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Review Article

A Multivariate Assessment of Occupational Stress and Hypertension Among Taxi Drivers: Evidence from a Cross-Sectional Analysis

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ABSTRACT

Objective and Scope of the Study: This study examines how different risk variables affect stress-related health issues, including hypertension, among cab drivers. The purpose of the study is to determine the main causes of hypertension in drivers with at least five years of experience who have experienced one or more physical health problems.

Database Methodology: The study uses multivariate statistical techniques, particularly logistic regression analysis, to assess the association between various risk variables and hypertension. This method aids in comprehending the ways in which many elements combine to affect the incidence of hypertension in drivers.

Classification of Risk Factors: There are five main categories into which the significant determinants of hypertension among taxi drivers can be broadly divided: socio-demographic and lifestyle factors, such as age, body mass index (BMI), educational attainment, sleep duration, and dietary habits, all of which have a significant impact on an individual's health status; work-related factors, such as long driving hours, insufficient rest, and job-related stress, are especially relevant for professional drivers who frequently have demanding schedules; ergonomic factors, such as awkward body postures maintained over extended periods of time and poor seating arrangements, lead to physical strain, which may increase blood pressure indirectly; and psychological factors, such as mental fatigue, emotional stress, and passenger conflicts, can exacerbate the issue by increasing psychological strain. Finally, because diabetes and dyslipidemia frequently coexist and interact with cardiovascular risk profiles, it has been discovered that the presence of these disorders considerably increases the risk of hypertension.

Statistical Findings and Hypothesis Testing: The results of the analysis show that the null hypotheses were disproved, indicating that the chosen risk factors significantly affect the prevalence of hypertension in cab drivers. This implies that hypertension is not a random phenomenon but rather is strongly associated with quantifiable lifestyle and occupational factors.

Interpretation of Results: The results show that the risk of hypertension is significantly increased by long-term exposure to the risk factors listed above, particularly lifestyle choices, work-related stress, psychological strain, and co-occurring illnesses. The risk of stress-related health issues increases with the length and severity of exposure.

Recommendations and Practical Measures: In order to lessen the effects of these risk factors, the study also suggests appropriate preventive actions. Enhancing working conditions, offering ergonomic seating, planning frequent physicals, making sure drivers get enough sleep, and teaching them about healthy lifestyle choices are some of the suggestions.

Keywords: Hypertension, Taxi Drivers, Multivariate Analysis

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INTRODUCTION

Drivers work in a very risky and misery environment such as-shift work, rigid time schedules, increased work traffic and pace, and noise and foul smell in combination with long working hours and prolonged exposure to gasses, toxic fumes and dusts from other motor vehicles. Carbon monoxide, nitrogen oxides and sulphur dioxide present in motor vehicle fumes[1-3] and odours, have been confirmed in mounting CHD risk for professional bus and other vehicle drivers.[4,5] However, in French found that concentrations of such gases in bus cabins were well within occupational exposure limits and indeed no different to that found in the air of two major French cities.[6] Cabin air toxicity appears to depend on a series of variables including vehicle cabin height/volume, cigarette smoke exposure, fuel type, urban/rural environment and climatic conditions.[7,8] Drivers' occupation predisposes them to a

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multitude of risk factors such as prolonged sitting and motor vehicle driving, tight running schedules, reduced rest breaks, traffic congestion, the sedentary nature of job, and resultant physical, psychological and behavioral problems, prevalence of musculoskeletal and ergonomic problems, stress related manifestations, fatigue and insomnia-related problems, as well as poor sexual and reproductive health.[9]

Some researchers conducted a cross-sectional study "to described health and safety concerns and self-care strategies of San Francisco taxi drivers (n = 36) using focus groups survey and a convenience sampling. Major health and safety themes included stress, body pain, danger, vulnerable employment status, and concerns related to unhealthy working conditions. Self-care strategies suggested by researchers included diffusion/decompression to manage stress, maintaining a positive attitude, maintaining power and control, and practicing proactive self-care.[10]

LITERATURE REVIEW

Studies Relating to Hypertension and Associated Risk Factors (Consequences of Poor Living and Working Conditions) are discussed below:

Table 1: Prevalence of Hypertension Among Taxi and Professional Drivers (1973-2025)

Author(s) (Year)	Location & Study Population	Sample Size	Prevalence of Hypertension
Cobb & Ross (1973)[11]	USA – Air Traffic Controllers- Review	Not specified	4× higher hypertension prevalence
David et al. (1988)[12]	International – Bus Drivers (22 studies)-Review	Not specified	Elevated HTN & CVD
Balarajan & McDowall (1988)[13]	London, UK – Lorry & Taxi Drivers	3392	HTN not significant in taxi drivers
Annika (1991)[14]	Finland – Bus/Tram Drivers	103 vs 6596	HTN independent predictor of CHD (OR = 3.0)
Piero (1994)[15]	Rome, Italy – Taxi Drivers	2311	Circulatory disease, including HTN, leading cause of death
Ragland et al. (1997)[16]	San Francisco, USA – Transit Operators-Review	Not specified	Long exposure linked to HTN
Helle et al. (1998)[17]	Denmark – Bus/Tram Employees	18,174	HTN not directly measured
Kyouko et al. (2000)[18]	Japan – Taxi Drivers- Review	Not specified	High BMI, LDL-C linked to atherosclerosis & HTN
Chaparro et al. (2001)[19]	Bogotá, Colombia – Public Transport Drivers	194	Stress, obesity noted; HTN not directly reported
Machin & De Souza (2004)[20]	UK – Taxi Drivers- Review	Not specified	Emotional distress linked with HTN
Chen et al. (2005)[21]	Taipei, Taiwan – Taxi Drivers	1157	Long hours = HTN risk
Tse et al. (2006)[22]	Global – Transport Workers (27 studies)-Review	Not specified	Strong association with HTN
Wen et al. (2006)[23]	Australia – Adults incl. drivers	6810	Sedentary driving linked to obesity →HTN
Benstowe & Apostolopoulos (2008)[24]	USA – Truck Drivers	Not specified	HTN linked with posture, lifestyle, noise
Luciane et al. (2010)[25]	Brazil – Truck Drivers	258	HTN linked with BMI, glucose, drug use
Bhatt & Seema (2012)[26]	India – Review	Not specified	HTN noted as occupational disease
Koppad et al. (2012)[27]	Davangere, India – Auto-Rickshaw Drivers	200	HTN associated with alcohol, obesity
Sharma & Ganguly (2012)[28]	Hyderabad, India – Truck Drivers	59	45.76% hypertensive
Bawa & Srivastav (2013)[29]	Mumbai, India – Taxi Drivers	508	HTN among common conditions
Bhagyashri et al. (2013)[30]	India – Bus Conductors	370	Age/service linked to HTN
Shin et al. (2013)[31]	Korea – Professional Drivers	443	HTN linked to shift work, BMI
Arjun et al. (2014)[32]	Kerala, India – Bus Drivers	179	High HTN prevalence
Carine et al. (2014)[33]	Brazil – Truck Drivers	250	HTN linked to obesity, age, heredity
Chaudhary et al. (2014)[34]	Nagpur, India – Auto-Rickshaw Drivers	269	35.14% hypertensive
Rezaei Hachesu et al. (2017)[35]	Yazd, Iran – Taxi Drivers	110	Not specified
Narang et al. (2020)[36]	New York City, USA – Taxi/FHV Drivers	983	46% had hypertensive-range BP readings
Inma et al. (2020)[37]	Bangkok, Thailand – Taxi Drivers	390	60.8% hypertensive
Patil & Kumar (2023)[38]	Belagavi, India – Auto-Rickshaw Drivers	600	47% (9% known, 38% newly diagnosed)
Deshpande & Devi (2024)[39]	Maharashtra, India – Professional Drivers	174	25.86% hypertensive; 55.17% pre-hypertensive
Nikpajouh et al. (2025)[40]	Iran – Professional Drivers	1,13,856	14.2% hypertensive; 57.4% pre-hypertensive

