



Behavioral And Psychosocial Risk Factors for Hypertension Among Bus Drivers and Conductors in Karnataka

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ABSTRACT

Background: Hypertension being a disease of occupational origin, its prevalence is found to be high among those who work in few selected occupational groups. Road transport professionals are one such group and due to their work needs, they tend to adapt to the lifestyle which make them more vulnerable in developing such diseases on long run.

Objective: To identify behavioural and psychosocial risk factors for hypertension among bus drivers and conductors of NEKRTC, Raichur division.

Methods: A community based cross sectional study was carried out in two NEKRTC depots of Raichur division, Raichur. A total of 360 bus drivers and 338 conductors were interviewed. Data collection was done by interviewing bus drivers and conductors and by physical examination and analyzed using percentages and chi square test.

Results: The risk factors found to be significantly associated with hypertension in bus drivers and conductors were tobacco smoking, use of smokeless tobacco, alcohol consumption, duration of service, Body Mass Index and Waist Hip Ratio.

Conclusion and recommendations: Considering association of hypertension with various risk factors in bus drivers and conductors, preventive measures like lifestyle modifications and regular high risk screening program for early diagnosis needs to be promoted in them.

Key words: Hypertension, Risk factors, NEKRTC, Bus drivers, Bus conductors

INTRODUCTION

Hypertension is an "Iceberg disease" contributing to a huge extent to the present burden of cardiovascular disease epidemic worldwide. In India, hypertension is the leading NCD risk and estimated to be attributable for nearly 10% of all deaths.¹ According to WHO, the age-standardized prevalence of raised blood pressure in adults aged 18 years and over in India in 2014 was 23% with 25.9% in males and 24.8% in females.²

It remains silent, being generally asymptomatic, during most of its clinical course and does immense harm to the body in the form of "target organ" (end organ) damage, hence termed as "silent killer".³ Hypertension is an important and independent risk factor for coronary heart disease, heart failure, stroke, peripheral arterial disease, and renal failure in both men and women. It is responsible for at least 45% of deaths due to heart disease and 51% of deaths due to stroke worldwide⁴ and 57% of all stroke deaths and 24% of all coronary heart disease deaths in India.⁵

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Health has always been closely linked with occupation. The work environment and the nature of job contribute significantly in the causation of diseases. Road transport sector has varied number of occupational groups. Among these groups, the one carrying out the most stressful work are bus drivers and conductors. Though considerable progress has been made in recent years in improving health and safety at work, but for road transport personnel, whose work does not take place in a fixed location, there has been deterioration in work conditions over the last 20 years. This deterioration is largely the result of work-related factors like traffic congestion, air and noise pollution, exposure to vibration, long working hours with pressure of driving safe, managing a tight schedule in dense traffic, shift wise work, lack of scheduled breaks and also handling conflicts with passengers, which adds to the stress and strain of the job. These circumstances damage their physiological and psychological health in a way that is unacceptable.^{6,7}

Many studies⁸⁻¹⁰ have demonstrated that there exists a strong correlation between driving profession and risk of cardiovascular diseases like Myocardial Infarction and Stroke. Hypertension being a major and important underlying risk factor for cardiovascular diseases is thus of special importance in context of bus drivers and conductors. Apart from work related risk factors, health issues in these occupational groups are also partly attributed to their lifestyle that is not conducive to good health. Because of the nature of their profession, bus drivers and conductors are more likely to adopt harmful lifestyle like unhealthy diet, lack of physical activity with higher incidence of addictive habits like smoking, alcohol consumption etc which act as risk factors for development of various diseases subsequently in these occupational group compared to other group of workers.

Not many studies have been carried out in this context in India. Thus, this study was undertaken to determine the behavioural and psychosocial risk factors for hypertension among bus drivers and conductors working in NEKRTC region.

METHODOLOGY

This was a Cross-sectional study conducted in the two bus depots of Raichur Division, located in Raichur for a period of one year from January 2015 to December 2015. All the bus drivers of two NEKRTC bus depots of Raichur division including those who were previously diagnosed with hypertension were considered for the study. Total number of bus drivers and conductors working under NEKRTC during the study period were 711. Out of total 711, 13 were not willing to participate in the study hence a total of 698 participants were interviewed comprising of 360 bus drivers and 338 conductors.

