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Original Research Article

Prevalence of hypertension and associated anthropometric indices among the non-medical employees working in medical college Thiruvananthapuram: a cross-sectional study

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ABSTRACT

Background: Hypertension is a major public health problem. Globally 1.28 billion adults aged 30-79 years have hypertension and among this 46% were undiagnosed. Kerala is one state undergoing epidemiological transition and having high prevalence of hypertension. So, we did this study to estimate the proportion of hypertension among non-medical employees of Medical College Thiruvananthapuram.
Methods: A cross-sectional study was conducted among 202 non-medical employees of medical college Thiruvananthapuram. Data was collected using an investigator administered questionnaire. Anthropometric indices were measured and recorded. Blood pressure (BP) was recorded twice in a gap of 15 min for each participant in sitting position using mercury sphygmomanometer. Mean systolic BP (SBP) and diastolic BP (DBP) was calculated to confirm hypertension. Participants those who were already detected as hypertensive and on treatment were also noted. Data was analysed using SPSS software version 27.
Results: Prevalence of hypertension in the study population was 61/202 (30.19%). Among the hypertensive 39 (63.9%) were already detected and on treatment and 22 (36.1%) were undiagnosed. Among already detected hypertensive 13 (33.3%) were found to be inadequately treated. Hypertension was found to be associated with waist circumference and BMI.
Conclusions: The study population was found to have high prevalence of hypertension and having association with waist circumference and BMI. The rule of halves for depicting the trend of hypertension in study population can be used as a tool to deduce various interventions in the community.

Keywords: Hypertension, Anthropometric indices, Rule of halves, Gender distribution of hypertension, Hypertension

INTRODUCTION

Hypertension is a major public health problem and acting like a hidden sword killing many even in their young age.[1] Hypertension (HTN) is one of the most prevalent non communicable diseases in the world. According to WHO 1.28 billion adults aged 30-79 years have hypertension globally and about 46% were undiagnosed.[2] The prevalence of hypertension has increased, in low and middle-income countries, owing to ageing of the population and increased exposure to lifestyle risk factors like unhealthy diets, lack of physical activity and habits. In India more than 1 in 4 people are hypertensive and more than 90% of adults who are hypertensive are either undiagnosed, untreated or inadequately treated.[3]

According to NFHS-5 data Kerala has comparable distribution of hypertension among males (32.8%) and females (30.9%).[4] Kerala is in advanced stage of epidemiological transition and account for higher prevalence of hypertension.[5] In Kerala also the important risk factors associated with hypertension are physical inactivity, diet containing high saturated fatty acids, high salt intake and habits like smoking and alcoholism.

Anthropometric indices like waist circumference, hip circumference, waist hip ratio and body mass index which are non-invasive quantitative measurements of the body are associated with increase in prevalence of life style diseases especially hypertension.[6] The present study focuses on the prevalence of hypertension in non-medical permanent employees of Medical College Trivandrum and association of hypertension with anthropometric measures

The non-medical employees in medical college, the majority are doing sedentary works like office work, lab work and assisting the teaching and training activities and they have good access to health services. The work place forms a setting for health interventions promoting the health of employees and thereby preventing NCDs.[7] So we did a study to estimate the proportion of hypertension in this particular occupational group and hence this study.

METHODS

A cross-sectional study was done among the 202 non-medical permanent employees of age between 20-60 years working in medical college Thiruvananthapuram. The primary objective was to estimate the proportion of hypertension in the study population based on JNC 8 criteria and secondary objective to describe the associated anthropometric indices in the study population and to depict the existence of rule of halves in the study population. Study period was from October 2023 to December 2023. According to NFHS -5 mean prevalence of hypertension among adults aged 15 years and above was 23% in India. Using this prevalence with 95%confidence interval and 6% allowable error the minimum sample size was calculated as 196. Attendance register of all departments, administrative office and security wing was considered as sampling frame. A total of 225 employees were there in the attendance roll. Those with loco motor disability, pregnant women and those who were on leave were excluded from enrolling into the study and finally 202 were included in the study with a participation rate of 89.7%.

