

A STUDY TO ASSESS THE PREVALENCE AND ASSOCIATED RISK FACTORS OF HYPERTENSION AMONG THE WORKERS OF BANGALORE METROPOLITAN TRANSPORT CORPORATION (BMTC) IN BANGALORE CITY

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ABSTRACT

Introduction: Hypertension has become a significant health problem because of the rapid urbanization and major changes in the lifestyle of the population. Several studies suggest that the percentage increases when selected occupational groups are screened. Transport personnel are one such group who are at risk of developing hypertension due to the nature of their work. Very few studies have been undertaken in this group of population in our country, which prompted us to take up this study. **Methodology:** A cross-sectional descriptive study was done among all the workers of the randomly selected depots of Bangalore Metropolitan Transport Corporation (BMTC) in Bangalore city from October 2014 to June 2016. A pre-tested, semi-structured and self-administered questionnaire was used to collect the data. **Results:** Following the JNC 7 definition of hypertension, the prevalence rate of hypertension was 34.7% in this study. Significant association was found between hypertension and age of the worker; years of work experience; smoking; alcohol and body mass index. **Conclusion:** More than one-third of the workers were found to have hypertension. Thus more emphasis should be made on the need for comprehensive screening programmes for transport workers and awareness campaigns regarding non-communicable diseases and factors affecting them.

Key-words: Hypertension, Transport workers, Risk factors, Prevalence

INTRODUCTION

Non-communicable diseases (NCDs) are the leading causes of death globally, killing more people each year than all other causes combined. Nearly 80% of NCD deaths occur in middle and low income countries. Of the 57 million global deaths in 2008, 36 million, or 63% were due to NCDs, principally cardiovascular diseases, diabetes, cancers and chronic respiratory diseases.¹ Globally cardiovascular disease accounts for approximately 17 million deaths a year, nearly 1/3 of the total. Of these, complications of hypertension account for 9.4 million deaths worldwide every year.²

Hypertension (HTN) is a leading public health challenge globally due to its high prevalence and related morbidity and mortality. More than one in three adults worldwide has high blood pressure.³ HTN exerts a substantial public health burden on cardiovascular health status and healthcare systems in India. Hypertension is directly responsible for 57% of all stroke deaths and 24% of all coronary heart disease (CHD) deaths in India.⁵ Recent studies from India have shown the prevalence of HTN to be 25% in urban and 10% in rural people in India.⁴ The rates for HTN in percentage are projected to go up to 22.9

and 23.6 for Indian men and women, respectively by 2025.⁶

High income countries have begun to reduce hypertension in their populations through strong public health policies such as reduction of salt in processed foods and widely available diagnosis and treatment that tackle hypertension and other risk factors together. India is the largest country in South Asia with huge public transport system characterized by various transport corporations across the country. The transport employees with their busy lifestyles, poor socio-economic condition and high stress at job are subject to the risk of heart diseases especially hypertension. They form a subset of population who are at risk to develop hypertension. Very few studies have been conducted among transport employees in India which prompted us to do this study among the workers of Bangalore Metropolitan Transport Corporation (BMTC).

OBJECTIVES: To estimate the prevalence of hypertension among the workers of Bangalore Metropolitan Transport Corporation (BMTC)

To determine the risk factors associated with hypertension among the workers of BMTC

METHODOLOGY

Out of the 31 depots of Bangalore Metropolitan Transport Corporation (BMTC), 10 depots were chosen by simple random sampling. A cross-sectional descriptive study was done among all the workers of the randomly selected depots of BMTC in Bangalore city from October 2014 to June 2016. Based on a previous study done by Satheesh B.C. et al⁷ the sample size was calculated as 600.

