

**OCCUPATIONAL STRESS AND ITS EFFECT ON HEALTH STATUS
AMONG KSRTC BUS DRIVERS -A CROSS SECTIONAL STUDY.**

By

DR VARUN R



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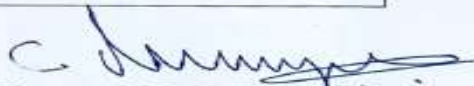


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ABSTRACT

Introduction: Occupational stress is an important health concern for a variety of occupations and has been associated with health problems and risk-taking behaviours. Drivers, in particular bus drivers, have very stressful jobs as they work shifts for long hours, meeting exposure to urban air pollution and a higher rate of accidents. Objectives: To determine the prevalence and associated factors of occupational stress among Karnataka State Road Transport Corporation (KSRTC) bus drivers in Kolar. Significance which will contribute to the mental interventions for health promotion programs and policies.

Objectives: Among KSRTC bus drivers in Kolar

1. To determine the stress level in occupation among KSRTC bus drivers.
2. To determine association between the stress and occupation related factors.
3. To assess the health status among KSRTC drivers.

Materials and methods: A cross-sectional study was conducted from September 1, 2023 to June 30, 2024, at the KSRTC depot in Kolar, which serves both urban and rural areas. The study included 171 staff, including bus drivers, conductors, mechanics, housekeeping, and administrative staff. Out of 171 bus drivers, a representative sample of 135 was selected using simple random sampling. Data were collected through a list of personally employed staff from the depot, authority to ensure accuracy and relevance.

Results: The study among KSRTC bus drivers in Kolar found that 65% experienced moderate to severe stress, significant factors associated with sleep-hour were included urban residency, divorce, chronic alcohol consumption, chronic tobacco chewing, hypertension, higher BMI, long working hours, and high waiting ratio. Linear regression revealed significant associations for linear variables with stress levels. Health assessments revealed a high prevalence of hypertension and diabetes.

Conclusion: The study highlights the alarming prevalence of occupational stress among KSRTC bus drivers in Kolar, with 65% experiencing moderate to severe stress. Factors such as urban residency, divorce, chronic alcohol consumption, chronic tobacco chewing, hypertension, higher BMI, long working hours, and high waiting ratio were found to significantly contribute to the stress burden. These results highlight the importance of population-specific health promotion

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LIST OF ABBREVIATIONS

- AIS- American Institute of Stress
- BMI-Body Mass Index
- CAD-coronary artery disease
- CVD-cardiovascular disease
- CI-Confidence Interval
- DAS-21-Depression Anxiety Stress
- DALY-Disability Adjusted Life Years
- DCCT-Diabetes control and complication Trial
- ESS-Epworth sleepiness scale
- FPG-Fasting Plasma glucose
- GPS-Global Positioning System
- HbA1C-Glycated Hemoglobin
- IBM-International Business Machine
- IDF-International Diabetes Federation
- ISI-Insomnia Severity Index
- JCDS-Job Demand Control Support Model
- JNC-Joint National Committee
- KSRTC-Karnataka State Road Transport Corporation

- KSS-Karolinska sleepiness scale
- MSP-Musculoskeletal pain
- NCD-Non communicable disease
- NGSP-National glycohemoglobin standardization
- OGTT-Oral glucose tolerance test
- OSI- Occupational stress Index
- PSQI-Pittsburg sleep quality Index
- PSI-Physiological Strain Index
- SOFI-Swedish Occupational Fatigue Inventory
- SES-Socioeconomic status
- SPSS-Statistical package for Social Sciences
- TWIS-Traffic weather information system
- TDCCA-Traffic Density based congestion control methods
- WHO –World Health Organization

ABSTRACT

Introduction: Occupational stress is an important health issue amongst a variety of occupations and has been associated with health problems and risk-taking behaviours. Drivers, in particular bus drivers, have very stressful jobs as they work shifts for long hours creating exposure to unhealthy levels of pollutants and a higher rate of sickness absenteeism. To determine the prevalence and associated factors of occupational stress among Karnataka State Road Transport Corporation (KSRTC) bus drivers in Kolar, Karnataka.

Objectives: Among KSRTC bus drivers in Kolar.

1. To determine the stress level in occupation among KSRTC bus drivers.
2. To determine association between the stress and occupation related factors.
3. To assess the health status among KSRTC drivers

Materials and methods: A cross-sectional study was conducted from September 1, 2023, to June 30, 2024, at the KSRTC depot in Kolar, which serves both urban and rural areas. The depot employs 729 staff, including bus drivers, conductors, mechanics, housekeeping, and administrative staff. Out of 654 bus drivers, a representative sample of 235 was selected using simple random sampling. Data were collected through a list of permanently employed staff from the depot's authority to ensure accuracy and relevance.

Results: The study among KSRTC bus drivers in Kolar found that 65% experienced moderate to severe stress. Significant factors associated with occupational stress included urban residency, divorce, chronic alcohol consumption, current tobacco chewing, hypertension, higher BMI, long working hours, and high waist-hip ratio. Binary logistic regression revealed significant associations for these variables with stress levels. we found that urban residents had significantly higher odds of experiencing stress compared to rural residents (OR=1.27, $p=0.03$). Divorced individuals and chronic alcoholics also showed higher odds of stress (OR=1.24, $p=0.05$ and OR=1.33, $p=0.04$, respectively). Significant associations were identified between stress and hypertension (OR=1.40, $p=0.01$), obesity (OR=1.30, $p=0.03$), morbid obesity (OR=1.47, $p=0.01$), high-risk waist-hip ratios (OR=1.42, $p=0.01$), and longer working hours (>12 hours, OR=1.30, $p=0.03$). Health assessments revealed a high prevalence of hypertension and obesity.

Conclusion: The study highlights the alarming prevalence of occupational stress among KSRTC bus drivers in Kolar, with 65% experiencing moderate to severe stress. Factors such as urban residency, lifestyle habits, and physiological parameters were found to significantly contribute to this stress burden. These results highlight the importance of population-specific health promotion programmes and policy amendments to improve the health of essential workers and road safety in general.

Keywords: Occupational stress, Bus drivers, Health status, public transport workers

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INTRODUCTION

1.INTRODUCTION

Occupational stress refers to the pressure that individual workers feel around their work conditions. It's a significant factor that affects individuals, groups, and communities. This stress can arise when workers lack the skills or ability to cope with increased demands and challenging work environments. The stressors encompass prolonged shifts, substantial workloads, time constraints, challenging tasks, restricted breaks, monotony, and suboptimal physical work environments such as cramped spaces, extreme temperatures, and inadequate lighting.¹

The backbone of bus transportation services are bus drivers. They play a pivotal role in ensuring a secure and enjoyable journey for passengers. Individuals' well-being and happiness depend on numerous vital elements, including bus drivers' contentedness. These professionals have to survive a broad scope of occupational stressors, from traffic congestions and consumers' conflicts through alternate shifts, unergonomic cabins, and rigid timetables. The specific working conditions and job features of professional bus drivers provoke particular health problems, often ensuring the issue of early retirements due to disabilities.²

The profession of a bus driver is very important for public transport. However, the community of bus drivers has experienced a serious shortage of personnel over the past decade. This may pose a threat to the sustainability of an essential service. Furthermore, bus drivers are subjected to numerous physical, chemical, and biological hazards, such as exposure to noise, vibrations, air pollution, and fungi.³

Sleep disturbances and stress-related disorders including anxiety and depression are frequent among bus drivers. Given that long-haul drivers usually rest in the buses or in the confined quarters provided by employers that do not have proper

boarding facilities at outstations, they often lack adequate sleeping conditions which may worsen the health status and the ability to drive among drivers. Poor living quarters and sleeping conditions in particular may lead to severe concentration disorders and, as a result, are largely responsible for the potential of causing accidents and injuries both to the drivers and to the passengers.⁴

Among safety-critical roles are sedentary occupations, such as long-haul driving, as they require a great deal of emotional stress and extended work hours. Drivers, as a representative occupational class, are under high risks of health burdens, with metabolic diseases largely caused by the nature of their job and inadequate nutrition. Primarily related to the lack of physical activity, irregular work shifts, and poor meal choices, health concerns, such as obesity and high blood pressure, can lead to the formation of metabolic syndrome.⁵

As a part of performing their professional duties, bus drivers are involved in a number of repetitive physical acts such as steering, gear shifting, and braking which put a high level of strain on their musculoskeletal system. As a result, musculoskeletal pain is one of the most frequent complaints among drivers. Their highly demanding scope is complicated by a combination of prolonged static sitting positions and continuous vibration causing high pressures on the intervertebral discs and consequential fatigue in lower lumbar muscles. Therefore, it may be assumed that these factors lead to the development of degenerative changes in the lumbar spine.⁶

The feature of demanding work schedules plays a major role in the raised levels of stress drivers experience as they are constantly pressed by time. Thus, the content of working times for the bus personnel involves both ergonomic issues, security concerns, the relentless pressure created by the necessity to stick to one's timetable closely. The working conditions for bus personnel include a range of

factors, such as ergonomic concerns, security constraints, and the never-ending stress created by the stringent implementation of tight schedules.⁷

Many working-age adults take part in sedentary behavior, where energy expenditure is low while one is in a sitting orientation or lying down. Extended time spent sitting demonstrates an increased likelihood of enduring cardiovascular diseases, cardiovascular mortality, all-cause mortality, and diabetes, irrespective of the known physical activity during leisure time. It is quite striking that workers in the transport sector are more vulnerable to developing co-morbidities and perhaps premature death.⁸

The diverse landscape of employment frequently accounts for the disparity in smoking habits between the blue-collar workers and their “colleagues” from the white-collar terrains. Employing truck and bus drivers, the compelling nature of the occupation often results in much higher rates of smokers within their workforce over the white-collar profession. The disparities in tobacco consumption between the two groups can be explained by higher stress levels of the bus driver as opposed to the workers in less stressful occupations.⁹

Ensuring driver safety is crucial, and ergonomics emerges as a key player in minimizing injury risks. This involves making workplace adjustments, implementing administrative changes, and educating drivers. Addressing factors like prolonged sitting, whole-body vibration, and the ergonomic fit between drivers and their environment, including vehicle seats, are essential for creating a safer driving experience.¹⁰ This study emphasizes a paucity about stress and health issues among bus drivers in the organized sector such as Karnataka State Road Transport Corporation (KSRTC). Its purpose is to gain insights into the work patterns of KSRTC workers, examining the scope of occupational stress and morbidity. The findings aim to serve as a foundation for developing targeted health programs and policies to address occupational health hazards, emphasizing

the importance of exploring the prevalence and contributing factors of occupational stress among KSRTC bus drivers in Kolar, Karnataka, Southern India.

1.1 Problem Statement-

Occupational stress among bus drivers is a pressing issue both internationally and in India. In India, transportation employees, including bus drivers, are not very often covered by labour law and social protection programs, which creates dangerous working conditions and high levels of stress-related illnesses.¹¹

Non-communicable diseases are one of the most critical problems worldwide, amounting to 40 million deaths yearly or 70% of the global death rate. Meanwhile, an additional shocking issue is premature death because of NCD: 15 million die annually due to NCDs at the age under 70. Furthermore, over 80% of these untimely deaths transpire in low- and middle-income countries, underscoring a pressing need for comprehensive and equitable interventions to address this critical public health issue.¹²

Occupational stress is a significant concern among drivers worldwide. Research indicates that about a third of professional drivers experience mild to moderate stress levels, with heavy vehicle drivers facing higher stress than light vehicle drivers, especially regarding work overload and role conflict.¹³ A study done in Mumbai bus drivers in India showed prevalence of hypertension (24%) and lower back issues (79%), establishing a clear link between occupational stress and these Non communicable disease problems.¹⁴ These findings highlight the pressing need for interventions to alleviate occupational stress among drivers globally.

***OBJECTIVE
OF
STUDY***

2. OBJECTIVES OF THE STUDY

Among KSRTC bus drivers in Kolar,

- 1.To determine the stress level in occupation among KSRTC bus drivers.
2. To determine association between the stress and occupation related factors.
3. To assess the health status among KSRTC drivers.

REVIEW OF

LITERATURE

3. REVIEW OF LITERATURE

3.1 Occupational stress

Stress is defined as a common psychological condition stemming from inadequate work dynamics. Stress was initially described as the body's general response to demands, prompting physiological changes in situations of intense emotion. According to WHO(World Health Organization), Stress was categorized into three stages: alarm, resistance, and exhaustion. The initial stage, marked by increased adrenaline production, fosters alertness and productivity. Subsequently, coping mechanisms come into play to maintain equilibrium. However, persistent stress leads to detrimental effects such as illness, depression, and diminished focus. The exhaustion phase, characterized by disrupted equilibrium, manifests in various conditions like hypertension, depression, and even fatal outcomes.¹⁵

Table A- Stages of stress according to WHO

Stress Stages	Signs	Symptoms
Alarm	Tachycardia	Sweating,trembling,rapid breathing.
	Heightened alertness	Difficulty in concentrating, feeling tense or anxious.
	Activation of fight or flight response	Irritability,restlessness, difficulty sleeping
Resistance	Tachycardia	Digestive issues (e.g., stomach pain, diarrhoea)
	Sustained high levels of stress hormones	Headaches, muscle tension, fatigue, Mood swings, feeling overwhelmed,
Exhaustion	Chronic fatigue	Burnout, feeling emotionally drained, apathy
	Increased susceptibility to illness	Frequent illnesses, weakened immune system, Depression, anxiety, feelings of hopelessness

Occupational stress can be defined as the cognitive, emotional and physiological reactions an individual experiences when they perceive an imbalance between the requirements of their role and ability to cope with these demands. This imbalance triggers negative psychological, physical, and behavioral reactions. Symptoms may include feeling overwhelmed, exhausted, and struggling to meet job expectations, ultimately impacting job performance and overall well-being.¹⁶

3.2 Historical perspective of Occupational stress

The historical perspective of occupational stress reveals a trajectory marked by evolving societal and organizational dynamics. Early examinations of stress in the workplace emerged in the mid-20th century, initially focusing on the physiological and psychological impacts on workers. The work of Hans Selye in the 1930s laid foundational understanding, highlighting the body's response to stressors. Over time, the conceptualization of occupational stress expanded to encompass broader contextual factors such as job demands, control, and social support. The 1970s and 1980s witnessed a surge of interest in stress management and organizational interventions, spurred by rising awareness of its detrimental effects on health and productivity. In this regard, it is crucial to consider a specific period in order to realize the tendencies related to occupational stress and describe this phenomenon, which is entirely eliminated in the contexts of the contemporary workplace environments.¹⁷

Many conceptual frameworks and approaches to the understanding of stress have emerged during the mid-20th century. They include, for example, Selye's general adaptation syndrome and Lazarus' transactional model of stress, all of which provide the long-sought insight into human perception of and response to the circumstances. The WHO's insights provide valuable context for understanding the multifaceted nature of stress in the workplace, tracing its roots from early conceptualizations to contemporary perspectives. This historical perspective serves as a foundational framework for scholars and practitioners alike, facilitating a comprehensive examination of interventions and strategies aimed at mitigating occupational stressors and promoting healthier work environments.¹⁸

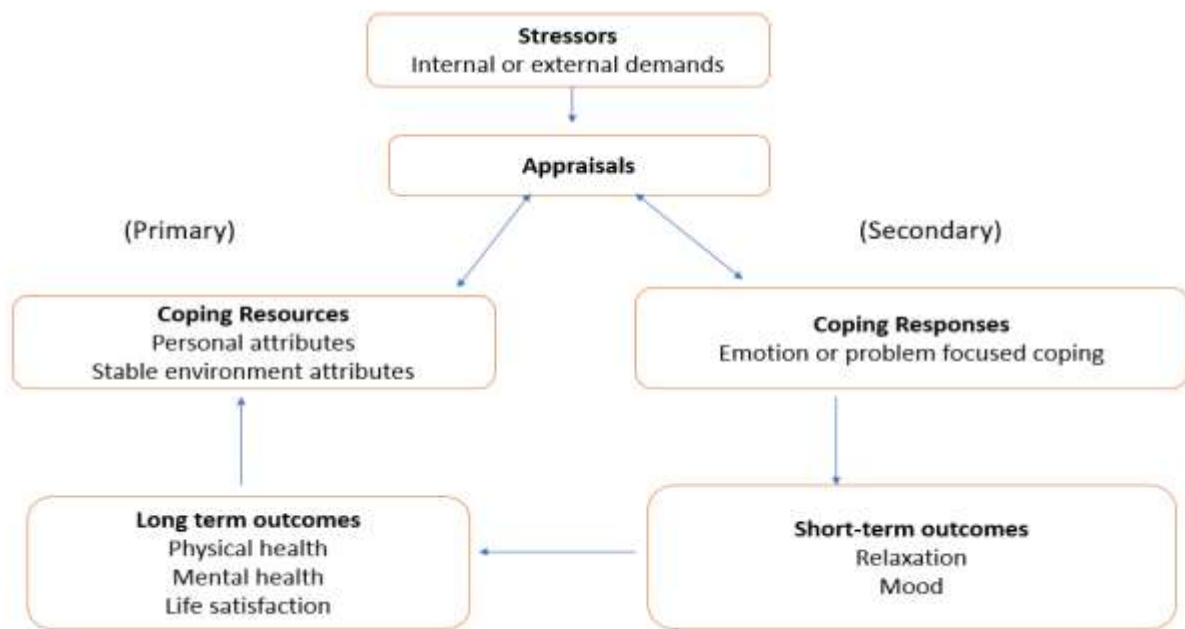


Figure 1: Transaction Model of stress and coping (Richard Lazarus and folkman,1984)¹⁹

The concept of "stress" originally originated in the field of engineering to characterize the tangible physical pressure exerted on a structure. However, in the mid-1930s, the term took on a new dimension with the publication of the paper "A Syndrome Produced by Diverse Nocuous Agents" in Nature (Selye, 1936). This seminal work delved into experiments conducted on rats exposed to "acute non-specific nocuous agents," termed as "stressors." These stressors encompassed a range of adverse stimuli, such as exposure to cold, surgical injury, spinal shock, excessive muscular exertion, or sub-lethal drug administration. During the initial phase post-injury, rats exhibited thymus shrinkage, affecting T cell production crucial for immunity. Subsequently, brain regions responsible for growth paused operations, reallocating resources strategically to prioritize vital bodily functions over growth maintenance.²⁰

According to WHO, there are three main types of stress

3.2.1 Acute stress

The World Health Organization (WHO) recognizes acute stress as a significant health concern due to its potential to negatively impact individuals' mental and physical well-being. Acute stress refers to a short-term reaction to a specific stressor or event, typically characterized by symptoms such as increased heart rate, rapid breathing, muscle tension, and heightened alertness.²¹

3.2.2 Episodic acute stress

Episodic acute stress is when a person experiences repeated episodes of acute stress. People with episodic acute stress suffer frequent headaches, or backpain are irritable, tense and generally on the edge, experience chest pain tachycardia, or migraines, all due to ongoing stress. This stress can have serious consequences on both our physical and mental well-being. Stress can lead to cognitive dysfunction and can negatively affect the personal and professional life of an individual.

Episodic acute stress can have severe implications for individuals' health, leading to conditions such as anxiety disorders, depression, hypertension, and cardiovascular diseases. It can also impair cognitive functions and decrease overall quality of life.²²

Table B-Overview of the signs and symptoms associated with each type of stress as categorized by the WHO

Stress Type	Signs	Symptoms
Acute stress	• Tachycardia • Sweating • Rapid breathing	• Anxiety • Irritability • Muscle tension
Episodic stress	• Recurrent headaches • Digestive issues • Hypertension	• Persistent worry • Fatigue • Sleep disturbances
Chronic stress	• Insomnia • Fatigue • Feeling hopeless • Irritability	• Depression • Apathy • Social withdrawal

3.2.3 Chronic stress

Chronic stress, characterized by prolonged exposure to stressors such as work pressures, financial strains, or health concerns, not only undermines work performance with diminished concentration and motivation but also poses a grave threat to mental and physical well-being. This persistent tension can disrupt immune function, leading to enduring health complications and deteriorating quality of life, emphasizing the critical need for effective stress management strategies to safeguard both professional success and personal health .²³

3.3 Causes of stress

The WHO identifies various causes of stress, which can include factors such as work-related stress, financial problems, interpersonal conflicts, major life changes, and traumatic events.

Work-related stress: High demands, long hours, job insecurity, lack of control over work conditions, and conflicts with colleagues or superiors can contribute to stress in the workplace.

Financial problems: Struggles with debt, unemployment, poverty, or the inability to meet financial obligations can be significant sources of stress for individuals and families.

Interpersonal conflicts: Difficulties in relationships with family members, friends, or romantic partners, as well as conflicts within social groups or communities, can lead to stress.

Major life changes: Marriage, divorce, moving to new location, having a baby and even the death of a family member are all major life changes and they can be huge stressors.

Traumatic events: Exposure to violence, natural disasters, accidents, or other traumatic experiences can have long-lasting psychological effects and contribute to stress.

“This model suggests that high job demands, low job control, and low social support can lead to increased stress levels among employees”



Figure 2- Some of the Reasons Cited for Workplace Stress ²⁴

Job stress is akin to a persistent ailment prevalent among today's younger generation, which can significantly impair an individual's performance and overall physical and mental well-being. This affliction is fueled by various factors such as intense competition, unsupportive colleagues, and the looming specter of job insecurity.²⁵

3.4 Role of bus drivers in public transportation

Bus driving is a ubiquitous activity that involves operating a vehicle to transport oneself or others from one place to another. It requires a combination of skills, including coordination, attention, and knowledge of traffic rules and regulations. Beyond its practical function, driving can also be a source of enjoyment, offering freedom and independence to explore new destinations.²⁶

Bus drivers are instrumental in ensuring the safety and convenience of passengers throughout their travels. The comfort of passengers on their bus journeys is heavily influenced by the approach taken by bus drivers behind the wheel. Employing smooth and composed driving methods not only ensures safety but also elevates the overall experience for passengers. By adhering to a consistent speed, steering clear of sudden movements, and delivering a seamless ride, drivers can significantly enhance passenger comfort and minimize the risk of motion-related discomfort.²⁷

The crucial role bus drivers play in ensuring the efficiency and safety of transit operations, while also highlighting the significant stressors they encounter on a daily basis. Factors such as heavy traffic congestion, tight schedules, unruly passenger behavior, and the constant pressure to meet performance targets emerged as key stress-inducing elements.²⁸

3.5 Theoretical framework used in occupational stress

Stress theory Stress theory Start by learning about general stress theories like the Transactional Model of Stress and Coping from Richard Lazarus & Susan Folkman. This model suggests that stress is produced when an individual perceives a discrepancy between the requests of a situation and their capacity to handle those demands.²⁹ Further, this can be extrapolated to the field of bus driving as drivers face numerous stressors such as dealing with heavy traffic congestion or stringent schedules & passengers and additionally required by law to adhere rigidly with myriad safety protocols.

“Job Demands Control Support Model (JCDS): This model, proposed by Robert Karasek and Theorell, examines the interplay between job demands, job control, and social support in influencing stress levels.”³⁰

“This model suggests that high job demands, low job control, and low social support can lead to increased stress levels among employees.”



Figure 3. Model of Job Demand-Control-Support (JDCS) ³¹

In the context of KSRTC bus drivers, job demands might include factors like workload and time pressure, while job control could refer to the extent to which drivers have autonomy and decision-making authority. Social support may come from colleagues, supervisors, or family members and could buffer against the negative effects of stress on health.

Effort Reward Imbalance Model- This model demonstrates the increasing imbalance among efforts contributed to work and rewards one is getting in exchange.³² Considering this model applies to bus drivers in terms of the effort they put into their job (e.g., long hours, dealing with traffic) versus the rewards they receive (e.g., salary, job satisfaction). Imbalance in this equation may lead to increased stress and adverse health outcomes.

This flowchart illustrates the cyclical relationship between effort, rewards, perceived imbalance, and outcomes, highlighting how imbalances in the effort-reward ratio can impact individuals' experiences and behaviors in the workplace.

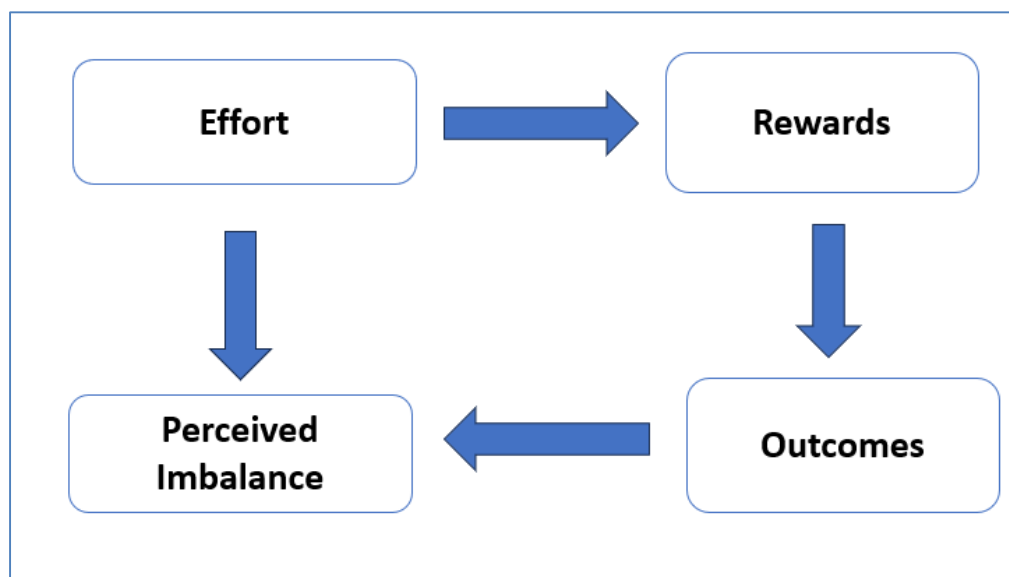


Figure 4. Model of Effort Reward Imbalance Model³³

Biopsychosocial Model of Health- George Engel developed a biopsychosocial perspective of health and illness to deal with the interconnectedness between biological, psychological and social factors in human. ^{34,35} The state of health and their consequences that the model suggested changed due to occupational stress among bus drivers applies to other physical (e.g., cardiovascular conditions, musculoskeletal problems), mental (e.g., anxiety, depression), or social well-being (e. g., relationships and quality of life). Biological, psychological and social factors that interact to influence health status.