Permission from the Division Controller of Raichur District and approval from Ethical committee of Raichur Institute of Medical Sciences, Raichur was obtained before the start of the study. Two meetings with bus drivers and conductors, one in each bus depot, in the presence of depot manager were conducted to explain the details of the study to them and to encourage them to participate in the study. Those already diagnosed with hypertension were asked to bring their previous health records at the time of interview. Two visits in a week were scheduled to interview all the bus drivers and conductors within the study period.

Interview using pre-tested semi structured questionnaire followed by physical examination was undertaken to collect the data. The questionnaire used was pretested and validated with a pilot study comprising of 30 bus drivers. It consisted of three sections, Section I - information on socio demographic variables, Section II - information on risk factors for hypertension and Section III - a record of the parameters obtained/ assessed during physical examination.

Operational definitions:

Tobacco smoking:^{11,12}

Non-Smoker has been defined as 'A person who never smoked cigarettes or any tobacco products in the lifetime'. Ex-Smoker has been defined as 'A person who quit smoking at least one year before the study'. Current Smoker has been defined as 'A person who smoked at any time either daily or occasionally during past one year'.

The current smokers were asked regarding the details of smoking habits like duration of smoking, type of tobacco product used for smoking.^{12,13} Based on average number of cigarette and beedi smoked per day¹⁴, they were grouped as Light smoker (≤ 5 cigarettes/beedi per day), Moderate smoker (6 - 20 cigarettes/beedi per day) and Heavy smoker (> 20 cigarettes/beedi per day).

Consumption of Smokeless tobacco (viz chewing):^{12,13} Non user has been defined as 'A person who never used smokeless tobacco in the life time'. Ex user has been defined as 'A person who quit using smokeless tobacco at least one year before the study'. Current tobacco user has been defined as 'A person who is using smokeless tobacco at present'.

Current tobacco users were asked about the total duration of smokeless tobacco use and the form in which they used them.¹³

Alcohol consumption:^{12,13} Non user has been defined as 'A person who has never consumed alcohol'. Ex (Former) user has been defined as 'A person who used to consume alcohol before but not since past one year'. Current user has been defined as 'A person who consumed alcohol at any time during past one year'.

Current users were enquired in detail regarding type of alcohol used, duration of alcohol use and number of times they consume alcoholic drinks in a week.^{12,13} Based on the frequency of alcohol consumption¹¹, they were grouped as Regular users who Consumes alcohol for ≥ 3 days in a week and Occasional users who Consumes alcohol for < 3 days in a week.

Physical activity: Regular exercise¹⁵ has been defined as 'Engage in regular aerobic physical activity such as brisk walking at least 30 min/day, at least 5 days/week'. Some exercise has been defined as 'Engage in regular aerobic physical activity such as brisk walking only on some days of the week'. No exercise has been defined as 'Does not engage in aerobic physical activity at all'.

Diet: Study subjects were classified in to vegetarian and mixed (Vegetarian + non-vegetarian) according to their food habits.

Blood Pressure (BP) was recorded using a mercury sphygmomanometer by Palpatory and Auscultatory method. Two BP readings were recorded 5 minutes apart in the sitting position and the mean of two BP measurements was taken for analysis. Hypertension is defined as SBP more than or equal to 140 mmHg

or DBP more than or equal to 90 mmHg. Those individuals already diagnosed as hypertensive were also labelled as hypertensive¹⁵.

Data was analyzed and presented in frequency tables and graphs using Microsoft word and Excel. Chi-square test was applied to test statistical significance wherever necessary. Significance is assessed at 5% level of significance and p-value of <0.05 was considered to be statistically significant. SPSS 16.0 statistical software was used for analysis.

RESULTS

Majority of study subjects were found in the age group of 31 to 40 years (35.8%) drivers and (36.1%) conductors. About 48.3% of bus drivers belonged to class III and 47% of conductors belonged to class II Socioeconomic class.