After getting consent from the participants a predesigned structured questionnaire was used to collect basic information and history regarding previous diagnosis and treatment of hypertension followed by measurement of anthropometric measures and measurement of blood pressure by mercury sphygmomanometer. All measurements were taken after ensuring adequate privacy to the study participants. Height was measured using stadiometer and weight by standardized weighing machine. Using the height and weight measured, BMI was calculated and classified according to WHO Asian criteria.[8] Waist circumference was classified according to NFHS-5, below 94 cm for men and 80 cm for women were considered normal.[4] Hip circumference was measured using measuring tape at the largest width around hip by the investigator in sitting position at the level of hip. Waist hip ratio was calculated and classified according to NFHS-5, a ratio above 0.9 for men and above 0.858 for women were considered as high values.[4] Blood pressure (BP) was recorded twice in a gap of 15 min for each participant in sitting position using mercury sphygmomanometer. The patient was given rest for 5 minutes before recording blood pressure by making them sit in a chair with back supported and arm placed on the table with palm facing upwards and supported at heart level while measuring blood pressure.[1] Mean systolic BP (SBP) and diastolic BP (DBP) was calculated to confirm hypertension. Further BP was classified according to JNC 8 classification.[9] In whom BP was found to be elevated this was confirmed by a second examiner after 5 minutes and was referred for further evaluation. Self-reported hypertension was also noted. Among self-reported hypertensive taking anti-hypertensive medication those with blood pressure below 140/90 mmHg was considered as having controlled hypertension.

Statistical Analysis

The data was collected using investigator administered questionnaire, entered and analyzed using SPSS software version 27. Quantitative variables were expressed in mean and standard deviation and the qualitative variables were expressed in proportion. t test was used to find out the statistical significance between two means and the significance level was fixed as p below 0.05.

RESULTS

We recruited total of 202 study participants.

Table 1: Demographic characteristics of study participants.

Demographic characters	Frequency	Percentage
Age group (years)		
20-29	15	7.4
30-39	44	21.8
40-49	82	40.6
50-60	61	30.2
Gender		
Male	69	34.2
Female	133	65.8
Education		
SSLC and below	25	12.4
Diploma/pre-degree	47	23.3
Degree	89	44.1
Post graduation	41	20.3

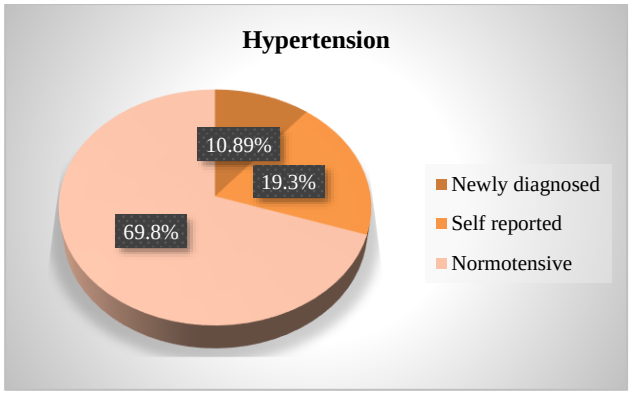

Figure 1: Proportion of hypertension in the study population.

Mean age of the study participants was 44.6±8.39. Majority of the participants were females (65.8%) and were educated up to Degree and above (64.4%).

In the study population the overall prevalence of hypertension was 30.19%. Among this 19.3% were diagnosed and on treatment and 10.89% were newly detected hypertensives. 69.8% were having normal blood pressure recordings.

Stage 2 hypertension in males and females was 2.8% and 3.75% respectively. Stage 1 hypertension was found to be 17.3% and 12.03% among males and females respectively. 14.49% males and 12.03% females were already diagnosed hypertensive but having controlled blood pressure. Pre-hypertension was found to be 31.88% among males and 15.78% among females. 33.33% males and 56.39% females had normal blood pressure. This shows that males had high stage 1 hypertension, diagnosed but controlled blood pressure and pre hypertension whereas females had high stage 2 hypertension and normal blood pressure values.

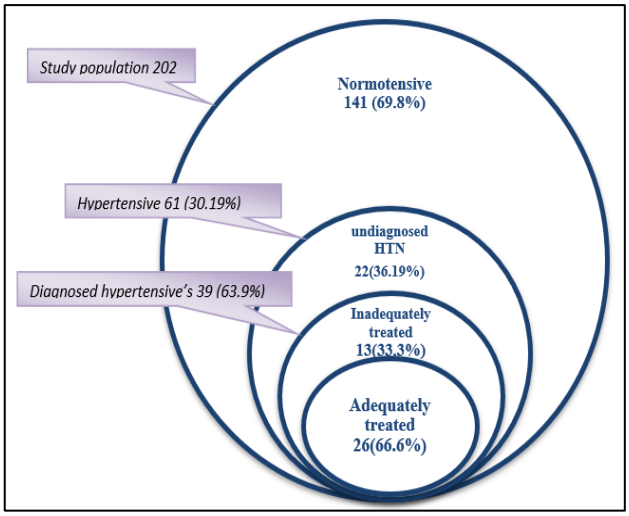

Figure 2: Depiction of rule of halves for hypertension in study population.