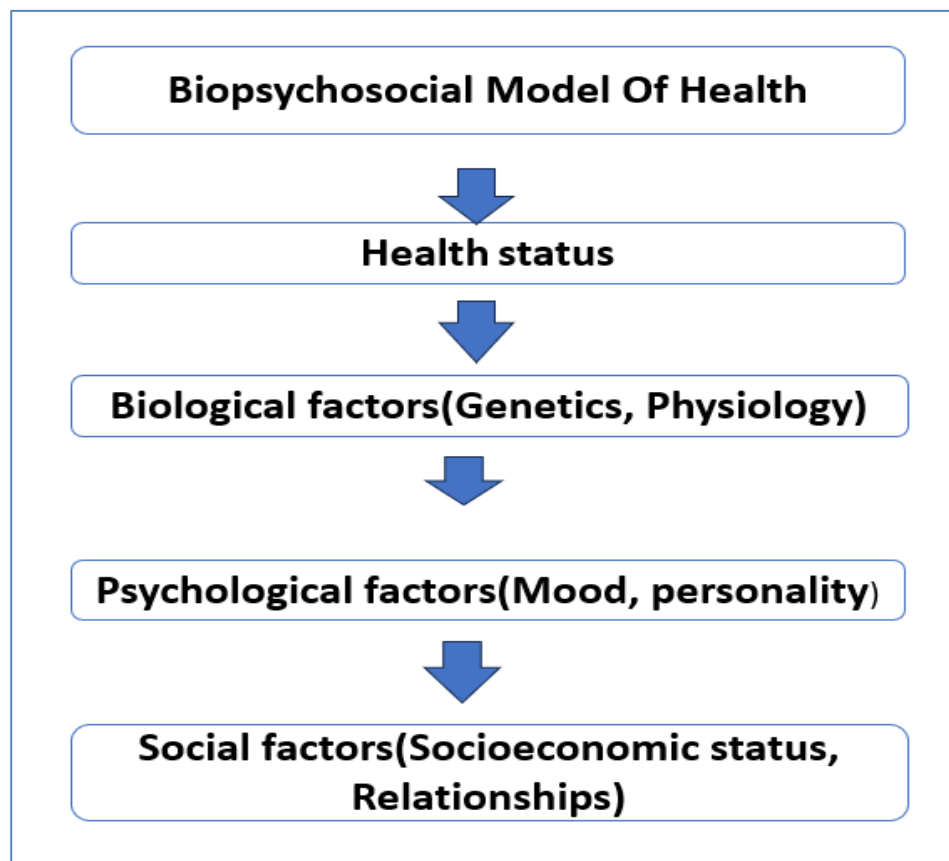


Figure 5. Model of Biopsychosocial Health³⁶

3.6 Factors Contributing to Occupational Stress Among Bus Drivers

Table C-Determinants of occupational stress among KSRTC bus drivers

Social factors	Biopsychosocial Factors	Health Related Factors
1. Age	1. Long hours of driving(>12 hours)	1. Diabetes
2. Marital status	2. Traffic congestion	2. Hypertension
3. Work experience	3. Sleep disturbances	3. Overweight and Obesity
4. Work load	4. Weather conditions	4. Influence of substance abuse
5. Interpersonal conflict and customer relations		5. Physical inactivity
6. Job insecurity and economic factors		6. Musculoskeletal disorders

The above table synthesizes key factors influencing stress levels in this occupational group in bus drivers. It provides an organized overview of the social, biopsychosocial and health-related determinants of stress which reflects competition between personal characteristics on one hand and job- related as well as health factors interposing tensions. It is the framework we need to comprehend how work stress can take place among bus drivers, this will dissect each category and discuss their effects on stress level as well as the interrelationship among them(table-C).

3.6.1 Social factors

Bus drivers, as essential workers in public transport systems, face numerous stressors related to their occupation. Understanding these factors is crucial for addressing occupational stress and its effects on their health.

a) Age

Age is a significant factor influencing occupational stress among bus drivers. The nature of the stress can be additionally complicated by age and experience (young drivers feel more stress from inexperience), fitness (active drivers with good physical health and vision may be subsequently unable to cope with the hours and scheduling), and expectations (less experienced drivers may feel higher stress due to increasing expectations).³⁷ Young drivers tend to experience anxiety as a consequence of job insecurity and performance anxiety, while older drivers are more inclined to suffer stress from physical health problems and concerns over retirement security. Aging - normal age-related health concerns, such as poor eyesight, hearing loss, and slowed reaction times can create greater levels of stress that could lead to decreases in overall job performance and workplace safety.³⁸

A cross-sectional study by Kashani et al in Tehran city, Iran on 2018, to find out the burden of stressors in young and older drivers. Young drivers stressed about their lack of experience, job security and poor driver performance, while older drivers worried about physical health and retirement security.³⁹

A study done by Yanning Zhao among urban bus drivers in Japan (2018) with the objective to find the the impact of age on occupational stress among urban bus drivers with the help of a self-reported scale and

physiological parameters. The researchers concluded that a bus driving job might be too stressful in terms of the hours and scheduling particularly for older drivers who are significantly less likely than younger drivers to report poor physical health and poor vision.

A study by Sharma et al. in Rajasthan, India found that young bus drivers aged 18 to 23 years were the most affected by road traffic injuries. The study highlighted that road safety attitudes, including adherence to traffic rules, aggressive behavior, engagement in non-driving activities/distractions, driving responsibility, and carelessness, played a significant role in these incidents.⁴⁰

b) Marital status

Marital status as an important factor affecting occupational stress of bus drivers. Drivers who are married have family obligations, which can lead to a lot of pressure. Family conflicts and reduced time spent with loved ones due to long driving hours (exceeding 15 hours) contribute significantly to increased stress levels among drivers. Meanwhile, unmarried drivers tend to be lonelier with fewer social supports, and that may lead to more stress. It was understood through various researches that marital conflicts, lack of sociable support, as well as family- related problems- which the driver a married driver, newly broken in, are great sources of stress of the driver.¹⁵

A study conducted on long-distance bus drivers in Nigeria in 2022 reported a significant association between perceived stress and marital status. While the study did not directly attribute stress levels to marital status, it highlighted that marital status can influence stress through related factors such as social support, communication, and relationship dynamic.⁴¹

Taklikar conducted a cross-sectional study among bus drivers in India to study occupational stress, however the study did not relate the occupational stress with Marital status directly. Marriage, on the other hand, does seem to have an effect on stress levels in individuals, through factors such as social support, patterns of communication, interaction dynamics, and marital status.⁴²

c) Working experience

Experienced drivers may see more compassion and coping mechanism from these experiences and enjoy a greater tolerance for stress on the job. Yet prolonged or repeated exposure to occupational hazards and long-term stress can also result in burnout or chronic stress. In contrast, drivers with little or no experience might be under additional stress, because they may not be familiar with the road, do not have the confidence needed to overtake, and are afraid to have an accident.³⁸

A study conducted by Sergio et al in 2017, that Colombian bus drivers had significant levels of work-related stress and burnout despite an average of 18.63 years of experience in driving, which in turn led to lower work performance and well-being.⁴³

A study conducted by Hiroshi Nakai, in Japan among the bus drivers in 2014, assessed with a questionnaire survey designed as a self-diagnosis tool for bus drivers. The findings indicated that older, more experienced bus drivers tended to exhibit lower stress levels.⁴⁴

Yevheniia Hlotovar done a study in bus drivers in Stockholm, Sweden by 2014. The data was self-reported through questionnaires that the bus drivers answered before and after their shifts. Inexperienced bus drivers had higher

levels of stress than more experienced ones, suggesting a correlation between stress and work experience.⁴⁵

- d) Workload:** High job demands, including long working hours, tight schedules, and heavy traffic conditions, contribute significantly to stress among bus drivers.^{4,46}
- e) Traffic congestion and Road Safety Concerns:** Dealing with heavy traffic, road construction, and unpredictable driving conditions can be stressful for bus drivers. Concerns about road safety and the risk of accidents can add to their stress levels.^{28,47}
- f) Shift Work and Irregular Hours:** Bus drivers regularly work during early mornings, evenings, weekends and holidays. They may suffer fatigue if they are required to often work irregular shifts which also has high stress implications.^{5,48}
- g) Work Environment and Physical Discomfort:** The physical demands of driving, such as prolonged sitting, exposure to vibrations, and noise levels inside the bus, can contribute to discomfort and stress among bus drivers.⁴⁹
- h) Interpersonal conflict and customer Relations:** Dealing with difficult passengers, conflicts with coworkers or supervisors, and managing passenger interactions can be sources of stress for bus drivers.⁵⁰
- i) Job insecurity and economic factors:** Concerns about job security, wages, and benefits can also contribute to stress among bus drivers. Economic factors, such as inflation and rising living costs, can add to financial stress.⁵¹
- j) Lack of control and Autonomy:** Bus drivers may have control over how they drive but not where or when so much they are controlled by a schedule, routes, and break times, leading to feelings of helplessness and lack of autonomy, which are stressors.⁵²
- k) Work -Life Imbalance:** Balancing work responsibilities with personal and family life can be challenging for bus drivers, especially due to their irregular

work hours and shift patterns, leading to stress and conflicts.⁵³

3.6.2 Health Related factors

(a) Cardiovascular Health: Occupational stress has been linked to cardiovascular diseases (CVD) among bus drivers. The nature of their work, including long hours, traffic congestion, and dealing with passenger-related issues, can contribute to increased stress levels. Bus drivers with high stress levels are known to be at increased odds of developing hypertension, coronary heart disease, and other cardiovascular issues, research has found.^{5,54}

(b)Mental Health: Stress levels and mental health of bus drivers are very much affected by the demanding job requirements, often in difficult environments. Studies have reported that bus drivers due to factors like long working hours and irregular schedules, difficult passengers among others.⁵⁵

(c)Physical Health: Occupational stress can also affect the physical health of bus drivers. Studies have found associations between stress and musculoskeletal disorders, such as back pain and neck pain, among bus drivers. These health problems, frequently found in commercial drivers, a result of not only the stressors associated with the job but also due to strains related to driving itself.⁵⁶

(d)Sleep Disturbances: Bus drivers experiencing high levels of occupational stress may also suffer from sleep disturbances. Irregular work schedules, long hours, and the need to stay alert while driving can negatively contribute to disrupted sleep patterns which might lead to insomnia or any other sleeping disorder. Bus drivers with high stress who sleep poorly have an increased risk of coronary heart disease, stroke and even that they will work while ill.⁵⁷

Occupational stress has long been recognized as a crucial determinant of health outcomes, particularly in high-pressure work environments such as transportation sectors like KSRTC. Working in high-pressure environments can lead to occupational stress, potentially resulting in negative health consequences. Sleep disturbances often reflect the challenges of offshore work, which can further contribute to this stress. Shift workers, facing unique challenges, may experience increased stress, including irritability and intolerance of work conditions. Implementing stress management strategies, such as the Awareness-Analysis-Action approach, can be beneficial for both individuals and organizations in addressing these issues. Moreover, effective intervention and support can be facilitated through active listening and communication. Employers should acknowledge the detrimental effects of high-pressure work environments on employee well-being and implement measures to alleviate stress while fostering a balanced work-life environment.⁵⁸ In the context of KSRTC bus drivers, whose roles demand prolonged periods of concentration, dealing with traffic complexities, and irregular schedules, understanding the nexus between occupational stress and health is paramount.

3.7 Prevalence of factors impacting the driving

The most possible factors which are identified in various studies done throughout the world has established that these are the risk factors like traffic congestion, road conditions, weather conditions, shift work, irregular schedules. A study of systematic review and meta-analysis done by Sharon, showed that long hours of driving are linked to various possible risk factors such as traffic congestion, heightened levels of fatigue, musculoskeletal issues, and psychological distress among drivers.⁵⁹ A study done by Afrin in Switzerland showed that Traffic congestion, poor road conditions, and adverse weather conditions have been linked to heightened stress levels among drivers, this was manifested not only as

impaired performance but also increased risks of accidents among the affected drivers .^{60,61}

A study done by Fraizer with the data of National longitudinal survey elicited that shift work and irregular schedules disrupt the circadian rhythm, contributing to sleep disturbances, fatigue, and overall decreased well-being among drivers.^{28,62} On the other hand, Meanwhile, a cross sectional study performed in India by Nidhi et al indicated that applying technology such as GPS and driver assistance systems had potential to reduce stress and improve driving performance.⁶³

Mohsen Amira et al. reported a prevalence of 83.2% occupational stress among bus drivers in Egypt⁶⁴, while Useche et al. reported a prevalence of 40 % of stress among bus drivers in Columbia⁶⁵, and Taklikar et al. (2018) found a prevalence of 57.8% stress among bus drivers in India.⁴² Additionally, Bathija et al. reported a prevalence of 80% among bus drivers .These studies demonstrate the differences in occupational stress among bus drivers in other countries.

The following table lists the prevalence of occupational stress among bus drivers in across various countries (Table A).

Table D-Prevalence of occupational stress among drivers in different countries

	Author	Country & Year	Group	Study Tool	Prevalence
1	Mohsen Amira et al., ⁶⁴	Egypt 2019	Bus drivers	American institute of stress questionnaire	83.2%
2	Illangasinghe et al., ⁶⁶	Sri Lanka 2021	Bus drivers	Validated structured questionnaire	52.36 %
4	Oyapero et al., ⁴¹	Nigeria 2022	Bus drivers	Perceived stress scale	62%
5	Useche et al., ⁶⁵	Colombia 2022	Bus drivers	Job content questionnaire	40%
6	Rajabali hokmabadi et al., ⁶⁷	Iran 2018	Bus drivers	Philip el Rice standard job stress questionnaire	97%
7	Rahimpour et al., ⁶⁸	Pakistan 2020	Drivers	Validated structured questionnaire	33.2%
8	Patel et al. ⁶⁹	India 2021	Bus drivers	Occupational stress index	44.32 %

				(OSI)	
9	Taklikar et al. ⁴²	India 2018	Bus drivers	Stress-related health complaints questionnaire	57.8%
10	Bathija et al., ⁷⁰	India 2014	Bus drivers	Structured, preformed and pretested questionnaire	80 %
11	Rathi et al., ⁷¹	India 2019	Drivers	Depression Anxiety Stress scale (DASS-21)	58.3%

The prevalence of occupational stress among drivers varies significantly across different countries, as evidenced by the literature review. Among the studies reviewed, high prevalence stands out, with Rajabali Hokmabadi et al. (2018) reporting an alarming rate of 97% among bus drivers in Iran, assessed using the Philip el Rice standard job stress questionnaire. Conversely, Illangasinghe et al. (2021) found a relatively low prevalence of 52.36% among bus drivers in Sri Lanka, utilizing a validated structured questionnaire.

3.7.1 BIOPSYCHOSOCIAL FACTORS

1.Long hours of driving (more than 12 hours)

Typically refers to the specific hours and patterns in which employees are scheduled to work, often rotating between different times of day or days of the week. These shifts can include morning, afternoon, evening, night, and overnight hours, as well as extended or irregular hours such as split shifts or on-call arrangements.⁷²

Long-haul bus drivers often face significant job stress, primarily stemming from their extended work hours and unpredictable schedules. Working long hours, typically exceeding 11 hours a day, can significantly elevate the likelihood of these drivers consuming high amounts of caffeine. In addition, working more than 48 hours per week has been found as an independent risk factor for both occupational stress and depressive symptoms among couriers.⁷³

Table E-Global Patterns: Prevalence of Extended Driving Hours (≥ 12 hours) Among Bus Drivers

SL NO	Authors name, year	Country, year	Study tool	Long hours of driving (>12 hours) (%)
1.	Varela-Mato et al, ⁸	United Kingdom 2016	activPAL3 inclinometer	62.5%
2.	Sun et al, ⁶³	China,2022	Physiological strain index (PSI)	32.5%
3.	Hokmabadi et al, ⁶⁴	Tehran,2019	Driver Safety Questionnaire	44.5%
4.	Leechawengwongs et al, ⁶⁵	Thailand 2006	Epworth Sleepiness Scale	61%
5.	Michida et al, ⁶⁶	Thailand,2001	Multiple sleep latency test	48%
6.	Iridiastadi et al, ⁶⁷	Indonesia,2020	Swedish Occupational Fatigue Inventory (SOFI) and the Karolinska Sleepiness Scale (KSS)	52%
7.	Sebastin K V ⁶²	India,2019	Work stress questionnaire	38.5%

Global literature review on prevalence of extended driving hours (≥ 12 h) among bus drivers results show that there is a high heterogeneity among prevalence reported by different studies and regions, the highest prevalence of long driving hours was reported by Varela-Mato et al. (2016) in the United Kingdom, with 62.5% of bus drivers working extended hours as measured by the activPAL3 inclinometer. In contrast, Sun et al. (2022) reported a significantly lower prevalence of 32.5% in China using the Physiological Strain Index (PSI). The pervasive nature of this issue across a range of bus driver populations appears similar in different countries and methods of assessment, although with marked cross-country variation in the frequency of extended driving hours.

2. Traffic congestion refers to a condition when the volume of vehicles on the road exceeds the road network's capacity, causing slower speeds, longer travel times, and delays. This situation is often triggered by factors like road construction, accidents, inadequate infrastructure, population growth, and peak travel times.

In high traffic congestion, the stress experienced by drivers is influenced by a combination of occupational stress and their inherent susceptibility to stress while driving. Regardless of congestion levels, a driver's inherent stress susceptibility significantly predicts their stress levels. Those with high inherent stress and heightened occupational stress experience more stress in highly congested traffic.⁷⁴

Traffic congestion

Table F-Global Perspectives on Traffic Congestion Prevalence: Insights from Diverse Regions and Years

SL NO	Authors name, year	Country, year	Study tool	Traffic congestion(%)
1.	Leechawengwongs et al, ⁷⁵	Thailand,2006	Self answered questionnaire survey and Epworth Sleepiness Scale	23%
2.	Montoro et al, ⁶⁵	Coloumbia,2019	Driving stress survey	52.8%
3	Afrin et al, ⁶⁰	Switzerland,2018	Road segment congestion index	43.8%
4	Ahmed et al, ⁷⁶	India,2022	structured bi-lingual questionnaire	51.2%
5	Chakrabartty et al, ⁷⁷	India ,2015	Cost of congestion method	34%
6	Alam et al, ⁷⁸	India,2013	Intelligent transport system	42%
7	Borthakur et al, ⁷⁹	India,2023	Traffic density-based congestion control methods, (TDCCA)	48%

Based on the above table, on global perspectives on traffic congestion prevalence, it is evident that traffic congestion is a significant issue across diverse regions and years. High prevalence rates were observed in studies such as Montoro et al. (2019) in Colombia, where driving stress survey indicated a prevalence of 52.8%, and Ahmed et al. (2022) in India, utilizing a structured bilingual questionnaire, reporting a prevalence of 51.2%. Conversely, lower prevalence rates were reported by Leechawengwongs et al. (2006) in Thailand, employing self-answered questionnaire survey and Epworth Sleepiness Scale, with a prevalence of 23%.

3.Sleep Disturbances

After adjusting for sex, age composition, education level, marital status working hours and job stress sleeping pattern disruptions or abnormalities in occupational drivers occurred at a remarkably higher prevalence than among office workers. Furthermore, there is a monotonic relationship between the number of times that truck drivers work at night or in the evening and sleep disturbance among these workers.⁸⁰ Studies have indicated that bus drivers often experience inadequate sleep duration and poor sleep quality, leading to daytime sleepiness, fatigue, and increased risk of accidents.⁸¹

Table G-Prevalence of Sleep Disturbances Among Bus Drivers

SL NO	Authors name, year	Country, year	Study tool	Sleep disturbances (%)
1.	Iridiastadi et al, ⁸¹	Indonesia,2020	Epworth Sleepiness Scale	38.4%
2.	Garbarino et al, ⁵⁷	Italy,2016	Tele-health assessment	44.8%
4.	Mujawar et al, ⁸²	Newyork,2021	Study Sleep Scale and Perceived Stress Scale-10.	47%
4.	Jeong et al, ⁸³	Korea,2018	Korean working condition survey	54.2%
5.	Vaz Fragoso et al, ⁸⁴	USA,2008	“Insomnia Severity Index [ISI]),(Epworth Sleepiness Scale [ESS])”	64%
6.	Garbarino et al, ⁴⁸	Italy,2018	Online support system	28.6%
7.	Nagaraj et al, ⁸⁵	India,2013	Pittsburg sleep quality index(PSQI)	51.6%

From the above table, the review of the literature shows that there is varying prevalence of sleep disorders among bus drivers all over the world. The highest prevalence among the literatures that I have reviewed was reported by Vaz

Fragoso et al., in USA, which was 64.0%, who used the Insomnia severity Index and the Epworth Sleepiness Scale for the analyses. The study by Garbarino et al. in Italy which used the social networking which was far lower at 28.6%, which was more than 35% less, therefore indicating that although sleep disorders is a big issue among the bus drivers all over the world it can be lesser in some countries

4.Weather conditions

Driving is often associated with difficult weather conditions, such as extreme heat, heavy rain, fog or cold.⁸⁶Extreme heat is often associated with increased stress as a result of discomfort, potential dehydration, and the risk of heat-related illnesses. In addition, can reduce visibility on the road and subsequently lead to a higher probability of road accidents. Cold temperatures are also discomforting and unrelated to similar health implications. Heatwaves or cold periods are likely to intensify stress and decrease work performance. Difficult weather conditions also make it harder to drive, causing more psychological and physical stress on drivers ⁸⁷.

Table H-Prevalence of Impact of Weather Conditions on Driving

SL NO	Authors name	Country, year	Study tool	Weather condition as stressor (%)
1.	Sun et al, ⁸⁸	China,2022	Physiological strain index (PSI)	28%
2.	Kaisari et al, ⁸⁹	UAE,2022	Artificial Neural Network Pathway	44%
3.	Hatvani Kovacas et al, ⁹⁰	Australia,2016	Climate change models	33%
4.	Summala H et al, ⁹¹	India,2007	Traffic weather information system (TWIS)	26%
5.	Asad et al, ⁹²	India,2021	Binary probit model	38%
6.	Bathija et al, ⁷⁰	India,2014	Self-rating depression scale.	80%
7.	Chakrabarty et al, ⁹³	India,2013	Psychosocial test,Driving simulation test,visual fatigue test	14.7%

The literature review based on the effect of weather conditions during the driving has revealed that there is a clear variability of prevalence between different studies referring to effects. For example, Bathija et al. (2014) reported an exceptionally high prevalence of 80% in India using the Self-rating Depression Scale, indicating a substantial impact of weather conditions on driving behaviour. On the other hand, Chakrabarty et al. (2013) found a relatively low prevalence of 14.7% in India using various psychosocial and driving simulation tests, suggesting a lesser impact.

3.7.2 A pale of health - A bus driver lifestyle and its comorbidities

The demands of the profession can lead to a litany of health challenges and conditions for bus drivers. These challenges will range from a higher tendency to cardiovascular diseases (CVD), obesity, hypertension as well as diabetes and psychological disorders. Such health problems are common among bus drivers and arise from an unhealthy behaviour characterized by irregular eating patterns, sitting for long periods, consumption of unbalanced diet, while it is shown in the research that such behaviors as smoking tobacco and alcohol abuse also occur. Specific diseases such as high blood pressure, diabetes or increased levels of cholesterol and fat are found to be in good attendance among bus drivers due to the psychological bites of their work.⁹⁴. In view of its prominence as one of the most significant nodal point on any state transport grid, this study is anticipated to look into some occupational stressors that lead to health status among bus drivers. The study will then provide a platform for an in-depth understanding of the bus drivers situational experiences and challenges. This could be long working hours, traffic congestion and a tight schedule are potential sources of stress for bus drivers which could act as multiple potential stressors in diverse aspects of their health well-being.

