

**A STUDY ON DIETARY PATTERN AND PREVALENCE OF
DIABETES MELLITUS, OBESITY AND HYPERTENSION AMONG
MALE BUS DRIVERS IN SATHYABAMA INSTITUTE OF SCIENCE
AND TECHNOLOGY**

Submitted in partial fulfilment of the requirements for the award of
Bachelor of science degree in Clinical Nutrition and Dietetics

by
R Dharani (40736001)



DEPARTMENT OF CLINICAL NUTRITION AND DIETETICS
SCHOOL OF ALLEID HEALTH SCIENCE

SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY)

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BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of DHARANI R (40736001) who carried out the project entitled "A STUDY ON DIETARY PATTERN AND PREVALENCE OF DIABETES MELLITUS, OBESITY, AND HYPERTENSION AMONG MALE BUS DRIVERS IN SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY" under my supervision from JUNE 2022 to MAY 2023.

Internal Guide
(Ms. ROSHNI .M, M.Sc, NET)

Head of the Department
(Dr. L. INBATHAMIZH)

Submitted for Viva Voce Examination on 12 - 05 - 2023

SATHYABAMA
INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)
K. J. Somaiya Nagar, Rajiv Gandhi Salai
Chennai - 600 079

Internal Examiner

12/5/23
External Examiner

DECLARATION

I DHARANI.R hereby declare that the Project Report entitled “**A STUDY ON DIETARY PATTERN AND PREVALENCE OF DIABETES MELLITUS, OBESITY AND HYPERTENSION AMONG MALE BUS DRIVERS IN SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY**” done by me under the guidance of Ms. ROSHNI.M is submitted in partial fulfillment of the requirements for the award of Bachelor of Science degree in Clinical Nutrition and Dietetics.

DATE:

PLACE:

SIGNATURE OF THE CANDIDATE

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ABSTRACT

The WHO estimates that within the next few years, non-communicable diseases will become the principal global cause of morbidity and mortality. Tobacco use, physical inactivity, the harmful use of alcohol and unhealthy diets all increase the risk of dying from an NCD. Bus drivers whose lifestyle is primarily sedentary and characterized by poor eating habits are at increased risk. Several studies have shown that the prevalence of obesity and unrecognized hypertension are attributable to prolonged sitting, late-night eating, smoking, physical inactivity, and lack of nutritional knowledge. This study aims to assess Dietary patterns and the prevalence of obesity, diabetes, and hypertension among male bus drivers at the Sathyabama Institute of Science and Technology. Also, to study the dietary factor that contributes to diabetes mellitus and obesity. Around 75 samples

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CHAPTER - 1

INTRODUCTION

1.1 NON-COMMUNICABLE DISEASE

Non-communicable diseases are predicted to overtake communicable diseases as the leading cause of morbidity and mortality globally within the next few years by the WHO. Diabetes and obesity were often thought of as "diseases of affluence," but they are now increasingly prevalent in poorer nations and among the poorer populations of affluent nations.[[Yang Wang 2020](#)]

Non-communicable diseases (NCDs) account for 41 million annual fatalities or 74% of all fatalities worldwide. Every year, 17 million people under the age of 70 pass away from an NCD; 86% of these untimely deaths take place in low- and middle-income nations. 77% of NCD-related deaths occur in low- and middle-income nations. [[Yang Wang 2020](#)]

The majority of NCDs, or 17.9 million fatalities each year, are caused by cardiovascular illnesses, followed by malignancies (9.3 million), chronic respiratory conditions (4.1 million), and diabetes (2.0 million, including deaths from renal disease brought on by diabetes). [[Yang Wang 2020](#)]

Over 80% of all NCD-related deaths that occur prematurely are caused by these four disease types. The use of tobacco products, inactivity, harmful alcohol use, unhealthy diets, and physical inactivity raises the chance of dying from an NCD.[[Yang Wang 2020](#)]

1.2 PREVALENCE OF DIABETES MELLITUS:

A person with diabetes mellitus (DM) has excessive blood sugar levels, either as a result of insufficient insulin production by the pancreas or as a result of cells that do not react to the insulin that is generated. A complicated interplay of genetic and environmental variables results in the development of several unique forms of DM. In the past 20 years, there has been a significant rise in the prevalence of this condition. According to reports, this incidence rose from 30 million cases in 1985 to 285 million cases in 2010. According to predictions, 77.6% of diabetic patients would reside in developing nations by the year 2030. [[Erika F. Brutsaert 2022](#)]

reaction time, imbalance, and loss of consciousness Type 2 diabetes affects 90–95% of diabetics who are diagnosed after the age of 30. According to reports, the prevalence of type 2 diabetes is rising more quickly. This trend is attributed to the aging population, rising rates of obesity, and sedentary lifestyles. [[Erika F. Brutsaert 2022](#)]

One group of professionals whose work and health conditions have a significant impact on public safety is drivers. Road accidents may be more likely to occur if drivers have any health issues. Additionally, these issues might affect their performance and lead to absenteeism due to illness, which places a heavy financial burden on society. [[Erika F. Brutsaert 2022](#)]

Symptoms:

Some of the symptoms of type 1 diabetes and type 2 diabetes are:

- Feeling more thirsty than usual.

- Urinating often.
- Losing weight without trying.
- Presence of ketones in the urine. Ketones are a by-product of the breakdown of muscle and fat that happens when there's no enough insulin available.
- Feeling tired and weak.
- Feeling irritable or having other mood changes.
- Having a blurry vision.
- Having slow-healing sores.
- Getting a lot of infections, such as gum, skin, and vaginal infections.