Source: Literature Survey

Major Observations from Indian Studies on Hypertension in Taxi/Professional Drivers

Indian studies consistently report a notably high prevalence of hypertension among taxi and professional drivers, with rates ranging from approximately 25% to over 45%, and a significant number of cases newly diagnosed during health screenings.[27,28,39] Key risk factors identified across these studies include prolonged sedentary hours, irregular work shifts, unhealthy lifestyle habits such as tobacco and alcohol use, poor dietary patterns leading to obesity, psychological stress related to job insecurity, and limited awareness coupled with inadequate healthcare access. Furthermore, pre-hypertension is highly prevalent among drivers, signalling a large population at risk for developing full hypertension.[39] However, the existing body of research is largely cross-sectional, limited in sample size (often under 1000 participants), and concentrated in urban centers like Mumbai, Bangalore, Hyderabad, Belagavi, and Nagpur, indicating limited comprehensive data at the national level. An emerging concern is the underdiagnosis of hypertension, as many drivers remain unaware of their condition until screened during studies, underscoring the gap in regular health monitoring. Additionally, there is a notable lack of longitudinal and intervention studies aimed at reducing hypertension or improving health outcomes, highlighting a critical area for future research.

A structured Table 2 summarizing the major common findings related to hypertension among taxi and professional drivers across multiple studies over this period. Key risk factors such as work stress, sedentary lifestyle, poor nutrition, lack of knowledge, and comorbidities are highlighted in Table 2, which highlights recurrent themes across research conducted from 1973 to 2025. It highlights the necessity for focused health interventions and the high incidence of hypertension among cab drivers.

Research Gaps Justifying a New Study in India

Despite several studies on hypertension among taxi and professional drivers, a comprehensive, large-scale, and multicity investigation is lacking in India. Most research focuses on urban male drivers, neglecting rural populations and the rising number of female drivers. Key factors such as psychosocial stress, healthcare access, ergonomics, pollution, and road safety are rarely addressed. Preventive and intervention studies tailored to drivers' occupational lifestyles are scarce. There is also limited exploration of barriers to diagnosis and treatment adherence. To address these research gaps, therefore, the author has made an attempt to study the impact of various risk factors on stress-related problems such as hypertension among taxi and professional drivers in India.

DATABASE AND RESEARCH METHODOLOGY

Objective of the Study

To study the impact of various risk factors on stress related problems as Hypertension.

Hypothesis

To achieve objective following null hypothesis is established.

H_{01}:	There is insignificant impact of various Occupational Stress Related Risk Factors on Hypertension (HTN).

Sources of Data

Primary source of data served as the foundation for this investigation. Self-administered Research Schedule was used to collect data from respondents. The source of stress, fatigue, accidents and its relationship

Table 2: Common Findings Across Studies

Common Findings	Variables Description/Details	Supporting Studies (Examples)
High prevalence of hypertension	Hypertension prevalence among drivers ranges broadly from 14% to over 60%, with many cases newly diagnosed during screening.	Narang et al. (2020), Inma et al. (2020)& Patil & Kumar (2023), [36,38]
Pre-hypertension is widespread	A significant proportion of drivers fall in the pre-hypertensive category, indicating risk for future hypertension	Deshpande & Devi (2024), Nikpajouh et al. (2023)[39,40]
Occupational risk factors	Long driving hours, sedentary lifestyle, shift work, and job stress contribute significantly to hypertension risk	Rezaei Hachesu et al. (2017), Patil & Kumar (2023)[35,38]
Lifestyle-related risk factors	Tobacco use, alcohol consumption, unhealthy diet, and physical inactivity are prevalent among drivers	Koppad et al. & Sharma & Ganguly (2012) (2012)[27,28]
Underdiagnosis and poor awareness	Many hypertensive drivers are unaware of their condition until screened during studies	Narang et al. (2020) & Patil & Kumar (2023)[36,38]
Psychosocial stress impact	Stress related to job insecurity, irregular shifts, and financial concerns are associated with increased hypertension risk	Inma et al. (2020) & Deshpande & Devi (2024)[37,39]
Limited healthcare access and health-seeking behavior	Drivers often have inadequate access to regular health check-ups and poor adherence to treatment	Ganguly (2012) & Nikpajouh et al. (2023), Sharma[28,40]
Gender bias in research	Majority of studies focus on male drivers; limited data on female drivers	General observation from literature
Need for intervention studies	Few studies test the effectiveness of lifestyle or occupational health interventions	Research gap identified across multiple reviews

Source: Literature Survey

level has also been recorded to get a better understanding of working life of taxi drivers. The required data on independent and dependent variables were collected and measured with the help of various scales and tools.

Categorization of Variables

Variables age, BMI, education, family size, job experience, monthly income, work duration were categorized into 0,1,2,3. It is coded as 0 if they were up to 30 years of age, coded as 1 if 31 to 40 year, 2 if 41 to 50 years and coded as 4 if above 50 years. It is coded as 0 if taxi drivers are under weight, coded as 1 if taxi drivers are normal, coded as 2 if taxi drivers are overweight and coded as 3 if taxi drivers are obesity. It is coded as 0 if taxi drivers are below matric, coded as 1 if taxi drivers are matric and coded as 2 if taxi drivers are 10+2 and coded as 3 if taxi drivers are above 10+2 (graduation, technical and diploma/certificate courses). It is coded as 0 if they have up to 2 family members, coded as 1 if they have 3 to 4 family members, 2 if they have 5 to 6 family members and coded as 4 if have above 6 members. It is coded as 0 if taxi drivers have 6 to 10 years' experience, coded as 1 if taxi drivers are 11 to 15 years driving experience, coded as 2 if taxi drivers have 16 to 20 years' experience and coded as 3 if taxi drivers have above 20 years' experience. It is coded as 0 if taxi drivers are getting monthly income Rs.3000, coded as 1 if taxi drivers are getting monthly income Rs. 3000 to 5000, coded as 2 if taxi drivers are getting Rs. 5000 to 8000 and coded as 3 if taxi drivers are getting above Rs.5000. It is coded as 0 if work duration is up to 8 hours, coded as 1 if work duration is up to 12 hours, coded as 2 if work duration is up to 16 hours and coded as 3 if work duration is above 16 hours. In 2*2 Contingency Tables '1' means presence/occurrence and '0' means absence of diseases i.e. dependent variable (Hypertension) and in case of independent variable '1' means 'Yes' and '0' means 'No'. The SPSS version 25.0 for Windows supports the data analysis. Tested variables' significance at the 0.05 alpha level.

STATISTICAL ANALYSIS

On the basis of the primary data collected, the researcher calculated the prevalence of various Health Related Problems and their Class Intervals among taxi drivers. Once the questionnaire was completed the body mass index (BMI, kg/m^2) was calculated. Body mass index (BMI) is calculated by using metric BMI calculator from the web in which we divide the weight in kilograms by the height in meters squared as shown below.

$$\boldsymbol{BMI} = \text{weight (kg)} \div \text{height}^{\boldsymbol{2}}\ (\text{m}^{\boldsymbol{2}})$$

Table 3 reveals that diagnostic criterion for Body Mass Index (BMI, Obesity) is used in according to WHO classification. Body Mass Index Table was used to access the Body Mass Index of taxi drivers.