Probability proportional to size (PPS) sampling procedure was used to attain the desired study sample size.. The number of workers to be included in the study from each of these 10 depots was calculated using the formula,

$$N_1 = \frac{\text{Population in each depot}}{\text{Total population}} \times \text{Sample size}$$

Permission from the human resources development (HRD) department of the Bangalore Metropolitan Transport Corporation (BMTC) was sought before taking up this study. The study protocol was approved in the Institutional Ethics Committee of Bangalore Medical College & Research Institute for ethical clearance. A pilot study was done first in one depot, before starting the actual study. Informed consent for the study was obtained from the study participants (Drivers, Conductors & Mechanics) who were not disturbed in their duty hours.

Inclusion criteria for the workers to participate in the study were age above 30 years and a minimum of 5 years work experience at BMTC. A pre-tested, semi-structured and self-administered questionnaire was used to collect the data. The questionnaire was divided in three parts. **Part I** included the information on socio demographic variables; **Part II** had information on risk factors and **Part III** included the information on physical examination and blood pressure recording of the study subjects. A standard calibrated mercury sphygmomanometer, a standard measuring tape, a standard weighing scale calibrated to zero were used for data collection.

Data was entered in an MS Excel sheet and analyzed by SPSS version 23. Descriptive statistical analysis, which included frequency, mean, standard deviation and percentages, was used to characterize the data.

RESULTS

Out of the total 600 workers who participated in the study, 538 were males and only 62 were females. Following the JNC 7 definition of hypertension, the prevalence rate of hypertension was 34.7% in this study. More than two-third of the study participants were in the age group of 30 to 39 years and those workers aged 40 to 44 years constituted the least. Significant association was found between age of the workers and hypertension. (Table 1) Nearly equal participation of all types of workers such as drivers cum conductors (26%), drivers (27%), conductors (25%) and mechanics (22%) was seen. There was no significant

association between hypertension and designation of the workers in this study. (Table 1)

Table 1: Distribution of study population according to blood pressure and its related factors

Parameter	Hypertensive No (%)	Normotensive No (%)	Significance
Age of the worker			
30 - 34 years	44 (18.6%)	192 (81.4%)	$\chi^2 = 51.176$ p = < 0.05
35 - 39 years	72 (41.9%)	100 (58.1%)	
40 - 44 years	51 (56.6%)	39 (43.3%)	
≥ 45 years	41 (40.1%)	61 (59.8%)	
Designation			
Driver cum Conductor	60 (38.5%)	96 (61.5%)	$\chi^2 = 4.504$ p = > 0.05
Driver	56 (35%)	104 (65%)	
Conductor	56 (36.8%)	96 (63.2%)	p = > 0.05
Mechanic	36 (27.3%)	96 (72.7%)	
Years of Service			
5 - 9 years	84 (26.3%)	236 (73.8%)	$\chi^2 = 29.768$ p = < 0.05
10 - 14 years	64(43.2%)	84 (56.8%)	
15 - 19 years	16 (30.8%)	36 (69.2%)	
≥ 20 years	44 (55%)	36 (45%)	
Education			
Primary/Middle school	--	--	$\chi^2 = 0.114$ p = > 0.05
High school	68 (34.7%)	128 (65.3%)	
Intermediate school	77 (38.3%)	124 (61.6%)	
Diploma	27 (28.4%)	68 (71.5%)	
Graduate	36 (33.3%)	72 (66.7%)	
Socio-economic status			
Upper	3 (42.8%)	4 (57.1%)	$\chi^2 = 26.116$ p = > 0.05
Upper Middle	172 (40.8%)	249 (59.1%)	
Lower Middle	19 (13.2%)	124 (86.1%)	
Upper Lower	11 (55%)	9 (45%)	
Lower	3 (33.3%)	6 (66.6%)	
Smoking Habit			
Smoker	80 (58.8%)	56 (41.2%)	$\chi^2 = 45.311$ p = < 0.05
Non-Smoker	107 (25.4%)	313 (74.5%)	
Ex-Smoker	21 (47.7%)	23 (52.2%)	
Duration of Smoking			
≤ 5 years	4 (20%)	16 (80%)	$\chi^2 = 79.149$ p = < 0.05
6 - 10 years	40 (55.5%)	32 (42.1%)	
11 - 15 years	12 (75%)	4 (25%)	
16 - 20 years	8 (66.7%)	4 (25%)	
≥ 20 years	16 (100%)	--	