Table 1: Prevalence of hypertension among study subjects (n=698)

Occupation	Total	Hypertensives (%)
Bus driver	360	91 (25.3)
Bus conductor	338	67 (19.8)

Table no 2: Table showing association of addictive habits with hypertension among bus drivers and conductors of NEKRTC region

Study group	Drivers		OR (95% CI)	P value	Conductors		OR (95% CI)	P value
	HTN (N=91)	Non-HTN (N=269)			HTN (n=67)	Non-HTN (n=271)		
Smoking status								
Current smokers	35(37.6)	58(62.4)	2.5 (1.46-4.25)	0.003	23(28)	59(72)	2.07(1.14-3.77)	0.033
Ex-smokers	12(29.3)	29(70.7)	1.71(0.81-3.62)		8(27.6)	21(72.4)	2.02(0.83-4.92)	
Non smoker	44(19.5)	182(80.5)	Ref		36(15.9)	191(84.1)	Ref	
Duration of smoking (in years) among current smokers*								
≤ 5	2(8.3)	22(91.7)	Ref	0.001	1(5.9)	16(94.1)	Ref	0.003
6-10	3(25)	9(75)	3.67 (0.52-25.77)		3(13.6)	19(86.4)	2.53 (0.24-26.73)	
>10	30(52.6)	27(47.4)	12.22 (2.63-56.9)		19(44.2)	24(55.8)	12.67 (1.54-104.3)	
Frequency of smoking/ day among current users*								
Light	11(24.4)	34(75.6)	Ref	0.037	13(27.7)	34(72.3)	Ref	0.978
Moderate	19(48.7)	20(51.3)	2.94 (1.16-7.41)		9(28.1)	23(71.9)	1.02 (0.38-2.79)	
Heavy	5(55.6)	4(44.4)	3.86 (0.88-16.98)		1(33.3)	2(66.7)	1.31 (0.11-15.68)	
Smokeless tobacco consumption								
Current user	50(31.8)	107(68.2)	1.98 (1.2-3.25)	0.024	31(29)	76(71)	2.32(1.32-4.07)	0.011
Ex user	6(30)	14(70)	1.81 (0.65-5.05)		4(23.5)	13(76.5)	1.75 (0.54-5.71)	
Non user	35(19.1)	148(80.9)	Ref		32(15)	182(85)	Ref	
Duration of smokeless tobacco use (In years) among current users**								
≤ 5	15(22.4)	52(77.6)	Ref	0.016	12(23.1)	40(76.9)	Ref	0.260
6-10	13(29.5)	31(70.5)	1.45 (0.61-3.46)		8(28.6)	20(71.4)	1.33 (0.47-3.78)	
>10	22(47.8)	24(52.2)	3.18 (1.41-7.18)		11(40.7)	16(59.3)	2.29 (0.84-6.25)	
Alcohol consumption								
Current user	46(33.8)	90(66.2)	2.44 (1.46-4.07)	0.001	37(29.8)	87(70.2)	2.78 (1.56-4.95)	0.002
Ex user	11(39.3)	17(60.7)	3.08 (1.33-7.17)		6(18.2)	27(81.8)	1.45 (0.54-3.89)	
Non user	34(17.3)	162(82.7)	Ref		24(13.3)	157(86.7)	Ref	
Duration of alcohol use (In years) among current users***								
≤ 5	6(13)	40(87)	Ref	<0.001	7(13.5)	45(86.5)	Ref	0.003
6-10	13(29.5)	31(70.5)	2.8 (0.95- 8.19)		17(40.5)	25(59.5)	4.37 (1.6-11.96)	
>10	27(58.7)	19(41.3)	9.47(3.35-26.79)		13(43.3)	17(56.7)	4.92 (1.68-14.4)	
Frequency of alcohol use in a week among current users***								
Regular	20(60.6)	13(39.4)	4.56 (1.99-10.43)	<0.001	13(56.5)	10(43.5)	4.17 (1.62-10.71)	0.002
Occasional	26(25.2)	77(74.8)	Ref		24(23.8)	77(76.2)	Ref	

Figures in parenthesis indicate percentages if not specified otherwise; *Current smokers: n= 35 in Drivers; n= 23 in conductors

Current smokeless tobacco users: n= 50 in drivers; n=31 in conductors; *Current alcohol users: n= 46 in drivers; n= 37 in conductors

Table 3: Table showing association of hypertension with duration of service in bus drivers and conductors of NEKRTC region