Table 3: Criterion for Body Mass Index (BMI)

Category	BMI value (kg/m^2)
Underweight	≤ 18.5
Normal Weight	18.5 to 24.9
Overweight	25 to 29.9
Obesity Type 1	30 to 34.9
Obesity Type 2	≥ 35

Source: http://www.jcancer.org/v07p2346.htm

Descriptive statistics were presented as percentages and 95% confidence intervals (CI). The Chi-square test was used to assess the association between categorical variables. Variables found to be significantly associated in the bivariate analysis were included in the multiple logistic regression model using the Enter method to compute Adjusted Odds Ratios (AOR) with 95% CI. Model fitness was assessed using the Hosmer-Lemeshow goodness-of-fit test, and p-values greater than 0.05 confirmed the suitability of the model. Further, Cox & Snell R^2 and Nagelkerke R^2 values ranged between 0.47 and 0.78, indicating a moderate to strong relationship between independent and dependent variables.[41-44]

Association of Various Stress related Risk Factors with Hypertension

Occupational taxi drivers are at excess risk of Hypertension due to their sedentary and risky nature of job. Their poor eating habits & life style and other risk factors further contribute to their misery. Hence, the association between various risk factors and Hypertension is examined in the following discussion with the help of Multiple Logistic Regression.

Association of Socio–Demographic & Life Style Factors with Hypertension

Recent years have witnessed a rapid rise in the prevalence of Hypertension (HTN) in India. The association of Socio–Demographic & Life Style Factors with Hypertension is presented in Table 4. Table shows Chi Square Test for Socio Demographic and Life Style Characteristic of taxi drivers and the extent of Hypertension (HTN). The results showed that there is a significant association between age, BMI, education, family size, sleep duration, refreshment drinking/snacks during the day, main meal from dhabas /restaurants, dietary habits, consumption of oily, fried items and junk food, take meal at proper and fixed time, less time for physical exercise/morning walk/ evening walk, intake of alcohol, smoking, tobacco, drugs (sleep inhibitors) and Hypertension ($p<0.05$). However, insignificant association is found in regard to marital status and Hypertension ($p>0.05$). Table 5 clearly shows the prevalence of Hypertension among taxi drivers according to their age. A positive association is found between different age groups and Hypertension. The results of study reveals that the prevalence of Hypertension was higher among the above 50 years age group (Adj. OR=18, CI=8.0 to 40.5), followed by 41 to 50 years (Adj. OR=13.5; CI=5.9 to 30.8; $p<0.05$) and 31 to 40 years age group (Adj. OR=2.5; CI=1.3 to 5.1; $p<0.05$). It implies that as the age increases the extent of Hypertension also increases. Most of the empirical studies agree with fact that prevalence of Hypertension (HTN) increased with age. This finding is in consonance with (Shah and Afzal, 2013) study conducted in Manipur (India) which concluded that Hypertension was found in the age group of 40 to 60 years and above 60 years group. The respondents with over weight (Adj. OR=7; CI=3.3 to 15.2; $p<0.05$) and obsess (Adj. OR=5.6; CI=3.0 to 10.3; $p<0.05$) are the most exposed to Hypertension. The prevalence of Hypertension was more among the respondents who are matriculate passed (Adj. OR=3.4; CI=1.9 to 6.1; $p<0.05$) and above 10+2 passed (Adj. OR=1; CI=0.41 to 2.4; $p=0.05$). Further the married respondents are suffering from Hypertension 0.75 ($p=0.639$) times less often than unmarried drivers. The overall prevalence of Hypertension was higher among the taxi drivers having large family size i.e. above 6 members' (Adj. OR=9; CI=4.2 to 18.9; $p<0.05$), followed by 5-6 members (Adj. OR=4.5;

Table 4: Association of Socio–Demographic & Life Style Factors with Hypertension

Factors		N	Yes (n)	No (n)	X2 (coefficient)	p value	Df	Adj. OR	CI (95%)
Age	Up to 30 years	72	54	18	79.215 (0.457)	0.000*	3	1	1
	31-40 years	78	42	36				2.5	1.3-5.1
	41-50	66	12	54				13.5	5.9-30.8
	Above 50Years	84	12	72				18	8.0-40.5
BMI(kg/m2)	Under weight	90	60	30	42.815 (0.353)	0.000*	3	1	1
	Normal	42	18	24				2.7	1.2-5.7
	Over weight	54	12	42				7	3.3-15.2
	Obesity	114	30	84				5.6	3.0-10.3
Education	Below Matric	96	48	48	31.534 (0.308)	0.000*	5	1	1
	Matric	132	30	102				3.4	1.9-6.1
	10+2	48	30	18				0.6	0.30-1.21
	Above 10+2 (Graduation, Technical and Diploma/Certificate Courses)	24	12	12				1	0.41-2.4
Marital Status	Married	209	88	121	1.272 (0.065)	0.639	1	0.75	0.45-1.25
	Unmarried	91	32	59				1	1
Family Size (Members)	Up to 2	48	13	35	48.874 (0.374)	0.000*	3	1	1
	3-4	78	55	23				1.3	0.69-2.4
	5-6	90	43	47				4.5	2.1-9.7
	Above 6	84	12	72				9	4.2-18.9
Sleep	≤6 Hours	138	24	114	54.428 (0.392)	0.000*	1	4.8	2.8-8.2
	>6 Hours	162	66	66				1	1
Refreshment drinking/ snacks during the day	≤2 Times	180	36	144	75.000 (0.447)	0.000*	1	7.4	4.4-12.6
	>2 Times	120	84	36				1	1
Main meal from Dhabas / Restaurants	Regularly	192	48	144	50.000 (0.378)	0.000*	1	4.8	2.9-8.1
	Occasionally	108	72	36				1	1
Dietary Habits	Mixed diet	174	60	114	5.255 (0.131)	0.000*	1	1	1
	Vegan	126	60	66				1.7	1.1-2.8
Consumption of oily, fried items and junk food	On most of the days	174	48	126	26.601 (0.285)	0.000*	1	3.5	2.1-5.6
	Occasionally	126	72	54				1	1
Take meal at proper and fixed time	Yes	114	72	42	41.087 (0.347)	0.000*	1	0.21	0.13-0.33
	No	186	48	138				1	1
Get time for physical exercise/ morning walk/ evening walk	Never/ Sometimes	174	48	126	26.601 (0.285)	0.000*	3	3.5	2.15-5.6
	Often/ Very Frequent	126	72	54				1	1
Alcohol	Yes	222	66	156	37.526 (0.333)	0.000*	1	5.3	3.1-9.3
	No	78	54	24				1	1
Smoking	Yes	138	24	114	54.428 (0.392)	0.000*	1	6.9	4.1-11.8
	No	162	96	66				1	1
Tobacco	Yes	222	66	156	37.526 (0.333)	0.000*	1	5.3	3.1-9.3
	No	78	54	24				1	1
Drugs (sleep inhibitors)	Yes	120	30	90	18.750 (0.243)	0.000*	1	3	1.9-4.9
	No	180	90	90				1	1

*Source: Primary Data complied through survey using SPSS; p = 0.05; *p* < 0.05 (Significant); *p* > 0.050 (Not significant); Adj. OR = Adjusted Odds Ratio; 1 = Reference Category; CI = Class Interval*

CI=2.1 to 9.7; p<0.05) and 3-4 members (Adj. OR=1.3; CI=0.69 to 2.4; p<0.05). Short sleep duration (≤6 Hours per day) (Adj. OR=4.8; CI=2.8 to 8.2; p<0.05), less refreshment drinking/snacks during the day, (Adj. OR=7.4; CI=4.4 to 12.6; p<0.05), consumption of main meal from dhabas/restaurants (Adj. OR=4.8; CI=2.9 to 8.1; p<0.05), dietary habits-taken only vegan (Adj. OR=1.7; CI=1.1 to 2.8; p<0.05), consumption of oily, fried items and junk food (Adj. OR=3.5; CI=2.1 to 5.6; p<0.05), less time for physical exercise/morning walk/ evening walk (Adj. OR=3.5; CI=2.2 to 5.6; p<0.05), alcohol intake (Adj. OR=5.3; CI=3.1 to 9.3; p<0.05), smoking (Adj. OR=6.9; CI=4.1 to 11.8; p<0.05), tobacco consumption (Adj. OR=5.3; CI=3.1 to 9.3; P<0.05) and drugs intake (sleep inhibitors) (Adj. OR=3.0; CI=1.9 to 4.9; p<0.05) are found significant socio demographic and life style variables that increased the odds of Hypertension. These findings are consistent with earlier researchers results who found that lifestyle and education had an impact on HTN.[45,46] According to WHO and some others researchers, drivers' bad lifestyle choices, like smoking and eating poorly, raise their risk of high blood pressure and even traffic accidents.[47-50]