Complication:

Diabetes if not controlled, it can cause a host of complications that can affect nearly every organ in the body. Diabetes complications include:

- Heart disease
- Stroke
- Kidney disease
- Nerve disease
- Eye damage
- Digestion problems
- Erectile dysfunction
- Skin problems
- Infection
- Dental problems

Both complications of diabetes and medications' side effects can affect driving skills. Diabetic neuropathy and retinopathy are two common complications that can cause muscle weakness or even amputation.

Treatment:

An important part of managing diabetes is keeping a healthy weight through a healthy diet and exercise plan:

- *Healthy eating:* A diabetes diet is simply a healthy-eating plan that helps to control blood sugar. The diet should be more focused on fruits, vegetables, lean proteins, and whole grains. These foods are high in nutrition and fiber and low in fat and calories. saturated fats, refined carbohydrates, and sweets have to be cut down.
- *Physical activity:* Regular aerobic activity is much needed. Physical activity lowers the blood sugar level by moving sugar into the cells, where it's used for energy. Physical activity also makes the body more sensitive to insulin. That means the body needs less insulin to transport sugar to your cells.

1.3 PREVALENCE OF HYPERTENSION:

High blood pressure (HBP), sometimes referred to as hypertension (HTN or HT), is a chronic medical condition in which the blood pressure in the arteries is consistently increased. Symptoms of high blood pressure are uncommon. A key risk factor for coronary artery disease, stroke, heart failure, peripheral vascular disease, vision loss, and chronic kidney disease is however long-term high blood pressure. .[Anu Mary Oommen 2016]

Drivers are a group of mentally taxed workers who are at risk of acquiring hypertension due to the nature of their jobs, and the effects on them have an impact not just on them but also on society as a whole. Bus drivers are more likely to acquire hypertension because of their employment.

They put themselves and other drivers on the road at risk once they develop hypertension, which increases their chance of developing coronary heart disease and stroke. According to the World Health Organization's 2004 forecast, there would be a 65% increase in road traffic accidents between 2000 and 2020, although the number is anticipated to reach as high as 80% in developing nations. .[Anu Mary Oommen 2016]

The majority of driving habits, including drinking, using drugs, and smoking, are linked to hypertension. These actions play a part in auto accidents.

They handle large trucks loaded with passengers with the utmost care. Their anguish is exacerbated by traffic congestion, exposure to vehicle exhausts, continuous whole-body vibration, bad road conditions, ineffective traffic laws, excessive speeding brought on by bus competition, and reckless pedestrian behavior.

Besides, most of the drivers are in the habit of eating main meals from hotels and consuming snacks (often oily and fried) and fast-food items between trips. Many resorts to alcohol and smoking to overcome stress. It follows logically that they may have an additional risk of developing HTN. [Anu Mary Oommen 2016]

Bus drivers are known to be a high-risk group for the development of hypertension. This may be due to the nature of their profession. They have to cope with the pressure of time, responsibility to passengers' welfare and safety as well as other demands related to passengers 'generally asymptomatic most of its course.

It is one of the major risk factors for cardiovascular mortality, which accounts for 20-50% of all deaths. Hypertension has become a Global public health burden it results in cardiovascular accidents, heart failure, heart attacks, blindness, and renal failure. [Sasikaladevi S 2023]

Symptoms:

Most people with hypertension don't feel any symptoms. Very high blood pressure can cause headaches, blurred vision, chest pain, and other symptoms.

If hypertension is not treated, it can cause other health conditions like kidney disease, heart disease, and stroke.

People with very high blood pressure (usually 180/120 or higher) can experience symptoms including:

- severe headaches
- chest pain
- dizziness
- difficulty breathing
- nausea
- vomiting
- blurred vision or other vision changes
- anxiety
- confusion
- buzzing in the ears
- nosebleeds
- abnormal heart rhythm

Risk factors

High blood pressure has many risk factors, including:

- *Age:* The risk of high blood pressure increases with age. Until about age 64, high blood pressure is more common in men. Women are more likely to develop high blood pressure after age 65.
- *Race:* High blood pressure is particularly common among Black people. It develops at an earlier age in Black people than it does in white people.
- *Family history:* more likely to develop high blood pressure if anyone have a parent or sibling with the condition.
- *Obesity or being overweight:* Excess weight causes changes in the blood vessels, the kidneys, and other parts of the body. These changes often increase blood pressure. Being overweight or having obesity also raises the risk of heart disease and its risk factors, such as high cholesterol.

- *Lack of exercise:* Not exercising can cause weight gain. Increased weight raises the risk of high blood pressure. People who are inactive also tend to have higher heart rates.
- *Tobacco use or vaping:* Smoking, chewing tobacco, or vaping immediately raises blood pressure for a short while. Tobacco smoking injures blood vessel walls and speeds up the process of hardening the arteries.
- *Too much salt:* A lot of salt — also called sodium — in the body can cause the body to retain fluid. This increases blood pressure.
- *Low potassium levels:* Potassium helps balance the amount of salt in the body's cells. A proper balance of potassium is important for good heart health. Low potassium levels may be due to a lack of potassium in the diet or certain health conditions, including dehydration.
- *Drinking too much alcohol:* Alcohol use has been linked with increased blood pressure, particularly in men.
- *Stress:* High levels of stress can lead to a temporary increase in blood pressure. Stress-related habits such as eating more, using tobacco, or drinking alcohol can lead to further increases in blood pressure.
- *Certain chronic conditions:* Kidney disease, diabetes, and sleep apnea are some of the conditions that can lead to high blood pressure.
- *Pregnancy:* Sometimes pregnancy causes high blood pressure. High blood pressure is most common in adults. But kids can have high blood pressure too. High blood pressure in children may be caused by problems with the kidneys or heart. But for a growing number of kids, high blood pressure is due to lifestyle habits such as an unhealthy diet and lack of exercise [Sasikaladevi S 2023]

Complications:

The excessive pressure on the artery walls caused by high blood pressure can damage blood vessels and body organs. The higher the blood pressure and the longer it goes uncontrolled, the greater the damage.

