Cardiovascular System)

Table 1: Mean & SD of SBP, DBP, Pulse pressure, MAP

Parameter	Mean	Std. Deviation
Systolic Blood Pressure	129.02	13.55
Diastolic Blood Pressure	83.84	8.53
Pulse Pressure	45.48	11.59
Mean Arterial Pressure	98.275	9.13

Table shows descriptive statistics details of cardiovascular parameter. The parameters are Systolic Blood Pressure, Diastolic Blood Pressure, pulse pressure, mean arterial pressure.

The mean systolic blood pressure was 129.02±13.55

The mean diastolic pressure was 83.84±8.53

The mean pulse pressure was 45.48±11.59

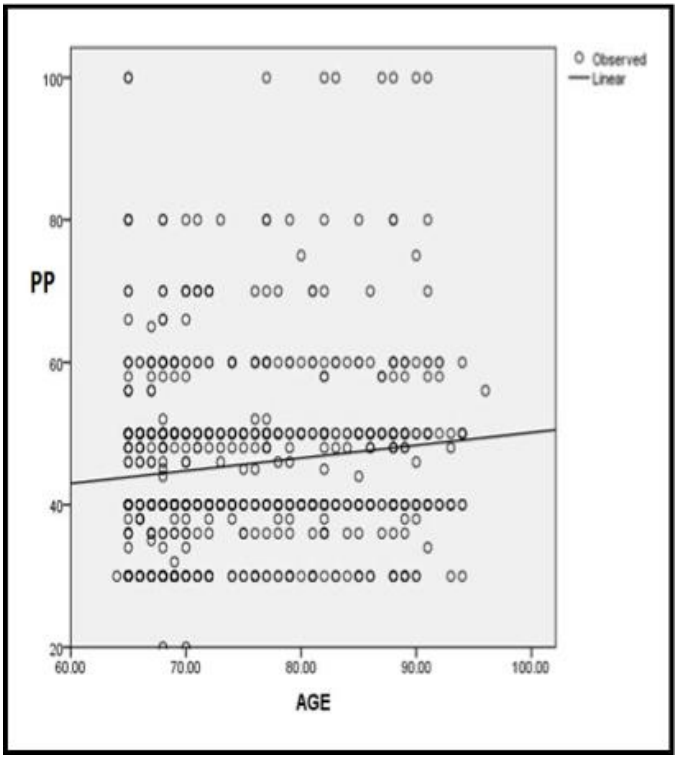
The mean arterial pressure was 98.27±9.13

Table 2: Correlation Coefficient between MAP and PP

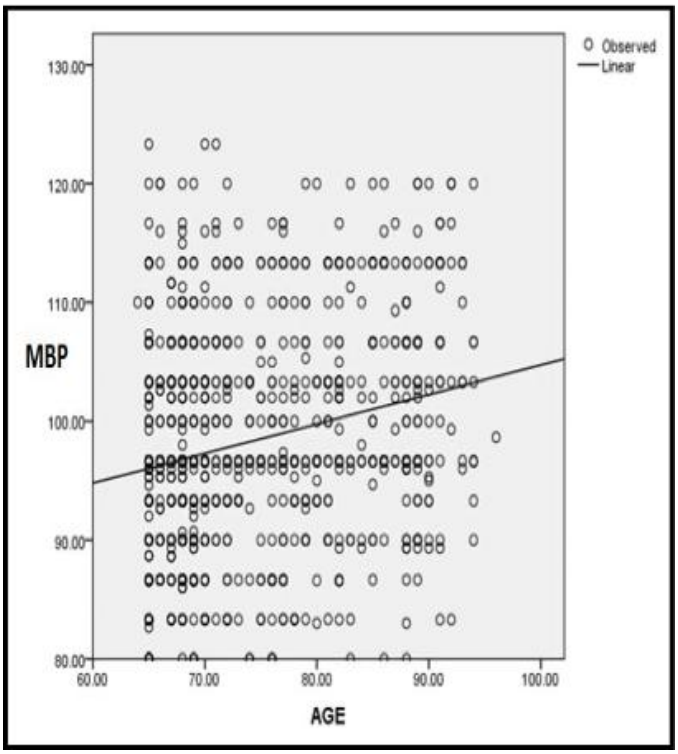
Parameter	Correlation Coefficient	P –Value Significance
Pulse pressure	0.129	<.001 (*)
MAP	0.228	<.001 (*)

Table shows correlation of age with various cardiovascular parameters analysis showed that there was statistically significant correlation between age and pulse pressure (r=0.129, p<0.001), age and mean arterial pressure (r=0.228, p<0.001).

Graph 1: Graph of Correlation of PP with Age



Graph 2: Graph of Correlation of MAP with age



Conclusion

In our study the cardiovascular parameter that pulse pressure and mean arterial pressure shows significant correlation with age. Obesity is an important risk factor for cardiovascular disease. Blood pressure at each age is generally regarded as the single most reliable predictor of blood pressure at a later age. Exercise and training may be responsible for age related decreases in maximum heart rate and arteriovenous oxygen difference. Age and hypertension make act independently to reduce baroreceptor sensibility and heart rate variability. Sometimes decreased heart rate

variability is associated with a decrease in the range of systolic and diastolic blood pressure in the elderly. The older subjects have a lower intrinsic heart rate but it can be increased by daily activities.

