



PREVALENCE AND ASSOCIATED FACTORS OF HYPERTENSION AMONG OCCUPATIONAL BUS DRIVERS IN NAGPUR CITY, CENTRAL INDIA- A CROSS SECTIONAL STUDY

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ABSTRACT

Introduction: This study was done to study the prevalence of hypertension and factors related to it among bus drivers working in four bus depots of Maharashtra State Road Transport Corporation (M.S.R.T.C.), of Nagpur City in Central India.

Method: Present cross-sectional study was carried out among bus drivers of MSRTC bus depots of Nagpur city. The data was collected with the help of interview method using structured questionnaire. History taking included personal details, occupational history, socio-demographic details, family history, presenting complaints, past history, duration of driving (hrs.), and daily average driving (km).

Results: Prevalence of hypertension was found to be 34.8%. Hypertension was significantly associated with various socio-demographic characteristics like age, socio-economic status, education, family h/o hypertension, BMI and certain occupational characteristics like duration of service, daily average driving, duration of driving per week.

Conclusion: Prevalence of hypertension was high among bus drivers. Study emphasize the need for the periodic screening and regular follow up of drivers for diagnosis and maintaining the compliance with the treatment. Also there is need for targeted educational interventions and lifestyle modifications among bus drivers.

Key words: Bus Drivers, Hypertension, prevalence, risk factors

INTRODUCTION

Cardiovascular diseases claims nearly one third of deaths worldwide. In India prevalence of cardiovascular diseases is increasing and is predicted to be major cause of morbidity and mortality by 2020.¹ India prevalence of hypertension varies from 17% to 21% in all states with marginal rural – urban differences.² Also it is documented that even in developed countries only about half of the

hypertensive subjects are aware of condition which emphasizes importance of screening.³

Bus drivers are known to be at higher risk for development of hypertension.^{4,5,6} Driving involves many risk factors such as prolonged sitting, reduced rest breaks, competing time demands, traffic congestion, and rotating duty patterns etc.⁷ The health impact of hypertension not only affects drivers themselves but also large population that depends on them for safety and interacting daily

with the system. Screening of hypertension at regular intervals will enable us to identify the risk factors early, to control them and institute necessary treatment and intervention.

With this background, present study was carried out with the objective to study the prevalence of hypertension and some factors related to it among bus drivers working in four bus depots of Maharashtra State Road Transport Corporation (M.S.R.T.C.), in Nagpur City, Central India.

METHOD

This was a cross sectional study carried out in four bus depots of M.S.R.T.C. in Nagpur city in central India. The study was conducted during period of one year between March 2010 and March 2011. Study population included all bus drivers working in M.S.R.T.C. in four bus depots of the Nagpur city. It was decided to include only those bus drivers in study who were working for more than one year. There were 587 workers on roll, as on 1st March 2010 and all were working for more than one year. So, all 587 bus drivers working with MSRTC in the city were included in the study.

Ethical clearance was obtained from Institutional Ethics Committee at Govt. Medical College, Nagpur. Study subjects were assured regarding the confidentiality. Before the personal interview objective of the study was explained to participants and informed consent was taken.

All bus drivers were enlisted with the help of depot managers of respective bus depots. A time schedule was prepared for the study participants, so that they could participate in the study conveniently without disturbing their duty pattern. It was decided to collect the data from study subject before going to duty.

The pilot study was carried out in the month of Feb. 2010 among 100 study participants with pre-designed questionnaire to check the feasibility and to test the questionnaire, necessary changes in questionnaire were made after pilot study.

Data was collected with the help of interview technique followed by clinical examination and necessary investigations. History taking included personal details, occupational history, socio-demographic details, family history, presenting complaints, and past history. Further required investigations and expert opinion was sought at Government Medical College, Nagpur.