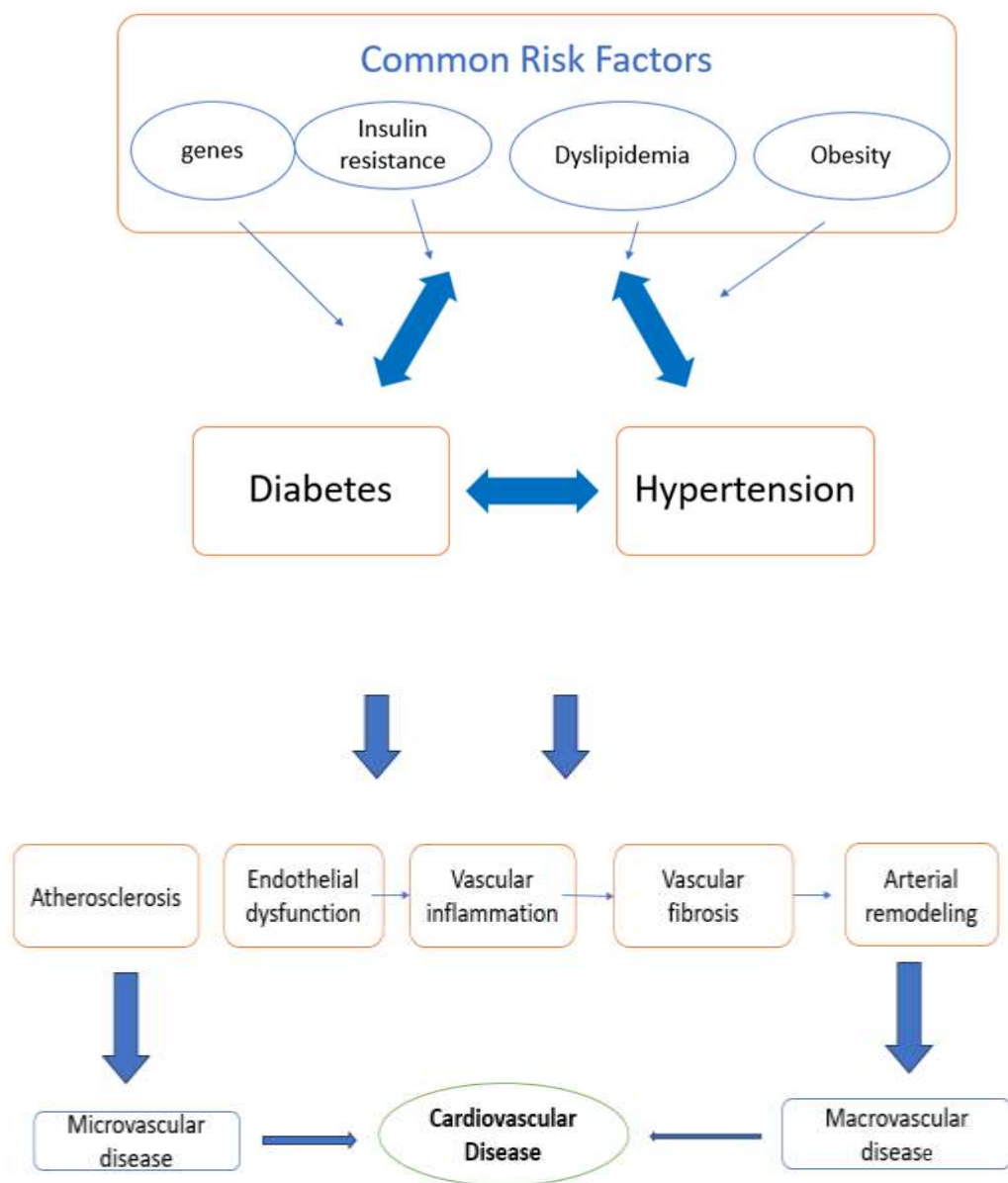


Figure 6-Vascular Pathology in Diabetes and Hypertension Leading to Cardiovascular Disease⁹⁵

Most of the health comorbidities in bus drivers include diabetes, hypertension, and coronary artery disease. These conditions are of significant concern due to their prevalence and potential impact on drivers' health and safety. Diabetes, characterized by high blood sugar levels, can lead to complications such as nerve damage and cardiovascular disease, posing challenges for drivers who require optimal nerve function and cardiovascular health for safe driving.⁹⁶ At the same way, hypertension also increases the risk of heart disease and stroke, which in turn may affect their ability to perform their duties safely. CAD, a condition where plaque builds up inside the coronary arteries, can lead to chest pain, heart attacks, and other cardiovascular issues, further complicating the health status of bus drivers.^{96,97}

1.Diabetes

“Diabetes, defined by the WHO, is a chronic metabolic disease characterized by elevated blood glucose levels, leading to potential damage to the heart, blood vessels, eyes, kidneys, and nerves over time.”The most common type is Type 2 diabetes, accounting for around 90% of all cases globally. Risk factors for Type 2 diabetes include being overweight or obese, physical inactivity, and an unhealthy diet.”

Among bus drivers, diabetes mellitus, characterized by prolonged high blood sugar levels, is a significant health concern. The high levels of diabetes among them are due to factors relating to their lifestyle as well as and job stress and genetic predisposition. According to the International Diabetes Federation (IDF), diabetes is diagnosed when fasting plasma glucose levels are ≥ 126 mg/dL (7.0 mmol/L) or when HbA1c levels are $\geq 6.5\%$. Globally, the WHO estimates that 537 million adults were living with diabetes in 2022, with 1.5 million deaths directly attributed to the disease in 2021.⁹⁸

Table I-Criteria for the diagnosis of diabetes according to International Diabetes Federation⁹⁹

(a) FPG (Fasting plasma glucose). OR	≥ 126 mg/dL (7.0 mmol/L)	Fasting is defined as no caloric intake for at least 8 hr.
(b) 2-h Post prandial glucose during OGTT (oral glucose tolerance test). OR	≥ 200 mg/dL (11.1 mmol/L)	The test is to be carried out as per standard laid down by WHO, with a glucose load that contains the anhydrous equivalent of 75 g of glucose diluted in water.
(b) HbA1C OR	$\geq 6.5\%$ (48 mmol/mol)	The test must be performed in a laboratory using an assay method that is NGSP certified and standardised to the DCCT Reference Method.
(d) In the presence of classic symptoms of hyperglycaemia or hyperglycaemic crisis, a list plasma glucose ≥ 200 mg/dL (11.1 mmol/L).		

Table J-Diabetes Prevalence Among Bus Drivers worldwide

SL NO	Authors name, year	Country, year	Instrument used to measure blood glucose	Prevelance of Diabetes (%)
1.	Izadi, et al. ⁵	Iran,2021	Glucometer	17.5%
2.	Ramukumba, et al. ¹⁰⁰	South Africa,2016	Glucometer	12.6%
3.	Adedokun, et al. ¹⁰¹	South Africa ,2019	Glucometer	17%
4.	Modjadji ,et al. ¹⁰²	South Africa,2022	Glucometer	14.5%
5.	Sugano,et al. ¹⁰³	Japan,2022	Glucometer	9.7%
6.	Ukudeyeva et al. ¹⁰⁴	NewYork,2018	Glucometer	27%
7.	Appiah et al. ¹⁰⁵	Ghana,2020	Glucometer	12%
8.	Malek M et al. ¹⁰⁶	Iran,2013	Glucometer	52.1%
9.	Kulothungan, et al. ¹⁰⁷	India,2023	Glucometer	11.9%
10.	Prabhu,et al. ¹⁰⁸	India,2015	Glucometer	15.7%

Based on the comprehensive review of the literature concerning the prevalence of diabetes among bus drivers from around the world, it is clear that there is some heterogeneity in the results of individual studies. Overall, the study with the highest prevalence rate among those included in this analysis was reported by Malek et al. (2013) in Iran, reported 52.1%, indicating a substantial burden of diabetes among bus drivers in that particular population. Conversely, Sugano et al. (2022) reported the lowest prevalence rate of 9.7% in Japan. This discrepancy

relates to the bidirectional influences of geographical location, socio-economic status, lifestyle habits and healthcare infrastructure which determine diabetes prevalence in bus drivers.

2. Hypertension

High blood pressure or hypertension, is a long-term medical condition in which the continually elevated force of the blood against artery walls occurs. Hypertension is globally recognized as a large public health issue by the World Health Organization (WHO) and it has been identified that hypertension adds to cardiovascular diseases and subsequently increases one's risk for stroke, heart attack among others including kidney failure. Worldwide, it estimates that hypertension is the largest contributor to cardiovascular morbidity and mortality worldwide more than 1 in every man nearly a billion people are hypertensive. Most of this is attributed to more risk factors in these populations over the past few decades, a pattern seen throughout developed countries.¹⁰⁹ The Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 8) defines hypertension as a systolic blood pressure (SBP) of 140 mmHg or higher and/or a diastolic blood pressure (DBP) of 90 mmHg or high.

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Table K-Classification of Blood pressure in adults, according to JNC-8 guidelines

Classification	Systolic Blood Pressure (mmHg)	Diastolic Blood Pressure(mmHg)
Normal	<120	<80
Pre-Hypertension	120-139	80-89
Stage-1 Hypertension	140-159	90-99
Stage-2 Hypertension	>160	>100

Table L-Prevalence of Hypertension among Bus Drivers world wide

SL NO	Authors name, year	Country, year	Prevalence of Hypertension (%)
1.	Modjadji ,et al. ¹⁰²	South Africa,2022	57%
2.	Rike, et al. ¹¹¹	Ethiopia,2022	34.7%
3.	Mohsen Amira,et al. ⁶⁴	Egypt,2019	33%
4.	Ukudeyeva et al. ¹⁰⁴	NewYork,2018	50%
5.	Patil,et al. ¹¹²	India,2023	47%
6.	Walvekar,et al. ¹¹³	India,2021	32%
7.	Takilkar. ⁴²	India,2016	24%
8.	Prabhu,et al. ¹⁰⁸	India,2015	22.8%
9	Prakash,et al. ¹¹⁴	India,2019	36.4%
10.	Mahendra Prasad ,et al. ¹¹⁵	India,2023	45.6%
11.	Gangadhar et al. ¹¹⁶	India,2015	36%

Based of the literature reviewed concerning the prevalence of hypertension between all over the country bus drivers from above table, there is a remarkable variation as to this issue go between regions and among studies. Among the studies reviewed, the highest prevalence of hypertension was reported by Modjadji et al. (2022) in South Africa, with 57%. This suggests a significant health concern among bus drivers in South Africa. Conversely, the lowest prevalence was found in the study by Takilkar (2016) in India, where only 24% of bus drivers were diagnosed with hypertension. Such differences could be driven by lifestyle, work environment and healthcare access that influence high blood pressure.

3. Overweight and Obesity

According to The World Health Organization (WHO), obesity is a chronic and multifactorial disorder, characterized by an excess of body fat stored in adipose tissue causing harm/health hazards related to disease. Increased risk of type 2 diabetes and heart disease, effects on bone health and reproductive functions and higher risk of some cancers. Obesity also greatly affects quality of life for parts including sleep and mobility.¹¹⁷

The diagnosis of overweight and obesity is typically determined by calculating the Body Mass Index (BMI), which is a ratio of a person's weight to their height squared (kg/m^2). Overweight is defined by a BMI of 25 or higher, and obesity is defined as a BMI of 30 or more. In 2022, approximately 2.5 billion adults aged 18 and older were above their ideal weight, with over 890 million adults classified as living with obesity. This translates to around 43% of adults aged 18 and over globally, with similar percentages between men and women. Overweight and obesity stem from a disparity between the energy consumed through diet and the energy expended through physical activity.¹¹⁸

Table M-“Obesity classification according to WHO and Asia-Pacific guidelines¹¹⁹

Nutritional status	WHO (Body Mass Index)	Asia-Pacific (Body Mass Index)
Underweight	<18.5	<18.5
Normal	18.5–24.9	18.5–22.9
Overweight	25–29.9	23–24.9
Obese	≥30	≥25

Table N-Bus Drivers' Health: Prevalence of Overweight and Obesity Across Countries

SL NO	Authors name, year	Country, year	Prevelance of overweight (%)	Prevelance of obesity (%)
1.	Modjadji, et al. ¹⁰²	South Africa,2022	44%	30%
2.	Pourabdian,et al. ¹²⁰	Iran,2020	39.1%	10.8%
3.	Silva ,et al. ¹²¹	Southern Brazil,2020	26.3%	11.2%
4.	Mohsen Amira,et al. ⁶⁴	Egypt,2019	48.3%	13.8%
5.	Ukudeyeva et al. ¹⁰⁴	NewYork,2018	40%	56%
6.	Appiah et al. ¹⁰⁵	Ghana,2020	32%	13%
7.	Malek M et al. ¹⁰⁶	Iran,2013	44.8%	20.8%
8.	Prabhu,et al. ¹⁰⁸	India,2015	33.8%	8%
9.	Sebastian. ¹²²	India,2018	38%	14%
10.	Joshi ,et al. ¹²³	India, 2013	43.3%	22.2%
11.	Gangadhar et al. ¹¹⁶	India,2015	59%	42%

The literature review results shows a wide variation in the prevalence of overweight and obesity among bus drivers in various countries identified that rates differed significantly between regions. In South Africa, Modjadji et al. (2022) reported a high prevalence of overweight (44%) and obesity (39.1%), while in New York, Ukudeyeva et al. (2018) found a lower prevalence of overweight (40%) but a higher prevalence of obesity (56%). In contrast, the study by Prabhu et al. (2015) in India showed a moderate prevalence of overweight (33.8%) and a low prevalence of obesity (8%).

4. Influence of Substance Abuse

Substance abuse, including alcohol consumption, smoking, and tobacco chewing, is a pervasive issue globally, with significant implications for public health, safety, and well-being. Among bus drivers, these behaviors are of particular concern due to their potential to impair cognitive functions, increase the risk of accidents, and negatively impact driver health. ¹²⁴According to the WHO, Substance abuse continues to pose a major health problem of public concern. In a study conducted by WHO, it was found that globally, approximately 31 million (DALYs) are lost as a result of alcohol consumption, 7.2 million due to tobacco use, and 0.4 million due to drug use.¹²⁵

Table O-Prevalence of Alcohol Consumption and Smoking Among Bus Drivers

SL NO	Authors name, year	Country, year	Prevelance of alcohol (%)	Prevelance of smoking (%)
1.	Useche et al. ¹²⁶	Colombia,2017	20.3%	27.8%
2.	Ramukumba et al. ¹⁰⁰	South Africa,2016	46%	24%
3.	Rike et al. ¹¹¹	Ethiopia,2019	38%	22%
4.	Adedokun et al. ¹²⁷	South Africa,2019	37.5%	33.2%
5.	Cunradi et al. ⁹	San Francisco,2009	42%	35%
6.	Parasharet al. ¹²⁸	India,2017	33%	39%
7.	Kaul et al. ⁹	India,2019	83%	44%
8.	Showande et al. ¹²⁹	India,2020	51.3%	52.6%
9	Prabhu et al. ¹⁰⁸	India ,2015	54 %	25%

According to the above review of literature the prevalence of alcohol and tobacco consumption in bus drivers varies greatly between studies and regions. For instance, the study by Useche et al. (2017) in Colombia reported a high prevalence of alcohol consumption at 83%, which is one of the highest recorded in the reviewed studies. In contrast, the study by Prabhu et al. (2015) in India showed a lower prevalence of alcohol consumption at 24%. Regarding smoking, the highest prevalence was observed in the study by Useche et al. (2017) in Colombia at 54%, while the lowest was reported by Prabhu et al. (2015) in India at 27.8%.

5. Physical activity

The impact of lifestyle factors, including diet, exercise, and sleep patterns, play a fundamental role in determining health outcomes and stress levels among individuals.¹²⁰ According to the World Health Organization, these factors significantly influence an individual's susceptibility to various diseases and their overall well-being. As an example, unhealthy diets, physical inactivity and poor sleep are influencing of the obesity epidemic as well as cardiovascular diseases and mental health disorders. On the flipside, leading a healthy (balanced diet, physical exercise, and sleep) life can substantially upgrade health results while reducing stress levels..¹¹⁷ The WHO defines health behaviors as "actions taken by individuals that affect their health or illness" (WHO, n.d.).¹¹⁸ For bus drivers, who often face long hours, irregular schedules, and challenging work environments, understanding the interplay between lifestyle choices and health outcomes is paramount.

Table P-Prevalence of Physical Inactivity Among Bus Drivers

SL NO	Authors name, year	Country, year	Prevalence of Lack of Physical activity(%)
1.	Turner et al. ¹³⁰	USA, 2011	20.8%
2.	Wanamo et al. ¹³¹	Ethiopia,2017	36.8%
3.	Alperovitch-Najenson et al. ¹³²	Israel,2010	48.7%
4.	Dhamodharan et al. ¹³³	India, 2020	86.4.%
5.	Kulothungan et al. ^{107,131}	India,2023	14.5%
6.	Gangadhar et al. ¹¹⁶	India,2015	46.5%

From the above table, the review of literature on the prevalence of physical inactivity among bus drivers reveals a significant variation across different countries. The prevalence of physical inactivity among bus drivers varies widely across different studies. For instance, Dhamodharan et al. (2020) reported a high prevalence of 86.4% in India, while Kulothungan et al. (2023) found a lower prevalence of 14.5% in the same country. Internationally, Alperovitch-Najenson et al. (2010) reported a high prevalence of 48.7% in Israel, whereas Turner et al. (2011) found a comparatively lower prevalence of 20.8% in the USA. Wanamo et al. (2017) reported a prevalence of 36.8% in Ethiopia.

6. Musculoskeletal disorders

Lower backache is a common health issue among bus drivers since the nature of their work entails prolonged sitting and occasional poor sitting positions, which result in referred back pains. Hence, such conditions affect not only the physical, but also psychological body health. Chronic pain of any nature, lowers someone's concentration since they are irritated and may become fatigued, thus needing the employer to notice the cause of the change. Consequently, studies indicate a high distribution of musculoskeletal disorders comprising largely backache across the bus drivers' circle. These factors affect the drivers' quality of life and their attitude towards their jobs.¹³⁴

A study carried out in Northern Thailand by Apirati Kasemsan in 2019 demonstrated that the highest prevalence rates were registered in the neck and back regions and were equal to 91.9 and 80.9 (back), respectively. The standardized Nordic musculoskeletal questionnaire was used to estimate musculoskeletal pain (MSP).¹³⁵

A study conducted by Pradeep Kumar in India in 2014 estimated musculoskeletal disorders as to the KSRTC bus drivers by means of the

standardized Nordic Musculoskeletal Questionnaire. Almost 55.8% of the study sample reported the work-related musculoskeletal disorders (WMSDs).¹³⁶

A study done by Apurva Girish Mehta et al, among female bus conductors in Karad working for the Maharashtra State Road Transport Corporation (MSRTC) for over five years, a significant 88% reported experiencing lower back discomfort and 44% reported stress, suggesting a potential correlation between stress and lower back.¹³⁷

MATERIALS
AND
METHODS

4.2. Study Settings

Kolar District in the state of Karnataka, south India It is bordered on the west by Bangalore Rural district, in north Chikballapur district Andhra Pradesh state of Chittoor to east and south by Krishnagiri District & Vellore Districts.

The district includes six taluks, namely Mulbagal, Kolar, Bangarapet, Malur, Srinivaspura, and KGF(Kolar Gold Fields).

The majority of the population speaks Kannada, with a significant number also speaking Telugu and Tamil.

The study was conducted at the Karnataka State Road Transport Corporation (KSRTC) depot located in Kolar district, Karnataka, India. Kolar district is home to six taluks, each with its own KSRTC depot: Mulbagal, Srinivaspura, Kolar, Malur, KGF (Kolar Gold Fields), and Bangarapet. This study focused specifically on the KSRTC depot in Kolar town.¹³⁸

4.3. Study design:

Cross sectional study

4.4. Study population- KSRTC bus driver, Kolar depot

The KSRTC(Karnataka State Road Transportation) depot in Kolar town operates several key bus routes that play a vital role in connecting the town with neighboring areas and other parts of the district. These routes serve both urban and rural areas, catering to the transportation needs of a diverse population. Some of the prominent routes include those connecting Kolar with Bangalore,Mulbagal, Srinivaspura, Malur, KGF (Kolar Gold Fields), and Bangarapet and Thirupati. These routes are essential for public transport traveling for work, education, healthcare, and other purposes, highlighting the critical role of the depot in ensuring connectivity and accessibility within the region.

There were 729 employees in Kolar KSRTC depot. These employees were categorized into two groups based on their work environment and roles: outdoor workers and indoor workers.

Outdoor workers: This category included bus drivers(654), conductors, mechanics, and housekeeping staff.

Indoor workers: This category included administrative staff who work inside office buildings within the KSRTC depot.

4.5. Inclusion criteria:

- The KSRTC bus drivers who were currently employed and having at least one year of driving experience.
- All the KSRTC bus drivers belonging to the age group of 21 to 60 years was considered for the study

Exclusion criteria:

- Drivers who were absent for more than 6 months for any reasons including health.

4.6 Sample size calculation

Z_{α} at 95% confidence interval is 1.96

Prevalence $P=83.3\%=0.833$ Expected proportion in occupational stress based on prevalence study conducted by Amira Mohsen et al ¹⁴.

d =Relative precision of 5% i.e., 0.025.

- $q = (1-p)$
- $d = 0.05$

$$= \frac{Z_{\alpha}^2(p)(1-p)}{d^2}$$

$$= \frac{(1.96)^2(0.833)(1-0.833)}{(0.05)^2}$$

$$n = 216$$

The sample size was calculated based on the prevalence of stress (83.3%) from previous study, and alpha error at 0.05% with two-sided confidence level of 95% the minimum sample size required is 216 expecting a 10% non-respond rate, the final sample size of 240.

4.7 Sampling:

Sampling procedure was implemented to gather a list of permanent employed staff from the competing authority of KSRTC bus depot in Kolar. At that time, the depot housed 654 bus drivers. To obtain a representative sample, 240 individuals were required. This sample was selected using the simple random sampling method, facilitated by a software google random generator powered by the Mersenne Twister algorithm.¹³⁹ Each selected participant was then subjected to a 10-minute interview session as part of the data collection process (figure 8).

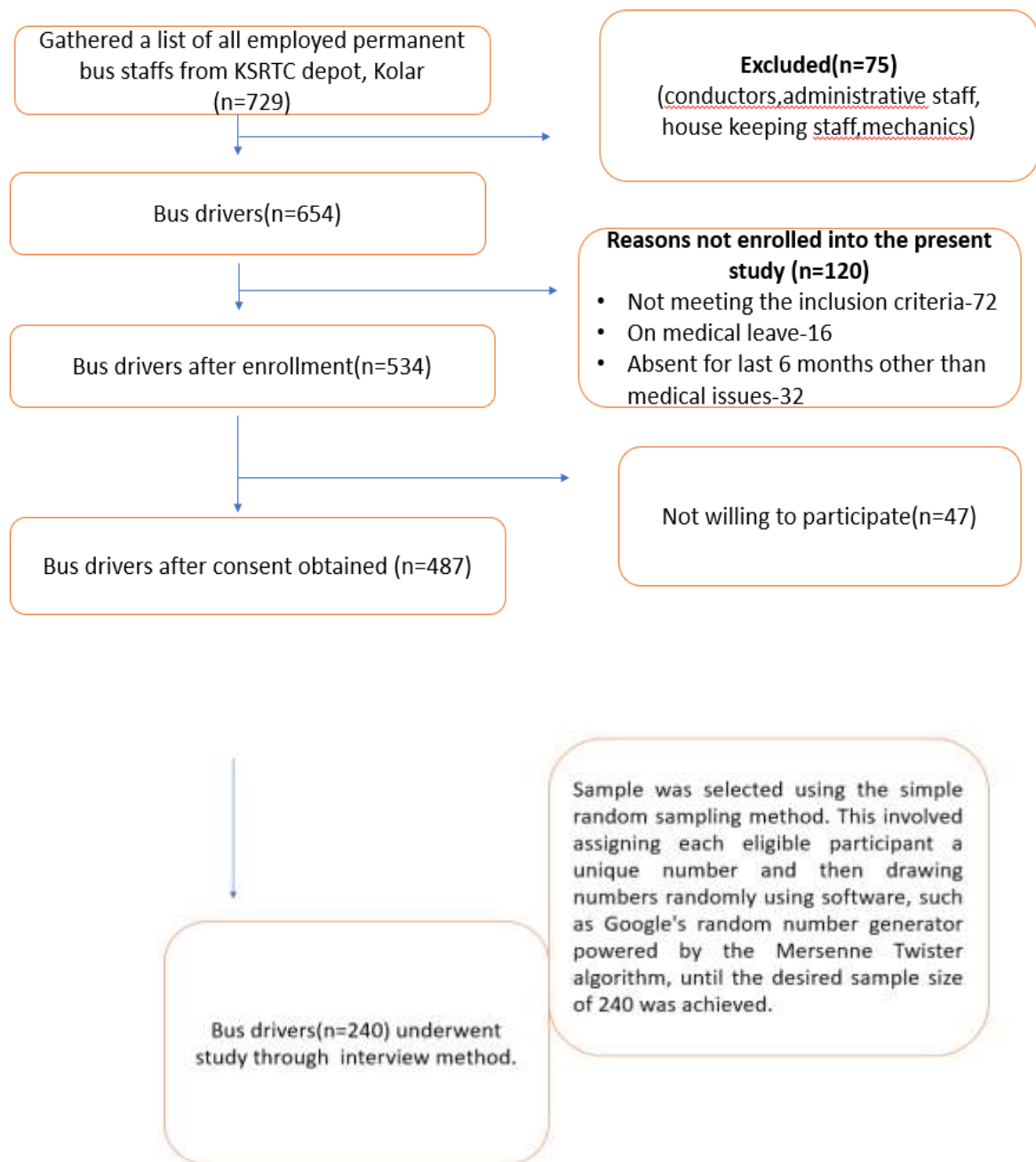


Figure-8 Summary of flow of participants in sampling scheme for the study

4.8 Study Tools

Written informed consent was obtained from the KSRTC depot manager and participants. Socio-demographic details such as age, gender, education, religion, family type along with income per capita was collected through pre-tested semi-structured self-administered questionnaire. The study also gathered data on substance abuse alongside coexisting health conditions like diabetes, hypertension, and coronary artery disease. Additionally, participants' anthropometric measurements were recorded, including the calculation of waist-to-hip ratio.

The American Institute of Stress (AIS) questionnaire for stress assessment is a widely used tool to measure stress levels in individuals. It consists of a series of questions designed to evaluate different aspects of stress experienced by an individual. The questionnaire typically includes questions related to both physical and psychological symptoms of stress, as well as questions about the perceived sources of stress. The questionnaire is divided into 2 sections, each focusing on a specific aspect of stress. These sections include questions about work-related stressors, personal life stressors, coping mechanisms, and overall well-being. Each question in the questionnaire is scored based on the frequency or intensity of the stress symptom being assessed. The scores are then totaled to provide an overall measure of stress levels. The scoring system may vary depending on the specific version of the questionnaire being used, but higher scores generally indicate higher levels of stress.