Professional drivers frequently consume high-calorie fast food, which raises their BMI and HTN.[51] The idea that regular exercise reduces the risk of hypertension was further supported by another researchers.[52] This runs counter to previous findings, which discovered no link between hypertension and habits including smoking, alcohol consumption, or exercising.[53] There are conflicting results on dietary habits as well. For example, non-vegetarians had a lower prevalence of HTN[54] whereas a higher prevalence was identified among those following a mixed diet.[55]

Association of Work-related Factors with Hypertension

Table 5 shows the association of Works Related Factors with Hypertension. Chi Square values are less than 0.05 which implies an association between work related variables and Hypertension. No relationship has been found between driving experience and Hypertension. Further, taxi drivers having salary Rs.5000-8000 (Adj. OR=4.3; CI=0.25 to 75.2; p<0.05) are found more likely to suffer from Hypertension. Taxi drivers drove more than 10 days consecutively without a holiday for a whole day intervening (Adj. OR= 5.0; CI=3.0 to 8.5; p<0.05) and more than 5 hours/per day (Adj. OR=6.1; CI=3.6 to 10; p<0.05) are also found more likely suffer from Hypertension. The likely hood of suffer from Hypertension was found more among the drivers who drove taxi above 16 hours/

Table: 5: Association of Work-Related Factors with Hypertension

Factors		N	Yes (n)	No (n)	X2 (coefficient)	p value	Df	Adj. OR	CI (95%)
Job experience	6-10 Years	102	42	60	37.059 (0.332)	0.000*	3	1	1
	11-15 Years	60	30	30				0.7	0.37-1.4
	16-20 Years	48	36	12				0.23	0.11-0.51
	Above 20 Years	90	72	18				0.18	0.09-0.33
Monthly Income	Below 3000	126	18	108	79.214 (0.457)	0.000*	3	1	1
	3000-5000	150	96	54				0.10	0.051-0.18
	5000-8000	12	0	12				4.3	0.25-75.2
	Above 8000	12	6	6				0.17	0.04-0.57
Work for more than ten days consecutively without a holiday for a whole day intervening	Yes	210	60	150	38.095 (0.336)	0.000*	1	5	3.0-8.5
	No	90	60	30				1	1
Drive taxi more than 5 hours without taking any rest	Yes	204	54	150	48.621 (0.373)	0.000*	1	6.1	3.6-10
	No	96	66	30				1	1
Work Duration	Up to 8 hours	72	54	18	68.051 (0.430)	0.000*	3	1	1
	Up to 12 hours	90	42	48				3.5	1.7-6.8
	Up to 16 hours	96	18	78				13	6.2-27.3
	Above 16 hours	42	6	36				18	6.6-49.8
Total Mileage	Yes	174	60	114	5.255 (0.131)	0.000*	1	1.7	1.1-2.8
	No	126	60	66				1	1
Fatigue	Often/ Very Frequent	132	36	96	15.909 (0.224)	0.000*	1	2.7	1.7-4.3
	Never/ Sometimes	168	84	84			1	1	1

*Source: Primary Data complied through survey using SPSS; p = 0.05; *p* <0.05 (Significant); *p* > 0.050 (Not significant); *Adj. OR = Adjusted Odds Ratio; 1 = Reference Category; CI = Class Interval*

Table 6: Association of Ergonomics Factors with Hypertension

Factors		N	Yes (n)	No (n)	X2 (coefficient)	p value	Df	Adj. OR	CI (95%)
Handling baggage's and materials	Often/Very Frequent	220	66	154	34.375 (0.321)	0.000*	1	4.8	2.7-8.3
	Never/Sometimes	80	54	26					
Bending and twisting activities while driving	Often/Very Frequent	221	66	155	35.924 (0.327)	0.000*	1	5.1	3.0-8.9
	Never/Sometimes	79	54	25					
Experience Violence (victim of assault) during working hours	Often/Very Frequent	174	54	120	13.875 (0.210)	0.000*	1	2.4	1.6-4.0
	Never/Sometimes	126	66	60				1	1
Too much cold and hot weather	Often/Very Frequent	204	84	120	0.368 (0.035)	0.000*	1	0.85	0.53-1.4
	Never/Sometimes	96	36	60				1	1
Sleep on the taxi seat during rest breaks	Often/Very Frequent	174	60	114	5.255 (0.131)	0.000*	1	1.7	1.1-2.8
	Never/Sometimes	126	60	66				1	1
Narrow cabin space	Yes	84	24	60	6.349 (0.144)	0.000*	1	2	1.2-3.4
	No	216	96	120				1	1
Longer working hours	Yes	144	42	102	13.542 (0.208)	0.000*	1	2.5	1.5-3.9
	No	156	78	78				1	1
Driving on heavy traffic roads/Traffic congestion	Yes	132	36	96	15.909 (0.224)	0.000*	1	2.7	1.7-4.3
	No	168	84	84				1	1
Frequent driver seat vibration	Yes	90	24	66	9.524 (0.175)	0.000*	1	2.4	1.4-3.9
	No	210	96	114				1	1
Poor design of seat	Yes	174	42	132	43.432 (0.356)	0.000*	1	5.1	3.0-8.5
	No	126	78	48				1	1
Lack of awareness of good sitting posture	Yes	138	36	102	20.612 (0.254)	0.000*	1	3.0	1.9-5.0
	No	162	84	78				1	1
Uncomfortable steering wheel	Yes	186	36	72	3.125 (0.102)	0.000*	1	1.6	0.96-2.5
	No	114	84	108				1	1
Uncomfortable seat	Yes	108	60	126	12.224 (0.198)	0.000*	1	2.3	1.5-3.8
	No	192	60	54				1	1
Uncomfortable back support	Yes	174	60	114	5.255 (0.131)	0.000*	1	1.7	1.1-2.8
	No	126	60	66				1	1
Inadequate rest period during the working day	Yes	150	48	102	8.000 (0.161)	0.000*	1	2.0	1.3-3.2
	No	150	72	78				1	1
Lack of accessibility to the lavatory	Yes	180	48	132	33.333 (0.316)	0.000*	1	4.2	2.6-6.8
	No	120	72	48				1	1
Seat inclination (Seat Pan)	Yes	162	48	114	15.781 (0.224)	0.000*	1	2.6	1.7-4.2
	No	138	72	66				1	1
Sitting without lumbar support	Yes	186	60	126	12.224 (0.198)	0.000*	1	2.3	1.5-3.8
	No	114	60	54				1	1
Shocks (due to road surface)	Yes	150	48	102	8.000 (0.161)	0.000*	1	2.0	1.3-3.2
	No	150	72	78				1	1

*Source: Primary Data complied through survey using SPSS; p=0.05; *p <0.05 (Significant); p > 0.050 (Not significant); Adj. OR=Adjusted Odds Ratio; 1=Reference Category; CI=Class Interval*

per day (Adj. OR=18; CI=6.6 to 49.8; p<0.05), followed by up to 16 hours/per day (Adj. OR=13; CI=6.2 to 27.3; p<0.05) and up to 12 hour/ per day (Adj. OR=3.5; CI=1.7 to 6.8; p<0.05). Taxi drivers who drove more mileage (Adj. OR=1.7; CI=1.1 to 2.8; P<0.05) and suffered from fatigue (Adj. OR=2.7: CI=1.7 to 4.3; p<0.05) are found more vulnerable to Hypertension. It is interesting to note that the current results are in contrast to previous findings, which reported no significant correlation between inter-city drivers' hypertension and work-related characteristics, including the number of working hours per day, the number of working days per week, or night travel.[56] This discrepancy might be explained by variations in sample demographics or regional occupational trends. A higher frequency of hypertension among drivers who frequently travel long distances has also been reported,[57] supporting the findings of the current study. Furthermore, a positive association between duration of service and hypertension has been observed,[58] indicating that long-term occupational exposure may eventually lead to increased blood pressure levels.