Information about duration of driving (hours (hrs.)), daily average driving (km), and total salary including all allowances was gathered from the records maintained with respective depot managers. Hypertension (HTN) was defined as systolic blood pressure (BP) of ≥ 140 mmHg and/or diastolic BP of ≥ 90 mmHg or current pharmacological treatment for HTN. A study subject was called "aware" if he was already diagnosed as hypertensive by medical practitioner. And was considered on "Regular treatment" if he was using prescribed medication for hypertension as per prescription regularly.⁸

Blood pressure was measured using manual mercury sphygmomanometer. The study subject was asked to sit comfortably with legs uncrossed for 15 minutes. Two readings of blood pressure were taken 15 minutes apart. Average of the two readings was noted as blood pressure of study subject. Those study subjects having blood pressure in pre-hypertensive and hypertensive range were called again after a week and another set of readings was taken. The lower reading among these two visits was taken as blood pressure of study subject.⁸

The weight was measured to nearest 0.1kg using SICCA electronic weighing scale and height was measured using board type SICCA scale nearest to 0.1 cm.

Data was analyzed using Statistical Package for Social Sciences (SPSS) version 16 and Microsoft Excel. Descriptive statistics used was mean, standard deviation, percentage. Chi-square test and chi-square for linear trend was used for inferential statistics

RESULTS

Table 1: Socio-demographic characteristics of study subjects (n = 581)

Variable	Mean \pm SD	Range
Age (Years)	46.9 \pm 6.69	28-57
BMI (Kg/m ²)	25.01 \pm 3.7	15.9-37.0
Duration of service (Years)	24.47 \pm 7.4	03-38
Avg. driving (Hrs/wk)	54.86 \pm 8.08	30-72
Daily avg. driving (km)	235.16 \pm 50.22	73-346
Systolic BP	132.8 \pm 15.9	96 - 190
Diastolic BP	81 \pm 9.66	56 - 118

Total 581 out of 587 study subjects were included in analysis. Six study subjects who were absent throughout the month of data collection at a respective bus depots were excluded from analysis. All the study subjects were males. Socio-demographic characteristics of the study subjects were shown in table 1.

Mean age of study subjects was 46.9 ± 6.7 years (range 28-57). Most study subjects were Hindu by

religion i.e. 348 (59.9%), followed by 135(23.2%) Muslims. Among 581 study subjects, 556 (95.6%) drivers were married. In M.S.R.T.C. minimum education required for bus drivers was 8th standard. In this study majority of study subjects, 480(82.6%) were educated up to 10th standard, 84(14.5%) had done 12th and only 17 (2.9%) drivers were graduate.

Table 2: Association of Sociodemographic and occupational characteristics with Hypertension (n = 581)

Variable	Hypertension		Total	OR (95% CI)	X ²	p value
	Present (%)	Absent (%)				
Education						
>10	28 (27.72)	73 (72.28)	101	1	2.31	0.13
≤ 10th	174 (36.25)	306 (63.75)	480	1.48 (0.92 - 2.38)		
SES						
Lower	177 (38.06)	288 (61.94)	465	1	10.44	0.001
Middle & Upper	25 (21.55)	91 (78.45)	116	0.45 (0.28 - 0.72)		
Marital Status						
unmarried/single/divorced	11 (40.74)	16 (59.26)	27	1	0.21	0.65
Married	191 (1.00)	363 (65.52)	554	0.77 (0.35 - 1.68)		
Age						
≤35	2 (4.44)	43 (95.56)	45	1	18.35	<0.001
>35	200 (37.31)	336 (62.69)	536	12.8 (3.07 - 53.4)		
BMI						
< 25 kg/m ²	62 (18.79)	268 (81.21)	330	1.00	86.01	0.001
≥ 25 kg/m ²	140 (55.78)	111 (44.22)	251	5.45 (3.76 - 7.91)		
Family H/o HT						
absent	153 (32.28)	321 (67.72)	474	1	6.44	0.01
present	49 (45.79)	58 (54.21)	107	1.77 (1.16 - 2.71)		
Smoking						
Absent	69 (26.04)	196 (73.96)	265	1	16.37	<0.001
present	133 (42.09)	183 (57.91)	316	2.06 (1.45 - 2.94)		
Consumption of Smokeless tobacco						
Absent	30 (23.62)	97 (76.38)	127	1.00	8.9	0.002
present	172 (37.89)	282 (62.11)	454	1.97 (1.26 - 3.1)		
Alcohol consumption						
Absent	64 (30.62)	145 (69.38)	209	1.00	2.47	0.115
present	138 (37.10)	234 (62.90)	372	1.34 (0.93 - 1.92)		
Duration of Service						
≤15 years	12 (13.19)	79 (86.81)	91	1	21.04	<0.001
>15 years	190 (38.78)	300 (61.22)	490	4.17 (2.21 - 7.86)		
Daily Average Driving (kms)						
≤250	107 (30.75)	241 (69.25)	348	1	6.18	0.012
>250	95 (40.77)	138 (59.23)	233	1.55 (1.1 - 2.19)		
Duration of driving (hrs/wk)						
≤60	149 (31.77)	320 (68.23)	469	1	8.96	0.002
>60	53 (47.32)	59 (52.68)	112	1.93 (1.27 - 2.93)		

