SHORT ARTICLE

Screening for Non-Communicable Diseases among transport employees of a University: A Descriptive Analysis

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Abstract

Introduction: In most parts of the world today, non-communicable diseases (NCDs) are on the rise. Worldwide they are currently responsible for almost half (42%) of the premature deaths which occurs before the age of 70. Due to sedentary lifestyle, workers of transportation department may be at a higher risk for development of obesity, hypertension, hypercholesterolemia and hyperglycaemia. **Objective**: To screen all the transport employees of a university for non-communicable diseases. **Methods**: This cross-sectional study was carried out among all transport employees to screen for hypertension, Type II diabetes, obesity and visual impairment. Data was collected by personal interviews using a pre designed questionnaire. Anthropometry, blood pressure recording, fasting blood glucose testing, vision assessment followed by electrocardiogram recording was done for all subjects. **Results**: Out of 90 participants, 10(11.1%) had diabetes, 26(28.9%) were hypertensive, 36(40.0%) were overweight and obese, three individuals had myopia and abnormal colour vision, whereas 17(18.9%) had impaired near vision. The screen positives were referred to tertiary care hospital for further management. Over half of the subjects reported alcohol use while 21(23.4%) were using tobacco. Only 43(47.8%) used seat belts while driving. Conclusion: Proportion of obesity, hypertension, and diabetes was found to be more among the transport employees. This demands an urgent need for appropriate preventive and health promotive interventions to address these chronic diseases.

Key Words

Screening; Non-Communicable Diseases; Cross-Sectional; Transport Employees; Occupation.

Introduction

Non-communicable diseases (NCDs) are no longer a disease of developed countries. According to WHO 2012 estimates, NCDs contribute to 38 million deaths globally. This figure is further expected to rise up to 52 million by 2030 if urgent preventive steps are not taken.(1) Worldwide these are currently responsible for almost half (42%) of the premature deaths which occurs before the age of 70. In India, as per the Harvard school of Public health 2014 report, the prevalence of hypertension among the age group above 45 years is 40% while for diabetes, it is 9%.(2) They accounted for 40% of hospital stay and 35% of total outpatient visits in 2004.(3)

The occupation of driving has been well associated with an increased risk of developing NCDs.(4) In order to exercise their professional duties, the workers of the transportation department indulge in long hours of sitting, sedentary behaviour and low-intensity physical activity. (5) Their altered circadian rhythm, changes in lifestyle, tension and stress at work predispose them to a high risk to obesity, high blood pressure, high cholesterol and

hyperglycaemia.(6) Studies in recent decades have shown that sedentary lifestyles and irregular eating habits of the bus drivers has translated to high rates of morbidity and mortality caused by NCDs.(7,8) Few studies have proved that there is a significant prevalence of diabetes and other NCDs among sedentary workers. (9,10,11) A study done in Davengere city of Karnataka revealed that 17% of the auto-rickshaw drivers were hypertensive while 48% were overweight and obese. (12) Another study done in Bangalore reported 35% of the bus drivers to be hypertensive and 14% to be diabetic.(13) These estimates demand early detection of NCDs in such focused work groups, in order to reduce its overall burden and complications. This can well be achieved by implementing easily available and cost-effective screening tools in the population.

Aims & Objectives

To screen all the employees working in the transport department of a University for presence of non-communicable diseases.

Material and Methods

Study design and participants: On the occasion of 23rd World Diabetes day celebrated on the 14th of November, the Department of Community Medicine, Kasturba Medical College, Manipal organized a screening camp for the employees of the transport department of Manipal University, Manipal in South Karnataka. Screening for hypertension, diabetes mellitus, obesity, ischemic heart disease (IHD), and visual impairment was done and data was collected. The subjects of the study were the regular employees of the transport department (n=90) working under Manipal University. Consecutive sampling was employed, wherein all the employees were screened.

Study variables and instruments: Institutional ethical clearance (IEC684/2014) was obtained prior to the initiation of the study. Written informed consent was obtained from all the participants. On the day of camp, data was collected by personal face-to-face interview using a pretested questionnaire. Main domains of the questionnaire were: Socio-demographic details, past medical history, family history, personal habits, occupational history, awareness and practice of road safety measures, anthropometry, blood pressure recording, fasting blood glucose testing, vision assessment and ECG recording. Individuals with history of either parent or sibling having hypertension or diabetes was considered to have a positive family history.