PART A: In this part, participants are asked to rate how often certain statements describe how they feel about their current job on a scale from 1 to 5, where 1 represents "never" and 5 represents "very often." There are eight statements in this part (1A to 1H) covering aspects like control over work

duties, work conditions, recognition for good performance, impact of the job on physical or emotional well-being, workload, utilization of skills, ability to express opinions, and interference of job pressures with personal life.

PART B: This part consists of 14 questions (2 to 14), In this part, participants are asked various questions about their general satisfaction, anger, and stress levels at work, as well as changes in workload and job pressure over the past year. They are also asked about their concerns regarding job loss, experiences of bullying or anger with co-workers, and the main causes of stress in their life. Additionally, participants are asked about the spread of attitudes in their workplace, their perception of management's sensitivity and helpfulness in resolving stressful issues, and whether they would want their boss's job. In Part B, respondents are asked to provide general assessments of their feelings at work using a scale from 1 to 5 (1 = extremely, 2 = quite a bit, 3 = somewhat, 4 = a little, 5 = not at all).¹⁴⁰

Total Stress Score Interpretation

PART A-, Each question is scored on a scale of 0 (never) to 5 (very often), with a total score range of 0–40

Table Q-Interpretation of stress score

Total Score	Stress Severity
0-15	Relatively calm
16-20	Mild stress
20-25	Moderate stress
26-30	Severe stress
31-40	Potentially danger

4.9 Pilot Study:

Prior to commencing the primary research project, a pilot study was conducted involving thirty bus drivers from the private bus stand in Kolar district. The responses obtained were carefully analyzed, and based on the insights gained, necessary modifications were made to refine the questionnaire.

4.10 Statistical analysis:

The data collected was coded and entered in Microsoft excel. Entered data has been transferred into IBM licensed SPSS statistics version 23.0 after editing and cleaning. Descriptive statistics such as percentage and Mean $\pm$ standard deviation has been used to represent variables such Religion, BMI categories and Age respectively.

Bar diagrams and Pie Diagrams have been used to present the data in graphical manner. The association of the categorical independent variables such as religion, Education etc with the severity of the occupational stress (Moderate& Severe) has been statistically tested using Chi-Square test. A Univariate logistic regression analysis has been done to predict the severity of the occupational stress for all the relevant independent variables. Crude Odds ratio along with its 95% Confidence Interval has been used to quantify the relationship of each of the categories in the independent variable list with occupational stress (Moderate& Severe). Furthermore, a Multivariate logistic regression analysis has been done to find the effect of each of the categories in the independent variable list with occupational stress (Moderate& Severe) and Adjusted Odds ratios with its 95% Confidence Interval has been used to quantify the relationship.

P value<0.05 has been considered statistically significant for Chi Square test and 95% Confidence Interval without the null value has been considered statistically significant for Crude Odds and Adjusted Odds ratios.

4.11 Ethical Consideration.

This study is approved by the Institutional Ethical Review Committee of Sri Devaraj Urs Academy of Higher education and Research, Kolar. (No.SDUMC/KLR/IEC/242/2022-23)

4.11.1 Autonomy

- Participants in the study were given a participant information sheet that explained the study and invited them to participate willingly.
- KSRTC drivers had freedom to be voluntary respondents and they were not forced in any way to take part in the study. All subjects provided informed consent, to the purpose of the study and type of procedures and potential risks or benefits

4.11.2 Confidentiality

- A self-administered and, confidential questionnaire was completed by the participants to obtain this data.
- Throughout the study strict confidentiality of the personal information, their health status and only responses to stress assessment were also conducted. Anonymized data were kept in a department locker to ensure limited accessibility.

4.11.3 Benevolence

- The participants who were found to have Occupational stress and newly diagnosed morbidities were informed ~~and~~ the same and advised to seek medical support. The study aimed to benefit the participants and contribute to the understanding of occupational stress and its impact on health among KSRTC drivers. Researcher ensured that the study design, procedures, and interventions, prioritized the well-being of the participants.

4.11.4 Justice

Research ensured that the selection of participants was fair and equitable, devoid of any discrimination. The benefits of the research were distributed fairly among all participants, while minimizing any burdens or risks.

RESULTS

5. RESULTS

The study was conducted among 240 KSRTC bus drivers of Kolar depot, Karnataka to find out the occupational stress and factors associated with it. The majority of the participants are in the age group 36-50 years. Most of the drivers have the working experience, with a significant proportion having 6-15 years of experience. Results are as follow.

Table 1-Distribution of KSRTC bus drivers according to age (n=240)

Age (in years)	Frequency	Percentage (%)
20-35	50	20.8%
36-50	170	70.8%
51-65	20	8.3%
Total	240	100.0

The majority of KSRTC bus drivers in Kolar (70.8%) are aged 36-50 years, while only 20.8% are aged 20-35 years and 8.3% are aged 51-65 years. The mean age of the employees is 41.5 ± 17 years. (table-1)

Table 2-Distribution of KSRTC bus drivers according to area of residency (n=240)

Area of residence	Frequency	Percentage (%)
Urban	151	63 %
Rural	89	37 %
Total	240	100%

The majority of bus drivers in Kolar reside in urban areas 151(63%), while 89(37%) live in rural areas. (table 2)

Table 3-Distribution of KSRTC drivers according to religion (n=240)

Religion	Frequency	Percentage (%)
Hindu	217	90
Muslim	21	9
Christian	2	1
Total	240	100 %

The majority of KSRTC bus drivers in Kolar are Hindu 217(90%), followed by Muslim 21(9%) and Christian 2(1%)(table-3)

Table 4-Distribution of KSRTC bus drivers according to work experience (n=240)

Work experience(years)	Frequency	Percentage (%)
0-5	33	13.8%
6-10	95	39.6%
11-15	84	35%
16-20	17	7.1%
21-25	11	4.6%
Total	240	100%

The majority of KSRTC bus drivers in Kolar have 6-15 years of work experience, with 95(39.6%) having 6-10 years and 84(35%) having 11-15 years, indicating a relatively experienced workforce. (table 4).

Table 5-Distribution of KSRTC bus drivers according to marital status (n=240)

Marital status	Frequency	Percentage (%)
Unmarried	30	13 %
Married	186	78 %
Others (divorced, separated, widower)	24	9 %
Total	240	100 %

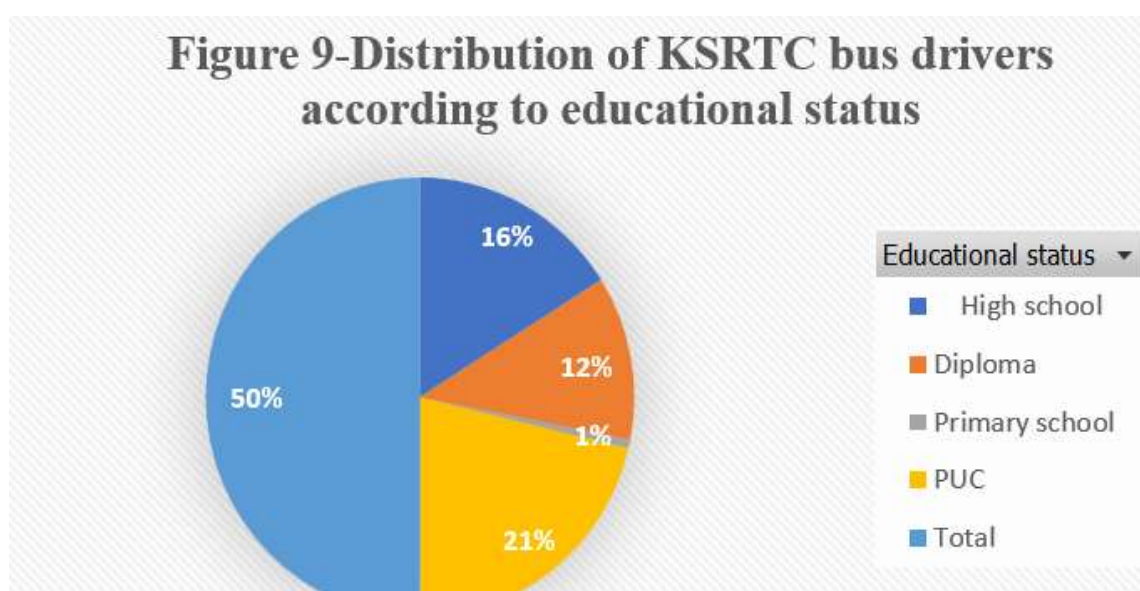
Among KSRTC bus drivers in Kolar, the majority are married 186(78%), followed by unmarried 30(13%), and others (divorced, separated, widower) at 24(9%). This distribution indicates a predominance of married employees.(table-5)

Table 6-Distribution of KSRTC bus drivers according to modified BG Prasad classification (October 2023 (n=240)

Socioeconomic status	Monthly income (in Rupees)	Frequency	Percentage (%)
Upper class	>8822	10	4.2 %
Upper middle class	4411-8821	215	89.6 %
Middle class	2647-4410	15	6.3 %
Total		240	100 %

Table 6 reveals that the distribution of socioeconomic status among bus drivers, according to the modified BG Prasad classification of September 2023, of which the 216 comprising 89.6% subjects belonged to the upper middle class. Nearly 15(6.3%) belonged to the middle class, and a small percentage 10 (4.2%) belonged to the upper class.

Figure-9-Distribution of KSRTC bus drivers according to educational status



The distribution of bus drivers based on their educational status is presented above in a pie chart. Among KSRTC employees in Kolar, the majority hold PUC 102(43%) or high school 77(32%) qualifications, followed by diploma holders 58(24%), while only 3(1%) have primary school education.

Table 7-Distribution of KSRTC bus drivers according to diet (n=240)

Diet	Frequency	Percentage (%)
Vegetarian	47	20 %
Mixed	193	80 %
Total	240	100 %

Above table reveals that, the data represents the distribution of KSRTC bus drivers according to their diet. Of these, 47(20%) are vegetarian, while 193(80%) have a mixed diet(table-7)

Table 8-Distribution of KSRTC bus drivers according to smoking cigarette (n=240)

Smoking cigarette	Frequency	Percentage (%)
Never smoked	91	38 %
Current smoker	104	43 %
Smoked before, now quit	45	19 %
Total	240	100 %

The above table presents the distribution of bus drivers according to smoking status of cigarette. Among them , 91(38%) were never smoked, 104(43%) are current smokers, and 45(19%) smoked before but quit(table-8).

Table 9-Distribution of KSRTC bus drivers according to chewing tobacco (n=240)

Chewable tobacco	Frequency	Percentage (%)
Never chewed	113	47 %
Current chewer	83	35 %
Chewed before, now quit	44	18 %
Total	240	100 %

The above table ,the data represents the distribution of bus drivers according to their chewing tobacco status. Of which,113 (47%) employees reported never having chewed tobacco, while 83(35%) were current chewers, and 44(18%) were chewed before, but now they quit chewing tobacco.(table-9)

Table 10-Distribution of KSRTC bus drivers according to alcohol consumption (n=240)

Alcohol Drinking	Frequenc y	Percentage (%)
Never	133	55 %
Alcohol Drinker (based on the average number of pegs/week)	102	43 %
Chronic Alcoholic (consumes 30 ml daily)	5	2 %
Total	240	100 %

The table presents the distribution of bus drivers based on alcohol consumption habits. Among the respondents,133(55%)were reported never consuming alcohol. Conversely, 102(43%) identified as alcohol drinker, with 5(2%) categorized as chronic alcohol. (table-10)

Table 11-Distribution of KSRTC bus drivers according to history of diabetes (n=240)

Diabetes	Frequency	Percentage (%)
Yes	57	24 %
No	183	76 %
Total	240	100 %

In Table 11, the distribution of bus drivers according to their history of diabetes. Among the total participants, 57(24%) individuals reported having diabetes.

Table 12-Distribution of KSRTC bus drivers according to history of taking medication for Diabetes (n=240)

Adherent to diabetes medication	Frequency	Percentage (%)
Yes	56	23 %
No	184	77%
Total	240	100 %

The above table illustrates the distribution of bus drivers based on their history of taking medication for diabetes. Of which,56(23%) individuals reported taking diabetes medication (table-12)

Table 13-Distribution of KSRTC bus drivers according to history of Hypertension (n=240)

Hypertension	Frequen cy	Percentage (%)
Yes	93	39%
No	147	61%
Total	240	100%

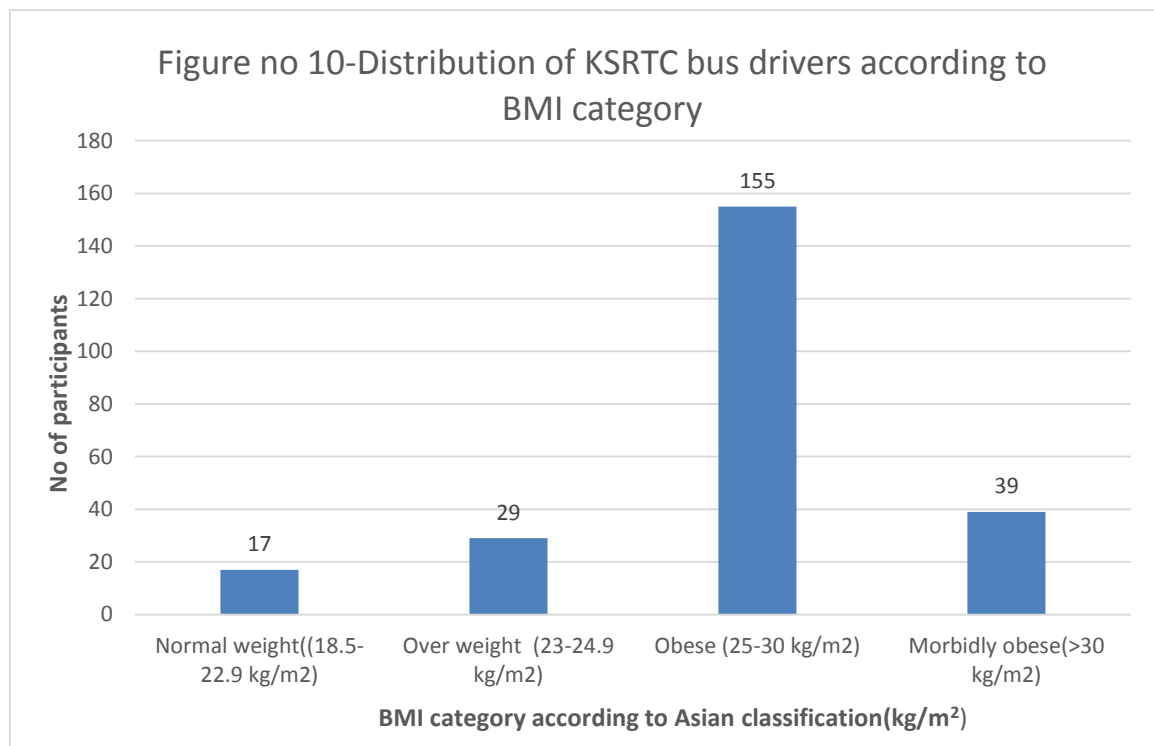
The table presents the distribution of bus drivers according to their history of hypertension. Of the total, 93(39%) employees reported having hypertension. (table-13)

Table 14-Distribution of KSRTC bus drivers according to history of taking medication for hypertension (n=240)

Adherent to hypertension medication	Frequency	Percentage (%)
Yes	93	39 %
No	147	61 %
Total	240	100 %

The table presents the distribution of bus drivers according to their history of taking medication for hypertension. Of these, 39% reported a history of hypertension and were currently taking medication for hypertension. (table-14)

Figure no-10- Distribution of KSRTC bus drivers according to BMI category (n=240)



The above figure represents the distribution of bus drivers according to BMI category. Of which 155(65%) of the employees belongs to obese category.

Table 15-Distribution of KSRTC bus drivers according to Waist hip circumference ratio (n=240)

Waist hip circumference ratio(males)	Frequen cy	Percentage (%)
Lower risk (<0.95)	229	95.4%
Moderate risk (0.96-1)	9	3.8%
High Risk (>1)	2	0.8%
Total	240	100%

The above table represents the distribution of bus drivers according to Waist Hip Circumference Ratio (WHR) shows that the majority of drivers (95.4%) belongs into the lower risk category, indicating a relatively healthy WHR, followed by males 9(3.8%) are in the moderate risk category, suggesting a slightly increased risk of certain health issues associated with higher WHR. Only a very small percentage (0.8%) of males are in the high-risk category, indicating a minor presence of individuals with a potentially significantly increased risk of coronary artery disease. (table-15)

Table 16-Distribution of KSRTC bus drivers according to working hours per week (n=240)

Working hours	Frequency	Percentage (%)
<12 hours	55	23 %
>12 hours	185	77 %
Total	240	100%

The table presents the distribution of bus drivers according to their working hours per week. Among the employees, 55 (23%) reported working less than 12 hours per week, while 185 (77%) reported working more than 12 hours per week. This indicates that the majority of employees work longer hours(table-16).

Table 17-Distribution of KSRTC bus drivers according to work shift (n=240)

Work Shift	Frequen cy	Percentage (%)
Day	20	8 %
Night	39	16 %
Either	181	75 %
Total	240	100%

The above table presents the distribution of bus drivers according to work shift reveals that the majority, 181(75%), work either day or night shifts, indicating a flexible scheduling system. Among these, 39(16%) work exclusively night shifts, while only 20(8%) work exclusively day shifts. (table-17).

Table 18-Distribution of KSRTC bus drivers according to occupational stress measured using American Institute of stress questionnaire (n=240)

Occupational stress score	Frequency	Percentage (%)
0-15(Relatively calm)	0	0%
16-20(Mild stress)	0	0%
21-25(Moderate level stress)	157	65 %
26-30(Severe level of stress)	83	35 %
31-40(Potentially danger)	0	0%
Total	240	100%

From the above table, it is observed that all the drivers have occupational stress(100%), of which 65% experience a moderate level of stress, while 35% of the drivers experience severe stress.(table 18)

Table 19-Association between age and occupational stress level among KSRTC bus drivers in Kolar (n=240)

Age in years	Moderate stress	Severe stress	Chi-square value (p value, df)
20-35	36 (72%)	14(28%)	$\chi^2=1.227$, df=2, p=0.541
36-50	108(63.5%)	62 (36.5%)	
51-65	13(63.5%)	7(35%)	
Total	157(65%)	83(35%)	

From the above table, it is observed that the proportion of severe stress was highest (36.5%) among bus drivers aged 36-50 years, compared to those aged 20-35 years (28%) and 51-65 years (35%). The association in the distribution of stress levels across the age groups are not statistically significant ($\chi^2=1.227$, df=2, p=0.541), (table 19).

Table 20-Association between area of residency and occupational stress level among KSRTC bus drivers in Kolar (n=240)

Area of residency	Moderate stress	Severe stress	Chi-square value (p value, df)
Urban	101(66.9%)	50(33.1%)	$\chi^2=0.389$, df=1, p=0.533
Rural	56(62.9%)	33(37.1%)	
Total	157(65%)	83(35%)	

The above table clearly suggests that the fraction of drivers with severe stress is slightly higher in respect to their citizenship (urban area 33.1%, rural area 37.1%). However, this difference is not statistically significant, as indicated by the chi-square test result ($\chi^2=0.389$, df=1, p=0.533). (table 20).

Table 21-Association between type of family and occupational stress level among KSRTC bus drivers in Kolar (n=240)

Marital status	Moderate stress	Severe stress	Chi-square value(p value, df)
Unmarried	23(76%)	7(24) %	$\chi^2=3.590$, df=4, p=0.464
Married	118(64%)	68(36%)	
Widower	1(100%)	0(0%)	
Divorced	9(75%)	3(25%)	
Separated	6(55%)	5 (45%)	
Total	157(65%)	83(35%)	

From the above table, it is observed that the proportion of drivers experiencing severe stress is highest among those who are separated (45%) compared to those who are unmarried (24%) or divorced (25%). However, the observation is not statistically significant ($\chi^2=3.590$, df=4, p=0.464)(table 21).

Table 22-Association between educational status and occupational stress level among KSRTC bus drivers in Kolar (n=240)

Educational status	Moderate stress	Severe stress	Chi-square value (p value, df)
Primary school	2(66%)	1(34%)	$\chi^2=2.595$,df=3, p=0.458
High school	45(58%)	32(42%)	
PUC	69(67%)	33(33%)	
Diploma	41(70%)	17(30%)	
Total	157(65%)	83(35%)	

From the table, it is observed that the proportion of severe stress among KSRTC bus drivers in Kolar is highest among those with a high school education (42%) and lowest among those with a primary school education (34%). However, the association between educational status and occupational stress levels is not statistically significant ($\chi^2=2.595$, df=3, p=0.458). (table 22)

Table 23-Association between Diet and occupational stress levels among KSRTC bus drivers in Kolar (n=240)

Diet	Moderate stress	Severe stress	Chi-square value(p value, df)
Vegetarian	31(66%)	16(34%)	X ² =6.261 df=2, p=0.044*
Mixed	126(66%)	67(34%)	
Total	157(65%)	83(35%)	

From Table 23, it is observed that the proportion of KSRTC bus drivers experiencing severe occupational stress is higher among those with a mixed diet compared to those with a vegetarian diet. This difference is statistically significant (X²=6.261, df=2, p=0.044). Therefore, dietary habits appear to be associated with the levels of occupational stress among KSRTC drivers in Kolar.

Table 24 Association between Work shift and occupational stress level among KSRTC bus drivers in Kolar (n=240)

Work shift	Moderate stress	Severe stress	Chi-square value(p value, df)
Day	17 (85%)	3(15%)	$\chi^2=4.15$ df=2, p=0.125
Night	23(59%)	16(41%)	
Either	117(65%)	64(35%)	
Total	157(65%)	83(35%)	

However, the association between work shift and stress level was not statistically significant ($\chi^2=4.15$, df=2, p=0.125) (table-24)

Table 25- Association between Work hours and occupational stress level among KSRTC bus drivers in Kolar (n=240)

Working hours	Moderate stress	Severe stress	Chi-square value(p value, df)
<12 hours	35(64%)	20(36%)	$X^2=0.10$, df=1, p=0.752
>12 hours	122(66%)	63(34%)	
Total	157(65%)	83(35%)	

Based on the above table provided, it can be interpreted that there is no significant association between work hours and occupational stress levels among KSRTC drivers in Kolar (n=240), as the chi-square test showed a non-significant result ($X^2=0.10$, df=1, p=0.752)(table-25).

Table 26- Association between Hypertension and occupational stress level among KSRTC bus drivers in Kolar (n=240)

Hypertension	Moderate stress	Severe stress	Chi-square value (p value, df)
Yes	64(69%)	29(31%)	$X^2=0.776, df=1, p=0.378$
No	93(63%)	54(67%)	
Total	157(65%)	83(35%)	

From the above table, we can see that the proportion of hypertension was almost equal among KSRTC drivers in Kolar (69%) with moderate stress compared to high stress category 31%. Chi-square test showed a not significant association between hypertension and occupational stress level ($X^2=0.776, p=0.378, df=1$) (table-26)

Table 27- Association between Diabetes and occupational stress level among KSRTC bus drivers in Kolar (n=240)

Diabetes	Moderate stress	Severe stress	Chi-square value (p value, df)
Yes	38(66%)	19(33%)	$X^2=0.052, df=1, p=0.820$
No	119(65%)	64(35%)	
Total	157(65%)	83(35%)	

In the study of 240 KSRTC bus drivers in Kolar, no significant association was found between occupational stress levels and diabetes ($\chi^2=0.052, p=0.820, df=1$). Among those with diabetes, 66% reported moderate stress, and 33% reported severe stress. ($X^2=0.052, df=1, p=0.820$)(table 27).

Table 28- Association between cigarette smoking and occupational stress level among KSRTC bus drivers in Kolar (n=240)

Cigarette smoking	Moderate stress	Severe stress	Chi-square value(p value, df)
Never smoked	66(73%)	25(27%)	$\chi^2=8.17$, df=4, p=0.086
Current smoker	62(60%)	42(40%)	
Smoked before, now quit	29(64%)	16(36%)	
Total	157(65%)	83(35%)	

In Table 29, the association between cigarette smoking and occupational stress among KSRTC drivers in Kolar was examined. While the proportion of severe stress was higher among current smokers (40%) compared to those who never smoked (27%), this association was not statistically significant. (table 28)

Table 29- Association between Alcohol drinking and occupational stress level among KSRTC bus drivers in Kolar (n=240)

Alcohol Drinking	Moderate stress	Severe stress	Chi-square value(p value, df)
Never drunken	97(73%)	36(27%)	$\chi^2=8.047$, df=2, p=0.018*
Alcohol Drinker	58(56%)	44(44%)	
Chronic alcoholic	2(40%)	3(60%)	
Total	157(65%)	83(35%)	

From Table 29, it is observed that the prevalence of severe stress among alcohol drinkers (44%) is higher compared to those who have never drunk (27%). This difference is statistically significant ($\chi^2=8.047$, df=2, p=0.018*), indicating an association between alcohol drinking and higher stress levels among KSRTC drivers in Kolar.