* significant

Among the study subjects, 361 (62.1%) were belonging to lower middle, 116 (20%) to upper lower and 104 (17.9%) to upper middle socioeconomic status. Mean Body Mass Index (BMI) of drivers was 25.01 ± 3.7 kg/m² (range 15.9 - 37 kg/m²). Duration of service was more than 25 years for maximum study subjects i.e. 297(51.1%) drivers. It

was observed that 458 (78.8%) drivers were driving for average 48-60 hours per week. Study subjects with driving more than 250 km per day were 263 (40.1%), and 191 (32.9%) were having daily average driving of 201- 250 km.

Hypertension was found among 202 (34.8%) study subjects. Mean systolic blood pressure was 132.8 ± 15.9 mmHg (range 96-190 mmHg) and mean diastolic blood pressure was 81 ± 9.7 mmHg (range 56-118 mmHg). Of these 202 (34.8%) hypertensive study subjects, 125 (61.9%) were aware of it and 77 (38.1%) were diagnosed for the first time during study. Among those who were aware of hypertensive status, 91 (72.5%) were taking treatment and among these 91 study subjects, 57 (62.8%) were taking treatment for hypertension regularly.

Table 2 shows association of socio-demographic and occupational characteristics with hypertension. Education and marital status were found non-significant with hypertension. There was significant association observed between socio-economic status and hypertension ($p = 0.001$). Proportion of hypertensive was significantly higher among study subjects of lower socio-economic status. Significant association was found between age and hypertension. Higher proportion of hypertensive were among study subjects with more than 35 years of age. Also highly significant trend was observed between age and hypertension (χ^2 for linear trend = 47.78, $p < 0.001$). As age goes on increasing the prevalence of hypertension also goes on increasing significantly.

Significant association was also observed between BMI, Family History of (H/O) HTN and hypertension ($p=0.001$ and $p=0.01$ respectively). Proportion of hypertension was significantly higher among study subjects with BMI ≥ 25 kg/m² and in those who were having family h/o hypertension.

Some occupational characteristics were studied in this study. It was found that Study subjects with daily average driving > 250 km. and driving for > 60 hrs/wk shows significantly higher proportion of hypertension ($p=0.012$ & $p=0.002$ resp.). Significant association was observed between duration of service and HTN ($p<0.001$) with highly significant linear trend showing increase in prevalence of hypertension with increase in duration of service (χ^2 for linear trend = 57.47, $p<0.001$).

Association of some personal habits with hypertension was studied. It was found that smoking and consumption of smokeless tobacco were significantly associated with HTN ($p<0.001$ & $p=0.002$ resp.). There was no significant association observed between alcohol consumption and hypertension, however proportion of hypertensive study subjects was higher among those consuming alcohol ($p=0.11$).

