



## Hypertension in Indian Truck Drivers: The Need for Comprehensive Service Provision to This Mobile Population (2017-18)

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### Abstract

**Background:** Uncontrolled hypertension and diabetes in truckers can negatively affect their work performance. This paper analyses the first-year data of an eye care program for truckers to assess their need for hypertension and diabetes screening.

**Materials and Method:** In this cross-sectional study, data were collected via eye camps for truckers held between July 2017 and June 2018. Truckers who consented to have their blood pressure and glucose examined were included. Variables analysed included basic age profiles of the drivers attending the camps, the proportion of the truckers suffering from hypertension, the proportion with previously undetected hypertension, proportion of hypertensive drivers taking treatment and the proportion of the truckers with suspected diabetes. Z-test and Chi-square test were used for data analysis.

**Results:** During the study period, 4,059 truckers attended camps, of whom 86.13% underwent hypertension screening. Out of those screened, 865 (24.7%, 95% CI: 23.31-26.17%) were diagnosed with hypertension. The mean age of the hypertensive drivers was higher than that of those with normal blood pressure ( $p < 0.001$ ) and susceptibility to hypertension was found to increase with age. Among 816 drivers with hypertension who responded to questions about hypertension history, only 49.1% reported to have undergone blood pressure examinations earlier, while only 25.4% had received the treatment prescribed. The prevalence of high blood glucose was found to be 4% in the 3,433 drivers tested, which had an increasing trend with aging.

**Conclusions:** There is an urgent need for formulating policies on hypertension screening and launching awareness campaigns in this mobile population.

**Keywords:** Adults, Blood Pressure, Work Performance, Hypertension, Motor Vehicles.

### Introduction

Indian truck drivers contribute significantly to the transportation sector [1]. However, the mobile lifestyle of these truckers compromises their health [2], and the nature of their profession creates a variety of health conditions, with most of which

remaining either undiagnosed or worsening over time [3, 4].

Being on the road for long hours and days nonstop restricts their awareness of and access to proper healthcare services [4]. The disease pattern observed in the Indian truckers is similar to that in the United States [5, 6], which includes visual

disorders, watering eyes, coughing, diabetes, breathlessness, dermatological conditions, and gastric problems, like hyperacidity [7]. In fact, risk factors for metabolic syndrome are considered a key finding achieved in their health profiles [3].

Lack of sleep is associated with an increase in the prevalence of hypertension [8]. Among behavioural risk factors leading to hypertension, one could refer to tobacco use and obesity [9]. In addition, occupations leading to a sedentary routine life, family history of hypertension, and alcohol addiction are other causative factors of hypertension [10]. Hypertension has been shown to exert highly deleterious effects on the executive function as well as on the speed of reactions [11], with both of which directly affecting truck drivers.

The Driver Care Program (DCP) was conceptualised by our organization, i.e. Dr Shroff's Charity Eye Hospital, in 2016 to provide better eye care services to truck drivers at their rest hubs in the national capital region. This was done in cooperation with a partner active in manufacturing vehicles, especially trucks. While it is primarily focused on improving accessibility and affordability of quality eye care services for truck drivers, the DCP provides basic screening services for systemic conditions, such as hypertension and diabetes.

A national survey conducted in the United States reported the high prevalence of hypertension and diabetes in truck drivers [12]. In India, a systematic review and meta-analysis determined the prevalence of hypertension (high blood pressure) to be around 29-30% in adults [13]. It also highlighted a difference in the prevalence rate between urban (33.8%) and rural populations [27.6%]. Similarly, the prevalence of diabetes in the adult population was estimated by the International Diabetes Federation to be 8.8% [14]. Both hypertension and diabetes are risk factors for metabolic syndrome shown to exist primarily in the 40-69 age group [15]. A national study reported that hypertension is common among the 18-25 age group [16], and the World Health Organisation reported that diabetes affects Indians in the 25-40 age group [17]. All of the aforementioned reports indicate that these productive Indian age groups suffer from diabetes and hypertension, which could negatively affect work performance among this mobile population, i.e. truck drivers.

The DCP included screening for hypertension and diabetes because the majority of truckers catered to by the program fall under this productive and susceptible age group. Opportunistic screening for hypertension has proved fruitful in earlier research [18]. Thus, this technique was used in the present study to target this unique population. The first

step in developing a long-term program in this study was to analyse the first-year data of the program to assess the need for hypertension and diabetes screening among the truck drivers. This would also help plan for additional resources and equipment that might be required.

## Materials and Methods

The present cross-sectional study was approved by the Institutional Review Board (IRB/2019/OCT/08) and adheres to the tenets of the Declaration of Helsinki. Data were collected from the routine eye camps for truck drivers during the study period from July 2017 to June 2018. Next, the data were entered into Microsoft Excel. No sample size calculation was required because all truck drivers accessing camp services during the study period were included in the analysis, and non-drivers, i.e. auto mechanics and helpers, accessing services were excluded. Driver data were authenticated by the government for commercial driver identification which is a category of driver's license issued by the government for commercial drivers of heavy motor vehicles.