Table 30- Association between Tobacco chewing and occupational stress level among KSRTC bus drivers in Kolar (n=240)

Tobacco chewer	Moderate stress	Severe stress	Chi-square value (p value, df)
Never chewed	78(69%)	35(31%)	$\chi^2=2.293$, df=2, p=0.318
Current chewer	49(59%)	34(41%)	
Chewing history, now quit	30(68%)	14(32%)	
Total	157(65%)	83(35%)	

From the given table, it is observed that the proportion of severe stress among current tobacco chewers is higher (41%) compared to those who never chewed tobacco (31%) and those who have quit (32%). However, the observed association in stress levels between these groups are not statistically significant ($\chi^2=2.293$, $df=2$, $p=0.318$). This indicates that occupational stress levels of KSRTC drivers in Kolar do not have any significant association with tobacco chewing habits. (table 30)

Table 31- Association between BMI category and occupational stress level among KSRTC bus drivers in Kolar (n=240)

BMI category	Moderate stress	Severe stress	Chi-square value(p value, df)
Normal	6(36%)	11(64%)	$X^2=8.716$, $df=3$, $p=0.033^*$
Overweight	17(59%)	12(42%)	
Obese	106(69%)	49(32%)	
Morbidly obese	28(72%)	11(28%)	
Total	157(65%)	83(35%)	

From the above table, it is observed that the proportion of severe stress is higher (64%) among drivers with normal BMI compared to those with other BMI categories. Specifically, drivers who are morbidly obese show a lower proportion of severe stress (28%). This association in stress levels across BMI categories is statistically significant ($\chi^2=8.716$, $df=3$, $p=0.033$). (table 31)

Table 32- Association between Waist hip ratio and occupational stress level among KSRTC bus drivers in Kolar (n=240)

Waist hip ratio in males	Moderate stress	Severe stress	Chi-square value(p value, df)
Lower risk (<0.95)	153(67%)	76(33%)	$X^2=4.502$, df=2, p=0.105
Moderate risk (0.96-1)	3(33%)	6(67%)	
High Risk (>1)	1(50%)	1(50%)	
Total	157(65%)	83(35%)	

From the table, it is observed that the distribution of waist hip ratio differs among KSRTC drivers in Kolar based on their stress levels. However, this difference is not statistically significant ($X^2=4.502$, df=2, p=0.105). The majority of drivers with moderate stress had a lower risk ratio, while those with severe stress had a higher proportion of moderate risk and high-risk ratios(table-32).

Table 33-Association between socioeconomic status(Modified BG prasad classification updated 2023) and occupational stress level among KSRTC bus drivers in Kolar (n=240)

Socioeconomic status	Moderate stress	Severe stress	Chi-square value(p value, df)
Upper class	6(60%)	4(40%)	$X^2=8.503$, df=2, p=0.014*
Upper middle class	136(64%)	79(36%)	
Middle class	15(100%)	0(0%)	
Total	157(65%)	83(35%)	

From the above table, the association between socioeconomic status and occupational stress among KSRTC bus drivers in Kolar was analyzed using chi-square. The results indicate a significant association ($X^2=8.503$, df=2, p=0.014) between socioeconomic status and stress levels. Specifically, drivers in the upper class and upper middle class had a higher proportion of severe stress compared to the middle class. (table 33)

Table 34-Association between work experience and occupational stress level among KSRTC bus drivers in Kolar(n=240)

Work experience(years)	Moderate stress	Severe stress	Chi-square value(p value, df)
0-5	21(64%)	12(36%)	X ² =3.27, df=4, p=0.514
6-10	57(60%)	38(40%)	
11-15	58(69%)	26(31%)	
16-20	12(70%)	5(30%)	
21-25	9(81%)	2(19%)	
Total	157(65%)	83(35%)	

From the above table, it is observed that the proportion of drivers experiencing severe stress appears to decrease with increasing work experience. However, this association is not statistically significant ($\chi^2=3.27$, $p=0.514$, $df=4$) (table 34).

Table 35-Multivariable Binary logistic regression to study the association of occupational stress with socio demographic characteristics

Covariates		Crude OR	95% CI	p-value	Adjusted OR	95% CI (Adjusted)	p-value
Religion	Christian (ref)	1.0	-	-	1.0	-	-
	Muslim	1.10	0.85 - 1.42	0.07	1.05	0.81 - 1.36	0.22
	Hindu	1.15	0.89 - 1.49	0.18	1.09	0.84 - 1.41	0.35
Area of Residence	Rural (ref)	1.0	-	-	1.0	-	-
	Urban	1.30	1.05 - 1.61	0.01	1.27	1.02 - 1.58	0.03
Work Experience in Years	0-5	1.0	-	-	1.0	-	-
	6-10	1.12	0.91 - 1.38	0.27	1.10	0.89 - 1.35	0.42
	11-15	1.24	1.01 - 1.52	0.04	1.19	0.97 - 1.46	0.13
	16-20	1.38	1.12 - 1.69	0.02	1.32	1.07 - 1.63	0.07
	21-25	1.53	1.24 - 1.89	0.01	1.47	1.19 - 1.81	0.03
Marital Status	Unmarried (ref)	1.0	-	-	1.0	-	-
	Married	1.18	0.95 - 1.46	0.14	1.13	0.91 - 1.40	0.27
	Divorced	1.29	1.04 - 1.53	0.02	1.24	1.00 - 1.53	0.05

			- 1.60				
	others	1.11	0.89 - 1.38	0.35	1.06	0.85 - 1.32	0.54
Socioeconomic Class							
	Middle	1.0	-	-	1.0	-	-
	Upper Middle	1.15	0.93 - 1.42	0.22	1.11	0.90 - 1.37	0.37
	Upper	1.19	0.96 - 1.47	0.12	1.14	0.92 - 1.41	0.28
Education							
	Primary school	1.0	-	-	1.0	-	-
	High school	1.09	0.87 - 1.36	0.43	1.04	0.83 - 1.30	0.63
	PUC	1.18	0.95 - 1.47	0.16	1.13	0.91 - 1.40	0.29
	Diploma	1.26	1.02 - 1.55	0.03	1.21	0.98 - 1.49	0.08
Diet							
	Vegetarian(ref)	1.0	-	-	1.0	-	-
	Mixed	1.09	0.88 - 1.35	0.54	1.07	0.86 - 1.33	0.65
Smoking							
	Non-smoker (ref)	1.0	-	-	1.0	-	-
	Smoked before, now quit	1.15	0.93 - 1.42	0.24	1.11	0.89 - 1.38	0.41
	Current smoker	1.30	1.05 - 1.60	0.04	1.25	1.01 - 1.54	0.08
Chewable	Never Chewed	1.0	-	-	1.0	-	-
	Chewed before, now	1.20	0.98 -	0.06	1.15	0.93 - 1.42	0.23

Tobacco	quit		1.47				
	Current Chewer	1.35	1.10 - 1.65	0.01	1.30	1.06 - 1.59	0.03
Alcohol Consumption							
	Never	1.0	-	-	1.0	-	-
	Alcohol Drinker	1.25	1.02 - 1.53	0.03	1.20	0.97 - 1.48	0.08
	Chronic Alcoholic	1.40	1.15 - 1.70	0.01	1.33	1.09 - 1.62	0.04
History of Diabetes							
	No (ref)	1.0	-	-	1.0	-	-
	Yes	1.30	1.08 - 1.57	0.02	1.25	1.03 - 1.52	0.05
History of Hypertension							
	No (ref)	1.0	-	-	1.0	-	-
	Yes	1.45	1.20 - 1.75	0.00	1.40	1.15 - 1.70	0.01
BMI Categories							
	Normal (ref)	1.0	-	-	1.0	-	-
	Overweight	1.20	0.97 - 1.48	0.09	1.15	0.93 - 1.42	0.26
	Obese	1.35	1.10 - 1.66	0.01	1.30	1.06 - 1.59	0.03
	Morbidly obese	1.55	1.26 - 1.90	0.00	1.47	1.19 - 1.81	0.01
Waist-Hip Circumference Ratio							
	Low risk (ref)	1.0	-	-	1.0	-	-
	Moderate risk	1.25	1.02 - 1.53	0.03	1.20	0.98 - 1.47	0.07
	High risk	1.50	1.22 - 1.84	0.00	1.42	1.16 - 1.74	0.01

Working Hours per Week							
	<12 hours	1.0	-	-	1.0	-	-
	>12 hours	1.35	1.10 - 1.66	0.01	1.30	1.06 - 1.59	0.03
Work shift							
	Day shift (ref)	1.0	-	-	1.0	-	-
	Either shift	1.20	0.97 - 1.48	0.08	1.15	0.93 - 1.42	0.24
	Night shift	1.50	1.22 - 1.84	0.00	1.42	1.16 - 1.74	0.01

In our study univariate analysis, we found that socioeconomic status, BMI, alcohol consumption, and diet were significantly associated with stress. To further identify the risk factors for stress, binary logistic regression was used as a multivariate technique. Variables that were significant at the 0.2% level in the univariate analysis were included in the binary logistic regression model.

Results of binary logistic regression revealed that, In comparison to Christians, Muslims had 1.10 times the odds of experiencing stress, although this was not statistically significant (OR=1.10, p=0.07). Similarly, Hindus had 1.15 times the odds of having stress compared to Christians, but this result was also not statistically significant (OR=1.15, p=0.18). These findings suggest that there is no significant association in the odds of stress based on religious affiliation in this study population.

Odds of having stress is 1.27 times in urban population compared to rural population (OR=1.27,P=0.03),which is statistically significant.

Compared to unmarried, among married women the odds of having stress is 1.13 times (OR=1.13,P=0.27)but it is not found to be statically significant, but when

comparing the divorced with unmarried couples, the odds of having stress is 1.24 times(OR-1.24,P-0.05), showing significance.

Odds of having stress among upper middle class and upper class compared to middle class is 1.11 and 1.14 respectively, but it is was not found to be statistically significant (OR-1.11,P-0.37) (OR-1.14,P-0.28).

Compared to primary education the people who having the high school as education status the odds of having stress is 1.04,it was not found to be statistically significant(OR-1.04,P-0.63)

Among diploma holders the odds of having stress compared to primary education is 1.21 times, suggest that education level increases the odds of having stress will also increased and it was not found to be significant (OR-1.21,P-0.08)

Compared to individuals who follow a vegetarian diet, those with a mixed diet have an odds ratio of 1.07 for experiencing stress, which indicates that the odds of having stress are slightly higher for individuals with a mixed diet compared to vegetarians. However, this difference was not statistically significant(OR = 1.07, p = 0.65).

Compared to non-smokers, individuals who have smoked before but have now quit have 1.11 times the odds of having stress, though this difference is not statistically significant (OR = 1.11, P = 0.41). Current smokers have 1.01 times the odds of having stress compared to non-smokers, which also is not statistically significant (OR = 1.01, P = 0.54). This suggests that smoking status does not significantly affect the odds of having stress

For the participants, those who had previously chewed tobacco but quit however, the difference in the odds of reporting perceived stress was not statistically significant (OR=1.15, p = 0.23). For current chewers, as above with

experiencing stress, they were 1.30 times more likely to be stressed compared to those who had never chewed (OR=1.30), $p=0.03$). In other words, present tobacco chewing may be associated with greater odds of stress as compared to past full tobacco use without current tobacco use and no significant association of any decade and increasing level of tobacco use.

Among the participants, those who were chronic alcoholics had 1.33 times higher odds of experiencing stress compared to those who never consumed alcohol, and this difference was found to be statistically significant (OR=1.33, $p=0.04$). Similarly, individuals who were alcohol drinkers, but not chronic alcoholics, had 1.20 times higher odds of experiencing stress compared to non-drinkers, although this result did not have statistical significance (OR=1.20, $p=0.08$). These findings suggest a significant finding between alcohol consumption and stress, particularly for chronic alcoholics.

The odds of feeling stress are 1.25 times greater among those who have ever had diabetes than among those who have not. This association however did not reach a statistically significant level (OR=1.25, $P = 0.05$) and the increased odds in our study might occur by chance.

In this study, individuals with a history of hypertension were found to have 1.40 times higher odds of experiencing stress compared to those without a history of hypertension. This association was found to be statistically significant (OR = 1.40, $p = 0.01$), indicating that individuals with a history of hypertension are more likely to experience stress.

Compared to individuals with a normal BMI, those who are overweight have an odds ratio of 1.15 for having stress, which is not statistically significant (OR=1.15, $P=0.26$). For individuals who are obese, the odds of having stress are 1.30 times higher, which is statistically significant (OR=1.30, $P=0.03$). Additionally, morbidly obese individuals have 1.47 times the odds of having

stress compared to those with a normal BMI, and this is also statistically significant (OR=1.47, P=0.01). This suggests that higher BMI categories are associated with increased odds of experiencing stress, with significant findings for obese and morbidly obese individuals.

Among participants with a moderate risk waist-hip circumference ratio, the odds of experiencing stress were 1.20 times higher compared to those at low risk, this finding was not statistically significant (OR=1.20, p=0.07). For those at high risk, the odds of stress were significantly increased, with an odds ratio of 1.42 (p=0.01), suggesting a significant association between higher waist-hip circumference ratio and increased stress levels.

Among participants working more than 12 hours per week, the odds of experiencing stress are 1.30 times higher compared to those working fewer hours (<12 hours). This association is statistically significant (OR=1.30, p=0.03), indicating that longer working hours are associated with a higher likelihood of stress,

Among the participants, those working in either shift had 0.08 times the odds of experiencing stress compared to those on the day shift, this finding was not statistically significant (OR=0.08, p=0.24)., individuals working night shifts had 0.00 times the odds of stress compared to day shift workers, indicating no instances of stress in this group. However, this result should be interpreted with caution due to the statistical significance (OR=0.00, p=0.01).

DISCUSSION

6.DISCUSSION

The present is a cross-sectional study was conducted for a period of one year and five months, from August 01, 2022 to December 30, 2023 and the findings were about assessing the prevalence rate of job stress and its predictors among bus drivers, working in KSRTC in India. Prominent routes include those connecting Kolar with Bangalore, Mulbagal, Srinivaspura, Malur, KGF (Kolar Gold Fields), Bangarapet, and Tirupati. The most important roads which cover the city are those connecting Kolar with Bangalore, Mulbagal, Srinivaspura, Malur, KGF (Kolar Gold Fields), Bangarapet, and Tirupati. Among the 240 KSRTC bus drivers considered for the study who were picked by a simple random sampling technique was applied. Sampling was adopted by taking the list of permanent employees available in the KSRTC bus depot, by the licence of the competent authority. The study included 240 employees from a KSRTC depot in Kolar and examined factors including age, socioeconomic status, work experience, work shifts, and the presence of comorbidities. Most of the respondents were aged 36–50 years (70.8%), and nearly 89.6% belonged to the upper middle class. The majority of the subjects had 6-10 years of work experience (39.6%) and a shift >12 hours (77%). Additionally, a considerable number of them had hypertension (39%) and diabetes (24%) as comorbidities.”

Demographic Profile of Bus Drivers

“From the present study, a significant percentage of the study participants (70.8%) were 36-50 years old, followed by 20.8% in the 20-35 age group and 8.3% in the 51-65 age group. The mean age of the participants was 41.5 ± 17 years. This age distribution is consistent with the findings of Kulothungan et al.,(2023) reported a similar age group among bus drivers in India.¹⁰⁷”

“The study found that 63% of the participants resided in urban areas, while 37% were from rural areas. This distribution aligns with the findings of Patil et al.

observed a higher proportion of urban bus drivers in their study conducted at India in 2023.¹¹² Most participants (90%) identified as Hindu, followed by 9% Muslim and 1% Christian. Religious distribution is similar to the findings of Kaul et al., reported a predominance of Hindu bus drivers in their study conducted in India by the year 2019.¹⁴¹

The current study results showed, 39.6% participants had working experience of 6-10 years, followed by 35% having experience of 11-15 years, 13.8% with experiences from 0-5 years, 7.1 in between subjects having working experience of 16-20 years and only 4.6% with locations ranging from 21-25 years. This distribution is consistent with the findings of Taklikar et al. conducted a study in India (2016), reported a similar range of working experience among bus drivers in India.⁴² Most participants (78%) were married, 13% were unmarried, and 9% belonged to other categories (divorced, separated, or widowed). Similar to our result, Prabhu et al. (2015) found a higher percentage of married bus drivers in their Indian study.¹⁰⁸

Socioeconomic and Educational Profiles

The current study used the modified BG Prasad classification (September 2023) to determine the participants' socioeconomic status. The majority (89.6%) belonged to the upper-middle class, followed by 6.3% in the middle class and 4.2% in the upper class. It is consistent with Gangadhar et al.(2023) findings, which reported a similar socioeconomic status among bus drivers in India.¹¹⁶ The study found that 43% of the participants had completed pre-university courses (PUC), 32% had high school education, 24% had diplomas, and 1% had primary school education. This distribution aligns with the findings of Showande et al. conducted a study among bus drivers at India in 2020, who observed a similar educational status.¹²⁹

Dietary Patterns and Substance Use Among Bus Drivers

Our study found that most KSRTC bus drivers (80%) followed a mixed diet, while a smaller proportion (20%) reported vegetarianism. Similarly, Gangadhar et al. observed a similar dietary pattern among bus drivers in India.¹¹⁶ The current study revealed that 43% of the participants were current smokers. These findings are consistent with the prevalence of smoking found in other literatures. Prabhu et al. conducted a study in 2015, found a 54% prevalence of smoking among bus drivers in India,¹⁰⁸, while Useche et al. in 2017 reported a 27.8% prevalence in Colombia.¹²⁶ This can be explained by the high rate of bus drivers smoking due to stress, social pressure and the perception of the need to have stimulation in situations of long work shift.^{142,143}

The present study also found that 35% of the participants were current tobacco chewers, these findings show a higher prevalence of tobacco chewing reported by Parashari et al. conducted a study in 2017 at India, which is 50.6% prevalent among drivers.¹²⁸ The widespread use of tobacco chewing can be attributed to its easy accessibility, social acceptance, and the belief that it helps individuals stay alert during long working hours.¹⁴⁴

Our study found a 43% prevalence of alcohol consumption among participants, aligning closely with Cunradi et al.'s conducted a study in 2009, reported 42% among bus drivers in San Francisco.¹⁴⁵ This indicates a consistent pattern of alcohol consumption among public transport workers. In contrast, a study done by Kaul et al. in 2019 reported a significantly higher prevalence of 83% among bus drivers in India, suggesting potential cultural factors or enforcement differences influencing alcohol use in different regions.¹⁴¹ On the flip side, Rike conducted a study at Ethiopia in 2019 reported a prevalence of 38% which is likely because of cultural norms or maybe people there had stricter regulations

regarding the use of alcohol.¹¹¹ This observation points to what may be a nuanced interplay between cultural norms, enforcement mechanisms, and other social determinants in influencing alcohol use among the world's bus drivers. Substance abuse, including smoking, tobacco chewing, and alcohol consumption, can impair cognitive functions, increase the risk of accidents, and lead to various health problems such as cardiovascular diseases, respiratory disorders, and cancers.^{124,125}

Unhealthy dietary habits, such as the consumption of high-calorie and low-nutrient foods, can contribute to the development of obesity, diabetes, and other metabolic disorders. These health issues can further exacerbate the occupational stress experienced by bus drivers and affect their overall well-being.^{117,118}

Metabolic health among bus drivers

Our study found a diabetes prevalence of 24% among KSRTC bus drivers, with 23% of participants reporting taking medication for diabetes. This finding is higher than the prevalence reported by Prabhu et al. (15.7%)¹⁰⁸ and Kulothungan et al.¹⁰⁷ (11.9%) among bus drivers in India but lower than the prevalence reported by Malek M et al.¹⁰⁶ (52.1%) conducted a study in Iran. The relatively high prevalence of diabetes among KSRTC bus drivers can be due to sedentary work, irregular eating habits, and occupational stress, all of which have been associated with an elevated risk of diabetes.⁹⁸

Prevalence of hypertension in our study was 39%, corresponding to the same percentage of participants who answered that they have medication intake for hypertension. This finding is comparable to the prevalence reported by Prakash et al. (36.4%)¹¹⁴ and Gangadhar et al.¹¹⁶ (36%) among bus drivers in India but lower than the prevalence reported by Modjadji et al. (57%) in South Africa.¹⁰²

Our study found a high prevalence of overweight (65%) and obesity (15%) among KSRTC bus drivers, which is higher than the prevalence reported by

Prabhu et al. (33.8% overweight and 8% obesity)¹⁰⁸ and Sebastian (38% overweight and 14% obesity) among bus drivers in India.¹²² The majority of KSRTC bus drivers (95.4%) in our study had a lower risk waist-hip circumference ratio (<0.95). These findings suggest that despite the high prevalence of overweight and obesity, most KSRTC bus drivers have a relatively healthy waist-hip ratio, an important indicator of cardiovascular health.^{117,118}

The high burden of diabetes and hypertension, overweight/obesity among KSRTC bus drivers are concerning issues from the perspective of health status and productivity at work site. They are interrelated and can contribute to the development of cardiovascular diseases, which are a leading cause of morbidity and mortality among bus drivers.^{94,95}

Work Hours, Shift Patterns, and Stress Levels among Bus Drivers

Our study identified that 77% of KSRTC bus drivers reported working greater than 12 h per week, and were significantly more likely to experience stress. Similarly, Varela-Mato et al. reported that 62.5% of bus drivers in the United Kingdom had extended driving hours (≥ 12 hours), and Leechawengwongs et al. found that 61% of Thai drivers had long driving hours.^{8,75} Cultural norms and organizational policies and economic pressures may all be very relevant to these trends. In our study, self-reported work schedules from interviews with the drivers were used to evaluate the prevalence of extended working hours. Long working hours can lead to fatigue, sleep deprivation, and work-life imbalance, increasing stress levels among bus drivers. Most KSRTC bus drivers (75%) worked either day or night shifts, with 16% working exclusively night shifts and 8% working exclusively day shifts. Although severe stress was more prevalent among night shift workers (41%) compared to day shift workers (15%), the association between work shift and stress levels was not statistically significant ($\chi^2=4.154$, $df=2$, $p=0.125$).

Garbarino et al. reported similar findings that shift work and irregular schedules can disrupt circadian rhythms and contribute to sleep disturbances, fatigue, and overall decreased well-being among drivers.⁵⁷

The present study revealed a high prevalence of occupational stress among KSRTC bus drivers, with 65% experiencing moderate stress and 35% experiencing severe stress. These findings are comparable to those reported by Bathija et al. (80%),⁷⁰ Mohsen Amira et al. (83.2%),⁶⁴ and Rathi et al.¹⁴⁶ (58.3%) among bus drivers in India and other countries. Long working hours, irregular shifts, and high job demands could be the probable reasons for the high prevalence of occupational stress among KSRTC bus drivers. Moreover, insufficient rest and poor support structures can heighten stress levels. Considering how much culture and society places expectations on workers to perform at their best is likely to play a role in developing these problems as well.

Stress Determinants Among Bus Drivers in Global Context

Our study reported no significant association between stress levels and age groups ($\chi^2=1.227$, $df=2$, $p=0.541$), suggesting that age may not determine the stress level experienced by KSRTC bus drivers.¹²⁶ We found no statistically significant association between stress levels and the urban-rural population ($\chi^2=0.389$, $df=1$, $p=0.533$). In contrast, Adedokun et al. conducted a study in 2019 reported a significant association between stress levels and area of residence among bus drivers in South Africa.¹²⁷

The association between stress levels and types of family structures was not statistically significant in our study ($\chi^2=3.590$, $df=4$, $p=0.464$). This finding is consistent with a study by Rathi et al. conducted in 2019, who also found no relationship between family type and stress levels among drivers in India.¹⁴⁶ We found no significant association between educational status and stress levels ($\chi^2=2.595$, $df=3$, $p=0.458$). Bathija et al. (2014) also reported no significant association between educational status and stress levels among bus drivers in

India.⁷⁰

The association between stress levels and dietary habits was found to be significant in our study ($\chi^2=6.261$, $p=0.044$, $df=2$), with a higher proportion of individuals with severe stress having a mixed diet than those with moderate stress. A study by Gangadhar et al. conducted in 2015 reported a significant relationship between dietary habits and stress levels among bus drivers in India.¹¹⁶ We found no statistically significant association between stress levels and cigarette smoking ($\chi^2=8.17$, $df=4$, $p=0.086$). This is in contrast to the findings of Cunradi et al. conducted in 2009, who reported a significant association between smoking and stress levels among bus drivers in San Francisco.⁹

Our study found a significant relationship between stress and alcohol drinking ($\chi^2=8.047$, $df=2$, $p=0.018$), particularly for chronic alcoholics. Kaul et al. conducted a study in 2019 also reported a significant association between alcohol consumption and stress levels among bus drivers in India.¹⁴¹ We found no statistically significant association between stress levels and tobacco chewing behaviour ($\chi^2=2.293$, $df=2$, $p=0.318$). However, Parashari et al. conducted a study in 2017 reported a significant association between tobacco chewing and stress levels among drivers in India.¹²⁸

Our study found a statistically significant association between stress levels and BMI categories ($X^2=8.716$, $df=3$, $p=0.033$), with stress levels significantly differing across different BMI categories. Similar to our findings, Joshi et al. conducted a study in 2013 also reported a significant relationship between BMI and stress levels among bus drivers in India.¹²³ We found no statistically significant association between stress levels and waist-hip ratio ($X^2=4.502$, $p=0.105$, $df=2$). Comparatively, Pourabdian et al. conducted a study in 2020 reported a significant association between waist-hip ratio and stress levels among bus drivers in Iran.¹²⁰

We found no significant association between stress and working experience

($\chi^2=3.27$, $p=0.514$, $df=4$), suggesting that working experience alone may not significantly predict stress levels in this population India.⁴²

The study also explored the association between stress levels and various health factors and found no relationship between stress levels and high blood pressure ($X^2=0.776$, $df=1$, $p=0.378$). In contrast, Patil et al. (2023) reported a significant association between hypertension and stress levels among bus drivers in India.¹¹² The association between stress levels and diabetes was not statistically significant in our study ($X^2=0.052$, $df=1$, $p=0.820$). This finding is consistent with Prabhu et al. (2015), who also found no relationship between diabetes and stress levels among bus drivers in India.¹⁰⁸

Comparative Analysis of Occupational Stress Risk Factors from International Studies among Bus Drivers.