DISCUSSION

Although lot of work had been done in western countries regarding health hazards of bus drivers, very few work and research had been done and documented in India. The aim of this study was to find out prevalence of hypertension and its associated factors in this vulnerable group of drivers. In present study maximum study subjects were belonging to higher age groups as there is no recent recruitment of bus drivers in company in last 10 years. Some bus drivers were recruited on compensatory or daily paid basis during this period. In this study

In the this study, mean duration of service was 24.47 ± 7.4 years and mean duration of driving was 54.6 ± 8.08 hrs/wk which was similar to that observed by Maciulyte N (2000)⁹, Tamrin S et al. (2007)¹⁰ and Szeto GP (2007)¹¹. In our study, 54.4% study subjects were found to be smokers, 78.1% bus drivers were having habit of consuming smokeless tobacco and 64% were having habit of consuming alcohol. These findings were similar to those obtained in other studies carried out by Jafaripour I et al. (2009)¹², Kaewboonchoo O et al. (2007)¹³, and Saleekul S et al. (2006).¹⁴ We found significant association between smoking, consumption of smokeless tobacco and hypertension. However no significant association was found with alcohol consumption. Probably study among larger population might be required to study association between hypertension and alcohol consumption. Nasri H et al. (2006)¹⁵ and Viridis et al. (2010)¹⁶ found positive association between smoking and hypertension, while Lakshman et al (2014)¹⁷ and Erhiano E et al. (2015)¹⁸ didn't find any such association.

The prevalence of hypertension according to JNC VII found in this study was 34.8%, maximum prevalence of hypertension was found in study subjects with ≥ 56 years of age. This prevalence was higher as compared to most other studies, reason could be the aggregation of study subjects in the higher age groups and higher daily average driving and driving duration (hrs/wk) observed in the present study.

Jafaripour I et al. (2009)¹² found prevalence of hypertension as 30.7% in their study carried out in Iran while Katti SM (2009)¹⁹ found prevalence of 23.8% in study carried out in Belgaum Karnataka. Prevalence of hypertension observed in this study was also higher than those observed by Taklikar C (2006)²⁰ in study carried out among 210 bus

drivers of Mumbai central bus depot who found 24.3% hypertensive bus drivers. Studies done in Bangkok by Kaewboonchoo O et al. (2007)¹³, and Saleekul S et al. (2006)¹⁴ also shows lower prevalence of hypertension i.e. 23% and 17.5% respectively.

However our findings of prevalence of hypertension was close to that observed by Erhiano E et al. (2015)¹⁸ in Nigeria of 41.3%, Raquel et al (2012)²¹ of 38.2% and 38.7% observed by Ismail et al. (2003)⁴. Overall prevalence of hypertension in general population in India varies between 17% and 21%². In bus drivers it was higher as compared to general population in India. This may be due to their occupation which involves longer duration of driving, higher daily average driving, prolonged sitting while driving, and higher BMI.

During this study it was observed that awareness regarding hypertensive status was 61.9%, and 45% out of total hypertensive and 72.5% among aware hypertensive drivers were taking treatment of which 62.8% were taking it regularly. This proportion was slightly higher than that observed by Lakshman et al (2014)¹⁷ in Kerala and Erhiano E et al. (2015)¹⁸ in Nigeria. This difference might be due to availability of medical facilities to bus drivers provided by their company and might be due to 100% literacy status in them.

In the present study hypertension was found to be associated with age, duration of service, daily average driving, and duration of driving (hrs/wk), socio-economic status, family H/o HTN and BMI ≥ 25 kg /m². It was observed that prevalence of hypertension increased with increased age and duration of service. Association with duration of service might be due to age which may be acting as confounder. These findings were similar to that observed by Kaewboonchoo O et al. (2007)¹³, Wang PD et al. (2001)²², and Ragaland DR(1997).²³

CONCLUSION

To conclude, prevalence of hypertension in bus drivers was 34.8%, higher than that observed in general population. Hypertension was significantly associated with various socio-demographic characteristics like age, socio-economic status, education, family h/o hypertension, BMI and certain occupational characteristics like duration of service, daily average driving, duration of driving per week. Therefore daily average driving and duration of driving hours should be in accordance with norms set by MSRTC. Study emphasize the need for the periodic screening and regular follow

up of drivers for diagnosis and maintaining the compliance with the treatment. Also there is need for targeted educational interventions and life-style modifications among bus drivers.

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