References

1. Garavaglia L, Gulich D, Defeo MM, Thomas Mailland J, Irurzun IM. The effect of age on the heart rate variability of healthy subjects. PLoS One. 2021 Oct 8;16(10):e0255894. doi: 10.1371/ journal.pone.0255894. PMID: 34624048; PMCID: PMC8500436.
2. Tseng CD et al. Influence of age on ambulatory blood pressure in treated hypertensive patients with normal casual pressure. J Formos Med Assoc 1993; 92: 609–613.
3. Ferrari AU. Age-related modifications in neural cardiovascular control. Aging ClinExp Res 1992; 4: 183–195.
4. Tochikubo O, Miyazaki N, Yamada Y, Fukuoka M, Kaneko Y. Mathematical evaluation of 24-hour blood-pressure variability in young, middle-aged and elderly hypertensive patients. Jpn Circ J. 1987 Oct;51(10):1123-30. doi: 10.1253/jcj.51.1123. PMID: 3430686.
5. Frattola A et al. Prognostic value of 24-hour blood pressure variability. J Hypertens 1993; 11: 1133–1137.
6. Parati G et al. Relationship of 24-hour blood pressure mean and variability to severity of target-organ damage in hypertension. J Hypertens 1987; 5: 93–98.
7. Giles T, Aranda JM Jr, Suh DC, Choi IS, Preblick R, Rocha R, Frech-Tamas F. Ethnic/racial variations in blood pressure awareness, treatment, and control. J Clin Hypertens (Greenwich). 2007 May;9(5):345-54. doi: 10.1111/j.1524-6175.2007.06432.x. PMID: 17485970; PMCID: PMC8109924.
8. BarkerWH, Mullooly JP, Linton KL. Trends in hypertension prevalence, treatment, and control: in a well-definedolder population. Hypertension. 1998;31(1Pt2):552-559.
9. Robinson S: Experimental studies of physical fitness in relation to age. Arbeitsphysiol 10: 251, 1938
10. Bruce RA, Blackmon JR, Jones JW, Strait G: Exercising testing in adult normal subjects and cardiac patients. Pediatrics 32 (suppl): 742, 1963.
11. Jose AD, Collison D: The normal range and determinants of the intrinsic heart rate in man. Cardiovasc Res 4: 160, 1970.
12. Asrand PO: Human physical fitness with special reference to sex and age. Physiol Rev 36: 307, 1956
13. Robinson S: Experimental studies of physical fitness in relation to age. Arbeitsphysiol 10: 251, 1938
14. Bruce RA, Blackmon JR, Jones JW, Strait G: Exercising testing in adult normal subjects and cardiac patients. Pediatrics 32 (suppl): 742, 1963.
15. Jose AD, Collison D: The normal range and determinants of the intrinsic heart rate in man. Cardiovasc Res 4: 160, 1970.
16. Shock NW: Physiological aspects of aging i-n man. Annu Rev Physiol 23: 97, 1961
17. Erikssen E, Lundholm L: Adrenergic beta-receptor activity in cyclic AMP metabolism: variation with age. Mech Ageing Develop 4: 1, 1975.
18. Report of the Task Force on Blood Pressure Control in Children. Pediatrics 59: 797, 1977 U.S. Department of Health, Education and Welfare: Blood pressure levels of persons 6-74 years. United States 1971- 1974. Data from the National Health Survey. NO203 DHEW Publication (HRA) 78-1648,

Series II. Vital and Health Statistics. Washington. DC: US Government Printing Office, 1975.

19. Page LB: Dietary sodium and blood pressure: evidence from human studies. In Childhood Prevention of Atherosclerosis and Hypertension, edited by Laucr RK. Shekcllc RB. New York: Raven Press. 1980, p 291.
20. Le Gros V, Escourrou P, Nédelcoux H, Gaultier C. Mesure continue nocturne de la pression artérielle au cours du syndrome d'apnées du sommeil. Comparaison entre sujets normotendus et sujets hypertendus [Nocturnal continuous measurement of blood pressure in sleep apnea syndromes. Comparison between normotensive and hypertensive patients]. Arch Mal Coeur Vaiss. 1991 Aug; 84(8):1127-31. French. PMID: 1953262.
21. Mann S, Millar Craig MW, Altman DG, Raftery EB, Hunyor SN. Blood pressure variability in health, hypertension and autonomic failure. ClinExp Hypertens A. 1985;7:187-194.
22. Floras JS, Hassan MO, Vann Jones J, Osikowska BA, Sever PS, Sleight P. Factors influencing blood pressure and heart rate variability in hypertensive humans. Hypertension. 1988; 11:273-281.
23. Kawamota A, Shimada K, Matsubayashi K, Chikamori T, Kuzumc O, Ogura H, Ozawa T. Cardiovascular regulatory functions in elderly patients with hypertension. Hypertension. 1989; 13:401 -407.
24. Gifford RW Jr. Are systolic/diastolic and isolated systolic hypertension risk factors for the elderly? Geriatrics. 1989 Oct;44 Suppl B:10-4. PMID: 2680775.
25. Kannel WB. Host and environmental determinants of hypertension: perspective from the Framingham study. In: Kesteloot H,Joossens JV, eds. Epidemiology of Arterial Blood Pressure. TheHague, the Netherlands: MartinusNijhoff; 1980:265-296.
26. Rockwood, Hogan, and MacKnight 2000; Rockwood, Song, and MacKnight 2005; Bortz 2002; Gillick 2001; Fried et al. 2001; Morley, Ferry, and Miller 2002.