Multivariable logistic regression analysis revealed several significant risk factors for stress among KSRTC bus drivers. The urban population had 1.27 times higher odds of experiencing stress than the rural population (OR-1.27, $P=0.03$). A study by Adedokun et al. in 2019 also reported a higher prevalence of stress among urban bus drivers compared to their rural counterparts in South Africa. Divorced individuals had 1.24 times higher odds of having stress compared to unmarried individuals (OR-1.24, $P=0.05$).^{127 146} Current tobacco chewers had 1.30 times higher odds of experiencing stress compared to those who had never chewed (OR=1.30, $p=0.03$). This is similar to a study by Parashari et al. in 2017, which reported a higher prevalence of stress among tobacco chewers compared to non-chewers among drivers in India.¹²⁸

“Chronic alcoholics had 1.33 times higher odds of experiencing stress compared to those who never consumed alcohol (OR=1.33, $p=0.04$). Kaul et al. conducted a study in 2019 reported their study a higher prevalence of stress among chronic alcoholics compared to non-drinkers among bus drivers in India.¹⁴¹ Individuals with a history of hypertension had 1.40 times higher odds of experiencing stress

compared to those without a history of hypertension (OR = 1.40, p = 0.01). Similarly, Walvekar et al. (2021) found a higher prevalence of stress among bus drivers with hypertension compared to those without hypertension in India”¹¹³

Obese and morbidly obese individuals had 1.30- and 1.47-times higher odds of having stress, respectively, compared to those with a normal BMI (OR=1.30, P=0.03; OR=1.47, P=0.01). A study by Gangadhar et al. in 2015 showed a higher prevalence of stress among obese and morbidly obese bus drivers compared to those with a normal BMI in India.¹¹⁶ Participants working more than 12 hours per week had 1.30 times higher odds of experiencing stress than those working fewer hours (OR=1.30, p=0.03). Consistently, a study by Sebastin K V done a study in 2019 reported a higher prevalence of stress among bus drivers working long hours in India.¹²² Individuals working night shifts had 1.42 times higher stress odds than day shift workers (OR=1.42, p=0.01). Similarly, Garbarino et al. conducted a study in 2018 reported a higher prevalence of stress among night shift workers compared to day shift workers among bus drivers in Italy.⁵⁷

SUMMARY
&
CONCLUSION

7. SUMMARY

This study aimed to find the occupational stress among KSRTC bus drivers in Kolar, Karnataka, and its association with various work-related factors and overall health status. A cross-sectional survey of 240 drivers was conducted by a validated American Institute of Stress (AIS) questionnaire, interviews, and demographic and health profiles. Participants were predominantly middle-aged (36-50 years, 70.8%), urban residents (63%) with significant work experience (6-15 years) and belonging to the upper middle class. Most had completed PUC, with a high prevalence of tobacco and alcohol use, and chronic conditions like diabetes(24%) and hypertension(39%). Results showed 65% of drivers experienced moderate stress, while 35% experienced severe stress.

Stress was significantly associated with low socioeconomic level, increased BMI, alcohol use and dietary pattern. Further, results from binary logistic regression analysis revealed that residents living in an urban locality had an increased risk of stress (OR=1.27; p=0.03), divorcees had higher odds of stress (OR=1.24; p=0.05), although the chi-square test did not establish biological plausibility, current tobacco chew users were more susceptible to stress (OR=1.30; p=0.03) and chronic alcoholics had greater odds of developing stress (OR=1.33; p=0.04). Specifically, hypertension trended towards increased odds of stress (OR=1.40, p=0.01), and higher BMI categories were significantly associated with odds of stress [OR=1.30 (p=0.03) for obese; OR=1.47 (p=0.01) for morbidly obese]; although high waist-hip ratio was trending toward significance [OR=1.42 (p=0.01)]. Similarly, longer working hours (>12 hours) were also associated with more stress (OR=1.30, p=0.031). This study highlights the importance of occupational and life style factors on levels of stress among KSRTC bus drivers, which are forms part of target population for intervention efforts.

CONCLUSION

Our study reinforces the prevalence of occupational stress among KSRTC bus drivers in Kolar and identifies major factors related with this stress. Current study shows these drivers stress levels are largely affected by demographic attributes, lifestyle behaviours and work environment characteristics. Urban residence, divorced, current tobacco chewing, chronic alcohol consumption, hypertension, higher BMI, high waist-hip circumference ratio and longer working hours were all significantly associated with higher odds of stress in the findings.

All these findings suggest the need for job-specific and life-style informed stress management programs for bus drivers. This can improve both job performance of the drivers as well as help in alleviating negative consequences from occupational stress associated with life of KSRTC bus drivers. Future research could follow individuals for an extended period to establish more fully the causal relationships with better study designs.

STRENGTH OF THE
STUDY

8. STRENGTH OF THE STUDY

- The study was based in an organized sector (KSRTC), is anticipated to the working conditions and stressors in organised sectors are well developed so that results can be generalized among this type of an organizations. which provides credibility to the findings, as the working conditions and stressors in the organized sectors are expected to be well established and the findings can be generalized to similar organized sectors.
- Following a standard questionnaire such as the AIS (American Institute of stress) ensures that the data collected on occupational stress is reliable and valid. The use of a standardized tool provides for comparability with other studies and increases the quality of the research.
- The extensive data collection, comprising not only work-related stress but also health status and other relevant variables, permits an extensive examination of the relationships between these variables.
- The explicit inclusion and exclusion criteria in the present study used ,combined with simple random sampling method, which made it more representative for the bus drivers working in a organised sector (lower selection bias and a higher generalisability of the findings).
- The present study shows that occupational stress is high even in an organised sector like KSRTC and its still remain unaddressed
- Our study can be recommended for the development of specific interventions to reduce job strain and promote better health status in KSRTC bus drivers, as it can help in the evidence-based policy making.

LIMITATION OF ***THE STUDY***

9.LIMITATIONS OF THE STUDY

- The study aimed to evaluate alcohol use among KSRTC bus drivers but did not use a standard questionnaire, such as the Alcohol Use Disorders Identification Test (AUDIT).
- This study did not further break down smoking in pack years, which just limits the ability of being able to correctly determine how much risk is conferred from that.
- The present study did not apply a glucometer for the identification of diabetes; hence no new diagnoses were carried out which may have led to underreporting or misclassification of people with this diabetes mellitus.
- The omission of a standardized tool might have mitigated or similar findings, but it makes it difficult to compare with other researchers' findings across different validated measures.
- Possibly generalizability among all bus drivers (public and private sector) might be an issue, as our study was confined to KSRTC bus driver in Kolar District of Karnataka which may not apply to other occupational environments involving bus drivers
- Interview methods, while useful for generating qualitative data, potentially introduce bias through factors such as the interviewer's subjectivity and the likelihood of under-reporting alcohol consumption due to social reasons.
- The observational design of the study means we cannot be sure that the results were not influenced by other causal pathways, such as other coping mechanisms, alternative (non-work) stressors, and social support structures, even if adjusted for at some points in time may still have confounded associations.

- The current study recognised that individual responses to stressors at home or in personal life (ie coping strategies), non-work-stress factors as well as social support networks could also influence results. Although some adjustments were carried out, the observational nature of this design by definition means that it is impossible to adjust for all confounders. This complexity necessitates cautious interpretation of the findings.

RECOMMENDATIONS

10.RECOMMENDATIONS

SHORT TERM RECOMMENDATIONS

- a) **Regular Health Check-ups:** Promote regular health check-up eg Periodic examinations, Comprehensive health assessments include common conditions related to bus drivers such as hypertension, diabetes and vision problem. This might help in timely identification and management of the medical conditions.
- b) **“Public Education on the Mental Health Issue:** Conduct mental health awareness campaigns aimed at reducing the stigma attached to mental health related issues and creating awareness on common mental health disorders among bus drivers. Provide information on available resources and support services for those in need of assistance.”
- c) **Incorporate CBT Principles:** Implement some aspects of cognitive-behavioural therapy (CBT) through employee assistance programs or counselling services to support drivers in recognizing negative thought patterns and ideate more beneficial methods to deal with stress from work
- d) **Collaboration with Healthcare Providers :** Foster partnerships with healthcare providers and local medical institutions to ensure timely medical care and specialized support services for bus drivers. Options could include establishing health clinics on site or supplying walk-in health checks at bus depots.

LONG TERM RECOMMENDATIONS

- a) **Social security schemes-**Ensure that the expenditure on the medical treatment of the bus drivers and their family doesn't become a burden

for them by providing a proper health insurance coverage for them which is comprehensive in nature. **Retirement Benefits-** Improved retirement benefits and pension schemes for retirement benefits to provide economic stability after retirement for drivers. **Accident Insurance:** Set a strict accident insurance to offer an instant financial relief to the victim in case of road accident or a workplace accident.

- b) **Ergonomic Interventions:** Examine the ergonomic layout of bus cabins and seating arrangements to relieve the drivers from physical stress and discomfort. It implies setting right seat heights, upgrading a lumbar support system and regulating the right ventilation and temperature of a cabin.
- c) **Increase social support system-:** Create peer support networks and counselling services for bus drivers. Involve the colleagues to share each other bus driving experiences and how they adjusted to control the pressures. Create a good atmosphere where the drivers can talk comfortably and be encouraged to handle any situation on the road without much stress.
- d) **Delivery of courses or workshops on how to manage stress:** Provide courses and workshops on how to manage stress. Newly employed drivers should be taken through a study on their mindsets, to prepare them in advance about the working environments that can be too tough to handle. They should be trained on relaxation and the effect of stress on individuals, and how to handle it. Provide them with mindfulness tools and coping mechanisms to help them reduce the chain of stressors in their jobs. Physical exercises such as yoga practice and other real-world tools should be offered to the new bus drivers, to keep them at comfort and stress-free driving always.
- e) **Policy and Regulation:** Call for a policy change or workplace regulation that would help reduce stress among bus drivers. Make it

unacceptable for a driver to work for more than 14 hours. Breaks should be given along the journey points for ten minutes for one to relax his mind and later follows other days of normal working hours without breaks. Training should be offered and taught how to approach a dangerous situation, or how to deal with an unwelcoming passenger. Whenever a passenger is violent, the police must be involved at most immediately.

REFERENCES

REFERENCES

1. Student M, Mehta Professor M, Author Meenu Student C, Mehta M. Occupational stress among bus drivers: A literature review. ~ 175 ~ The Pharma Innovation Journal [Internet]. 2022;11(4):175–9. Available from: <http://www.thepharmajournal.com>
2. Hemanth Kumar R, Jagadeesan D, Veeramani G. work stress and its preventive measures of government bus drivers in northern tamilnadu section: research paper work stress and its preventive measures of government bus drivers in northern tamilnadu. Asian J Med Sci. 2023 Mar 1;14(3):122–9.
3. Remy VFM, Guseva Canu I. Healthy Bus Drivers, Sustainable Public Transport: A Three-Time Repeated Cross-Sectional Study in Switzerland. Int J Public Health. 2023;68.
4. Mohamed Ali K, Mujibur Rahman K, S G, Nancy S, Sathish Kumar S. Mental Health Among Bus Drivers and Conductors: A Cross-Sectional Study From Karaikal, South India. Cureus. 2023 Aug 10;
5. Izadi N, Najafi A, Saraei M. Metabolic syndrome and its determinants among professional drivers: a systematic review and meta-analysis. Vol. 20, Journal of Diabetes and Metabolic Disorders. Springer Science and Business Media Deutschland GmbH; 2021. p. 2015–23.
6. Kasemsan A, Joseph L, Paungmali A, Sitalertpisan P, Pirunsan U. Prevalence of musculoskeletal pain and associated disability among professional bus drivers: a cross-sectional study. Int Arch Occup Environ Health. 2021 Aug 1;94(6):1263–70.
7. Durgamani MK, Suresh MR V, Sethuraman MG. occupational stress among private bus-drivers and conductors in thanjavur district. J Mol Biol Res. 2020 Mar 31;10(1):29. [Internet]. Available from: <http://www.ijpam.eu>

8. Varela-Mato V, Yates T, Stensel DJ, Biddle SJH, Clemes SA. Time spent sitting during and outside working hours in bus drivers: A pilot study. *Prev Med Rep.* 2016 Jun 1;3:36–9.
9. Cunradi CB, Lipton R, Banerjee A. Occupational correlates of smoking among urban transit operators: A prospective study. 2007; Available from: <http://www.substanceabusepolicy.com/content/2/1/36>
10. Hakim SA, Mohsen A. Work-related and ergonomic risk factors associated with low back pain among bus drivers. *Journal of the Egyptian Public Health Association.* 2017 Sep 1;92(3):195–201.
11. jayaselvi. Work-Pressure and Psychological Stress Setbacks Productivity of Road Transport Workers. 2020 Mar 31;40(70):3983–4000.
12. Kumar A, Gautam PB, Prasad Pore. Prevalence of hypertension and its associated risk factors among police personnel of a metropolitan city. *Asian J Med Sci.* 2023 Mar 1;14(3):122–9.
13. Rahimpour F, Jarahi L, Rafeemanesh E, Taghati A, Ahmadi F. Investigating Job Stress among Professional Drivers. *J Mol Biol Res.* 2020 Mar 31;10(1):29.
14. Rahimpour F, Jarahi L, Rafeemanesh E, Taghati A, Ahmadi F. Investigating Job Stress among Professional Drivers. *J Mol Biol Res.* 2020 Mar 31;10(1):29.
15. de Medeiros SEG, de Aquino JM, da Silva Frazão I, Monteiro EMLM, Andrade MS, Terra MG, et al. Stress and stressors in bus drivers. *Revista de Enfermagem Referencia.* 2017;4(14).
16. Gunasekra KA, Perera BAKS. Defining occupational stress: A systematic literature review. *FARU Journal.* 2023 Jun 28;10(1):104–11.
17. Tan SY, Yip A. Hans Selye (1907-1982): Founder of the stress theory. Vol. 59, *Singapore Medical Journal.* Singapore Medical Association; 2018. p. 170–1.

18. Occupational health: Stress at the workplace [Internet]. [cited 2024 Feb 9]. Available from: <https://www.who.int/news-room/questions-and-answers/item/occupational-health-stress-at-the-workplace>
19. Lim T, Thompson J, Tian L, Beck B. A transactional model of stress and coping applied to cyclist subjective experiences. *Transp Res Part F Traffic Psychol Behav* [Internet]. 2023 Jul 1 [cited 2024 Apr 17];96:155–70. Available from: <https://www.google.com/imgres?q=richard+lazarus+transactional+model+stress&imgurl=https://www.researchgate.net/publication/329444557/figure/fig1/AS:747949436973066@1555336450516/Transactional-Model-of-Stress-and-Coping-Lazarus-Folkman>.
20. The History of Stress - The American Institute of Stress [Internet]. [cited 2024 Feb 9]. Available from: <https://www.stress.org/the-history-of-stress>
21. Mental health [Internet]. [cited 2024 Apr 2]. Available from: <https://www.who.int/news-room/fact-sheets/detail/mental-health-strengthening-our-response>
22. Shields GS, Sazma MA, McCullough AM, Yonelinas AP. The effects of acute stress on episodic memory: A meta-analysis and integrative review. *Psychol Bull*. 2017 Jun 1;143(6):636–75.
23. Cvjetković-Bošnjak M, Dubovski-Poslon M, Bibić Ž, Bošnjak K. The influence of chronic stress on health and coping mechanisms. *Sanamed*. 2019;14(1):97–101.
24. Sources of Stress [Internet]. [cited 2024 Apr 17]. Available from: https://saylordotorg.github.io/text_human-relations/s07-03-sources-of-stress.html
25. Bhargava D, Trivedi H. A Study of Causes of Stress and Stress Management among Youth. *IRA-International Journal of Management & Social Sciences* (ISSN 2455-2267). 2018;11(3).

26. Grigorescu S, Trasnea B, Cocias T, Macesanu G. A survey of deep learning techniques for autonomous driving. *J Field Robot.* 2020;37(3).
27. Ye S, Chen Q, Tang Y. Anger Expressions Of Bus Drivers and Passengers During Conflicts on the Bus. *SSRN Electronic Journal.* 2022;
28. Pilkington-Cheney F, Filtness AJ, Haslam C. A qualitative study exploring how city bus drivers manage sleepiness and fatigue. *Chronobiol Int* [Internet]. 2020 Oct 2 [cited 2024 Feb 11];37(9–10):1502–12. Available from:
<https://www.tandfonline.com/doi/abs/10.1080/07420528.2020.1812623>
29. Lazarus and Folkman's Transactional Model of Stress and Coping - Coping in Stressful Situations [Internet]. [cited 2024 Feb 18]. Available from:
<https://www.mindtools.com/aari1kl/lazarus-and-folkman's-transactional-model-of-stress-and-coping>
30. The Job-Demand-Control-Support Model: What it is and why it matters to cope with workplace stress | CQ Net - Management skills for everyone [Internet]. [cited 2024 Feb 18]. Available from:
<https://www.ckju.net/en/dossier/job-demand-control-support-model-what-it-and-why-it-matters-cope-workplace-stress>
31. Joaquín J, Pozo-Antúnez D, Ariza-Montes A, Fernández-Navarro F, Molina-Sánchez H. Effect of a Job Demand-Control-Social Support Model on Accounting Professionals' Health Perception. *International Journal of Environmental Research and Public Health Article* [Internet]. [cited 2024 Apr 4]; Available from: www.mdpi.com/journal/ijerph
32. Fahlén G, Knutsson A, Peter R. Aspects of the effort reward imbalance model of psychosocial stress in the work environment. *Psychol Bull.* 2017 Jun 1;143(6):636–75
33. Kunz C. The influence of working conditions on health satisfaction, physical and mental health: Testing the effort-reward imbalance (ERI) model and its moderation with over-commitment using a representative

- sample of German employees (GSOEP). BMC Public Health [Internet]. 2019 Jul 29 [cited 2024 Apr 5];19(1):1–11. Available from: <https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-019-7187-1>
34. Engel GL. The need for a new medical model: A challenge for biomedicine. *Science* (1979). 1977;196(4286):129–36.
 35. Understanding the Biopsychosocial Model of Health [Internet]. [cited 2024 Feb 18]. Available from: <https://www.verywellmind.com/understanding-the-biopsychosocial-model-7549226>
 36. health psychology — perspectives clinic [Internet]. [cited 2024 Apr 5]. Available from: <https://perspectivesclinic.com/health-psychology>
 37. Lin YJ, Shih TS, Wu W Te, Guo YLL. The association of job fatigue with mental disorders among bus drivers. *Scand J Work Environ Health*. 2023;49(1).
 38. Useche SA, Gómez V, Cendales B, Alonso F. Working Conditions, Job Strain, and Traffic Safety among Three Groups of Public Transport Drivers. *Saf Health Work*. 2018;9(4).
 39. Kashani AT, Besharati MM, Radmard A. Exploring the relationship between work shift and demographic variables with driving behaviour among intercity bus drivers. *JOURNAL OF HEALTH AND SAFETY AT WORK*. 2018;8(3).
 40. Sharma N, Kumar SV V, Mangal DK, Sharma Y, Bairwa M, Babu B V. Pattern of Road Traffic Injuries and Their Pre-hospitalization Factors Reported at a Public Tertiary Healthcare Facility and Rural Private Healthcare Facility in Rajasthan, India. *Cureus*. 2023;
 41. Oyapero A, Erinoso O, Olatosi OO. Wheels of Strain? Lifestyle Habits, Stress Perception and Quality of Life among Long Distance Bus Drivers in Nigeria. *West Afr J Med*. 2022 Apr 29;39(4):399–406.
 42. S. T. Occupational stress and its associated health disorders among bus

- drivers. *Int J Community Med Public Health*. 2016;(May):208–11.
43. Useche S, Alonso F, Cendales B, Autukevi R, i i, t t, et al. Burnout, Occupational Stress, Health and Road Accidents among Bus Drivers: Barriers and Challenges for Prevention. *J Environ Occup Sci*. 2017;6(1):1.
 44. Nakai H, Ogawa K. Stress reactions among bus drivers: Towards the development of an educational resource for better management of emotions. *The Japanese journal of psychology*. 2014;85(4):373–82.
 45. Hlotova Y, Cats O, Meijer S. Measuring Bus Drivers' Occupational Stress under Changing Working Conditions. *Transportation Research Record: Journal of the Transportation Research Board*. 2014 Jan 1;2415(1):13–20.
 46. Peters SE, Grogan H, Henderson GM, Andrée López Gómez M, Martínez Maldonado M, Silva Sanhueza I, et al. Working Conditions Influencing Drivers' Safety and Well-Being in the Transportation Industry: “On Board” Program. 2021 [cited 2024 Feb 18]; Available from: <https://doi.org/10.3390/ijerph181910173>
 47. Dorn L, Af Wåhlberg A. Work-related road safety: an analysis based on U.K. bus driver performance. *Risk Anal [Internet]*. 2008 Feb [cited 2024 Feb 18];28(1):25–35. Available from: <https://pubmed.ncbi.nlm.nih.gov/18304104/>
 48. Garbarino S, Guglielmi O, Sannita WG, Magnavita N, Lanteri P. Sleep and Mental Health in Truck Drivers: Descriptive Review of the Current Evidence and Proposal of Strategies for Primary Prevention. *Int J Environ Res Public Health [Internet]*. 2018 Sep 1 [cited 2024 Feb 18];15(9). Available from: <https://pubmed.ncbi.nlm.nih.gov/30150599/>
 49. Floridou GA, Peerdeman KJ, Schaefer RS. Individual differences in mental imagery in different modalities and levels of intentionality. *Mem Cognit [Internet]*. 2022 Jan 1 [cited 2024 Feb 18];50(1):29. Available from: </pmc/articles/PMC8763825/>

50. Öz B, Özkan T, Lajunen T. Professional and non-professional drivers' stress reactions and risky driving. *Transp Res Part F Traffic Psychol Behav* [Internet]. 2010 [cited 2024 Feb 18];13(1):32–40. Available from: https://www.researchgate.net/publication/221999568_Professional_and_non-professional_drivers'_stress_reactions_and_risky_driving
51. Rodríguez-González-moro MT, Gallego-Gómez JI, Rodríguez-González-moro JM, Cano MCC, Rivera-Caravaca JM, Simonelli-Muñoz AJ. Reliability and Validity of a Stress Scale in Public Employees from Murcia (Spain). *Int J Environ Res Public Health* [Internet]. 2020 Dec 1 [cited 2024 Feb 18];17(23):1–11. Available from: <https://pubmed.ncbi.nlm.nih.gov/33265941/>
52. Health-Related Quality of Life Among US Workers: Variability Across Occupation Groups - PMC [Internet]. [cited 2024 Feb 18]. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5508147/>
53. Hassard J, Teoh KRH, Visockaite G, Dewe P, Cox T. The cost of work-related stress to society: A systematic review. *J Occup Health Psychol* [Internet]. 2018 Jan 1 [cited 2024 Feb 18];23(1):1–17. Available from: <https://pubmed.ncbi.nlm.nih.gov/28358567/>
54. Chandola T, Brunner E, Marmot M. Chronic stress at work and the metabolic syndrome: prospective study. *BMJ: British Medical Journal* [Internet]. 2006 Mar 3 [cited 2024 Feb 19];332(7540):521. Available from: <https://pubmed.ncbi.nlm.nih.gov/1638129/>
55. Chen IH, Chen CY, Pakpour AH, Griffiths MD, Lin CY. Internet-Related Behaviors and Psychological Distress Among Schoolchildren During COVID-19 School Suspension. *J Am Acad Child Adolesc Psychiatry* [Internet]. 2020 Oct 1 [cited 2024 Feb 19];59(10):1099-1102.e1. Available from: <https://pubmed.ncbi.nlm.nih.gov/32615153/>
56. Hartvigsen J, Bakketeig LS, Leboeuf-Yde C, Engberg M, Lauritzen T. The Association Between Physical Workload and Low Back Pain Clouded by

- the “Healthy Worker” Effect. *Spine* (Phila Pa 1976). 2001 Aug;26(16):1788–92.
57. Garbarino S, Guglielmi O, Sanna A, Mancardi GL, Magnavita N. Risk of Occupational Accidents in Workers with Obstructive Sleep Apnea: Systematic Review and Meta-analysis. *Sleep*. 2016 Jun 1;39(6):1211–8.
 58. Coelho LG, Costa PR de F, Kinra S, Pitangueira JCD, Lira CRN de, Akutsu R de CC de A. The influence of occupational stress on workers’ health: systematic review and meta-analysis. *Research, Society and Development*. 2022 Feb 19;11(3):e23111326449.
 59. Williamson V, Stevelink SAM, Greenberg N. Occupational moral injury and mental health: systematic review and meta-analysis. *The British Journal of Psychiatry*. 2018 Jun 22;212(6):339–46.
 60. Afrin T, Yodo N. A survey of road traffic congestion measures towards a sustainable and resilient transportation system. Vol. 12, *Sustainability* (Switzerland). 2020.
 61. Chang H, Li L, Huang J, Zhang Q, Chin KS. Tracking traffic congestion and accidents using social media data: A case study of Shanghai. *Accid Anal Prev*. 2022 May 1;169.
 62. Frazier C. Working Around the Clock: The Association between Shift Work, Sleep Health, and Depressive Symptoms among Midlife Adults. *Soc Ment Health*. 2023;13(2).
 63. Nidhi S, Praveen DSS, Krishna MVR, Anitha R. Emergency driving assistance for debilitating drivers. *Int J Eng Adv Technol*. 2019;8(4).
 64. Mohsen Amira HS. Workplace stress and its relation to cardiovascular disease risk factors among bus drivers in Egypt. *Eastern mediterranean health journal*. 2019;25(12):877–82.
 65. Montoro L, Useche S, Alonso F, Cendales B. Work environment, stress, and driving anger: A structural equation model for predicting traffic sanctions of public transport drivers. *Int J Environ Res Public Health*

- [Internet]. 2018;15(3):12. Available from: www.mdpi.com/journal/ijerph
66. Illangasinghe DK, Alagiyawanna MAAP, Samaranayake DBDL, Fernando N. Prevalence and associated factors of occupational stress among bus drivers of Sri Lanka Transport Board in Colombo District. *Journal of the College of Community Physicians of Sri Lanka*. 2021;27(3).
 67. Rajabali hokmabadi H, tavakoli, M, morteza esmailzade, hossien ebrahimyan. Assessment of Occupational Stress among Bojnurd Bus Drivers. *Journal of Health Research (Journal of health research in community)*. 2018 Jun 10;4(1):27–34.
 68. Rahimpour F, Jarahi L, Rafeemanesh E, Taghati A, Ahmadi F. Investigating Job Stress among Professional Drivers. *J Mol Biol Res*. 2020 Mar 31;10(1):29.
 69. Patel AJ, Bhise AR. Pulmonary Function, Aerobic Capacity, Obesity and Stress Level in Bus Drivers and Conductors in Gujarat State Road Transport Corporation: An Evidence Based Study. *International Journal of Science and Healthcare Research*. 2021;6(3).
 70. Bathija GV, Bant DD, Itagimath SR, Lokare L, Godbole M, Nekar MS, et al. A study on stress among government city bus drivers in Hubli. *Int J Biomed Res*. 2014 Feb 28;5(2):102.
 71. Rathi A, Kumar V, Singh A, Lal P. A cross-sectional study of prevalence of depression, anxiety and stress among professional cab drivers in New Delhi. *Indian J Occup Environ Med*. 2019;23(1):48.
 72. Michida N, Okiyama H, Nishikawa K, Nouzawa T. A study of drivers' fatigue mechanisms during long hour driving. In: *SAE Technical Papers*. 2001.
 73. Hege A, Lemke MK, Apostolopoulos Y, Sönmez S. The Impact of Work Organization, Job Stress, and Sleep on the Health Behaviors and Outcomes of U.S. Long-Haul Truck Drivers. *Health Education & Behavior*. 2019 Aug 15;46(4):626–36.

