

Hypertension among auto-rickshaw drivers in Belagavi, South India: A cross-sectional study

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Date of submission: 29.07.2022

Date of acceptance: 07.04.2023

Date of publication: 01.07.2023

Conflicts of interest: None

Supporting agencies: None

DOI:

<https://doi.org/10.3126/ijosh.v13i3.46828>



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ABSTRACT

Introduction: Auto-rickshaws are still the most commonly used mode of transportation in Tier II & III cities where metros or application-based cab aggregators are non-existent / not available. Auto-Rickshaw Drivers (ARDs) are at a higher risk for Cardiovascular Disease (CVD) because of their common lifestyle practices like irregular eating habits, sedentariness, addictions, and work-related stress. Studies have found that hypertension (HTN) is highly prevalent among ARDs in comparison to the general population. We studied the prevalence of HTN among ARDs of Belagavi.

Methods: It was a cross-sectional study conducted among 600 regular ARDs operating within Belagavi City between January to December 2016. The sample size was calculated to be 570 and rounded off to 600. Two ARDs who were last in the queue were selected from 300 major auto rickshaw stands. After getting informed consent, we collected the data through personal interviews and recorded the blood pressure of all the study participants. Data were analyzed using SPSS software. The Institutional Ethics Committee of J. N. Medical College approved the study.

Results: Among the 600 participants studied, 54 (09%) were previously known and 228 (38%) were newly diagnosed hypertensive. HTN was significantly associated with age, religion, educational status, length of working hours, years in present occupation, and body mass index.

Conclusion: The prevalence of HTN was high compared to the general adult population and increased with increasing age, length of working hours, years in present occupation, and body mass index.

Keywords: Auto rickshaw drivers, Hypertension, Prevalence.

Introduction

Globally, cardiovascular diseases (CVDs) are the leading cause of death, with an estimated 17.9 million deaths attributed in 2019 (32% of worldwide deaths).¹ Hypertension (HTN) is a major risk factor for heart disease and also a

leading cause of premature death worldwide. As the condition has no obvious signs or symptoms, the patient is typically unaware of the condition.^{2,3} As a result, it is critical that the condition be diagnosed early and treated appropriately using

lifestyle modifications and medications to reduce mortality and morbidity.

Three-wheeled motorized vehicles, commonly known as auto-rickshaws, are an integral part of urban transportation. Auto-rickshaw drivers (ARDs) health unlike other occupational workers' is affected by several determinants at work, including accidents, communicable and non-communicable diseases, and stress-related disorders.⁴ ARDs are the group that tends to develop these conditions as they spend most of their time in polluted, noisy, and stressful environments. ARDs work for over 10-12 hours per day and form a substantial part of the urban informal sector in India. ARDs are constantly exposed to increased stress due to irregular shifts, continuous increases in fuel prices, long waiting hours, and occupational factors all of which are identified as risk factors for HTN.^{5,6} Tobacco use is also a known risk factor for HTN and is highly prevalent among ARDs in comparison to Indian adults aged 15 and over.^{3,7-10}

Studies reveal that HTN is more prevalent among professional drivers compared to the general population.¹¹⁻¹³ Considering these factors, we conducted the study to know the prevalence of HTN and its association with various sociodemographic and occupational factors among ARDs of Belagavi.

Methods

It was a cross-sectional study conducted from January to December 2016 on registered ARDs in Belagavi City. Based on the estimated prevalence of HTN of 35.14% and an absolute error of 4%, a sample size of 570 was calculated.¹⁴ Adding a non-response rate of 5%, we rounded it to 600.

We included those participants who were registered, regular ARDs aged 18 years or above, and residents of Belagavi for at least one year and excluded those who drove part-time.

Based on the information from the Regional transport office, the city had around 300 major auto-rickshaw stands. Following the universal sampling method, we visited all 300 stands and purposively selected

two ARDs at each stand who were last in line. Thus, the participants could be interviewed and examined, which would have not been possible if we selected someone else from the queue, as their auto-rickshaw would have been hired in the meantime.

We recorded the data using a questionnaire tailored to the study requirements. We collected socio-demographic information, the number of years in the present occupation, the length of working hours, the number of night shifts performed per week, the use of tobacco, and their history of high blood pressure (HTN). Using standard procedures and standardized instruments, trained personnel measured weight using a digital weighing scale from Omron and height using Prime Surgical Height measuring scale - stadiometer and recorded blood pressure (BP) using a digital blood pressure monitor by Omron.^{15,16} We classified the BP using the JNC-8 classification.¹⁷

Following written informed consent, we interviewed and examined the participants in a convenient place nearby the auto-rickshaw stands. The participants were informed of their right to discontinue the study at any time if they had privacy concerns, confidential concerns, or concerns related to their work. We ensured that the participants had no hindrances in their work.