Duration of service (in years)	Drivers		OR (95% CI)	Conductors		OR (95% CI)
	HTN (%)	Non-HTN (%)		HTN (%)	Non-HTN (%)	
≤10	12(8.1)	136(91.9)	Ref	9(7)	119(93)	Ref
11-20	31(29)	76(71)	4.62 (2.24-9.53)	25(24)	79(76)	4.18 (1.86-9.44)
21-30	42(43.7)	54(56.3)	8.81 (4.31-18.02)	28(29.5)	67(70.5)	5.53 (2.46-12.4)
31-40	6(66.7)	3(33.3)	22.67 (5.03- 102.23)	5(45.5)	6(54.5)	11.02 (2.81-43.22)
Total	91(25.3)	269(74.7)		67(19.8)	271(80.2)	

For both, Drivers and Conductors, P value <0.001, Statistically significant

Table 4: Table showing association of certain other behavioural risk factors and hypertension among bus drivers and conductors of NEKRTC region

Study group	Drivers		OR (95% CI)	P value	Conductors		OR (95% CI)	P value
	HTN	Non-HTN			HTN	Non-HTN		
Total	91(25.3)	269(74.7)			67(19.8)	271(80.2)		
Physical activity								
Regular exercise	8(40)	12(60)	2.13 (0.84-5.41)	0.235	12(35.3)	22(64.7)	1.65 (0.78-3.5)	0.053
Some exercise	11(28.9)	27(71.1)	1.3 (0.62-2.75)		8(20.5)	31(79.5)	0.78 (0.34-1.78)	
No exercise	72(23.8)	230(76.2)	Ref		47(17.7)	218(82.3)	Ref	
Type of diet								
Mixed	84(26.5)	233(73.5)	1.85 (0.79-4.33)	0.148	57(20.7)	218(79.3)	1.39 (0.66-2.89)	0.383
Vegetarian	7(16.3)	36(83.7)	Ref		10(15.9)	53(84.1)	Ref	
BMI (Kg/m²)								
Underweight	2(10)	18(90)	0.66 (0.14-3.07)	<0.001	1(5.9)	16(94.1)	0.59 (0.07-4.88)	<0.001
Normal weight	20(14.4)	119(85.6)	Ref		12(9.5)	114(90.5)	Ref	
Overweight/ pre obese	33(27.3)	88(72.7)	2.23 (1.2-4.15)		37(26.2)	104(73.8)	3.38 (1.67-6.83)	
Obese	36(45)	44(55)	4.87 (2.55-9.3)		17(31.5)	37(68.5)	4.36 (1.91-9.98)	
Waist Hip Ratio								
Normal	8(9.3)	78(90.7)	Ref	<0.001	4(4.3)	88(95.7)	Ref	<0.001
Increased	83(30.3)	191(69.7)	4.24 (1.96-9.17)		63(25.6)	183(74.4)	7.57 (2.67-21.47)	

Figures in parenthesis indicate percentages if not specified otherwise.

Majority of drivers and conductors were non-smokers, more than half of them were non users of smokeless tobacco and alcohol. About two third of them were non exercisers and consumed mixed diet. (Table 2)

Prevalence of hypertension in bus drivers and conductors was higher among current smokers who smoked heavily and for longer duration of more than 10 years and also in current smokeless tobacco users who consumed it for more than 10 years.

Pertaining to alcohol consumption, hypertensives were more in ex users in bus drivers while in current users in conductors, however those who consumed alcohol for duration of 10 years or more and on regular basis showed higher prevalence compared to other groups. Proportion of hypertensives was high among those doing regular exercise and also in those consuming mixed diet. The observed association however was not statistically significant.

In the present study, majority of drivers (38.6%) had normal weight while majority of conductors (41.7%) were overweight and nearly two third had increased Waist Hip Ratio. Higher BMI and WHR were significantly associated with hypertension in both the groups. (Table 4)

In majority, 41.1% of drivers and 37.9% of conductors had worked in the department up to 10 years. The proportion of hypertension was least (8.1%) among drivers who have worked for 10 years or less compared to 66.7% among those who's with 31 to 40 years duration of service in department. Similarly in conductors, prevalence was least (7%) among those working for 10 years or less compared to 45.5% among conductors working for 31 to 40 years. The observed difference was found to be statistically significant. (Table 3)

DISCUSSION

The observed prevalence of hypertension in bus drivers and conductors was 25.3% and 19.8% respectively. The hypertension prevalence was almost comparable to general population², however if we consider the age distribution of the study population, majority were under the age of 40 years (57.5% drivers and 58.9% conductors) who have worked for very less duration in the department which might have influenced the outcome resulting in underestimation.