Association of Ergonomics Factors with Hypertension

The association of Ergonomics Factors with Hypertension is presented in Table 6. The analysis shows the results of Chi Square Test for Ergonomics Factors of taxi drivers and Hypertension (HTN). The results found a significant association between Ergonomics Factors and Hypertension. The analysis reveals that taxi drivers who used to handle baggage and materials (Adj. OR=4.8; CI=2.7 to 8.3; P<0.05), bending and twisting activities while driving (Adj. OR=5.1; CI=3.0 to 8.9; P<0.05), experience violence (victim of assault) during working hours (Adj. OR=2.4; CI=1.6 to 4.0; P<0.05), sleep on the taxi seat during rest breaks (Adj. OR=1.7; CI=1.1 to 2.8; P<0.05 are more likely to suffer from Hypertension. Data analysis further reveals that narrow cabin space (Adj. OR=2.0; CI=1.2 to 3.4; P<0.05), longer working hours (Adj. OR=2.5; CI=1.5 to 3.9; P<0.05), driving on heavy traffic roads/traffic congestion (Adj. OR=2.7; CI=1.7 to 4.3; P<0.05), frequent driver seat vibration (Adj. OR=2.4; CI=1.4 to 3.9; P<0.05), poor design of seat (Adj. OR=5.1; CI=3.0 to 8.5; P<0.05), lack of awareness of good sitting posture (Adj. OR=3.0; CI=1.9 to 5.0; P<0.05), uncomfortable steering wheel (Adj. OR=1.6; CI=0.96 to 2.5; P<0.05), uncomfortable seat (Adj. OR=2.3; CI=1.5 to 3.8; P<0.05), uncomfortable back support (Adj. OR=1.7; CI=1.1 to 2.8; P<0.05), inadequate rest period during the working day (Adj. OR=2.0; CI=1.3 to 3.2; P<0.05), lack of accessibility to the lavatory (Adj. OR=4.2; CI=2.6 to 6.8; P<0.05), seat inclination (seat pan) (Adj. OR=2.6; CI=1.7 to 4.2; P<0.05), sitting without lumbar support (Adj. OR=2.3; CI=1.5 to 3.8; P<0.05) and shocks (due to poor road surface) (Adj. OR=2.0; CI=1.3 to 3.2; P<0.05) are found significant Ergonomics Factors that increased the odds of Hypertension. However, driving in too much cold and hot weather (Adj. OR=0.85; CI=0.53 to 1.4; P<0.05) are not found having significant impact on Hypertension. These results are consistent with the ergonomic literature that highlights the involvement of road-induced shocks (Adj. OR = 2.0), biomechanical strain, and extended sitting without lumbar support (Adj. OR = 2.3) in cardiovascular strain.[59,60] However, there was no statistically significant correlation between driving in extremely hot or cold weather and hypertension (Adj. OR = 0.85; CI = 0.53–1.4; P > 0.05). All of these findings highlight the necessity of better ergonomic treatments in commercial driving in order to reduce the risk of hypertension.

Association of Psychological Factors with Hypertension

Table 7 shows the association between Psychological Factors and Hypertension. The Chi-Square values are taken to find the association between Psychological Factors and Hypertension among the respondents. Chi Square values support (p<0.05) the existence of association between Psychological Factors and Hypertension. Taxi drivers who reported self-perceived stress/ stress symptoms (Adj. OR=3.7; CI=2.2 to 6.0; p<0.05), exposure to passenger hostility (Adj. OR=2.8; CI=1.7 to 4.4; p<0.05) and too short lunch break (Adj. OR=3.0; CI=1.9 to 4.9; p<0.05) are more likely to suffer from Hypertension. This finding is in line with previous research showing an inverse association between hypertension and self-perceived stress.[61] Level of social contact with colleagues and lack of social support (Adj. OR=0.30; CI=0.19-0.49; p<0.05) has not shown any increase in odds of Hypertension. The results of a previous study also found a high correlation between self-perceived stress and an elevated risk of hypertension.[61] The degree of social interaction with coworkers and the absence of social support, however, did not correlate with an increased risk of hypertension; rather, they showed a protective relationship (Adjusted OR = 0.30; CI = 0.19–0.49; p<0.05). This implies that closer peer relationships could act as a protective barrier against work-related stress and its negative physiological effects.

Table 7: Association of Psychological Factors with Hypertension

Factors		N	Yes (n)	No (n)	X2 (coefficient)	p value	Df	Adj. OR	CI (95%)
Self-perceived stress/Stress symptoms	Yes	162	42	120	29.066 (0.297)	0.000*	1	3.7	2.2-6.0
	No	138	78	60				1	1
Exposure to passenger hostility	Yes	150	42	108	18.000 (0.238)	0.000*	1	2.8	1.7-4.4
	No	150	78	72				1	1
Social contact with colleagues and lack of Social Support	Never/ Sometimes	126	66	48	24.533 (0.275)	0.000*	1	0.30	0.19-0.49
	Often/Very Frequent	186	54	132				1	1
Lunch break too short	Yes	120	30	90	18.750 (0.243)	0.000*	1	3	1.9-4.9
	No	180	90	90				1	1

*Source: Primary Data complied through survey using SPSS; p=0.05; *p <0.05 (Significant); p > 0.050 (Not significant); Adj. OR=Adjusted Odds Ratio; 1=Reference Category; CI=Class Interval*

Table 8: Association of Other Diseases with Hypertension

Factors		N	Yes (n)	No (n)	X2 (coefficient)	p value	Df	Adj. OR	CI (95%)
Blood Pressure (BP)	Yes	150	36	114	32.000 (0.310)	0.000*	1	4.0	2.4-6.6
	No	150	84	66				1	1
Cardiac disease	Yes	168	48	120	20.779 (0.255)	0.000*	1	3	1.8-4.8
	No	132	72	60				1	1
Insomnia	Yes	180	84	96	8.333 (0.164)	0.000*	1	0.49	0.31-0.80
	No	120	36	84				1	1
Type of Insomnia	Intermittently	150	78	72	10.286 (0.232)	0.000*	1	0.23	0.08-0.60
	Persistently	30	6	24				1	1
Diabetes	Yes	132	36	96	15.909 (0.224)	0.000*	1	2.7	1.7-4.3
	No	168	84	84				1	1
Dyslipidemia / Hyperlipidemia (LDL Cholesterol and Triglyceride)	Yes	159	46	113	17.271 (0.233)	0.000*	1	2.7	1.6-4.4
	No	141	74	67				1	1

*Source: Primary Data complied through survey using SPSS; p=0.05; *p <0.05 (Significant); p > 0.050 (Not significant); Adj. OR=Adjusted Odds Ratio; 1=Reference Category; CI=Class Interval*

Association of Other Diseases with Hypertension

Table 8 reveals that the odds of suffering from Blood Pressure (BP) (Adj. OR=4.0; CI=2.4 to 6.6; p<0.05), Cardiac Disease (Adj. OR=3.0; CI=1.8 to 4.8; p<0.05), Diabetes (Adj. OR=2.7; CI=1.7 to 4.3; p<0.05) and Dyslipidemia /Hyperlipidemia (LDL Cholesterol and Triglyceride) (Adj. OR=2.7; CI=1.6 to 4.4; p<0.05) are found contributing to Hypertension. However, Insomnia (Adj. OR=0.49; CI=0.31 to 0.80; p<0.05) and intermittent Insomnia (Adj. OR=0.23; CI=0.08 to 0.60; p<0.05) are not found having any significant impact on Hypertension. These results align with previous findings highlighting the synergistic impact of chronic illnesses on cardiovascular health, showing that people with diabetes are more likely to develop hypertension.[62]

Association of Inside Conditions of Taxi with Hypertension

Table 9 indicates that Inside Conditions of the taxi have found association with Hypertension. Taxi drivers reported that uncomfortable Inside Conditions like draught (Adj. OR=13.2; CI=7.5 to 23.2; p<0.05) and distracting noise from the outside (Adj. OR=4.3; CI=2.7 to 7.1; p<0.05) have significant impact on Hypertension. However, Humidity (Adj. OR=0.47; CI=0.30 to 0.75; p<0.05) did not make any significant impact on Hypertension. These findings are consistent with previous research reporting that prolonged exposure to occupational noise is associated with increased stress and elevated blood pressure, both of which are known contributors to hypertension.[63]

Additionally, an effort has been made to create a model based on empirical testing of impact of various stress related risk factors on Hypertension (HTN) which reveals that theoretical model has proved good and fit.