The overall prevalence of hypertension in the study population was 30.19% (61/202), among the hypertensive, 22 (36.19%) didn't know their hypertensive status. Among the 39 (63.9%) known hypertensive all were under antihypertensive therapy, but 13 (33.3%) did not have controlled blood pressure even after antihypertensive therapy and 26 (66.6%) had controlled blood pressure. The association between anthropometric measurements and hypertension was tested using t test, and analysis showed significance association between waist circumference and BMI ($p<0.05$).

Table 2: Distribution of measured blood pressure status in study participants based on gender.

Blood pressure status	Male (n=69)		Female (n=133)		Total (n=202)	
	N	%	N	%	N	%
Stage 2 hypertension	2	2.8	5	3.75	7	3.46
Stage 1 hypertension	12	17.3	16	12.03	28	13.86
Diagnosed but controlled hypertension	10	14.49	16	12.03	26	12.87
Pre-hypertension	22	31.88	21	15.78	43	21.28
Normal	23	33.33	75	56.39	98	48.51

Table 3: Association between anthropometric indices and hypertension.

Anthropometric indices	Difference in mean	S.E of mean	t test value	df	95% confidence interval	P value
Waist circumference	6.66	1.18	4.19	200	3.53-9.8	0.0001
Waist hip ratio	0.02	0.0084	1.76	200	-0.0028-0.049	0.08
BMI	2.04	0.55	2.94	200	0.67-3.41	0.004

Table 4: Application of rule of halves for hypertension and its interpretation.

	Undiagnosed (%)	Not treated (%)	Not controlled (%)
Rule of halves	50	50	50
Study population	36.1	0	66.6

DISCUSSION

This study was conducted among permanent non-medical employees of Government Medical College Thiruvananthapuram to assess the proportion of hypertension and its association with anthropometric measurements and depicting the results according to of rule of halves in hypertension. We recruited 202 study subjects from various departments the mean age of study participants was 44.6±8.39 years, 65.8% were females and 34.2 % were males. About 64.4% have educational status Degree and above.

The overall prevalence of hypertension in the study population was 30.19% including the diagnosed and newly detected. According to NFHS-5, the prevalence of hypertension is 24% among men and 21% among women which is less compared to our study.[4] But in a study conducted by Venkatachalam Jayaseelan et al among sanitary workers in Puducherry the prevalence of hypertension was 36.6%.[10] In another study done by Chaithanya et al. in young adults (18-40 years) attending tertiary care institute of Nagpur, prevalence of hypertension was found to be 23.24%.[11] So the overall prevalence of hypertension is showing some difference according to the population studied and across different occupational groups.

The proportion of severe hypertension (stage 1 and 2) was 17.3% and 2.8% among males respectively and 12.03% and 3.75% among females respectively. Comparing with the data of NFHS-5 of Kerala, the proportion of population with stage 1 and stage 2 hypertension was 19.2 and 6.7% among men respectively and 15.5 and 6.6% among women respectively, which is higher than our study.[4] In a study done by Chaitanya R et al among younger adults attending a tertiary care centre in Nagpur, the proportion of stage 1 and stage 2 hypertension was 15.91 and 9.09% among males respectively and 16.39 and 5.88% among females respectively, which is quite higher compared to our study.[11] The difference may be due to high educational status and access to proper health care.

In our study the overall prevalence of hypertension including diagnosed and newly diagnosed was 61/202 (30.19%) and among hypertensive's 22/61 (36.1%) were undiagnosed and were detected by our survey. Among detected (39) all are under treatment but 26/39 (66.6%) were adequately treated. In another study done by Jayaseelan V et al among sanitary workers in Puducherry the prevalence of hypertension was 36.67% (114/311). Among this 80/114 (70.17%) patients were undiagnosed. Among detected (34) all were under treatment and 12/34 (35.3%) were adequately treated.[10] In a study done by Rao V et al among urban slums at Davangere the overall prevalence of hypertension was 367/1000 (36.7%). Of these 367 hypertensives' 340/367 (92.6%) were undiagnosed. Among this 87/127 (68.5%) were under antihypertensive therapy and 21/87 (24.1%) were adequately treated.[12] In the above two studies the proportion of undiagnosed hypertensive's is higher than our study but the proportion of adequately treated is less compared to our study.