The Institutional Ethics Committee of J. N. Medical College of KLE University, Belagavi approved the study. After the study concluded, we advised pre-hypertensive and hypertensive participants on non-pharmacological and pharmacological measures to take and offered clinical services to those who desired them.

We analyzed the data through descriptive statistics and a Chi-square test using the Statistical Package for Social Sciences (SPSS) software, version 24.0. $P < 0.05$ was accepted as the statistical significance value.

Results

The mean age of the participants was 39.71 ± 11.07 years [Table 1]. The majority of them (89.83%) were married, 371 (61.83%) stayed in nuclear families, and 346 (57.67%) resided in pukka

houses. The mean ± standard deviation of duration in the present occupation was 15.80 years ± 10.11 years, and participants worked over a length of 9.43 ± 1.82 hours per day. The prevalence of current use of tobacco was 62.17% (373). Cigarettes (87.05%) were the most common smoked form, while gutkha (54.93%) was the commonest smokeless form. The mean ± standard

deviation of the duration of tobacco use was 15.31 ± 10.29 years. Based on the Body Mass Index (BMI), 40 (6.67%) were underweight, 210 (35.0%) had normal weight, 197 (32.83%) were overweight and 153 (25.50%) were obese. The mean ± standard deviation of the BMI of the participants was 24.32 ± 4.51 kg/m².

Table 1. Sociodemographic and occupational profile of the participants (n = 600)

Characteristics		N (%)
Age (years)	< 30	159 (26.5)
	31 – 40	175 (29.17)
	41 – 50	164 (27.33)
	51 – 60	90 (15)
	> 60	12 (2)
Religion	Hindu	143 (23.83)
	Muslim	457 (76.17)
Educational qualification	Illiterate	49 (8.17)
	Primary School	141 (23.5)
	High School	327 (54.5)
	Pre-university college	59 (9.83)
	Diploma / Graduate	24 (4)
Socioeconomic status (Modified BG Prasad SES Scale)	Class I	17 (2.83)
	Class II	65 (10.83)
	Class III	196 (32.67)
	Class IV	265 (44.17)
	Class V	57 (9.5)
Number of years in the present occupation	< 10	235 (39.17)
	11 – 20	189 (31.5)
	> 20	176 (29.33)
Length of working hours on an usual day	6 - 8 hours	51 (8.5)
	8 - 10 hours	218 (36.33)
	10 - 12 hours	191 (31.83)
	> 12 hours	140 (23.34)
Usual number of night shifts per week	0	582 (97)
	> 1	18 (3)

The prevalence of HTN was 47% (282) which included known hypertensive [Figure 1]. Mean± standard deviation of systolic BP was 135.64 ±

17.89 mmHg while diastolic BP was 87.43 ± 13.28 mmHg. All of the 54 who were diagnosed as hypertensive were presently on treatment.

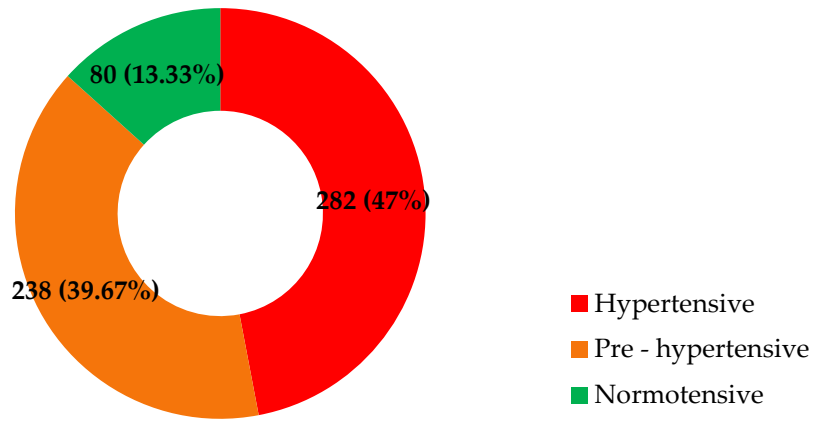


Figure 1. Distribution of study participants according to Blood Pressure (n = 600)

BP was significantly associated with age, religion, and educational status [Table 2]. The years in the present occupation and length of working hours were significantly associated with BP [Table 3].