The prevalence of hypertension is 2.5 times more likely among current smokers in drivers and 2.07 times among current smokers in conductors com-

pared to non-smokers. The study results indicate that the risk of hypertension is strongly associated with smoking habit in any form and also with increasing duration of its consumption. Prolonged exposure is known to initiate changes in blood vessels leading to hypertension in long run. The Prevalence of Hypertension was higher among ex users compared to non-users explaining the fact that smoking even for a short period in a lifetime makes that individual more prone to develop hypertension than his non-smoking counterparts. Borle and Jadhao¹⁶ and Lakshman et al¹¹ reported similar findings of significant association between tobacco use (smoking and smokeless tobacco) and hypertension prevalence among drivers. Hypertension prevalence increased with increasing duration of exposure. 85.9% of drivers who were smoking for more than 20 years had developed hypertension in a study conducted by Udayar et al¹⁷

Among drivers in our study, hypertension cases were highest among ex users of alcohol (39.3%; OR 3.08 and CI 1.33-7.17) followed by current users (33.8%; OR 2.44 and CI 1.46-4.07) and least among non-users (17.3%). This might be because most of the current alcohol users in drivers belonged to younger age group who might have started consuming alcohol lately and few of the current users might have stopped consuming alcohol after being diagnosed with hypertension. Among conductors, current users had higher proportion of hypertensive (29.8%), compared to non-users (13.3%). Similarly, more than half of the current users were hypertensives compared to 26% in non-users in a study by Rao et al¹⁸.

The prevalence of hypertension increased with the duration and frequency of alcohol use. Consistent to these findings, Lakshman et al¹¹ also reported that 58.8% among current alcohol users who consumed alcohol for most of the days in a week had hypertension compared to 39.5% among those who consumed alcohol occasionally. But the results were statistically insignificant.

Regular exercise is known to have a favourable effect on many of the established risk factors for cardiovascular disease. Studies by Erhiano et al¹⁹ and Chen et al²⁰, though found higher prevalence of hypertension among those who were physically inactive compared to physically active study subjects, the association observed was not statistically significant.

However, in our study, negative association was found between physical activity and hypertension. Further on subgroup analysis of our study, it was found that among study participants doing regular/some exercise, majority were already known cases of hypertension and they were doing regular/some exercise probably on advice after being diagnosed as hypertensive, thus the observed inverse association between physical activity and hypertension could be probably due to including these known hypertensive cases in our study.

There was positive association between hypertension and duration of service in the department. Drivers and conductors working for more than 30 years had 22.67- and 11.02-times higher risk of having hypertension than those working for less than 10 years and one of the major factors explaining this association is the job stress which increases as the duration of service in the department increases, thus affecting the health of bus drivers and conductors. Similar findings were reported in other studies by Joshi et al²¹ and Joshi et al²².

Higher BMI and WHR reported higher prevalence of Hypertension in study subjects ($P < 0.001$).

Similar findings were reported by Udayar et al (2015)²³. One important mechanism explaining association of hypertension and obesity is a hormone leptin, a derivative of fat tissue which is known to activate sympathetic nervous system thus acting as an underlying risk factor for development of hypertension²⁴.

LIMITATIONS

Few risk factors were assessed in a subjective manner based on self-reporting; therefore, their accuracy may be less than expected. Hence there are chances of having recall bias. Studies done in bus conductors are limited thus single study was used for discussion and making inferences.

CONCLUSION AND RECOMMENDATIONS

The risk factors found to be significantly associated with hypertension in bus drivers and conductors were tobacco smoking, use of smokeless tobacco, alcohol consumption, longer duration of service, higher Body Mass Index and increased Waist Hip Ratio. There is need for regular high risk screening program, lifestyle modifications like cessation of tobacco use and alcohol consumption, weight reduction, practicing yoga and meditation for stress management should be promoted.

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