Uncontrolled high blood pressure can lead to complications including:

- *Heart attack or stroke:* Hardening and thickening of the arteries due to high blood pressure or other factors can lead to a heart attack, stroke or other complications.
- *Aneurysm:* Increased blood pressure can cause a blood vessel to weaken and bulge, forming an aneurysm. If an aneurysm ruptures, it can be life-threatening.
- *Heart failure:* When you have high blood pressure, the heart has to work harder to pump blood. The strain causes the walls of the heart's pumping chamber to thicken. This condition is called left ventricular hypertrophy. Eventually, the heart can't pump enough blood to meet the body's needs, causing heart failure.
- *Kidney problems:* High blood pressure can cause the blood vessels in the kidneys to become narrow or weak. This can lead to kidney damage.
- *Eye problems:* Increased blood pressure can cause thickened, narrowed or torn blood vessels in the eyes. This can result in vision loss.
- *Metabolic syndrome:* This syndrome is a group of disorders of the body's metabolism. It involves the irregular breakdown of sugar, also called glucose. The syndrome includes increased waist size, high triglycerides, decreased high-density lipoprotein (HDL or "good") cholesterol, high blood pressure and high blood sugar levels. These conditions makes more likely to develop diabetes, heart disease and stroke.

1.4 PREVALENCE OF OBESITY:

More people worldwide than any other disease are affected by obesity, which has emerged as a serious chronic disorder. One of the most widespread diseases that can be avoided is obesity. Public health is seriously affected. The etiology of obesity is multifaceted and involves factors from the environment, socioeconomic status, genetics, and behavior or psychology. Obesity is caused by a persistently favorable energy balance that is controlled by a sophisticated interaction

between endocrine tissues and the central nervous system. [Divya Bharat 2020]

Estimating morbidity and mortality using obesity assessment is also possible. A screening tool for overweight and obese people is the body mass index (BMI). Waist circumference, on the other hand, is a better predictor of metabolic diseases including diabetes, hypertension, and dyslipidemia, and the best anthropometric measure of visceral fat.

To prevent weight gain and the issues that go along with it, exercise and food limitations have been widely encouraged. It has been demonstrated that caloric restriction effectively lowers inflammation in obesity. A small number of research, however, revealed that dietary weight loss has little effect on a long-term anti-inflammatory intervention. On the other hand, regular exercise has a considerable impact on the chronic inflammation linked to obesity and illnesses like hypertension, diabetes, and dyslipidemia, etc. that are connected with obesity. [Divya Bharat 2020]

The study was conducted in Belgaum to examine and evaluate the prevalence of overweight and obesity among bus drivers and conductors employed by North-West Karnataka Road Transport Corporation (NWKRTC) in Belgaum.

A predesigned, pretested structured questionnaire was used to conduct in-person interviews with 365 randomly chosen drivers and 370 randomly selected conductors. Measurements of height, weight, waist circumference, and hip circumference were taken during the physical examination. The BMI was calculated to determine whether a person was overweight or obese.

To evaluate central obesity, waist circumference, and waist-hip ratio were utilised. Rates and other summary statistics were computed. The chi-square test was employed to examine the prevalence differences between conductors and drivers.

According to the survey, 43.3% of drivers were overweight, 22.2% were obese, and 23.8% had a waist circumference greater than or equal to 102 cm. Conductors made up of 28.1% overweight, 16.2%

obese, and 18.1% with a waist circumference greater than or equal to 102 cm.

The prevalence of overweight and obesity was high among drivers compared to conductors. Drivers were also more centrally obese than conductors. These differences were found to be statistically significant.

Considering the high prevalence of overweight and obesity among drivers and conductors, necessary preventive measures need to be promoted

1.4.2 Causes:

Eating more calories than what is consumed by the body processes and burned as energy, in daily activity and exercise, coupled with a very sedentary lifestyle, causes obesity. Over time, these extra calories accumulate in tissues, and organs, with very high levels of weight gain. [Divya Bharat 2020]

The most common causes of obesity include:

- Eating a poor diet of foods high in fats and calories
- Having a sedentary, lethargic, and inactive lifestyle
- Not sleeping enough, which can lead to hormonal changes that constantly stimulate hunger sensations and cravings for sugar-rich, salty, oily, and high-calorie foods
- Genetics, which can affect the body's metabolism and how fat is stored
- Ageing, which can lead to less muscle mass and a slower metabolic rate, making it easier to gain weight

1.4.3Risk Factors:

- Leading a sedentary lifestyle at work and home
- Bad addiction habits of smoking tobacco, drinking alcohol
- Lack of sufficient hours of sleep regularly
- Extreme levels of mental stress and tension, due to work-related or personal reasons
- Inherited conditions from parents, other family members or close relative

Certain medical conditions may also lead to uncontrolled weight gain. These consist of:

- *Polycystic Ovary Syndrome (PCOS)*: a condition that causes an imbalance of female reproductive hormones
- *Prader-Willi syndrome*: a rare condition that an individual is born with which causes excessive hunger
- *Cushing syndrome*: a condition caused by having an excessive amount of the hormone cortisol in your system
- *Hypothyroidism (underactive thyroid)*: a condition in which the thyroid gland doesn't produce enough of certain important hormones
- Osteoarthritis: degeneration of joints and bones with age