Although BP increased with tobacco use, it was statistically insignificant. The association between BP with body weight was found to be statistically significant [Table 4].

Table 2. Association between blood pressure and socio-demographic profile

Characteristics		Normotensive (%)	Pre-hypertensive (%)	Hypertensive (%)	Total	χ^2
Association of blood pressure with age	< 30 years	33 (20.76)	101 (63.52)	25 (15.72)	159 (100)	97.2739, df = 6, P value < 0.00001
	31 – 40 years	15 (8.57)	69 (39.43)	91 (52)	175 (100)	
	41 – 50 years	15 (9.15)	41 (25.0)	108 (65.85)	164 (100)	
	> 51 years	17 (16.67)	27 (26.47)	58 (56.86)	102 (100)	
	Total	80 (13.33)	238 (39.67)	282 (47.00)	600 (100)	
Association of blood pressure with religion	Hindu	46 (32.17)	19 (13.29)	78 (54.54)	143 (100)	85.1626, df = 2, P value < 0.00001
	Muslim	34 (7.44)	219 (47.92)	204 (44.64)	457 (100)	
	Total	80 (13.33)	238 (39.67)	282 (47.00)	600 (100)	
Association of blood pressure with educational status	Illiterate	9 (18.37)	13 (26.53)	27 (55.10)	49 (100)	70.7878, df = 8, P value < 0.00001
	Primary	26 (18.44)	51 (36.17)	64 (45.39)	141 (100)	
	High school	22 (6.73)	145 (44.34)	160 (48.93)	327 (100)	
	PUC	8 (13.56)	26 (44.07)	25 (42.37)	59 (100)	
	Diploma & graduate	15 (62.5)	3 (12.5)	06 (25.0)	24 (100)	
	Total	80 (13.33)	238 (39.67)	282 (47.00)	600 (100)	

Table 3. Association between blood pressure and occupational profile

Characteristics		Normotensive (%)	Pre-hypertensive (%)	Hypertensive (%)	Total	χ^2
Association between blood pressure and years in present occupation	< 10 years	36 (15.32)	151 (64.26)	48 (20.42)	235 (100)	123.1216, df = 4, P value < 0.00001
	11 to 20 years	23 (12.17)	35 (18.52)	131 (69.31)	189 (100)	
	> 20 years	21 (11.93)	52 (29.55)	103 (58.52)	176 (100)	
	Total	80 (13.33)	238 (39.67)	282 (47.00)	600 (100)	
Association between blood pressure and the length of working hours	6 - 8 hours	21 (41.18)	28 (54.90)	2 (3.92)	51 (100)	74.8055, df = 6, P value < 0.00001
	8 - 10 hours	15 (6.88)	85 (39.0)	118 (54.12)	218 (100)	
	10 - 12 hours	31 (16.23)	82 (42.93)	78 (40.84)	191 (100)	
	> 12 hours	13 (9.29)	43 (30.71)	84 (60)	140 (100)	
	Total	80 (13.33)	238 (39.67)	282 (47.00)	600 (100)	
Association between blood pressure and number of night shifts per week	No night shifts	75 (12.89)	231 (39.69)	276 (47.42)	582 (100)	3.6441, df = 2, P value = 0.1617
	> 1-night shifts	5 (27.78)	7 (38.89)	6 (33.33)	18 (100)	
	Total	80 (13.33)	238 (39.67)	282 (47.00)	600 (100)	

Table 4. Association between blood pressure with tobacco use and body weight

Characteristics		Normotensive (%)	Pre-hypertensive (%)	Hypertensive (%)	Total	χ^2
Association of blood pressure with tobacco use	Tobacco users	43 (11.53)	149 (39.95)	181 (48.52)	373 (100)	2.917, df = 2, p = 0.2325
	Non-users	37 (16.30)	89 (39.21)	101 (44.49)	227 (100)	
	Total	80 (13.33)	238 (39.67)	282 (47.00)	600 (100)	
Association of blood pressure with body weight	Underweight	12 (30.00)	24 (60.00)	04 (10.00)	40 (100)	167.089, df = 6, p < 0.00001
	Normal	54 (25.71)	111 (52.86)	45 (21.43)	210 (100)	
	Overweight	05 (02.54)	78 (39.59)	114 (57.87)	197 (100)	
	Obese	09 (05.88)	25 (16.34)	119 (77.78)	153 (100)	
	Total	80 (13.33)	238 (39.67)	282 (47.00)	600 (100)	

Discussion

ARDs unlike other professional drivers spend most of their day in traffic fighting pollution, noise, psychiatric stress, accelerations and decelerations, lateral swaying, and whole-body vibrations while driving. Additionally, poor lifestyle practices such as irregular eating patterns and sleep patterns, low-intensity physical activity, smoking, and tobacco consumption, as well as the existence of comorbidities like overweight and obesity, may be associated with increased prevalence of HTN.^{6,18,19}

All 600 participants were male, consistent with other studies.^{7,13} Most of the participants had a high school education (54.50%). In comparison with other similar studies, participants had a higher educational level.⁷ We can attribute the increase in education to better literacy levels in South India.