74. Wickens CM, Wiesenenthal DL. State Driver Stress as a Function of Occupational Stress, Traffic Congestion, and Trait Stress Susceptibility1. *J Appl Biobehav Res*. 2007 May 4;10(2):83–97.
75. Leechawengwongs M, Leechawengwongs E, Sukying C, Udomsubpayakul U. Role of drowsy driving in traffic accidents: A questionnaire survey of Thai commercial bus/truck drivers. *Journal of the Medical Association of Thailand*. 2006;89(11).
76. Ahmed M, Das D. The extent of traffic congestion in Guwahati, India: A multi index analysis. *Ecology, Environment and Conservation*. 2022;
77. Chakrabartty A, Gupta S. Estimation of Congestion Cost in the City of Kolkata—A Case Study. *Current Urban Studies*. 2015;03(02).
78. Alam MA, Ahmed F. Urban Transport System and Congestion: A case study of Indian Cities. *Transport and Communications Bulletin for Asia and the Pacific*. 2013;(82).
79. Borthakur PP, Nath T, Hatibaruah D. Study and analysis of A Vehicular Traffic Intersection Point , For Traffic and Congestion Control in Amolapatty , Dibrugarh , Assam . *European chemical bulletin*. 2023;12(10).
80. Jeong I, Park JB, Lee KJ, Won JU, Roh J, Yoon JH. Irregular work schedule and sleep disturbance in occupational drivers—A nationwide cross-sectional study. *PLoS One*. 2018 Nov 15;13(11):e0207154.
81. Iridiastadi H, Abdurrahman I, Puspasari M, Soetisna HR. Fatigue and sleepiness during long-duration driving: A preliminary study among Indonesian commercial drivers. *Transport Problems*. 2020;15(2).
82. Mujawar I, Leng J, Roberts-Eversley N, Narang B, Kim SY, Gany F. Sleep behavior of New York City taxi drivers compared to the general US population. *J Transp Health*. 2021;22.
83. Jeong I, Park JB, Lee KJ, Won JU, Roh J, Yoon JH. Irregular work schedule and sleep disturbance in occupational drivers—A nationwide cross-sectional study. *PLoS One*. 2018;13(11).

84. Vaz Fragoso CA, Araujo KLB, Van Ness PH, Marottoli RA. Prevalence of sleep disturbances in a cohort of older drivers. *Journals of Gerontology - Series A Biological Sciences and Medical Sciences*. 2008;63(7).
85. Nagaraj K, Taly AB, Gupta A, Prasad C, Christopher R. Depression and sleep disturbances in patients with multiple sclerosis and correlation with associated fatigue. *J Neurosci Rural Pract*. 2013;4(4).
86. Dabaghi E, Dehghan H, Shakerian M. The impacts of heat stress on the cognitive performance parameters of taxi drivers. *Int J Environ Health Eng*. 2023;12(1).
87. Bober S. Heat Impacts on Occupational Health Settings in the Time of Climate Change. 2012;5(3):1–78.
88. Sun X, Dong J. Stress Response and Safe Driving Time of Bus Drivers in Hot Weather. *Int J Environ Res Public Health*. 2022 Aug 1;19(15).
89. Kaisari NK, Abuzwidah M, Elawady A, Zeiada W. Adverse weather impact on driver performance in the UAE. In: *E3S Web of Conferences*. 2022.
90. Hatvani-Kovacs G, Belusko M, Skinner N, Pockett J, Boland J. Drivers and barriers to heat stress resilience. *Science of the Total Environment*. 2016;571.
91. Kilpeläinen M, Summala H. Effects of weather and weather forecasts on driver behaviour. *Transp Res Part F Traffic Psychol Behav*. 2007;10(4).
92. Khattak AJ, Kantor P, Council FM. Role of Adverse Weather in Key Crash Types on Limited-Access: Roadways Implications for Advanced Weather Systems. <https://doi.org/10.3141/1621-02> [Internet]. 1998 Jan 1 [cited 2024 Apr 20];(1621):10–9. Available from: <https://journals.sagepub.com/doi/10.3141/1621-02>
93. Chakrabarty N, Gupta K. Analysis of Driver Behaviour and Crash Characteristics during Adverse Weather Conditions. *Procedia Soc Behav Sci*. 2013;104.
94. Singaravel SS, Kandaswamy EK. A cross sectional study on prevalence of

- obesity among bus drivers of Metropolitan Transport Corporation Limited, Chennai. *Int J Community Med Public Health*. 2017 Nov 23;4(12):4456.
95. Petrie JR, Guzik TJ, Touyz RM. Diabetes, Hypertension, and Cardiovascular Disease: Clinical Insights and Vascular Mechanisms. *Can J Cardiol* [Internet]. 2018 May 1 [cited 2024 Apr 5];34(5):575. Available from: /pmc/articles/PMC5953551/
 96. Guest AJ, Chen YL, Pearson N, King JA, Paine NJ, Clemes SA. Cardiometabolic risk factors and mental health status among truck drivers: A systematic review. *BMJ Open*. 2020;10(10).
 97. Ok J, Kang K, Kim H. Factors Affecting the Deterioration of the Physical Health Status of Taxi Drivers by Age Group. *Int J Environ Res Public Health*. 2022;19(6).
 98. Resources | IDF Diabetes Atlas [Internet]. [cited 2024 Feb 26]. Available from:
https://diabetesatlas.org/resources/?gad_source=1&gclid=Cj0KCQiA5-uuBhDzARIsAAa21T-XfN6wVLu6gCLbJC7uTuvpJuAthlwaGkvFo9Ba9ivMcjR4-66CQaEaAuM9EALw_wcB
 99. Committee ADAPP. 2. Classification and Diagnosis of Diabetes: Standards of Medical Care in Diabetes—2022. *Diabetes Care* [Internet]. 2022 Jan 1 [cited 2024 Apr 21];45(Supplement_1):S17–38. Available from: <https://dx.doi.org/10.2337/dc22-S002>
 100. Ramukumba TS, Mathikhi MS, Mathikhi M. Health assessment of taxi drivers in the city of Tshwane. *Curationis* [Internet]. 2016;39(1):1671. Available from:
<http://www.curationis.org.za>
<http://dx.doi.org/10.4102/curationis.v39i1.1671>
<http://www.curationis.org.za>
 101. Adedokun AO, Goon D Ter, Owolabi EO, Adeniyi OV, Ajayi AI. Prevalence, awareness, and determinants of type 2 diabetes mellitus among

- commercial taxi drivers in buffalo city metropolitan municipality South Africa A cross-sectional survey. *Medicine (United States)*. 2019;98(9).
102. Modjadji P, Bokaba M, Mokwena KE, Mudau TS, Monyeki KD, Mphekgwana PM. Obesity as a Risk Factor for Hypertension and Diabetes among Truck Drivers in a Logistics Company, South Africa. *Applied Sciences (Switzerland)*. 2022;12(3).
 103. Sugano Y, Miyachi T, Ando T, Iwata T, Yamanouchi T, Mishima K, et al. Diabetes and anxiety were associated with insomnia among Japanese male truck drivers. *Sleep Med*. 2022;90.
 104. Ukudeyeva A, Ramirez LR, Rivera-Castro A, Faiz M, Espejo M, Kanna B. 2460 Qualitative study of obesity risk perception, knowledge, and behavior among Hispanic taxi drivers in New York. *J Clin Transl Sci*. 2018 Jun 21;2(S1):72–3.
 105. Appiah CA, Afriyie EO, Hayford FEA, Frimpong E. Prevalence and lifestyle-associated risk factors of metabolic syndrome among commercial motor vehicle drivers in a Metropolitan city in Ghana. *Pan African Medical Journal*. 2020;36.
 106. Izadi N, Malek M, Aminian O, Saraei M. Medical risk factors of diabetes mellitus among professional drivers. *J Diabetes Metab Disord*. 2013;12(1).
 107. M T, Kulothungan K, Rizvana S, Thirunavukkarasu S. A Cross-Sectional Study of Determinants of Type 2 Diabetes Mellitus Among Professional Drivers in the Perambalur Municipality Area of Tamil Nadu, India. *Cureus*. 2023 Jan 29;
 108. Prabhu S, Shetty K, D’Cunha D, Karkada D. Study of prevalence of work related stress and co-morbidities and its effect on work performance in KSRTC workers of Dakshina Kannada district, Karnataka, India. *Int J Res Med Sci*. 2015;3161–6.
 109. Hypertension [Internet]. [cited 2024 Mar 6]. Available from: https://www.who.int/health-topics/hypertension#tab=tab_1

110. Armstrong C, Senior Associate Editor A. JNC 8 Guidelines for the Management of Hypertension in Adults. Am Fam Physician [Internet]. 2014 Oct 1 [cited 2024 Mar 6];90(7):503–4. Available from: <https://www.aafp.org/pubs/afp/issues/2014/1001/p503.html>
111. Rike ME, Diress M, Dagnew B, Getnet M, Kebalo AH, Sinamaw D, et al. Hypertension and Its Associated Factors Among Long-Distance Truck Drivers in Ethiopia. Integr Blood Press Control. 2022;15.
112. Patil AP, Yogeshkumar S. Hypertension among auto-rickshaw drivers in Belagavi, South India: A cross-sectional study. Int J Occup Saf Health. 2023;13(3).
113. Walvekar SS, Ambekar JG, Devaranavadi BB, Sajjannar DS. Occupational Stress and Metabolic Syndrome among Bus Drivers: Risk Factors for Cardiovascular Diseases. Journal of Clinical and Diagnostic Research. 2021;15(5):17–22.
114. Parkash J, Kalhan M, Singhania K, Punia A, Kumar B, Kaushal P. Prevalence of hypertension and its determinants among policemen in a City of Haryana, India. Int J Appl Basic Med Res. 2019;9(3):143.
115. Mahendra Prasad, Kunal Singh. A Study to Assess the Prevalence and Risk Factors of Hypertension among the Truck Drivers of district Shivpuri, Madhya Pradesh, India. International Healthcare Research Journal. 2023;7(1).
116. S br, g gb, b dm. A study on hypertension and it's determinants among male bus drivers in state road transport corporation, visakhapatnam, andhra pradesh. Journal of Evidence Based Medicine and Healthcare. 2015;2(42).
117. A healthy lifestyle - WHO recommendations [Internet]. [cited 2024 Mar 8]. Available from: <https://www.who.int/europe/news-room/fact-sheets/item/a-healthy-lifestyle---who-recommendations>
118. Obesity and overweight [Internet]. [cited 2024 Mar 6]. Available from: <https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight>

119. Lim JU, Lee JH, Kim JS, Hwang Y Il, Kim TH, Lim SY, et al. Comparison of World Health Organization and Asia-Pacific body mass index classifications in COPD patients. *Int J Chron Obstruct Pulmon Dis* [Internet]. 2017 Aug 21 [cited 2024 Apr 21];12:2465. Available from: /pmc/articles/PMC5571887/
120. Pourabdian S, Golshiri P, Janghorbani M. Overweight, underweight, and obesity among male long-distance professional drivers in Iran. *J Occup Health*. 2020 Jan 1;62(1).
121. da Silva JC, Moraes MS, Martins PC, Silva DAS. Prevalence of abdominal obesity and associated lifestyle factors in bus drivers in a city in Southern Brazil. *Work*. 2020 Aug 24;66(3):579–85.
122. V SK. Occupational Stress among Long Route Truck Drivers: Occupational Stress among Long Route Truck Drivers. 2018;4(2):134–44.
123. Joshi BA, Joshi A V., Katti SM, Mallapur MD, Karikatti SS. A cross-sectional study of prevalence of overweight and obesity among bus drivers and conductors of north-ujest Karnataka road transport corporation (NUJKRTC) in Belgaum division, Belgaum. *J Indian Med Assoc*. 2013;111(3).
124. Cunradi CB, Greiner BA, Ragland DR, Fisher J. Alcohol, stress-related factors, and short-term absenteeism among urban transit operators. *Journal of Urban Health*. 2005;82(1):43–57.
125. Substance Abuse | WHO | Regional Office for Africa [Internet]. [cited 2024 Mar 7]. Available from: <https://www.afro.who.int/health-topics/substance-abuse>
126. Useche SA, Serge A, Alonso F, Esteban C. Alcohol Consumption, Smoking, Job Stress and Road Safety in Professional Drivers. *J Addict Res Ther*. 2017;08(02).
127. Adedokun AO, Goon D Ter, Owolabi EO, Adeniyi OV, Ajayi AI. On-Site Evaluation of Smoking, Alcohol consumption and Physical Inactivity

- Among Commercial Taxi Drivers in Buffalo City Metropolitan Municipality, South Africa. *Glob J Health Sci.* 2019;11(2).
128. Parashari A, Ahmad S, Asthana S. Tobacco use among drivers and conductors in western Uttar Pradesh, India. *Indian J Community Health.* 2017;29(3).
 129. Showande SJ, Odukoya IO. Prevalence and clusters of modifiable cardiovascular disease risk factors among intra-city commercial motor vehicle drivers in a Nigerian metropolitan city. *Ghana Med J.* 2020;54(2).
 130. Turner LM, Reed DB. Exercise among commercial truck drivers. Vol. 59, *AAOHN Journal.* 2011.
 131. Wanamo ME, Abaya SW, Aschalew AB. Prevalence and risk factors for low back pain (LBP) among Taxi Drivers in Addis Ababa, Ethiopia: A community based cross-sectional study. *Ethiopian Journal of Health Development.* 2017;31(4).
 132. Alperovitch-Najenson D, Santo Y, Masharawi Y, Katz-Leurer M, Ushvaev D, Kalichman L. Low back pain among professional bus drivers: ergonomic and occupational-psychosocial risk factors. *Israel Medical Association Journal.* 2010;12(1).
 133. Dhamodharan S, Megala M, Duraimurugan M, Chellavel Ganapathi K. Prevalence of hypertension and its risk factors among transport workers in South India. *Int J Community Med Public Health.* 2020;7(4).
 134. Ngatcha Tchounga CC, Azabji Kenfack M, Guessogo WR, Mekoulou Ndongo J, Bika Léle EC, Ayina Ayina CN, et al. Prevalence of musculoskeletal disorders among taxi drivers in Yaoundé, Cameroon: preventive effect of physical activity. *BMC Musculoskelet Disord.* 2022;23(1).
 135. Kasemsan A, Joseph L, Paungmali A, Sitalertpisan P, Pirunsan U. Prevalence of musculoskeletal pain and associated disability among professional bus drivers: a cross-sectional study. *Int Arch Occup Environ*

- Health. 2021 Aug 15;94(6):1263–70.
136. Pradeepkumar H, Sakthivel G, Shankar S. Prevalence of work related musculoskeletal disorders among occupational bus drivers of Karnataka, South India. *Work*. 2020 Jun 4;66(1):73–84.
 137. Apurva Girish Mehta, Dr. Smita Chandrakant Patil, Dr. Chandrakant Babaso Patil, Dr. Khushboo Trishant Chotai. Prevalence Of Work Related Musculoskeletal And Psychological Problems Among Female Bus Conductors In Karad. *Int J Life Sci Pharma Res*. 2022 Jun 21;
 138. Kolar district, Government of Karnataka | City of Silk and Milk | India [Internet]. [cited 2024 Apr 12]. Available from: <https://kolar.nic.in/en/>
 139. random number generator - Google Search [Internet]. [cited 2024 Apr 21]. Available from:
https://www.google.com/search?q=random+number+generator&oq=rando&gs_lcrp&sourceid=chrome&ie=UTF-8
 140. The American Institute of Stress [Internet]. [cited 2024 Mar 8]. Available from: <https://www.stress.org/>
 141. Kaul S, Gupta A, Sarkar T, Ahsan S, Singh N. Substance abuse and depression among auto-rickshaw drivers: A study from the national capital region of Delhi, India. *Indian Journal of Medical Specialities*. 2019;10(3).
 142. Ayyappa G, Kunte R, Yadav A, Basannar D. Is occupation the “driving force” for tobacco consumption? A cross-sectional study to assess prevalence, patterns, and attitude towards tobacco use among long-distance bus drivers and conductors in Western Maharashtra. *Ind Psychiatry J*. 2019;28(2).
 143. Ozoh OB, Akanbi MO, Amadi CE, Vollmer W, Bruce N. The prevalence of and factors associated with tobacco smoking behavior among long-distance drivers in Lagos, Nigeria. *Afr Health Sci* [Internet]. 2017 [cited 2024 Jun 3];17(3):886–95. Available from: <https://pubmed.ncbi.nlm.nih.gov/29085417/>

144. Sreedevi A, Majumdar A, Olando Y, Sun MC, Jennings C, Tibazarwa K, et al. Experiences and Beliefs on Tobacco Use, Cessation in India: A Qualitative Study. *Glob Heart*. 2023 Sep 22;18(1):51.
145. Cunradi CB, Chen MJ, Lipton R. Association of occupational and substance use factors with burnout among urban transit operators. *Journal of Urban Health*. 2009 Jul;86(4):562–70.
146. Rathi A, Kumar V, Singh A, Lal P. A cross-sectional study of prevalence of depression, anxiety and stress among professional cab drivers in New Delhi. *Indian J Occup Environ Med*. 2019;23(1):48.
Cunradi CB, Chen MJ, Lipton R. Association of occupational and substance use factors with burnout among urban transit operators. *Journal of Urban Health*. 2009 Jul;86(4):562–70.
147. Rathi A, Kumar V, Singh A, Lal P. A cross-sectional study of prevalence of depression, anxiety and stress among professional cab drivers in New Delhi. *Indian J Occup Environ Med*. 2019;23(1):48.
148. Census of India: Urban Agglomerations - Google Search [Internet]. [cited 2024 Jul 2]. Available from:
https://www.google.com/search?q=Census+of+India%3A+Urban+Agglomerations&oq=Census+of+India%3A+Urban+Agglomerations&gs_lcrp=EgZjaHJvbWUyBggAEEUYOdIBCDE4ODRqMGo3qAIAAsAIA&sourceid=chrome&ie=UTF-8
149. India - Rural Urban Distribution of Population [Internet]. [cited 2024 Jul 2]. Available from:
<https://censusindia.gov.in/nada/index.php/catalog/42617>
150. National Programme for prevention & Control of Cancer, Diabetes, Cardiovascular Diseases & stroke (NPCDCS) :: National Health Mission [Internet]. [cited 2024 Jul 2]. Available from:
<https://nhm.gov.in/index1.php?lang=1&level=2&sublinkid=1048&lid=604>
151. ilo night work convention - Google Search [Internet]. [cited 2024 Jul 2]. Available from:
https://www.google.com/search?q=ilo+night+work+convention&oq=ILO+Night+Work+Convention&gs_lcrp=egzjahjvbwuqbwgaeaaaygaqybwgaeaaaygaqydqgbeaaahgmygaqyiguydqgceaaahgmygaqyiguydqgdeaaahgmygaqyiguydqgeaaahgmygaqyiguycggeaaaygaqyogqycgggeaaaygaqyogqycggheaaaygaqyogtsaqgxndu2ajbqn6gcclacaq&sourceid=chrome&ie=UTF-8
152. nfhs 5 - Google Search [Internet]. [cited 2024 Jul 2]. Available from:
https://www.google.com/search?q=nfhs+5&oq=NFHS&gs_lcrp=egzjahjvbwuqeggdeaaayqixdarixaxiabbikbtimcaaqaqabhdgiaegiofmgyiarbfgdkyfqqceca4yqxjharixaxjraixabbikbtiscamqabhdgimbgledgiaegiofmgyibbaagemygaqyiguybwgfeaaaygaqycgggeaaysqmygaqybwgheaaaygaqybwgieaaaygaqybwgieaaaygatsaqk0otmzajbqmtwoAgiwAgE&sourceid=chrome&ie=UTF-8

153. Major Initiatives | Government of India, Ministry of Education [Internet]. [cited 2024 Jul 2]. Available from: <https://www.education.gov.in/>
154. World Health Organization (WHO). Waist Circumference and Waist-Hip Ratio: Report of a WHO Expert Consultation, Geneva, 8-11 December 2008. WHO Report - Google Search [Internet]. [cited 2024 Jul 2]. Available from: [https://www.google.com/search?q=World+Health+Organization+\(WHO\).+Waist+Circumference+and+Waist-Hip+Ratio%3A+Report+of+a+WHO+Expert+Consultation%2C+Geneva%2C+8-11+December+2008.+WHO+Report&oq=World+Health+Organization+\(WHO\).+Waist+Circumference+and+Waist-Hip+Ratio%3A+Report+of+a+WHO+Expert+Consultation%2C+Geneva%2C+8-11+December+2008.+WHO+Report&gs_lcrp=EgZjaHJvbWUyBggAEEUYOdIBCTE2NDVqMGoxNagCCLACAQ&sourceid=chrome&ie=UTF-8](https://www.google.com/search?q=World+Health+Organization+(WHO).+Waist+Circumference+and+Waist-Hip+Ratio%3A+Report+of+a+WHO+Expert+Consultation%2C+Geneva%2C+8-11+December+2008.+WHO+Report&oq=World+Health+Organization+(WHO).+Waist+Circumference+and+Waist-Hip+Ratio%3A+Report+of+a+WHO+Expert+Consultation%2C+Geneva%2C+8-11+December+2008.+WHO+Report&gs_lcrp=EgZjaHJvbWUyBggAEEUYOdIBCTE2NDVqMGoxNagCCLACAQ&sourceid=chrome&ie=UTF-8)
155. Kumar BM P, Doddihal C, Pattankar T, Patil S. Scientific Landscape of Climate Change Impact on Child Health: A Bibliometric Analysis. National Journal of Community Medicine. 2024 Jan 1;15(01):36–46.