The eye camps were held across the national capital region, including parking lots owned by fleet owners and big transporters, workshops, filling stations, and transport colonies (residential locations of long-term truck drivers). Before launching each camp, awareness activities were done to encourage drivers to attend the camp. Upon arrival, the patients went through the registration process. Next, some personnel were sent to the camp after receiving training and being credentialed by senior nurses at the hospital, who checked their blood pressure and blood sugar at random. Accordingly, blood pressure (BP) was measured by the NoCoding 1 Plus device, and random blood sugar was checked using the automatic blood sugar monitoring machine. The check-ups were only done for truckers giving consent for the process. In addition, the instruments were regularly calibrated on a weekly basis. Besides, hypertension was defined as the systolic blood pressure of  $\geq 140$  mmHg or the diastolic blood pressure of  $\geq 90$  mmHg [19]. Similarly, diabetes was defined as the random blood sugar of  $\geq 200$  mg/dl [20]. Patients diagnosed with blood pressure exceeding the normal range were asked about their hypertension history. In addition, the suspected hypertensives and diabetics were provided with Information, Education, and Communication (IEC) material and referred to a physician nearby.

The basic age profiles of the drivers, the proportion of the drivers suffering from hypertension, the

proportion of the drivers with previously undiagnosed hypertension, and the proportion of the drivers with high blood sugar were analysed. Besides, the age-specific risk of hypertension as well as the relative risk (RR) were calculated. The former was calculated as the percentage of the drivers diagnosed with hypertension for each age category. The latter was used for the age group below 30 as a basis for measuring increased susceptibility of a person to a disease for different age categories. In addition, confidence intervals at a 95% level were calculated for the point estimates of age-specific risks and relative risks. Next, statistical analysis was performed using a Z-test and a Chi-square test by SPSS version 24 and Microsoft Excel 2013. In addition, a p-value of less than 0.05 was considered significant.

**Results**

A total of 4,059 truck drivers were examined at the eye camps in a mobile van during the study period. Most of the drivers belonged to the 20-50 year age group with the maximum (1622, 40.0%) number of drivers in the 20-30 year age group. The mean age of the truck drivers in the present study was 34.16 ± 10.09 years with the median age of 32 years and the age range of 17-74 years. All of the truck

drivers were male, for male dominance is observed in this occupation in India.

A total of 3,496 truck drivers (86.13% of the total 4,059 drivers) consented to have their blood pressure examined, and 865 of them (24.7%, 95% CI: 23.31-26.17%) were diagnosed with high BP. The average age of the truck drivers with high BP was found to be 38.65 ± 10.35 years, which was significantly higher than that of those with BP within the normal range (33.02 ± 9.77 years, p<0.001). The risk of hypertension increased with aging (Table 1). Using the relative risk of hypertension in truck drivers less than 30 years of age as a baseline for comparison, the risk of acquiring hypertension in drivers 30-39 years of age was 1.76 times more. The relative risk of hypertension among the truck drivers aged above 60 years was estimated to be 3.25 compared to the risk of hypertension below the age of 30 years. Those diagnosed with hypertension were asked about their hypertension history, with 816 out of the 865 (94.3%) drivers having responded to the questions. Out of them, 401 (49.1%, 95% CI, 45.7-52.6%) had their blood pressure examined earlier, and only 102 out of the 401 drivers (25.4%, 95% CI, 21.2-29.7%) were known hypertensive drivers who would receive the advised treatment.

**Table 1.** Prevalence of hypertension among truck drivers [Original]

Age category	Number of truck drivers	Number of truck drivers with hypertension	Age specific risk	95% CI for age specific risk	Relative risk	95% CI for relative risk	P-value (chi-square)	Hypertension prevalence in general population (NFHS-4) (25)
Less than 30 years	1357	196	14.44%	(12.57%-16.31%)	Base			6.28%
30-39 years	1040	265	25.48%	(22.83%-28.13%)	1.76	1.49-2.64	<0.001	17.10%
40-49 years	747	250	33.47%	(30.08%-36.85%)	2.32	1.97-4.56		24.70%
50-59 years	303	131	43.23%	(37.66%-48.81%)	2.99	2.49-7.46		
60 years plus	49	23	46.94%	(32.97%-60.91%)	3.25	2.35-7.63		
<b>Total</b>	3496	865	24.74%	(23.31%-26.17%)				

A total of 3,433 truck drivers underwent the random test for blood sugar, and 139 truck drivers were diagnosed with a sugar level higher than 200mg/dl (a prevalence of 4%, 95% CI: 3.4-4.7%). Similar to hypertensive patients, the average age of the diabetic truck drivers was significantly higher than that of those with a normal blood sugar level (45 and 34 years, respectively), so they differed significantly (p-value<0.05).