Table 2: Distribution of study population according to factors affecting blood pressure

Parameter	Hypertensive No (%)	Normotensive No (%)	Significance
Alcohol Consumption			
Non-user	82 (22.5%)	282 (77.4%)	$\chi^2 = 55.236$
Moderate user	98 (52.4%)	89 (47.5%)	p = < 0.05
Heavy user	28 (59.1%)	21 (42.8%)	
Duration of Drinking			
≤ 5 years	48 (48%)	52 (52%)	$\chi^2 = 48.014$
6 - 10 years	38 (52.7%)	32 (44.4%)	p = < 0.05
11 - 15 years	20 (62.5%)	14 (43.7%)	
16 - 20 years	16 (66.7%)	8 (33.3%)	
≥ 20 years	4 (50%)	4 (50%)	
Physical Activity			
Present	44 (29.7%)	104 (70.3%)	$\chi^2 = 2.114$
Absent	164 (36.3%)	288 (63.7%)	p = > 0.05
Type of Diet			
Vegetarian	21 (32.3%)	44 (64.7%)	$\chi^2 = 2.471$
Mixed	187 (34.9%)	348 (65.4%)	p = > 0.05
Salt rich food consumption			
Consumed	80 (37.7%)	132 (62.3%)	$\chi^2 = 3.306$
Not consumed	128 (32.9%)	260 (67%)	p = > 0.05
BMI			
Under weight	5 (31.3%)	11 (68.8%)	$\chi^2 = 50.142$
Normal	110 (34%)	214 (66%)	p = < 0.05
Over weight	79 (33.5%)	157 (66.5%)	
Obese	14 (58.3%)	10 (41.7%)	

developing hypertension than those employed for 5 to 9 years. In this study, there was no significant association between prevalence of hypertension and the level of education and the socio-economic status of the workers. (Table 1)

Among all, 70% of the study participants were non smokers and 22.7% were current smokers. 7.3% of them claimed that they had quit smoking. There was significant association between tobacco use and hypertension in this study (p<0.05). The odds for hypertension among current smokers were 4 times more than those for non-smokers. (Figure 1) About 60% of the study participants did not use alcohol ever while 31.2% were moderate users and 8.1% of them were heavy users of alcohol. Alcohol intake had a significant association with hypertension in this study (p<0.05). The odds of hypertension among those who were heavy users was 4.5 times more than those who were non-users. (Table 2)

Though the prevalence of hypertension was more (36.3%) among those who did no physical exercise at their leisure time than those who did some form of physical exercise (29.7%), there was no significant association (p>0.05). The prevalence of hypertension was more among those who consumed salt rich food (37.7%) than those who did not consume (32.9%). Still, there was no significant association (p>0.05) between hypertension and salt rich food intake in this study. (Table 2) In the present study 58.3% obese study participants had hypertension when compared to 34% of those who had normal BMI. As the BMI of the study participants increased, the prevalence of hypertension too increased in this study. The odds of hypertension among the obese was 2.7 times more than those with normal BMI. (Table 2)

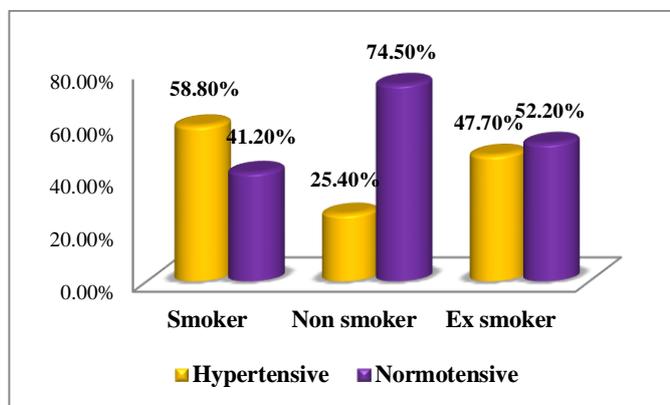
DISCUSSION

The prevalence rate of HTN in our study was found to be 34.7% The reason for such high prevalence could be attributed to the increased substance abuse seen among the workers, with 23% of them smokers and 40% consuming alcohol. Also 3/4th of study participants lacked adequate physical exercise and 65% of them were found to consume salt rich food on a daily basis.