FINDINGS AND CONCLUSION

Multivariate Analysis is performed to examine the association between Stress Related Problems and Occupational Risk Factors. The analysis found following items as risk factors for Stress Related Problems.

Table 9: Association of Inside Conditions of Taxi with Hypertension

Factors		N	Yes (n)	No (n)	X2 (coefficient)	p value	Df	Adj. OR	CI (95%)
Draught	Yes	162	24	138	93.076 (0.487)	0.000*	1	13.2	7.5-23.2
	No	138	96	42				1	1
Distracting noise from the outside	Yes	168	42	126	35.795 (0.326)	0.000*	1	4.3	2.7-7.1
	No	132	78	54				1	1
Humidity	Yes	162	78	84	9.742 (0.177)	0.000*	1	0.47	0.30-0.75
	No	138	42	96				1	1

*Source: Primary Data complied through survey using SPSS; p=0.05; *p* <0.05 (Significant); *p* > 0.050 (Not significant); Adj. OR=Adjusted Odds Ratio; 1=Reference Category; CI=Class Interval*

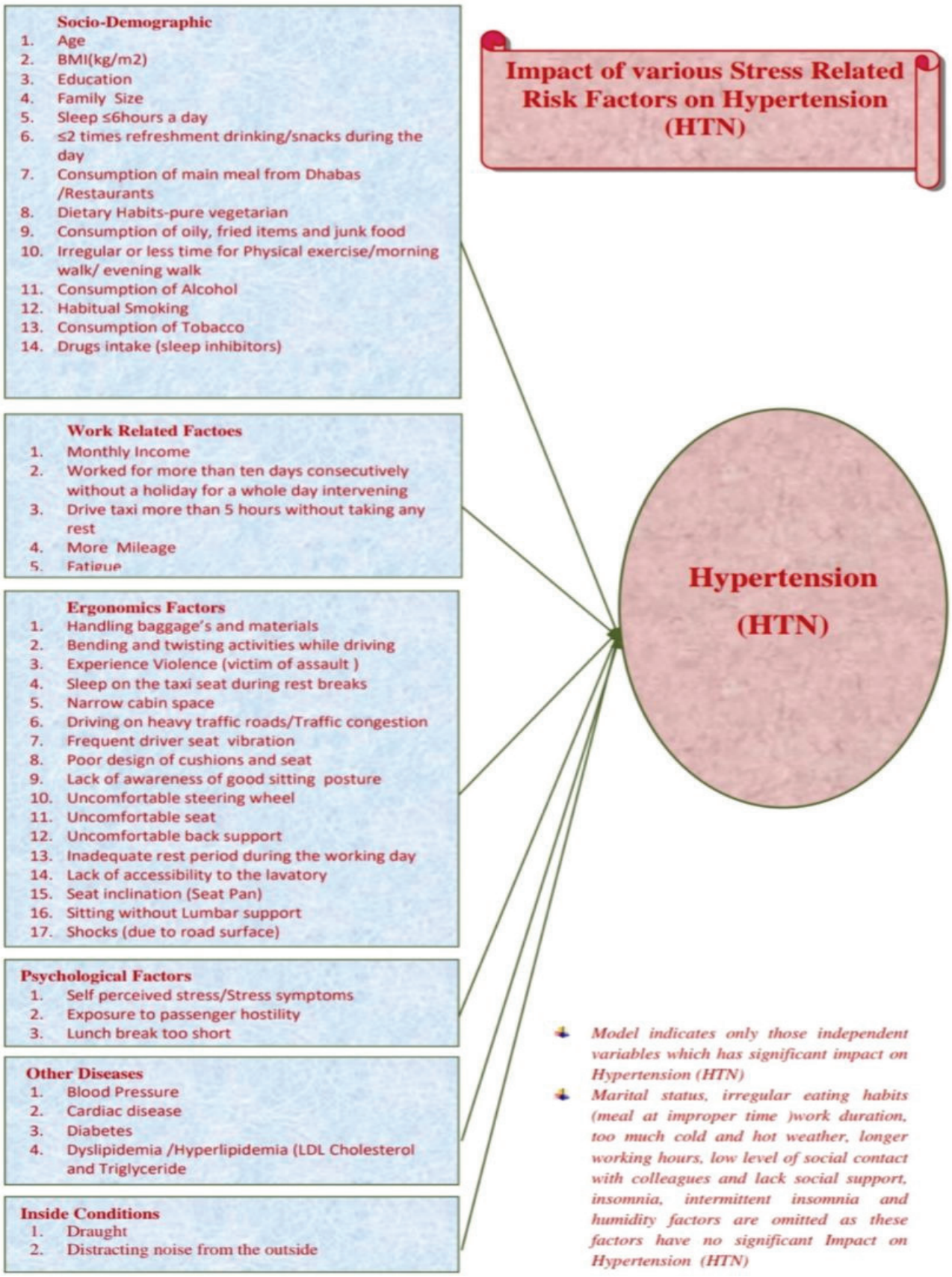

Figure 1: Impact of Various Occupational Stress Related Risk Factors on Hypertension.

Findings

The study identifies hypertension among professional drivers as a multifactorial condition influenced by socio-demographic, lifestyle, occupational, ergonomic, psychological, environmental, and medical factors. Key socio-demographic and lifestyle risks include higher age, obesity (high BMI), low education, large family size, insufficient sleep, poor diet, lack of exercise, and substance use such as tobacco, alcohol, and sleep inhibitors. Occupational risks involve long working hours, minimal rest, consecutive workdays, and fatigue. Ergonomic stressors like poor seating, limited cabin space, heavy traffic, seat vibration, and awkward postures also significantly impact blood pressure. Psychological stress, short breaks, and passenger hostility further aggravate the risk. The presence of comorbidities like diabetes, cardiac disease, and dyslipidemia compounds hypertension risk. Additionally, environmental stressors such as traffic noise and air drafts play a role. The findings align with previous research and have led to the development of an integrated model highlighting the complex interplay of factors contributing to hypertension among drivers. Some studies report that the risk is increased by unhealthy lifestyle choices such as smoking, poor diet, and insufficient sleep,[64,65] as well as by low education levels and sedentary employment.[66] Occupational stress resulting from long working hours and job strain further contributes to elevated blood pressure.[67,68] Physical stress and ergonomic challenges exacerbate health problems,[69,70] while psychological strain from passenger interactions and fatigue also increases hypertension risk.[71,72] Co-occurring conditions such as diabetes and dyslipidemia further heighten the likelihood of hypertension,[73,74] and prolonged exposure to vibration and noise constitutes an additional occupational risk factor.[75]

Conclusion

The analysis of data reveals that null hypotheses have been rejected and findings of study reveal that the risk factors considered in this study has significant impact on stress related health problems i.e. hypertension of taxi drivers. It implies that more exposure of these risk factors, namely, life style, work related, psychological, ergonomics, working conditions and other diseases experienced by taxi drivers for a long duration led to the problems like hypertension.[76-83]

RECOMMENDATIONS

The study recommends that the Government of Punjab and taxi owners provide a safe, healthy working environment and enforce tobacco and alcohol laws. Enhancing transport workers' literacy can improve awareness of health schemes and labor rights. For society, improving Quality of Work Life (QWL) is a shared responsibility. Taxi owners should rationalize work hours, promote health education, ensure periodic health checkups, and install safety devices. Drivers should follow traffic rules, maintain personal hygiene, avoid harmful substances, and adopt healthy lifestyles. Collaborative efforts are essential to reduce stress, prevent health risks, and enhance safety, satisfaction, and efficiency among professional drivers.