CHAPTER-2

REVIEW OF LITERATURE

Within the next few years, non-communicable diseases will become the principal global cause of morbidity and mortality estimates WHO. Use of Tobacco and alcohol, lack of physical activity, and unhealthy diets all increase the risk of mortality from an NCD. Bus drivers whose lifestyle is primarily sedentary and characterized by poor eating habits

are at increased risk. Several studies have shown that the prevalence of obesity and unrecognized hypertension are attributable to prolonged sitting, late-night eating, smoking, physical inactivity, and lack of nutritional knowledge. The study was conducted in Belgaum to examine and evaluate the prevalence of overweight and obesity among bus drivers and conductors employed by North-West Karnataka Road Transport Corporation (NWKRTC) in Belgaum. A predesigned, pretested structured questionnaire was used to conduct in-person interviews with 365 randomly chosen drivers and 370 randomly selected conductors. Measurements of height, weight, waist circumference, and hip circumference were taken during the physical examination. The BMI was calculated to determine whether a person was overweight or obese. To evaluate central obesity, waist circumference, and waist-hip ratio were utilized. Rates and other summary statistics were computed. The chi-square test was employed to examine the prevalence differences between conductors and drivers. According to the survey, 43.3% of drivers were overweight, 22.2% were obese, and 23.8% had a waist circumference greater than or equal to 102 cm. Conductors made up of 28.1% overweight, 16.2% obese, and 18.1% with a waist circumference greater than or equal to 102 cm. Drivers had a higher rate of obesity and being overweight than conductors did. Additionally, drivers had more central obesity than conductors did. [Joshi, 2013]

The study's participants had an average age of 48 9.7 years; 71.0 and 19.5% of the drivers smoked; and 50.9% were inactive physically. 41.7 and 21.1% of people were overweight or obese, whilst 39.7 and 13.9% of people had hypertension or diabetes, respectively. 56.3% of the individuals had dyslipidemia, and 90 (31.3%) had impaired fasting glucose levels. Age and body mass index (BMI) were predictors of hypertension. Only a BMI score might predict an abnormal glucose profile. [Casmir E., *et al.*, 2018]

In Ethiopia, long-distance truck drivers had a hypertension prevalence of 34.7%. Drivers under the age of 45 had a higher likelihood of

developing hypertension (adjusted odds ratio (AOR) = 4.32; 95% Confidence interval (CI): 2.16, 8.62), were more obese (AOR= 5.12; 95% CI: 1.33, 19.8), drank alcohol (AOR= 3.05; 95% CI: 1.27, 7.31), and smoked cigarettes (AOR= 3.74; 95% CI: 1.64, 8.51). Drivers who regularly engaged in physical activity had a lower risk of hypertension than those who did not [AOR=0.33; 95% CI: 0.17, 0.63]. [Rike, 2022]

At the level of $p < 0.05$, there is a significant correlation between the degree of hypertension and the following variables: age, education, place of residence, marital status, and hobbies. According to a chi-square test, there is a significant correlation between the level of hypertension and BMI, family history of hypertension, eating habits, excessive salt consumption, junk food intake, alcohol consumption, smoking habits, sleeping patterns, stress, and exercise/yoga habits at the level of $p < 0.05$. A total of 15 (50%) of the samples had stage I hypertension, 11 (37%) had pre-hypertension, and 4 (13%) had stage II hypertension. At the level of $p < 0.05$, there is a significant correlation between the degree of hypertension and the following variables: age, education, place of residence, marital status, and hobbies. [Josephine, 2016,]

This cross-sectional study was carried out between September 2022 and December 2022 among 118 private bus drivers and full-time, professional, three-wheeler drivers in the Perambalur Municipality. We recorded the anthropometric measurements and blood pressure. Three-fourths of the sample (83.1%) belonged to nuclear families. Around one-third were current smokers, one-fourth had the habit of chewing tobacco, and more than half of the participants consumed alcohol. Nearly 83.7% had moderate physical activity, followed by 11.9% who had heavy activity, and 5.1% who did not do any physical activity. The prevalence of T2DM among professional drivers was 11.9%. The risk factors that contributed to the development of T2DM among professional drivers were age, education, smoking, tobacco chewing, hypertension, elevated BMI, and elevated WC, which are statistically significant ($p < 0.05$). Conclusion We found the proportion

of obesity, hypertension, and diabetes to be higher among professional drivers than among the general population. [Tamilarasan, 2023]

This study determines the prevalence of pre-diabetes and type 2 diabetes mellitus among commercial taxi drivers in Buffalo City Metropolitan Municipality (BCMM), Eastern Cape and examines the factors associated with type 2 diabetes mellitus. A cross-sectional survey of 403 commercial taxi drivers was undertaken using the World Health Organization (WHO) STEPwise approach. Anthropometric, blood pressure, and blood glucose measurements followed standard procedure. Diabetes status was determined using the fasting blood glucose (FBG) test. Pre-diabetes was defined as an FBG of 5.6 to 6.9 mmol/L, whereas diabetes was defined as an FBG of 7.0 mmol/L, self-reported history of diabetes, or current use of diabetes medication (therapy). A self-reported history of diabetes was used to define diabetes awareness. The study's participants had an average age of 43.3 ± 12.5 years. Pre-diabetes prevalence was 17% (95% CI: 13.4-20.6) and diabetes prevalence was 16% (95% CI: 12.4-19.6), respectively. The majority of people with diabetes (n = 63) were receiving treatment (n = 30) and were aware of their condition (n = 43). Age, having ever been married, hypertension, obesity, and driving for more than five years were all independently linked with diabetes in the uncorrected logistic regression. However, in the adjusted logistic regression model, only age >35 (adjusted odds ratio [AOR]= 3.65, confidence interval [CI]: 1.17-11.32), being married at any time (AOR= 3.26, CI: 1.52-6.99), and hypertension (AOR= 3.23, CI: 1.56-6.69) were associated with diabetes. In this study, professional taxi drivers had a high prevalence of diabetes—nearly twice as common as diabetes overall in South Africa. To close the gap of undetected diabetes in South Africa, regular health screenings among this subgroup are crucial [Adedokun, 2019]