The prevalence of HTN was comparable to a similar study done by Madhumita et al in North Karnataka wherein the overall prevalence rate of hypertension was 37.6%.⁸ A similar study conducted by Arjun Lakshman et al in North Kerala showed the prevalence rate of hypertension to be 41.3% among bus drivers.⁹ Similar to our study, Mohan V et al showed that 80% of the hypertensives were aged 50 years or more in their Chennai Urban Rural Epidemiological Study (CURES)¹⁰ and Chandwani et al in Gujarat found significant correlation of blood pressure with increasing age groups.¹¹

In the present study significant association was found between tobacco smoking and hypertension. Das SK et al

Figure 1: Distribution of the study population according to Blood Pressure & Tobacco Smoking



In this study, the highest prevalence of hypertension was seen in those who had more than 20 years of service (55%) followed by those with 10 to 14 years of service (43.2%). A significant association between hypertension and years of service was found in this study (p<0.05). The workers employed more than 20 years have 3.4 times more risk of

have found in their study done among adults in West Bengal, that the prevalence was higher among tobacco smokers (85.4%) than those who do not smoke (53.3%).⁴ A study done by Madhumita et al in 2012 in North Karnataka had concluded that 51.5% of smokers had hypertension as opposed to 27.6% among non-smokers.⁸ Alcohol intake had a significant association with hypertension in this study, which is similar to a study done by Chandwani H et al in Gujarat.¹¹

There was no significant association between physical activity and hypertension in this study, whereas, Midha T et al¹² and Sharma AK et al¹³ concluded in their study that physically inactive persons were at a higher risk of developing hypertension as compared to persons who had regular physical activity. Unlike our study, Bhadoria et al have found in their study done in Central India that 37.6% of those who have excess salt intake had hypertension as opposed to 21.4% of those who consume less salt.¹⁴ In the present study a significant association was found between hypertension and BMI which is similar to many epidemiology studies on hypertension. In a study done by Gupta R et al, it was found that prevalence of hypertension increased significantly with increasing body mass index.¹⁵

CONCLUSION: Transport personnel are at higher risk of developing HTN due to the nature of their profession. The related impacts are not only harmful to their health but also may endanger the safety of the people using these public transport systems. As quite a proportion of the study participants are suffering from hypertension, it is imperative to focus on high risk screening for early diagnosis and prompt treatment to avoid grave complications of hypertension. This could be made mandatory to all the workers, especially those aged more than 40 years.

RECOMMENDATIONS: An education programme has to be conducted to raise the awareness among the workers regarding risk factors, complications of hypertension, its prevention and control, focusing more on modifiable risk factors. The finding that a large proportion of workers were smoking tobacco and consuming alcohol and its significant association with hypertension is a cause of serious concern. Medical and administrative authorities must educate the people about the risks associated with such habits and motivate them to avoid such habits.

Legislation should be passed by the government of India for banning tobacco products and alcohol as these are highly prevalent risk factors of hypertension. Obesity and extra salt intake are important risk factors for developing hypertension; hence the government should make it mandatory for all processed food products to display the amount of calories, cholesterol and salt present in them.

LIMITATIONS:

Few of the variables analyzed in the present study were based on the information given by the study participants.

Hence an element of unavoidable recall bias could be present in the study. In the present study, only selected risk factors of hypertension have been studied and all risk factors could not be studied because of lack of resources.

The blood pressure of the study participants were measured over a single period of time. So we cannot say whether the person had persistent hypertension. Secondary causes of hypertension could not be ruled out, which usually requires extensive radiological and biochemical investigations.

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