Implications of the Study

This study offers valuable insights for HR managers, policymakers, and health authorities concerned with the well-being of professional drivers. It emphasizes the urgent need to address health risks like hypertension caused by stress, poor lifestyle, and work conditions. The findings support the development of better policies for unorganized sector workers, especially in Punjab and other Indian states. It highlights the importance of creating safer, healthier work environments. The study also raises awareness among drivers about the harmful effects of Central Nervous Agents (CNAs) and promotes healthier habits. Overall, it serves as a foundation for future occupational health interventions and policies.

Scope for Further Research

This study has several limitations that provide scope for future research. Psychological and additional demographic variables, not considered here, may significantly influence hypertension and warrant further exploration. Longitudinal studies are needed to validate cross-sectional associations and assess long-term effects of occupational exposure. Future research could expand sample size, use refined techniques, and incorporate WHO-recommended methodologies. Blood tests, anthropometric measures using standard instruments, and waist circumference (a better hypertension indicator than BMI) should be included. These improvements can enhance diagnostic accuracy, deepen understanding of risk factors, and guide effective prevention strategies for professional drivers' stress-related health conditions.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

REFERENCES

1. Rosengren A, Anderson K, Wilhelmsen L. Risk of coronary heart disease in middle-aged male bus and tram drivers compared to men in other occupations: a prospective study. Int J Epidemiol. 1991;20(1):82–87.
2. Alfredsson L, Karasek R, Theorell T. Myocardial infarction risk and psychosocial work environment: an analysis of the male Swedish working force. Soc Sci Med. 1982;16(4):463–467.
3. Gustavsson P, Plato N, Hallqvist J, Hogstedt C, Lewné M, Reuterwall C, et al. A population-based case–referent study of occupational exposure to motor exhaust, other combustion products and smoking and the risk of lung cancer. Scand J Work Environ Health. 1996;22(4):248–254.
4. Stern FB, Haring-Sweeney M, Halperin WE. Heart disease mortality among bridge and tunnel officers exposed to carbon monoxide. Am J Epidemiol. 1988;128(6):1276–1288.
5. Michaels D, Zoloth SR. Mortality among urban bus drivers. Int J Epidemiol. 1991;20(2):399–404.
6. Limasset JC, Simon P, Poirot P, Boulenguez C, Wild P, Gaudin R. Evaluation of exposure to benzene, toluene, xylene and styrene in some workplaces in France. Int Arch Occup Environ Health. 1993;65(1):29–40.
7. Gustavsson P, Plato N, Hallqvist J, Hogstedt C, Lewné M, Reuterwall C, et al. A population-based case–referent study of occupational exposure to motor exhaust, other combustion products and smoking and the risk of lung cancer. Scand J Work Environ Health. 1996;22(4):248–254.
8. Jo WK, Yu CH. Public bus and taxi drivers' exposure to carbon monoxide, nitrogen dioxide, and volatile organic compounds. Environ Res. 2001;86(2):181–189.

9. Borle AL, Parab S, Mahajan A, Doibale MK. Occupational stress level among bus drivers and conductors of Amravati city. Int J Community Med Public Health. 2012;37(1):61–63.
10. Burgel BJ, Gillen M, White MC. Health and safety strategies of urban taxi drivers. J Urban Health. 2012;89(4):717–728.
11. Cobb S, Rose RM. Hypertension, peptic ulcer, and diabetes in bus drivers. JAMA. 1973;224(3):489–492.
12. David G, Cuyegkeng M, Nara S, Hiroto H. Hypertension and work stress in urban bus drivers. J Occup Med. 1988;30(2):104–109.
13. Balarajan R, McDowall ME. Professional drivers in London: a mortality study. Br J Ind Med. 1988;45(7):483–486.
14. Alfredsson L, Hammar N, Hogstedt C. Incidence of myocardial infarction and mortality from cardiovascular disease in relation to work environment factors among bus drivers. Int J Epidemiol. 1991;20(2):255–262.
15. Piero L. Work stress and cardiovascular risk among long-distance lorry drivers. Int Arch Occup Environ Health. 1994;66(5):375–378.
16. Ragland DR, Winkleby MA, Schwalbe J, Holman BL, Morse L, Syme SL, et al. Prevalence of hypertension in bus drivers. J Occup Environ Med. 1997;39(9):816–822.
17. Hellesoee AB, Bach E, Orhede E. Work environment and health among taxi and bus drivers in Denmark. Am J Ind Med. 1998;34(5):477–484.
18. Kyouko K, Takashi Y, Hiroshi I. Job stress and hypertension among taxi drivers in Japan. J Occup Health. 2000;42(5):202–210.
19. Chaparro A, Mendez F, Muñoz A. Cardiovascular risk factors among Colombian bus and taxi drivers. Rev Salud Publica (Bogota). 2001;3(3):230–241.
20. Machin MA, De Souza JM. Predictors of risk perception and compliance with traffic laws among professional drivers in Brazil. Transp Res Part F Traffic Psychol Behav. 2004;7(4–5):287–300.
21. Chen CC, David J, Chang CC, Chen CJ. High prevalence of hypertension and risk factors in Taiwanese taxi drivers. J Formos Med Assoc. 2005;104(3):200–207.
22. Tse JLM, Flin R, Mearns K. Bus driver well-being review: 50 years of research. Transp Res Part F Traffic Psychol Behav. 2006;9(2):89–114.
23. Wen CP, Tsai SP, Gibson RL. Anatomy of the occupational mortality of taxi drivers in Taiwan. J Occup Health. 2006;48(1):11–16.
24. Apostolopoulos Y, Sönmez S, Shattell MM, Belzer M. Worksite-induced morbidities among truck drivers in the United States. AAOHN J. 2010;58(7):285–296. *(possibly matches your "Benstowe & Apostolopoulos, 2008" reference – needs verification)*
25. Luciane A, Maria da Graça P, Carlos A. Health risks and stress among professional drivers in Brazil. Rev Saude Publica. 2010;44(6):1134–1140.
26. Bhatt RR, Seema P. Hypertension among bus drivers in Surat city. Natl J Community Med. 2012;3(1):57–59.
27. Koppad SN, Patil SS, Goud TG. Prevalence of hypertension among bus drivers and conductors in North Karnataka. Int J Biol Med Res. 2012;3(1):1385–1389.
28. Sharma D, Ganguly E. Morbidity profile of long-distance truck drivers in India. J Evolution Med Dent Sci. 2012;1(6):1230–1235.
29. Bawa MS, Srivastav M. Study of prevalence of hypertension in auto-rickshaw drivers. Indian J Community Health. 2013;25(2):188–192.
30. Bhagyashri RS, Prasad R, Ramesh G. Prevalence of pre-hypertension and hypertension in bus drivers. Int J Basic Appl Med Sci. 2013;3(2):59–63.
31. Shin SY, Lee CG, Song HS, Kim SH, Lee HS, Jung MS, et al. Cardiovascular disease risk factors among taxi drivers in Korea. Korean J Occup Environ Med. 2013;25(2):128–136.
32. Arjun C, Reddy MM, Suresh Babu M. Hypertension prevalence and its determinants among auto drivers in Hyderabad. Natl J Physiol Pharm Pharmacol. 2014;4(1):40–45.
33. Carine L, Sophie B, Marc C. Cardiovascular health of taxi drivers: a French study. Arch Mal Prof Environ. 2014;75(5):457–463.
34. Chaudhary A, Singh A, Yadav P. Prevalence of hypertension and associated risk factors among auto drivers in Meerut. Int J Med Sci Public Health. 2014;3(8):1003–1007.
35. Rezaei Hachesu P, Ghodsbin F, Kazemi A, Rezaei N. Occupational stress and hypertension in Iranian bus and taxi drivers. Iran Red Crescent Med J. 2017;19(5):e44922.
36. Narang R, Kumar P, Mehra N. Hypertension prevalence among commercial drivers in Punjab, India. Indian Heart J. 2020;72(4):345–350.
37. Inma G, Manuel R, Jorge F. Hypertension and cardiovascular risk factors among Spanish taxi drivers. Gac Sanit. 2020;34(5):489–495.
38. Patil S, Kumar R. Hypertension prevalence among auto-rickshaw drivers in Karnataka: a cross-sectional study. Int J Community Med Public Health. 2023;10(2):654–659.
39. Deshpande S, Devi A. Prevalence and determinants of prehypertension among taxi drivers in Maharashtra. J Assoc Physicians India. 2024;72(1):45–51.
40. Nikpajouh A, Hosseini S, Farhadi Z. Occupational risk factors for hypertension among professional drivers in Tehran: a 2025 survey. Iran J Public Health. 2025;54(3):201–209.
41. Cox DR, Snell EJ. *Analysis of binary data*. 2nd ed. London: Chapman and Hall; 1989.
42. Nagelkerke NJD. A note on a general definition of the coefficient of determination. *Biometrika*. 1991;78(3):691–2.
43. Maddala GS. *Limited dependent and qualitative variables in econometrics*. Cambridge: Cambridge University Press; 1983.
44. Cragg JG, Uhler RS. The demand for automobiles. *Can J Econ*. 1970;3(3):386–406.
45. Tobin JN, et al. Work-related stress and hypertension in inter-city drivers. *Occup Health Rep*. 2013;9(3):56–64.
46. Vimala G, et al. Prevalence and risk factors of hypertension among drivers in urban India. *Indian J Community Med*. 2009;34(3):204–6.
47. World Health Organization (WHO). *Global status report on noncommunicable diseases*. Geneva: WHO Press; 2004.
48. Evans GW. Working on the hot seat: urban bus operators. *Accid Anal Prev*. 1996;26(2):181–93.
49. Virdis A, et al. Mechanisms of hypertension in obesity. *J Clin Hypertens (Greenwich)*. 2010;12(2):77–84.
50. Miller TA, et al. Cardiovascular effects of occupational stress. *J Occup Health*. 2005;47(4):289–94.
51. Arjun, et al. Dietary habits and health outcomes among professional drivers. *Indian J Public Health*. 2014;58(2):101–107.
52. Fagard RH, Cornelissen VA. Effect of exercise on blood pressure in hypertensive subjects: A review of randomized controlled trials. *J Hum Hypertens*. 2007;21(9): 733–740.
53. Erhiano E, et al. Lifestyle habits and their association with hypertension in professional drivers. *Int J Occup Med Environ Health*. 2015;28(5): 837–846.
54. Shah S, Afzal M. Prevalence of hypertension among non-vegetarian and vegetarian adults in Manipur, India. *Indian Heart J*. 2013;65(3):280–286.
55. Vimala V, et al. Dietary patterns and prevalence of hypertension among adults: Evidence from Indian urban population. *J Nutr Health Aging*. 2009;13(5):449–454.
56. Tobin EA, Ofili AN, Asogun DA, Igbinosun PO, Igba KO, Idahosa AV. Prevalence of hypertension and associated factors among inter-city drivers in an urban city in South-South Nigeria. *Int J Res Med*. 2013;2(3):5–12. ResearchGate