The percentage of tobacco users (current smokers or daily smokeless tobacco users) was 23% in the rural sample and 18% in the urban

sample, with smoking rates being similar in both. The percentage of men who had ever consumed alcohol was 62% in rural areas and 42% in cities. 63% of the urban sample and 43% of the rural sample had low levels of physical activity. Fruit and vegetable consumption were both very low. In the urban group, 54% were overweight, 29% had hypertension, and 24% had diabetes, compared to 31, 17%, and 11% in the rural sample, respectively. Physical inactivity was associated with hypertension, body mass index (BMI) ≥ 25 kg/m² [2], central obesity, and dyslipidemia after adjusting for other factors. Increasing age, male sex, BMI ≥ 25 kg/m² [2], and central obesity were independently associated with both hypertension and diabetes. [Oommen, 2016]

Our objective was to study the prevalence of hypertension and its risk factors on commercial bus drivers. A cross-sectional descriptive study was conducted on 218 commercial bus drivers selected by simple sampling technic between April and July 2013. A proforma was used to collect data on the driver's socio-demographic characteristics, anthropometric measurement, and Blood pressure taken. The prevalence of hypertension was 33.5% and is associated with a BMI greater than 25kg/m² and an age greater than 40 years compared to non-drivers working in the same garage with a prevalence of 22.1%. The level of awareness of hypertension is low among the drivers, 21(28.8%) of the hypertensive drivers know they were hypertensive and 12(57.1%) are on treatment. [Erhiano, 2015]

In 2012, 8% of the 2.3 million work-related deaths globally were from chronic respiratory diseases (CRDs). This study was undertaken to estimate the prevalence of respiratory morbidity among the drivers and conductors of the public road transport network in Kochi. CRD exists as a public health problem affecting approximately one in ten bus drivers and conductors in Kochi city. Applying the logical principles of ergonomics by modifying duty hours may be considered. [Mohandas, 2019]

These findings indicate that overweight and obesity are prevalent among long-distance professional drivers in Iran and appear to be similar to the general population. [Pourabdian, 2020]

Our study provides preliminary data on the prevalence, risk factors, and perceptions of overweight and obesity among school bus drivers. Study data on drivers' body weight, health-related behaviors, and psychosocial characteristics could serve as a basis for worksite interventions to improve drivers' health. [Yeary, 2019]

There was a total of 26 studies involving 15,702 drivers. In all, 34% of drivers worldwide had hypertension (95% confidence interval [CI]: 27-40%). According to estimations from the World Health Organisation (WHO), the prevalence of drivers was highest in the Western Pacific area (56%) and lowest in the Eastern Mediterranean and African regions (21%). Studies revealed heterogeneity with considerable evidence ($I^2 = 1816.1$, $P = 0.001$), however, there was no publication bias with significant evidence ($P = 0.967$). [Krishnamoorthy, 2020]

In our study the risk factors of CVD and the 10-years CVD risk estimated using FRS were higher among bus drivers of the STU in comparison to the bus conductors. The bus drivers and bus conductors were similar with respect to socio-demographic and work-related characteristics, except for the task of driving a bus by a bus driver. However, because of the cross-sectional design of the study, the increased CVD risk in bus drivers cannot be interpreted as causal with respect to occupation of bus driving. A longitudinal study would be needed to overcome these limitations and conclude causal relationships. [shah, May 2021]

A census sample of 96 truck drivers was obtained and the mean age was 46 years (44.56; 47.85). Mean weight and height were 80.86 kg and 170.90 cm, respectively, ranging from 77.82 to 83.91 kg and 169.34 to 172.47 cm, respectively. Among the total number of participants, the mean SBP and DBP of the study population were

140.96 mmHg and 86.41 mmHg, respectively. The overall prevalence of hypertension and diabetes were found to be 57% and 14%, respectively. The results further showed that 29% of truck drivers were smoking, while 44% and 30% of them were overweight and obese, respectively, with an overall overweight/obesity of 74%. About 26% were physically active [Modjadji, 2022]

The prevalence of hypertension was found to be 49.5%. Smoking was found in 23.2% of the respondents, tobacco and betel nut chewing in 14.7% of the respondents and 45.5% were found to consume alcohol. It was found that as age increases the prevalence of hypertension also increases which was statistically significant ($p=0.001$). [Sasikaladevi, 2023]

Thus, studying their dietary pattern, nutritional knowledge and prevalence of Obesity, diabetes and hypertension of male bus drivers would help us to plan nutrition education programme in future. Also by identifying the major underlying cause for these NCDs would help the samples to focus on that particular cause and thereby helping them to manage their NCDs by bringing a small life style changes.

CHAPTER - 3

METHODOLOGY

3.1 RESEARCH DESIGN:

A Cross sectional study was carried out among 75 male bus drivers in Sathyabama institute of science and technology between the age group of 30 – 60 years.