For all the participants, anthropometric measurements were done using standard weighing scale (kg) and measuring tape (cm) for weight and height measurement respectively. Weight was recorded to the nearest 500 gm while height was taken to the nearest one cm. Body mass index (BMI) was calculated using the formula, weight/height2 (kg/m2). Waist circumference was measured at the mid-point between the lower margin of the last palpable rib and top of the iliac crest. Hip circumference was measured at the widest portion of the hip at the level of greater trochanters with the subject standing erect in a relaxed position with arm at the sides, feet positioned closed together. Waist-Hip ratio (WHR) was calculated as the ratio of waist circumference over hip circumference.(14) Blood Pressure (BP) was measured in the right arm using a standardized mercury sphygmomanometer with adult size cuff, with the subject in relaxed and in sitting position. Readings of the blood pressure was obtained ten minutes apart and average of the two readings was included as the final blood pressure reading.(15) Fasting Blood sugar (FBS) was measured for all individuals by glucometer after overnight fasting of eight hours.(16) Vision testing was done using Snellen's chart for distant and near vision. To assess the distance visual acuity, the subject was seated comfortably at a distance of six metres from Snellen's chart in a well-illuminated room. The subject was asked to read the chart with each eye separately and the visual acuity was recorded as a fraction; the numerator being the distance of the subject from the letters, and denominator being the smallest letters accurately read. Snellen's near vision chart was to be read from a distance of 35 cm from the eyes.(17) Colour vision was tested using Ishihara's chart. (17) Electrocardiogram (ECG) recording was done using 12-lead portable ECG machine by a trained technician.

Screening results were provided to the participants. Participants who were found to have raised blood pressure or high fasting blood sugar, or screened positive for any test were referred to Kasturba Hospital for further management. At the end of the study, the participants were provided an informal health education by medico-social workers, regarding physical activity, ill effects of tobacco and alcohol.

Definitions: Anthropometric measurements: An individual was considered to be overweight if BMI ≥25kg/m2 and obese if BMI ≥30kg/m2. Central/abdominal obesity was considered when waist circumference was ≥90 cm for males and ≥ 80 cm for females. Waist hip ratio of >0.90 for males and >0.80 for females was defined as truncal obesity.(14)

Diabetes Mellitus: Fasting blood sugar ≥ 126 mg/dl.(16)

Hypertension (HTN): HTN was defined as systolic BP of ≥140 mm Hg and/or diastolic BP of ≥90 mm Hg or current pharmacological treatment for HTN (JNC VII). (18)

On treatment for hypertension and/ or diabetes: Either pharmacological treatment or non-pharmacological treatment (life style modification) or both.

Normal near vision: If near visual acuity of either eye was equal to N6.(17)

Impairment of near vision: If near visual acuity of either eye was worse than N6.(17)

Normal distance vision: If distance visual acuity of either eye was equal to or better than 6/18.(19)

Impaired distance vision: If distance visual acuity of either eye was worse than 6/18.(19)

Statistical analysis: Data was entered and analyzed in Statistical Package for Social Sciences (SPSS) version 15. Data has been presented as percentages & proportions. Univariate analysis using Pearson chi-square test was done and $p<0.05$ was considered to be statistically significant