According to the global hypertension status report by WHO 16 March 2023 46% of hypertensive's was undiagnosed, 42% were diagnosed and treated and among this only 21% were having adequate blood pressure control.[2] As our study population was tertiary care employees, we got a low proportion of undiagnosed (36.1%) and higher proportion of controlled hypertension (66.6%).

Applying the rule of halves for depicting the trend of hypertension in the study population, it can use as a tool to deduce the prevention strategies. According to the rule of halves in hypertension 50% of the people in a community will be undiagnosed and 50% will be under treatment and 50% will have controlled hypertension. But in our study, this is 36.1 were undiagnosed hypertensive's, among diagnosed 100% were on treatment but 66.6% were adequately treated.

The variation may be due to the higher educational status and access to the health care facility. Even though the hypertension is a silent invisible killer that rarely causes symptoms 66.6% is having adequate controlled blood pressure. This is pointing towards different occupational group-based screening and improving awareness which is essential for adequate control of hypertension. As per the strategies of NCD control program for the prevention and control of non-communicable diseases work place-based intervention and stress management is an important intervention. The anthropometric measurements are always associated with non-communicable diseases especially hypertension .In our study also waist circumference and BMI was significantly associated with hypertension In study done by Chaitanya .R et al among younger adults attending a tertiary care centre in Nagpur, the they also got significant association between hypertension and BMI and waist circumference.[11] In another study done by Oumer F et al to determine association of blood pressure and anthropometric indices among hypertensive at health care centre in Addis Ababa Ethiopia, they got significant association for waist circumference, waist hip ratio and BMI.[1]

CONCLUSION

We found slightly high prevalence of hypertension among the permanent non-medical employees of medical college Thiruvananthapuram of 20-60 years. Among this 10.89% were undiagnosed and 66.6% of diagnosed had adequate blood pressure control. There was significant association of hypertension with waist circumference and BMI.

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REFERENCES

1. Fetiya O, Tesfaye T, Abebaye A. Association of Blood Pressure, Anthropometric Indices and Blood Group among Hypertensive Patients at Health centers in Addis Ababa Ethiopia. J Hypertens Manag. 2022;8(2):1-5.
2. WHO Report (16 march 2023) Available at: https://www.who.int/news-room/fact-sheets/detail/hypertension. Accessed on 17 Decembre 2023.
3. Varghese JS, Venkateshmurthy NS, Sudharsanan N, Jeemon P, Patel SA, Thirumurthy H, et al. Hypertension Diagnosis, Treatment, and Control in India. JAMA Netw Open. 2023;6(10):e2339098.
4. NFHS-5 2019-21 Available at: https://main.mohfw.gov.in/sites/default/files/NFHS-5_Phase-II_0.pdf. Accessed on 12 Decembre 2023.
5. Menon J, Sreedevi A, Janakiram C. Consequences of the epidemiologic transition in Kerala, India - A public–private-partnership model of health care: A critical analysis. Arch Med Health Sci. 2023;11(2):287.
6. Kyle Casadei, John Kiel. Anthropometric measurement, 2019. Available at: https://europepmc.org/article/nbk/nbk537315. Accessed on 12 Decembre 2023.
7. Clark BK, Brakenridge CL, Healy GN. The Importance of Research on Occupational Sedentary Behaviour and Activity Right Now. Int J Environ Res Public Health. 2022;19(23):15816.
8. WHO. The Asia Pacific perspective: Redifining obesity and its treatment. Available at: https://iris.who.int/bitstream/handle/10665/206936/0957708211_eng.pdf. Accessed on 12 December 2023.
9. WHO. Hypertension, 2023. Available at: https://www.ajmc.com/view/the-jnc-8-hypertension-guidelines-an-in-depth-guide. Accessed on 12 December 2023.
10. Jayaseelan V, Debnath K, Krishnamoorthy Y, Kar SS. Prevalence, Awareness and Control of Hypertension among Sanitary Workers Employed in a Tertiary Care Centre in Puducherry, South India. Indian J Occup Environ Med. 2020;24(2):119-24.
11. Patil CR, Sahoo DP, Dhoble M, Kherde A, Inamdar A. Prevalence of hypertension and its associated risk factors in young adults attending a tertiary care institute of Nagpur: a cross sectional study. Int J Commu Med Public Health. 2017;4(10):3630.
12. Rao V. Application of the "rule of halves" for hypertension as an assessment tool in an urban slum at davangere. Nat J Commu Medi. 2014;5(03):333-6.

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