3.2 METHODS AND TOOLS:

Direct methods: Deals with the individual and measure objective criteria.

Direct methods of nutritional survey:

- Dietary evaluation methods
- Anthropometric methods

Dietary assessment:

The 24-hr recall method and Quantitative food frequency questioner (OFFQ) were used to assess dietary intake of the respondents.

24hr Recall:

A structured 24hr recall was used (Appendix D-2). Food consumption was assessed with the 24hr recall method.

The 24hr recall method requires participants to recall all food and beverages consumed during the previous 24hrs, food samples were used during the completion of these questionnaires to assist the participants in estimating portion sizes.

Quantitative Food Frequency Questionnaire:

A quantified food frequency method requires participants to recall average amounts of food consumed on a daily, weekly or monthly basis and was used as a reference measure to the 24-hour recall questionnaire.

Participants were asked to indicate their frequency of consumption of items per day, per week, or per month and the questionnaire contains a specific column in which the respondent can indicate that a food item is eaten less frequently than once a month.

Anthropometric Methods:

Anthropometry is the measurement of body weight and proportion. It is an essential part of clinical examination of respondents. It used to

evaluate both under and over nutrition. The measured values reflect the current nutritional status.

Body Mass Index: The BMI was calculated using anthropometric measurements (height and weight).

3.3 STATISTICAL ANALYSIS:

The data were analyzed for percentage. Following formula used for statistical analysis -

Percentage:

Percentage was used for simple comparison and was calculated by multiplying the frequency of a particular item by hundred and dividing it by total frequency of the items.

$$\text{Percentage (\%)} = \frac{\text{Number of respondents belonging to particular categories.}}{\text{Total numbers of respondents.}} \times 100$$

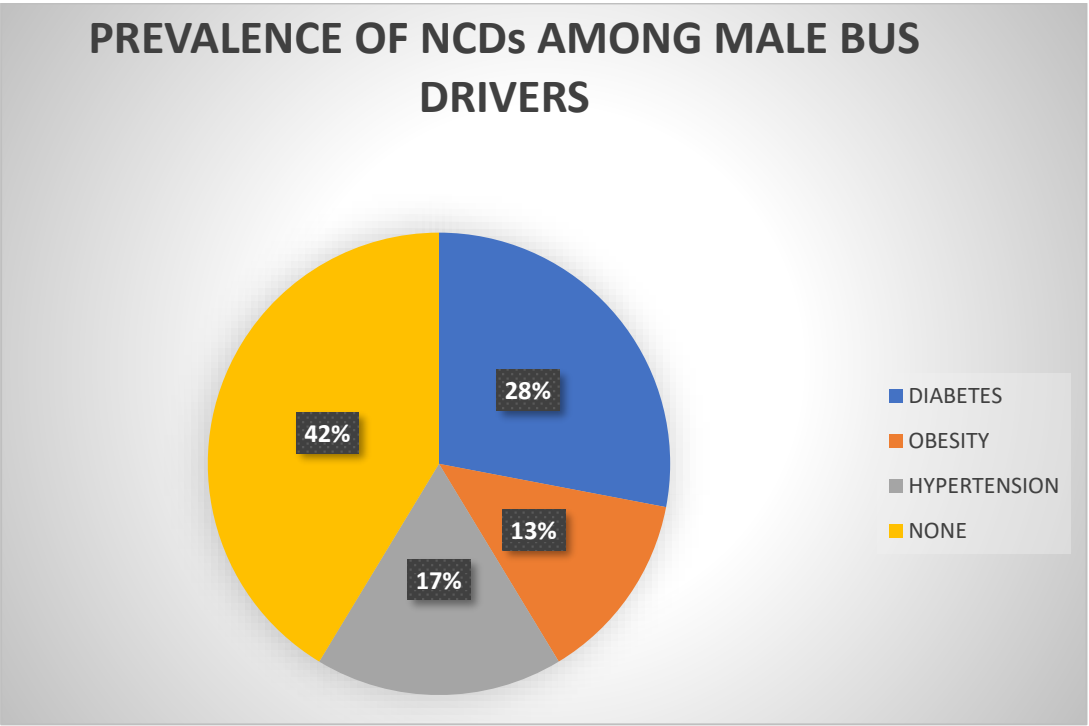
The software used to analyse the collected data is Raosoft with a 5% error, a confidence level of 95%, with a response distribution of 20% (The margin of error is the amount of error that you can tolerate. If 90% of respondents answer yes, while 10% answer no, you may be able to tolerate a larger amount of error than if the respondents are split 50-50 or 45-55. A lower margin of error requires a larger sample size.