The mean \pm standard deviation of years in present occupation was 15.80 ± 10.11 years, whereas it was 17.70 ± 7.62 years in the study done in Nagpur.¹³ The mean length of working hours per day was 9.43 ± 1.82 hours, while it was 11.52 ± 2.29 hours in the study done in Nagpur.¹³

The prevalence of tobacco use in any form was 62.17%. The study among ARDs in Gwalior showed the prevalence to be 84.26%,⁷ 64.44% among ARDs in Bareilly, Uttar Pradesh,⁸ and 69% among ARDs in South Delhi.⁹ These studies reveal a comparatively high prevalence among ARDs compared to Indian adults aged 15 years and above, which was just 28.6%, according to Global Adult Tobacco Survey (GATS) 2016-17.¹⁰ Furthermore, this rate was higher than 29.41% in Belgaum city.²⁰

The comparatively high prevalence among ARDs can be attributed to a variety of occupational factors coupled with socioeconomic factors, as well as many unknown factors.

Among the participants, 58.50% were either overweight or obese. The mean \pm standard deviation for the BMI of the participants was 24.32 ± 4.51 Kg / m². These results are in line with studies among similar subgroups^{21,22} that reveal higher BMI among ARDs compared to adult Indian men with a prevalence of 38.4%.²³

Around 47% of the participants were hypertensive (including previously known cases) consistent with studies done among ARDs and professional drivers.^{13,19,21,24}

In general, ARDs have higher levels of HTN, overweight, and obesity than the general population. This can be explained by their sedentary work pattern, long hours of inactivity, constant mental stress, and a higher level of tobacco use all of which are known to be risk factors.

Age was associated with a higher probability of HTN, and this association was statistically significant. An increase in BP with age is viewed as a universal characteristic of aging.²⁵ The prevalence of HTN was significantly higher among Hindus compared to Muslims, as evidenced by another study that found similar results.²⁶ The study found an inverse relationship between BP and school education, similar to another study.²⁷

Similar to a study conducted in Nagpur, both years in the present occupation and length of working hours were positively associated with BP.²⁸ ARDs who have been in the current occupation for a longer period are generally older, and age is a major risk factor for HTN.²⁵ Working long hours results in sedentary habits and inactivity, both of which are known risk factors for hypertension. The number of night shifts had no association with HTN.

Tobacco users were at an increased risk of HTN, however, this association was not statistically significant. The risk of hypertension increased with body weight, and this association was statistically significant. Tobacco and overweight/obesity are well-known modifiable risk factors for HTN.³

Conclusions

A large number of participants were pre-hypertensive (39.67%), while almost half were hypertensive (47%). Less than one-fifth of the hypertensive (54, 19.15%) were aware of their condition and all of them were currently on treatment. However, only 11 of them had adequate BP control. Hypertension was

significantly common in elderly participants, Hindus, participants with lower education, longer duration working as ARDs, long working hours, and overweight/obese participants.

Limitations and Recommendations

There is a possibility of recall bias while addressing the risk factors like tobacco consumption, food habits, stress, and so on. We might have missed those ARDs plying exclusively at night due to data collection in the daytime. We could not do the tests that measure the strength of association between the variables (such as Odd's ratio, Correlation coefficient (r) and Regression coefficient (B)) in the study. Workplace interventions for the prevention and control of HTN can include regular health education sessions about periodic health checkups for early detection and treatment, lifestyle changes, medication adherence, and mental health counseling for people experiencing a high level of stress. There is a need for strict implementation of legislation governing tobacco. To intervene at the right time, we have to continuously follow up and treat ARDs with HTN. Strict implementation of national programs and guidelines for the screening and management of HTN for vulnerable occupational groups is needed.

Acknowledgments

The authors would extend their sincere thanks to the auto-rickshaw union and the auto-rickshaw drivers for cooperating in the study. In addition, they would like to thank Dr. Preet Khona, Dr. Ishan Pathak, and Mr. Raju Madiwale for their assistance in acquiring data.

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