A total of 4% of the truck drivers were found to be suffering from both hypertension and high blood sugar. In addition, the proportion of comorbidities was less than 1% in the age group of less than 30, but it increased to 21% among the truck drivers 60

years old or older. The study results showed that 52% of the truck-drivers in the 50-59 year age group and 64% in the age group of 60 years and above suffered from hypertension, diabetes, or both.

**Discussion**

In the eye screening camps held during the study period, 3,496 truck drivers were screened for hypertension, with the prevalence of which found to be close to 25% in the study population. Among 816 drivers who answered questions about their hypertension history, 49% of them reported having

undergone an earlier check-up. However, only a quarter of them followed the treatment they had been advised to receive. In addition, the risk of hypertension was found to significantly increase with aging.

Among the 3,433 truck drivers who had their random blood sugar tested, the prevalence of diabetes (4%) was comparable to that in a study conducted in the Southern Indian, in which 3.39% of truck drivers were shown to suffer from diabetes [7]. The prevalence of high blood sugar or high blood pressure or both was found to increase with aging. In addition, 52% of the truckers suffered from either of the two comorbidities or both, while 4% of them suffered from both comorbidities.

The significant association of hypertension with aging has been reported earlier [21-23]. The prevalence of hypertension was calculable given that the mean age of the drivers in our study was just 34 years. In contrast, two studies from the Southern India reported the higher prevalence of 40-45% in similar age categories (the average age was 39 years in the former study, while it was 28 years in the latter) [7, 24]. These figures indicate that the hypertension trend is becoming increasingly common in truckers of relatively younger age groups. Another trend identified in non-trucker populations indicates that the Southern Indian populations have a higher hypertension prevalence than the Northern Indian populations both in urban and rural areas [13, 23]. Thus, the difference between our Northern Indian truck drivers and the mentioned Southern Indian ones [7, 24] could be explained by the difference in the regions in which the studies were conducted, if not by the association with aging.

In addition, the prevalence of hypertension among the truck drivers in this study was far higher than that in the general population of India (as recorded in the National Family Health Survey 2015-16; NFHS 4), which was estimated to be 13.8% in the general male population of 15-49 years old [25]. It was found out in the present study that the prevalence of hypertension among truckers in the same age group was 22.6%, with the risk of hypertension having been found to be consistently higher among truckers of all age-categories (Table 1). In addition, it was found out that only 49.1% of the drivers had undergone check-ups for hypertension. However, only 25.4% of the known hypertensives would receive the advised treatment. In a nationwide systematic review and meta-analysis of the general population, rural hypertensives were reported to have lower awareness of their hypertensive status (25%) than urban hypertensives with their awareness levels reported to be similar to that of the present study

(41.9%) [13]. Moreover, a smaller percentage of those diagnosed with hypertension adhered to the advised treatment (24.9%) in rural areas, while 37.6% of those diagnosed with hypertension adhered to the advised treatment in urban areas. In contrast, another study on truckers in the Southern India reported that nobody was aware of their hypertensive status prior to the study, so none of them would take medications to control it [7]. A global systematic review and meta-analysis reported that the prevalence of adherence to treatment was 45.2% [26] among the identified hypertensives, which was much higher than that reported by the present study (25.4%). The reported low level of awareness, lack of routine check-ups, and poor adherence highlight the need for health educational interventions.

A major limitation of the present study was its inability to follow up on the drivers to provide conclusive diagnoses of hypertension and high blood sugar. However, the great strength of the present study lies in its screening of one of the largest groups of Indian truck drivers for hypertension. This is especially important when compared to the numbers reported in earlier studies on truck drivers in India [2, 7, 24].

The provision of healthcare facilities to a mobile population of truck drivers could be a role model for health service providers [27]. Based on the results of the present study, it is recommended that health programs combine screenings for multiple ailments, especially asymptomatic systemic conditions at a single urban setting [28] where truck drivers could stop for taking some rest or refuelling. The present study highlights the need for examining truck drivers through hypertension screening programs. However, the DCP tries to achieve the same by combining hypertension screening with eye care screening. This would make services offered to the drivers more time- and cost-effective and also create awareness among drivers. Besides, including examinations for hypertension and other risk factors for metabolic syndrome such as diabetes accompanied by road safety and license testing protocols would further awareness campaigns among this population. Developing effective referral mechanisms for systemic conditions and closing the loop of healthcare availability, accessibility, and affordability for this mobile population would lead to logical progression in similar programs.

## Conclusion

We found out that a considerable proportion of the truck drivers were affected by, or at the risk of hypertension. Thus, screening programs should be

emphasised as a key public health strategy for decreasing mortality and morbidity rates in India, especially for unique populations, such as truck drivers who do not afford to access quality healthcare services. To better serve this mobile population, the results of this study positively affect decision making about continuation of the Driver Care Program (DCP) in order of developing referral linkages to fill the gaps of healthcare provisioned.

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