CHAPTER - 4

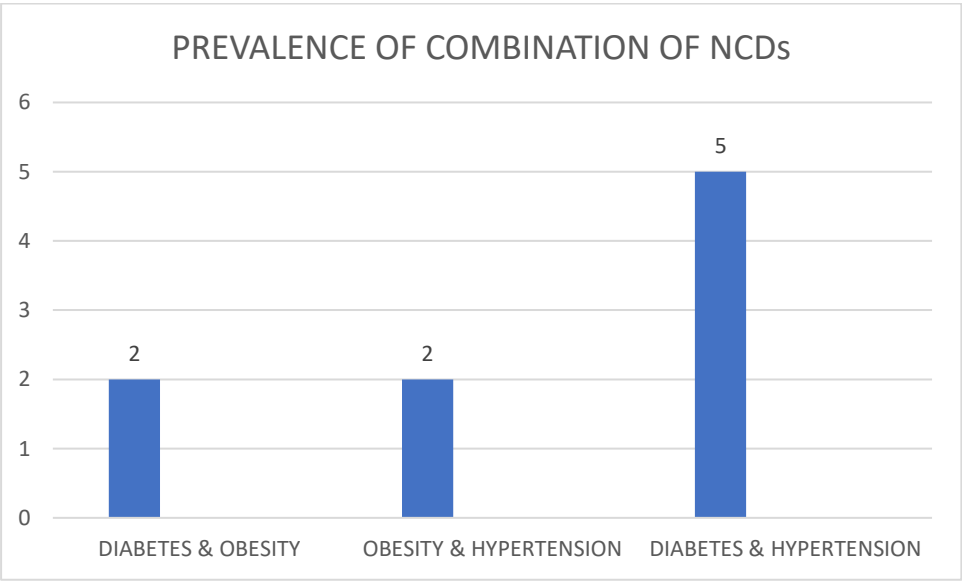
RESULT AND DISCUSSION

Results and Discussion:

The data were analyzed for percentage using Microsoft Excel.

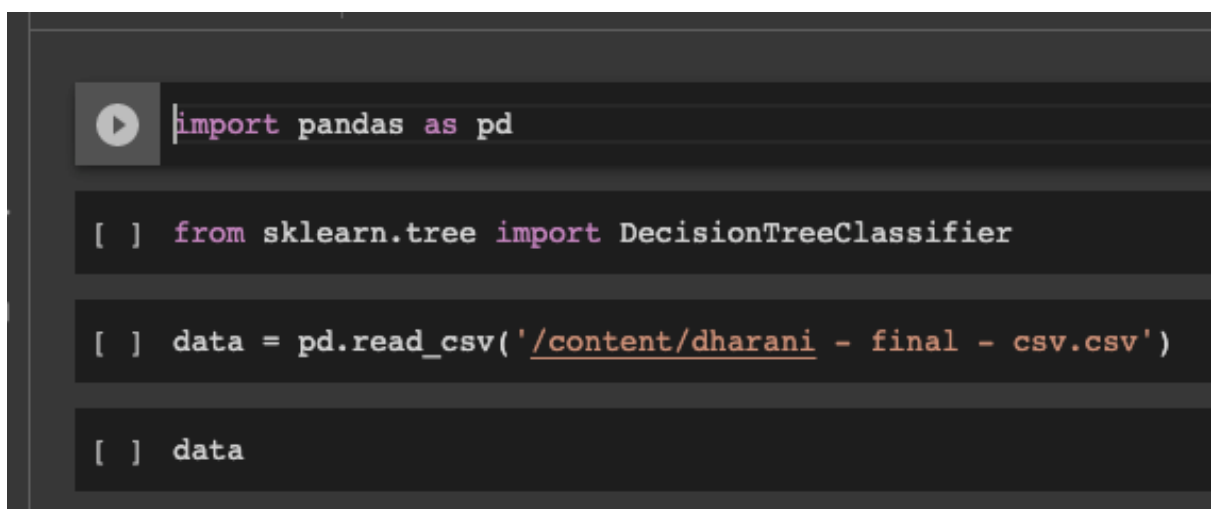
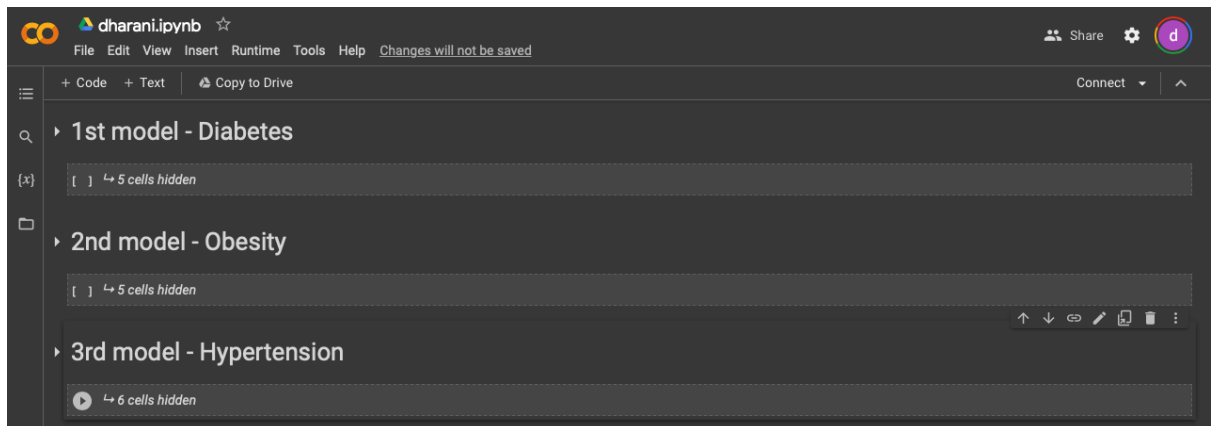


From the above pie-chart it is shown that prevalence of diabetes more with 48%, followed by hypertension with 29% and obesity with 23%. Thus male bus drivers are more prone to Diabetes.



From the above graph, it is found that the male bus drivers are prone to diabetes and hypertension. It is understood that the drivers with diabetes are at higher risk of getting hypertension in future.

The data collected was binarized using one – hot encoding. Decision Tree Classifier was implemented in python to analyse this dataset.



The pandas library is commonly used for data manipulation and analysis.

When feature importance was analysed for Diabetes in this dataset. The following priority table was obtained.