Results

In the present study, the mean ±Standard Deviation (SD) age of the participants was 40.2 years (±9.2). Majority (66.7%) had completed their education up to 12th standard and only one subject was illiterate. Three-fourth of the participants were drivers as shown in (Table1). The mean (±SD) duration of driving was 16.2years (±9.5). Results of the screening for NCDs are depicted in (Table 2). Half of the participants had BMI in the normal range (55.6%) while 28 (31.1%) were overweight and eight (8.9%) were obese. Truncal obesity was found among 78 (86.7%) participants while 38 (42.2%) had central/ abdominal obesity. All the participants underwent blood pressure and blood sugar testing irrespective of their hypertension or diabetes status. So, among all the subjects, impaired fasting glucose was found among 17(18.9%) participants while 10 (11.1%) had FBS≥126 mg/dL. According to JNC VII criteria, 26 (28.9%) had SBP≥140 and DBP ≥ 90mm Hg, while 46 (51.9%) were found to be in pre-hypertensive range. Among the transport employees, five subjects were known cases of hypertension and diabetes already on treatment. A positive family history was found among 28 (31.1%) and 17 (18.9%) for hypertension and diabetes respectively. ECG was found to be abnormal among 11 (12.2%) participants; among whom, four had left axis deviation and two had suspected posterior myocardial infarction. They were referred to the Cardiology department in the adjoining tertiary care hospital for further management and follow-up. Vision testing by Snellen's chart revealed three (3.3%) and 17 (18.9%) participants to be myopic and hypermetropic respectively. Only three subjects were found to have abnormal colour vision. A quarter of the participants had already been using spectacles for distant or near vision. Subjects with visual impairment were referred to the Ophthalmology department for further evaluation. Around 76 (74.4%) subjects were doing over-time while 62 (68.8%) had night shifts and 15 (16.7%) had at least one road traffic accident (RTA) during their entire driving career.

The proportion of participants having diabetes and hypertension were found to be more among individuals aged more than 40 years but there was an equal distribution of obese subjects in both the age categories when assessed according to BMI. Although, central and truncal obesity was found to be more among people aged over 40 years, there was no statistically significant association between educational status and diabetes, hypertension and obesity. As the number of drivers in the study sample was more than other jobs in transport department, the number of people with diabetes and hypertension was also more in this sub-group (Table 3)

Discussion

In the present study, among the 90 participants, 10 (11.1%) were found to have diabetes, 26 (28.9%) were hypertensive, 36 (40.0%) were overweight and obese; while 78 (86.7%) had truncal obesity and 38 (42.2%) were found to have central obesity. Over half of the subjects reported alcohol use while 14 (15.6%) were smoking and seven (7.8%) were using smokeless tobacco. The study design was similar to the study done by Koppad R in Davangere city 12 among 200 auto-rickshaw drivers; wherein there was

a marginally higher prevalence of central obesity (36.5%), obesity and overweight (48%) individuals in comparison to the present study, probably because of a lower BMI ≥ 23kg/m2 cut-off used in the study. The proportion of alcoholics (34.5%), pre-hypertensives (37%) and hypertensives (17%) was also lower in Davengere but proportion of smokers (29.5%) and smokeless tobacco users (36.5%) was higher as compared to the present study.(12) In a study done among bus drivers of Karnataka State Road Transport Corporation, Waist-to-Height ratio (WHtR) and WHO/ISH cardiovascular risk prediction charts was used to study the cardiovascular risk factors.(13) They reported that 78% subjects were above the WHtR cut-off value of 0.5, marginally higher proportion of subjects were smokers (29%), hypertensive (35%) and diabetic (14%) while only 24% were alcoholic as compared to the present study. These risk factors were found to be predominantly more among the participants who belonged to the age >50 years as compared to the present study where mean age of the participants was 40.2 years. In North Kerala, a study done among bus drivers by Lakshman A *et al* (20) reported higher proportion of the subjects to have non-communicable diseases and risk factors in contrast to the present study. Studies from Davangere12 and Andhra Pradesh (21) reported higher proportion of obese subjects owing to lower cut-off value of BMI ≥ 23.00 kg/m2 chosen, thereby differing in the results from the current study. A study from Nagpur (22) reported a substantial lower proportion of pre-hypertensives (37.2%), alcoholics (34.1%) and subjects with higher BMI (18.2%) but a higher number of tobacco consumers (71.3%) and hypertensives (35.1%) in comparison to this study. These differences could be attributed to sub-occupational variations and sample size differences. In Agra city, Singh SP *et al* (23) reported a similar proportion of visual impairment (3.6%) and hypertension (30.2%) among 440 auto-rickshaw drivers, while the prevalence of obesity was lower. Gadekar RD *et al* (24) reported comparable prevalence of diabetes (10.4%) amongst 287 bus drivers of Maharashtra. In South Brazil (25) and Iran, (26) higher proportion of the participants were found to be overweight and obese (79.2%) as well as centrally obese (58.2%) despite of the higher waist circumference cut-off being used (≥102 cm). Higher blood pressure levels was found among the subjects in both the studies while number of diabetics were more in South Brazil 25 study regardless of the higher cut-off used for post-prandial blood glucose measurement used (≥140mg/dl).