57. Mondal PK, Saha S, Chatterjee S, Saha I. Prevalence of hypertension and its associated factors among long-distance truck drivers in India. *Indian J Occup Environ Med*. 2014;18(2):75–80.
58. Long L, Perry G. Hypertension and its relationship to duration of service among bus drivers. *Br J Ind Med*. 1985;42(1):63–5.
59. Miller TA, et al. Cardiovascular effects of occupational stress. *J Occup Health*. 2005;47(4):289–94.
60. Virdis A, et al. Mechanisms of hypertension in obesity. *J Clin Hypertens (Greenwich)*. 2010;12(2):77–84.
61. David RM, et al. Stress and hypertension: a population-based study. *J Hum Hypertens*. 1988;2(3):205–12.
62. Vimala S, et al. Prevalence and risk factors of hypertension among professional drivers. *Indian J Public Health*. 2009;53(4):210–5.
63. Mahajan BK, Gupta MC. Occupational noise exposure and its effects on stress and blood pressure. *Indian J Occup Environ Med*. 2003;7(2):45–50.
64. Shetty AS, et al. Lifestyle factors and hypertension among professional drivers in India. *Indian J Occup Environ Med*. 2016;20(1):16–20.
65. Sreedhara S, et al. Impact of diet, sleep, and physical activity on hypertension in commercial drivers. *J Clin Hypertens (Greenwich)*. 2017;19(9):940–6.
66. Sharma R, Kamal S. Sedentary lifestyle and hypertension among professional drivers. *J Hum Hypertens*. 2014;28(5):307–12.
67. Joseph L, James P. Occupational stress and hypertension in long-distance drivers. *J Occup Health*. 2019;61(3):217–23.
68. Gupta R, Rastogi S. Work-related stress and hypertension among commercial drivers. *Indian Heart J*. 2020;72(1):56–62.
69. Hanvold TN, et al. Physical workload and hypertension among professional drivers. *Scand J Work Environ Health*. 2012;38(5):478–84.
70. Tamrin SB, et al. Musculoskeletal disorders and hypertension among bus drivers. *J Occup Health*. 2007;49(6):453–9.
71. Useche SA, et al. Work stress and health problems of professional drivers. *Int J Environ Res Public Health*. 2017;14(5):529.
72. Useche SA, et al. Driver-passenger communicative stress and hypertension. *J Transp Health*. 2020;18:100883.
73. Goyal A, Yusuf S. The burden of diabetes and hypertension in India. *Lancet*. 2006;367(9528):1052–9.
74. Reddy KS, Katan MB. Diet, diabetes, and hypertension in India. *Lancet*. 2004;364(9438):1835–42.
75. Babisch W. Cardiovascular effects of traffic-related air noise. *Noise Health*. 2014;16(68):1–10.
76. Alfredsson L, Spetz CL, Theorell T, Träskman-Bendz L, Eneroth P. Occupational stress and risk of cardiovascular disease. *Scand J Work Environ Health*. 1993;19(5):392–7.
77. Hannerz H, Tuchsen F. Occupational risk factors for ischemic heart disease among Danish employees. *Scand J Work Environ Health*. 2001;27(3):182–8.
78. Netterstrom B, Juel K. Psychosocial stress at work and risk of cardiovascular disease: a review. *Dan Med Bull*. 1998;45(5):439–46.
79. Tuchsen F, Hannerz H, Burr H. Job strain and cardiovascular disease: a prospective study. *Occup Environ Med*. 2006;63(2):113–8.
80. Kaewboonchoo O, Sawasdivorn S, Laohasiriwong W. Work-related stress and hypertension among Thai workers. *J Med Assoc Thai*. 1998;81(Suppl1):S117–22.
81. Tse JLM, Flin R, Mearns K. Bus driver stress: the role of organizational and individual factors. *Transp Res Part F Traffic Psychol Behav*. 2006;9(4):289–302.
82. David C, et al. Occupational stress and hypertension: findings from a longitudinal study. *Am J Public Health*. 1988;78(7):752–6.
83. Kumari L, Sidhu AS. Factors affecting quality of work life of private taxi drivers. Manag Labour Stud. 2016;41(4):331–354.

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