0	FH - Diabetes	0.018260
17	MAD - 3 meals	0.016695
2	FH - Hypertension	0.016231
6	SH - more than 8 hours	0.014608
20	SM - no	0.012173

This result showed that among the bus drivers who had been diagnosed with diabetes, the primary causes were family history of diabetes followed by number of meals a day, then was family history of hypertension followed by social habit and skipping of meals.

When feature importance was analysed for obesity, in this dataset. The following priority table was obtained.

2	FH - Hypertension	0.019112
37	FWS - yes	0.019112
17	MAD - 3 meals	0.009556
19	SM - yes	0.009556
12	Sochab - none	0.004546

This result showed that among the drivers who had been diagnosed with obesity, the primary causes were family history of obesity, followed by feeling stressed at work, followed by number of meals a day, that was followed by skipping meals and then finally, social habits.

When feature importance was analysed for hypertension, in this dataset. The following priority table was obtained.

7	DLC - yes	0.044410
5	SH - 6-8 hours	0.033848
33	anx - no	0.017764
42	FA10 - sometimes	0.017764
8	DLC - no	0.017764
31	Stress - no	0.013416
38	FWS - no	0.008882
25	PA - no	0.005329

This result showed that among the drivers who had been diagnosed with hypertension had already started implementing dietary or lifestyle changes to manage the disease condition. The main reasons for the condition seem to point to sleeping 6-8 hours of lesser followed by anxiety, followed by consuming food after 10pm and then stress and feeling stressed at work and finally was physical activity.

CHAPTER-5

CONCLUSION

The WHO estimates that within the next few years, non-communicable diseases will become the principal global cause of morbidity and mortality. Tobacco use, physical inactivity, the harmful use of alcohol and unhealthy diets all increase the risk of dying from an NCD. Bus drivers whose lifestyle is primarily sedentary and characterized by poor eating habits are at increased risk. Thus, the current study aimed to assess the dietary pattern and prevalence of obesity, diabetes and hypertension among male bus drivers at Sathyabama University in Chennai. Data were collected and analyzed. From the collected data it is found that the prevalence of diabetes (48%), is higher than that of the hypertension (29%) and, obesity (23%). Therefore, diabetes is more common among the male bus drivers. One of the causes for diabetes among the samples is reported to be hypertension. Also, it

is found that the samples with diabetes have been more prone to chance of acquiring hypertension in future. On finding out the major underlying cause It is the family history, number of meals per day and skipping meals is identified. Lack of sleep, physical activity and stress at work is also an important cause for obesity and hypertension is reported. understood that the drivers with diabetes are at higher risk of getting hypertension in future. the primary causes were

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APPENDIX – 1

1. Name :
2. Age :
3. Height (cm) :
4. Weight (in kg) :
5. BMI :
6. Do you suffer from any of the following disease?
 - a. Diabetes b. Obesity c. Hypertension d. Diabetes and obesity
 - e. Obesity and hypertension f. Diabetes and hypertension g. All three
7. How many years do you suffer from any of those disease?
 - a. _____ years b. _____ months
8. Do you have any family history of the following disease?
 - a. Diabetes b. Obesity c. Hypertension d. others _____
9. How many hours of sleep you get every night?
 - a. Less than 6 hours b. 6-8 hours c. More than 8 hours
10. Are you implementing any dietary or lifestyle changes to manage your disease condition?
 - a. Yes b. No
11. Do you have any social habit?
 - a. Smoking b. Drinking c. Others _____ e. None

12. What type of diet do you consume?
- a. Vegetarian b. Non-vegetarian c. Ova-vegetarian
13. How many meals do you have a day?
- a. 2 meals b. 3 meals c. More than three meals
14. Do you skip any meals?
- a. Yes b. No c. If yes specify _____
15. Do you have the habit of binge eating?
- a. Yes b. No c. Rarely d. Sometimes
16. Do you perform any Physical Activity?
- a. Yes b. No c. Sometimes
17. What type of food do you consume mostly?
- a. Home-made food b. Fast food c. college mess food
18. Do you have a habit of eating when you feel stressed?
- a. Yes b. No
19. Do you feel stressed at work?
- a. Yes b. No
20. Do you face any anxiety?
- a. Yes b. No
21. Do you consume snack in between meals?
- a. Yes b. no c. Sometimes
22. Do you have the habit of consuming food after 10pm?
- a. Yes b. No c. Sometimes
23. Are you under taking any other part time jobs?

a. Yes b. No

APPENDIX 2

FOOD FREQUENCY QUESTIONNAIRE

S NO	FOOD ITEMS	DAILY	WEEKLY ONCE	WEEKLY THRICE	RARELY	NEVER
	DAIRY PRODUCTS					
1	Milk					
2	Paneer					
3	Curd					
4	Butter milk					
5	Cheese					
6	Ghee					
S NO	FOOD ITEMS	DAILY	WEEKLY ONCE	WEEKLY THRICE	RARELY	NEVER
1	Banana					
2	watermelon					
4	sapota					
5	Mango					
6	jackfruit					
7	Pineapple					
	VEGETABLES					
9	Tomato					
10	Carrot					
11	Beetroot					
12	Brinjal					
13	Cabbage					
14	Potato					
15	Greens leafy vegetable					
	MEAT					
1	Skin less chicken					
2	Mutton					
3	Fish					
4	Egg					
5	Beef					
	OIL					
1	Butter					
2	groundnut oil					

3	refined oil					
4	Vegetable oil					
5	Olive oil					
	SWEET					
1	Refined sugar					
2	Jaggery					
3	Jam					
4	Ice cream					

PICTURES TAKEN DURING SAMPLE COLLECTION :