Conclusion

The present study revealed a high proportion of obesity, hypertension and diabetes among the transport employees.

Recommendation

Thus it can be noted that, that the proportion of individuals with non-communicable diseases and their risk factors is quite substantial among drivers and employees of transport department. These findings further, substantiate the need for appropriate preventive and health promotive interventions like encouragement of regular physical activity and quitting harmful habits like tobacco and alcohol to combat the rising risk factors for NCDs among the transport employees.

Authors Contribution

All authors had contributed equally.

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Tables

TABLE 1 SOCIO-DEMOGRAPHIC DETAILS OF THE STUDY PARTICIPANTS (N=90)

Variables	n (%)
Age (years)	
<40	47(52.2)
≥40	43(47.8)
Education(N=89)	
Up to Class 9th	25(27.8)
Class 10-12th	60(66.7)
Higher education	4(4.4)

Religion	
Hindu	87(96.7)
Christian	3(3.3)
Marital status	
Married	70 (77.8)
Unmarried	20(22.2)
Occupation	
Driving	69(76.7)
Others*	21(23.3)

TABLE 2 SCREENING RESULTS FOR HYPERTENSION, DIABETES MELLITUS, OBESITY AND VISUAL IMPAIRMENT (N=90)

Variables	N (%)
Body Mass Index(kg/m2) (N=90)	
Normal (<24.99)	54(60.0)
High (≥25.00)	36(40.0)
Waist Hip Ratio(N=90)	
Normal (<0.90)	12(13.3)
Truncal Obesity (≥0.90)	78(86.7)
Waist Circumference (N=88)	
Normal (<90 cm)	50(55.6)
Central/abdominal Obesity (≥90 cm)	38(42.2)
Blood Pressure (mm Hg)	
Normal (<140/90)	64(71.1)
Hypertension (≥140/90)	26(28.9)
Fasting Blood Glucose(mg/dl)	
Normal (<125)	80(88.9)
Diabetes (≥126)	10(11.1)
ECG Reports	
Normal	79(87.8)
Abnormal	11(12.2)
Visual Acuity	
Distance Vision†	
Normal	87(96.7)
Impaired Vision	3(3.3)
Near Vision‡	
Normal	73(81.1)
Impaired Vision	17(18.9)
Colour Vision	
Normal	87(96.7)
Impaired Vision	3(3.3)
Normal Distant Vision (6/6), Impaired Distant vision (worse than 6/18) Normal Near Vision (N6), Impaired Near Vision (worse than N9)	

TABLE 3 ASSOCIATION BETWEEN SOCIO-DEMOGRAPHIC VARIABLES AND NON COMMUNICABLE DISEASES

Variables	Diabetes (FBS:≥126mg/dl) (n=10)	Hypertension (BP:≥140/90 mmHg) (n=26)	Obesity (BMI≥25.00) (kg/m2) (n=36)	Central Obesity (WC≥90cm) (n=38)	Truncal Obesity (WHR≥0.90) (n=78)
Age (years)					
<40	2(20.0)	10(38.5)	18(50.0)	14(36.8)	38(48.7)
≥40	8(80.0)*	16(61.5)	18(50.0)	24(63.2)	40(51.3)*
Education	2(20.0)	11(42.3)	7(19.4)	13(34.2)	21(27.3)
Up to Class 9th	8(80.0)	15(57.7)	29(80.6)	25(65.8)	56(72.7)
Above Class 10th					
Occupation	8(80.0)	20(76.9)*	31(86.1)	31(81.6)	63(80.8)*
Driving	2(20.0)	6(23.1)	5(13.9)	7(18.4)	15(19.2)
Others					

*p<0.05, by chi square test