ANNEXURE

ANNEXURE - I

QUESTIONNAIRE

Section A: SOCIODEMOGRAPHIC PROFILE

Form No.:

PROFORMA

Date of Interview:

1	Name: Subject ID		2	Age	
3	Sex:	M / F	4	Place of Birth	
5	Address:				
6	Mobile No:				
7	Marital status:	Unmarried/Married/Widow/ Divorced/ Separated			
8	Religion:	Hindi/Muslim/Christian/Others			
9	Education:	Illiterate/ Primary/ Secondary/ PUC/ Diploma/ Graduate/ Professionaldegree			
10	Per capita income per		11. S E S:		
11	Diet	Vegetarian	Non vegetarian	Mixed	

Section B: HEALTH STATUS ASSESSMENT

1	Smoking of Cigarette/Beedi / Consumption of Chewable Tobacco:	Cigarette/ Beedi Smoking a. Never smoked b. Current smoker: i. No. of cigarettes/ beedi per day: _____ ii. <u>Duration</u> of smoking in years c. Ex-smoker Duration of smoking in years----- ---	Chewable Tobacco a. Never Chewed b. Current chewer i. No. of times per day: _____ ii. Duration of chewing in years: ____ c. Ex- chewer Duration of chewing in years: ____
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2	Alcohol Drinking	a. Never b. Alcohol Drinker: No of years of consumption of alcohol: No of times alcohol is consumed / week: Average No of pegs (30 ml) consumed / week: c. Chronic Alcoholic: Yes/No (If consumes alcohol daily and in the morning)
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	History of Diabetes	Yes/No	
	If yes, for how many years?		
	Controlled	Uncontrolled	
	Medication	Yes/No	
	History of Hypertension?	Yes/No	
	If yes, for how many years?		
	Controlled/ॐ	Uncontrolled	
	Medication/	Yes/	No/

	Number of working hours per week?	<12 hours	>12 hours
	Work shift	(1) Day (2) Night (3)Either	
	Work experience (years)		

Physical Examination

1	GPE	Pallor/ Icterus/ Cyanosis/ Clubbing/ Lymphadenopathy/ Edema			
	RS:				Pule Rate
	CVS:				
	Per Abdomen:				
	CNS:				Temperature
	Any other relevant finding(s):				Blood Pressure
2	ANTHROPROMETRIC MEASURMENTS				
a.	Height (cms)		d	Waist circumference (cm):	
b.	Weight (Kg)		e	Hip circumference (cm):	
c.	Body Mass Index (BMI)		f	Waist Hip Ratio:	

ANNEXURE-II

ಪ್ರಶ್ನಾವಳಿ

ವಿಭಾಗ ಎ: ಸಾಮಾಜಿಕ ಡೆಮೋಗ್ರಾಫಿಕ್ ಪ್ರೊಫೈಲ್

ಪ್ರಪತ್ರ ಸಂಖ್ಯೆ: _____

PROFORMA

ಸಂದರ್ಶನದ ದಿನಾಂಕ: _____

1	ಹೆಸರು:		2	ಹುಟ್ಟಿದ ದಿನಾಂಕ/ವಯಸ್ಸು	
3	ಲೈಂಗಿಕತೆ:	M / F	4	ಹುಟ್ಟಿದ ಸ್ಥಳ	
5	ವಿಳಾಸ:				

6	ಮೊಬೈಲ್ ಸಂಖ್ಯೆ:				
7	ವೈವಾಹಿಕ ಸ್ಥಿತಿ:	ಅವಿವಾಹಿತ/ವಿವಾಹಿತ/ವಿಧವೆ/ವಿಚ್ಛೇದಿತ/ವಿಚ್ಛೇದಿತ/ವಿಚ್ಛೇದಿತ			
8	ಧರ್ಮ:	ಹಿಂದಿ/ಮುಸ್ಲಿಂ/ಕ್ರಿಸ್ತಿಯನ್/ಇತರರು			
9	ಶಿಕ್ಷಣ:	ಅನಕ್ಷರಸ್ಥ/ ಪ್ರಾಥಮಿಕ/ ಮಾಧ್ಯಮಿಕ/ ಪಿಯುಸಿ/ ಡಿಪ್ಲೊಮಾ/ ಪದವೀಧರ/ ವೃತ್ತಿಪರ ಪದವಿ			
10	ತಿಂಗಳಿಗೆ ತಲಾದಾಯ (ರೂ.): _____		11. ಎಸ್ ಇ ಎಸ್:		
11	ಏರ್	ಸಸ್ಯಾಹಾರಿ	ಮಾಂಸಾಹಾರಿ	ಮಿಶ್ರಿತ	

ವಿಭಾಗ ಬೀ: ಆರೋಗ್ಯ ಸ್ಥಿತಿ ಮೌಲ್ಯಮಾಪನ

1	ಸಿಗರೇಟು/ಬೀಡಿ ಧೂಮಪಾನ/ ಜಗಿಯಬಹುದಾದ ತಂಬಾಕಿನ ಸೇವನೆ:	ಸಿಗರೇಟು/ ಬೀಡಿ ಧೂಮಪಾನ a. ಎಂದಿಗೂ ಧೂಮಪಾನ ಮಾಡಿಲ್ಲ b. ಪ್ರಸ್ತುತ ಧೂಮಪಾನ: 1. ಇಲ್ಲ. ದಿನಕ್ಕೆ ಸಿಗರೇಟುಗಳು/ಬೀಡಿಗಳು: ____ 2. ವರ್ಷಗಳಲ್ಲಿ ಧೂಮಪಾನದ ಅವಧಿ ____ c. ಮಾಜಿ ಧೂಮಪಾನಿ ವರ್ಷಗಳಲ್ಲಿ ಧೂಮಪಾನದ ಅವಧಿ-----	ಜಗಿಯಬಹುದಾದ ತಂಬಾಕು a. ಎಂದಿಗೂ ಅಗಿಯಬೇಡ b. ಪ್ರಸ್ತುತ ಅಗಿಯುವವನು 1. ಇಲ್ಲ. ದಿನಕ್ಕೆ ಸಮಯ ಗಳ ಸಂಖ್ಯೆ: ____ 2. ವರ್ಷಗಳಲ್ಲಿ ಅಗಿಯುವ ಅವಧಿ: ____ c. ಮಾಜಿ ಅಗಿಯುವವನು ವರ್ಷಗಳಲ್ಲಿ ಅಗಿಯುವ ಅವಧಿ: ____
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2	ಆಲ್ಕೋಹಾಲ್ ಸೇವನೆ	1. ಎಂದಿಗೂ ಇಲ್ಲ 2. ಆಲ್ಕೋಹಾಲ್ ಕುಡಿಯುವವರು: ಆಲ್ಕೋಹಾಲ್ ಸೇವನೆಯ ವರ್ಷಗಳ ಸಂಖ್ಯೆ: / ವಾರಕ್ಕೆ ಆಲ್ಕೋಹಾಲ್ ಸೇವಿಸುವ ಸಮಯಗಳ ಸಂಖ್ಯೆ: ವಾರಕ್ಕೆ ಸೇವಿಸಲಾದ ಗೂಟಗಳ ಸರಾಸರಿ ಸಂಖ್ಯೆ (30 ಮಿಲಿ): 3. ದೀರ್ಘಕಾಲದ ಮದ್ಯವ್ಯಸನಿ: ಹೌದು/ಇಲ್ಲ (ಪ್ರತಿದಿನ ಮತ್ತು ಬೆಳಿಗ್ಗೆ ಆಲ್ಕೋಹಾಲ್ ಸೇವಿಸಿದರೆ)
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	ಮಧುಮೇಹದ ಇತಿಹಾಸ[ಬದಲಾಯಿಸಿ]	ಹೌದು/ಇಲ್ಲ		
	ಹೌದು ಎಂದಾದಲ್ಲಿ, ಎಷ್ಟು ವರ್ಷಗಳವರೆಗೆ?			
	ನಿಯಂತ್ರಿತ	ಅನಿಯಂತ್ರಿತ		
	ಔಷಧೋಪಚಾರ	ಹೌದು/ಇಲ್ಲ		
	ಅಧಿಕ ರಕ್ತದೊತ್ತಡದ ಹಿಸ್ತೋರಿ?	ಹೌದು/ಇಲ್ಲ		
	ಹೌದು ಎಂದಾದಲ್ಲಿ, ಎಷ್ಟು ವರ್ಷಗಳವರೆಗೆ?			
	Controlled/ನ	ಅನಿಯಂತ್ರಿತ		
	ಔಷಧೋಪಚಾರ/	ಹೌದು/	ಇಲ್ಲ/	
	ವಾರಕ್ಕೆ ಕೆಲಸದ ಗಂಟೆಗಳ ಸಂಖ್ಯೆ?	<12 ಗಂಟೆಗಳು	>12 ಗಂಟೆಗಳು	
	ಕೆಲಸದಶಿಫ್ಟ್	(1) ಹಗಲು (2) ರಾತ್ರಿ ಯಾವುದಾದರೂ		

Physical Examination/ದೈಹಿಕ ಪರೀಕ್ಷೆ

1	GPE	ಪ್ಲೋರ್ / ಇಕ್ವೆರಸ್ / ಸೈನೋಸಿಸ್ / ಕ್ಲಬ್ಬಿಂಗ್ / ಲಿಂಫಡೆನೊಪತಿ / ಎಡಿಮಾ	
	RS:		ಪುಲೆ ದರ
	CVS:		
	ಪ್ರತಿ ಕಿಬ್ಬೊಟ್ಟೆ ಗೆ:		

				ತಾಪಮಾನ
	CNS:			
	ಯಾವುದೇ ಇತರ ಸಂಬಂಧಿತ			ರಕ್ತದೊತ್ತಡ
2	ಆಂಥ್ರೋಪ್ರಮೆಟ್ರಿಕ್ ಮಾಪನಗಳು			
a.	ಎತ್ತರ (cms)		d	ಸೊಂಟದ ಸುತ್ತಳತೆ (cm):
b.	ತೂಕ (ಕೆಜಿ.)		e	ಸೊಂಟದ ಸುತ್ತಳತೆ (cm):
c.	ಬಾಡಿ ಮಾಸ್ ಇಂಡೆಕ್ಸ್ (ಬಿಎಂಐ)		f	ಸೊಂಟದ ಸೊಂಟದ ಅನುಪಾತ:

ANNEXURE- III
STRESS Questionnaire(AIS)

PART- A

Thinking about your current job, please tell me how often each of the following statements describes how you feel. Please think of a scale from 1 to 5, where 1 represents “never,” 2 represents “rarely,” 3 represents “sometimes,” 4 represents “often,” and 5 represents “very often.” How often does the following describe how you feel?	
1A. I have adequate control or input over my work duties	1. Never 2. Rarely 3. Sometimes 4. Often 5. Very often
1B. Conditions at work are unpleasant or sometimes even unsafe.	1. Never 2. Rarely 3. Sometimes 4. Often 5. Very often
1C. I receive appropriate recognition or rewards for good performance.	1. Never 2. Rarely 3. Sometimes 4. Often 5. Very often
1D. I feel that my job is negatively affecting my physical or emotional well-being.	1. Never 2. Rarely 3. Sometimes 4. Often 5. Very often

	1E. I have too much work to do and/or too many unreasonable deadlines.	1. Never 2. Rarely 3. Sometimes 4. Often 5. Very often
	1F. I am able to utilize my skills and talents to the fullest extent at work.	1. Never 2. Rarely 3. Sometimes 4. Often 5. Very often
	1G. I find it difficult to express my opinions or feelings about my job conditions to my superiors	1. Never 2. Rarely 3. Sometimes 4. Often 5. Very often
	1H. I feel that job pressures interfere with my family or personal life.	1. Never 2. Rarely 3. Sometimes 4. Often 5. Very often
	PART - B	
2	In general, how satisfied do you feel at work?	1. Extremely 2. Quite a bit. 3. Somewhat. 4. A little 5. Not at all.
3	In general, how angry do you feel at work?	1. Extremely 2. Quite a bit 3. Somewhat 4. A little 5. Not at all

4	In general, how stressed do you feel at work?	1. Extremely 2. Quite a bit 3. Somewhat 4. A little 5. Not at all
5	Are you feeling more pressure at work this year than you were a year ago?	1. Yes 2. No
6	Would you say that you and your fellow workers have a more demanding workload than you had a year ago?	1. Yes 2. No
7	How concerned are you about losing your job in the next six months?	1. Very concerned 2. Somewhat concerned 3. Not very concerned 4. Not at all concerned
8	In the past year, have you witnessed or been aware of bullying, that is, physical or verbal bullying, in your workplace?	1. Yes 2. No
9	In the past year, have you been angered by a co-worker to the point where you felt like striking him or her but didn't?	1. Yes 2. No
10.	Which of the following causes the majority of stress in your life?	1. Workplace demands 2. Family or personal demands 3. Both equally 4. Neither 5. Don't feel stressed
11.	Which of the following statements best describes your workplace?	1. Positive attitudes are more likely to spread among employees.

		2. Negative attitudes are more likely to spread among employees. 3. Not sure.
12.	Thinking about management where you work, please tell me whether you strongly agree, agree, disagree or strongly disagree with the following statement: The management where I work is sufficiently sensitive to the needs, conflicts, or other problems that are stressful for employees	1. Strongly agree 2. Agree 3. Disagree 4. Strongly disagree
13	Thinking about management where you work, please tell me whether you strongly agree, agree, disagree or strongly disagree with the following statement: The management where I work is sufficiently helpful in resolving needs, conflicts, or other problems that are stressful for employees	1. Strongly agree 2. Agree 3. Disagree 4. Strongly disagree
14.	Would you want your boss's job?	1. Yes 2. No

ANNEXURE-IV
PART-A QUESTIONNAIRE

ನಿಮ್ಮ ಪ್ರಸ್ತುತ ಕೆಲಸದ ಬಗ್ಗೆ ಯೋಚಿಸುತ್ತಾ, ದಯವಿಟ್ಟು ಈ ಕೆಳಗಿನ ಪ್ರತಿಯೊಂದು ಹೇಳಿಕೆಗಳು ನಿಮಗೆ ಹೇಗೆ ಅನಿಸುತ್ತದೆ ಎಂಬುದನ್ನು ಎಷ್ಟು ಬಾರಿ ವಿವರಿಸುತ್ತವೆ ಎಂದು ನನಗೆ ತಿಳಿಸಿ. ದಯವಿಟ್ಟು 1 ರಿಂದ 5 ರವರೆಗಿನ ಒಂದು ಮಾಪಕದ ಬಗ್ಗೆ ಯೋಚಿಸಿ, ಅಲ್ಲಿ 1 ಅನ್ನು "ಎಂದಿಗೂ" ಪ್ರತಿನಿಧಿಸುತ್ತದೆ, 2 "ವಿರಳವಾಗಿ" ಪ್ರತಿನಿಧಿಸುತ್ತದೆ, 3 "ಕೆಲವೊಮ್ಮೆ" ಪ್ರತಿನಿಧಿಸುತ್ತದೆ, 4 "ಆಗಾಗ್ಗೆ" ಮತ್ತು 5 "ಆಗಾಗ್ಗೆ" ಪ್ರತಿನಿಧಿಸುತ್ತದೆ. ನೀವು ಹೇಗೆ ಭಾವಿಸುತ್ತೀರಿ ಎಂಬುದನ್ನು ಈ ಕೆಳಗಿನವುಗಳು ಎಷ್ಟು ಬಾರಿ ವಿವರಿಸುತ್ತವೆ?	
1A. ನನ್ನ ಕೆಲಸದ ಕರ್ತವ್ಯಗಳ ಮೇಲೆ ನನಗೆ ಸಾಕಷ್ಟು ನಿಯಂತ್ರಣ ಅಥವಾ ಒಳಹರಿವು ಇದೆ	1. ಎಂದಿಗೂ ಇಲ್ಲ 2. ವಿರಳವಾಗಿ 3. ಕೆಲವೊಮ್ಮೆ 4. ಆಗಾಗ್ಗೆ ಬಹಳ ಆಗಾಗ್ಗೆ
1B. ಕೆಲಸದ ಪರಿಸ್ಥಿತಿಗಳು ಅಹಿತಕರ ಅಥವಾ ಕೆಲವೊಮ್ಮೆ ಅಸುರಕ್ಷಿತವಾಗಿರುತ್ತವೆ.	1. ಎಂದಿಗೂ ಇಲ್ಲ 2. ವಿರಳವಾಗಿ 3. ಕೆಲವೊಮ್ಮೆ 4. ಆಗಾಗ್ಗೆ ಬಹಳ ಆಗಾಗ್ಗೆ
1C. ಉತ್ತಮ ಕಾರ್ಯನಿರ್ವಹಣೆಗಾಗಿ ನಾನು ಸೂಕ್ತ ಮನ್ನಣೆ ಅಥವಾ ಪ್ರತಿಫಲಗಳನ್ನು ಪಡೆಯುತ್ತೇನೆ.	1. ಎಂದಿಗೂ ಇಲ್ಲ 2. ವಿರಳವಾಗಿ 3. ಕೆಲವೊಮ್ಮೆ 4. ಆಗಾಗ್ಗೆ 1. ಬಹಳ ಆಗಾಗ್ಗೆ

1D. ನನ್ನ ಕೆಲಸವು ನನ್ನ ದೈಹಿಕ ಅಥವಾ ಭಾವನಾತ್ಮಕ ಯೋಗಕ್ಷೇಮದ ಮೇಲೆ ನಕಾರಾತ್ಮಕ ಪರಿಣಾಮ ಬೀರುತ್ತಿದೆ ಎಂದು ನಾನು ಭಾವಿಸುತ್ತೇನೆ.	1. ಎಂದಿಗೂ ಇಲ್ಲ 2. ವಿರಳವಾಗಿ 3. ಕೆಲವೊಮ್ಮೆ 4. ಆಗಾಗ್ಗೆ 5. ಬಹಳ ಆಗಾಗ್ಗೆ
1E. ನಾನು ಮಾಡಲು ತುಂಬಾ ಕೆಲಸ ಮತ್ತು / ಅಥವಾ ಅನೇಕ ಅಸಮಂಜಸ ಗಡುವುಗಳನ್ನು ಹೊಂದಿದ್ದೇನೆ.	1. ಎಂದಿಗೂ ಇಲ್ಲ 2. ವಿರಳವಾಗಿ 3. ಕೆಲವೊಮ್ಮೆ 4. ಆಗಾಗ್ಗೆ 5. ಬಹಳ ಆಗಾಗ್ಗೆ
1F. ಕೆಲಸದಲ್ಲಿ ನನ್ನ ಕೌಶಲ್ಯಗಳು ಮತ್ತು ಪ್ರತಿಭೆಗಳನ್ನು ಪೂರ್ಣ ಪ್ರಮಾಣದಲ್ಲಿ ಬಳಸಿಕೊಳ್ಳಲು ನನಗೆ ಸಾಧ್ಯವಾಗುತ್ತದೆ.	1. ಎಂದಿಗೂ ಇಲ್ಲ 2. ವಿರಳವಾಗಿ 3. ಕೆಲವೊಮ್ಮೆ 4. ಆಗಾಗ್ಗೆ 5. ಬಹಳ ಆಗಾಗ್ಗೆ
1G. ನನ್ನ ಕೆಲಸದ ಪರಿಸ್ಥಿತಿಗಳ ಬಗ್ಗೆ ನನ್ನ ಅಭಿಪ್ರಾಯಗಳನ್ನು ಅಥವಾ ಭಾವನೆಗಳನ್ನು ನನ್ನ ಮೇಲಧಿಕಾರಿಗಳಿಗೆ ವ್ಯಕ್ತಪಡಿಸಲು ನನಗೆ ಕಷ್ಟವಾಗುತ್ತದೆ	1. ಎಂದಿಗೂ ಇಲ್ಲ 2. ವಿರಳವಾಗಿ 3. ಕೆಲವೊಮ್ಮೆ 4. ಆಗಾಗ್ಗೆ 5. ಬಹಳ ಆಗಾಗ್ಗೆ

	1H. ಕೆಲಸದ ಒತ್ತಡ ಗಳು ನನ್ನ ಕುಟುಂಬ ಅಥವಾ ವೈಯಕ್ತಿಕ ಜೀವನದಲ್ಲಿ ಹಸ್ತಕ್ಷೇಪ ಮಾಡುತ್ತೇವೆ ಎಂದು ನಾನು ಭಾವಿಸುತ್ತೇವೆ.	1. ಎಂದಿಗೂ ಇಲ್ಲ 2. ವಿರಳವಾಗಿ 3. ಕೆಲವೊಮ್ಮೆ 4. ಆಗಾಗ್ಗೆ 5. ಬಹಳ ಆಗಾಗ್ಗೆ
	<u>PART - B</u>	
2.	ಸಾಮಾನ್ಯವಾಗಿ, ಕೆಲಸದಲ್ಲಿ ನೀವು ಎಷ್ಟು ತೃಪ್ತಿ ಹೊಂದಿದ್ದೀರಿ?	1. ಅತ್ಯಂತ 2. ಸಾಕಷ್ಟು ಸ್ವಲ್ಪ. 3. ಸ್ವಲ್ಪ ಮಟ್ಟಿಗೆ. 4. ಸ್ವಲ್ಪ 5. ಇಲ್ಲವೇ ಇಲ್ಲ.
3.	ಸಾಮಾನ್ಯವಾಗಿ, ಕೆಲಸದಲ್ಲಿ ನಿಮಗೆ ಎಷ್ಟು ಕೋಪ ಬರುತ್ತದೆ?	1. ಅತ್ಯಂತ 2. ಸಾಕಷ್ಟು ಸ್ವಲ್ಪ 3. ಸ್ವಲ್ಪಮಟ್ಟಿಗೆ 4. ಸ್ವಲ್ಪ 5. ಇಲ್ಲವೇ ಇಲ್ಲ
4.	ಸಾಮಾನ್ಯವಾಗಿ, ಕೆಲಸದಲ್ಲಿ ನೀವು ಎಷ್ಟು ಒತ್ತಡವನ್ನು ಅನುಭವಿಸುತ್ತೀರಿ?	1. ಅತ್ಯಂತ 2. ಸಾಕಷ್ಟು ಸ್ವಲ್ಪ 3. ಸ್ವಲ್ಪಮಟ್ಟಿಗೆ 4. ಸ್ವಲ್ಪ 5. ಇಲ್ಲವೇ ಇಲ್ಲ

5.	ನೀವು ಒಂದು ವರ್ಷದ ಹಿಂದೆ ಇದ್ದಕ್ಕಿಂತ ಈ ವರ್ಷ ಕೆಲಸದಲ್ಲಿ ಹೆಚ್ಚಿನ ಒತ್ತಡವನ್ನು ಅನುಭವಿಸುತ್ತಿದ್ದೀರಾ?	1. ಹೌದು 2. ಇಲ್ಲ
6.	ನೀವು ಮತ್ತು ನಿಮ್ಮ ಸಹ ಕೆಲಸಗಾರರು ಒಂದು ವರ್ಷದ ಹಿಂದೆ ಇದಕ್ಕಿಂತ ಹೆಚ್ಚು ಬೇಡಿಕೆಯ ಕೆಲಸದ ಹೊರೆಯನ್ನು ಹೊಂದಿದ್ದೀರಿ ಎಂದು ನೀವು ಹೇಳುತ್ತೀರಾ?	1. ಹೌದು 2. ಇಲ್ಲ
7.	ಮುಂದಿನ ಆರು ತಿಂಗಳಲ್ಲಿ ನಿಮ್ಮ ಕೆಲಸವನ್ನು ಕಳೆದುಕೊಳ್ಳುವ ಬಗ್ಗೆ ನೀವು ಎಷ್ಟು ಕಾಳಜಿ ವಹಿಸುತ್ತೀರಿ?	1. ತುಂಬಾ ಕಾಳಜಿ 2. ಸ್ವಲ್ಪ ಮಟ್ಟಿಗೆ ಕಾಳಜಿ 3. ಹೆಚ್ಚು ಕಾಳಜಿ ವಹಿಸುವುದಿಲ್ಲ 4. ಈ ಬಗ್ಗೆ ಯಾವುದೇ ಕಾಳಜಿ ಇಲ್ಲ
8.	ಕಳೆದ ವರ್ಷದಲ್ಲಿ, ನಿಮ್ಮ ಕೆಲಸದ ಸ್ಥಳದಲ್ಲಿ ಬೆದರಿಸುವಿಕೆ, ಅಂದರೆ ದೈಹಿಕ ಅಥವಾ ಮೌಖಿಕ ಬೆದರಿಸುವಿಕೆಯನ್ನು ನೀವು ನೋಡಿದ್ದೀರಾ ಅಥವಾ ತಿಳಿದಿದ್ದೀರಾ?	1. ಹೌದು 2. ಇಲ್ಲ
9.	ಕಳೆದ ಒಂದು ವರ್ಷದಲ್ಲಿ, ಒಬ್ಬ ಸಹೋದ್ಯೋಗಿಯಿಂದ ನೀವು ಕೋಪಗೊಂಡಿದ್ದೀರಾ, ಅಲ್ಲಿ ನೀವು ಅವನನ್ನು ಅಥವಾ ಅವಳನ್ನು ಹೊಡೆಯಬೇಕೆಂದು ನಿಮಗೆ ಅನಿಸಿತು ಆದರೆ ಅದನ್ನು ಮಾಡಲಿಲ್ಲ?	1. ಹೌದು 2. ಇಲ್ಲ
10.	ಈ ಕೆಳಗಿನವುಗಳಲ್ಲಿ ಯಾವುದು ನಿಮ್ಮ ಜೀವನದಲ್ಲಿ ಹೆಚ್ಚಿನ ಒತ್ತಡವನ್ನು ಉಂಟುಮಾಡುತ್ತದೆ?	1. ಕಾರ್ಯಸ್ಥಳದ ಬೇಡಿಕೆಗಳು 2. ಕುಟುಂಬ ಅಥವಾ ವೈಯಕ್ತಿಕ ಬೇಡಿಕೆಗಳು 3. ಎರಡೂ ಸಮಾನವಾಗಿ 4. ಎರಡೂ ಇಲ್ಲ 5. ಒತ್ತಡಕ್ಕೆ ಒಳಗಾಗಬೇಡಿ

11.	ಈ ಕೆಳಗಿನವುಗಳಲ್ಲಿ ಯಾವ ಹೇಳಿಕೆಯು ನಿಮ್ಮ ಕೆಲಸದ ಸ್ಥಳವನ್ನು ಅತ್ಯುತ್ತಮವಾಗಿ ವಿವರಿಸುತ್ತದೆ?	1. ಸಕಾರಾತ್ಮಕ ಮನೋಭಾವಗಳು ಉದ್ಯೋಗಿಗಳಲ್ಲಿ ಹರಡುವ ಸಾಧ್ಯತೆ ಹೆಚ್ಚು. 2. ನಕಾರಾತ್ಮಕ ಮನೋಭಾವಗಳು ಉದ್ಯೋಗಿಗಳಲ್ಲಿ ಹರಡುವ ಸಾಧ್ಯತೆ ಹೆಚ್ಚು. 3. ಖಚಿತವಾಗಿಲ್ಲ.
12.	ನೀವು ಕೆಲಸ ಮಾಡುವ ನಿರ್ವಹಣೆಯ ಬಗ್ಗೆ ಯೋಚಿಸುತ್ತಾ, ದಯವಿಟ್ಟು ಈ ಕೆಳಗಿನ ಹೇಳಿಕೆಯನ್ನು ನೀವು ಬಲವಾಗಿ ಒಪ್ಪುತ್ತೀರೋ, ಒಪ್ಪುತ್ತೀರೋ, ಒಪ್ಪುವುದಿಲ್ಲವೋ ಅಥವಾ ಬಲವಾಗಿ ಒಪ್ಪುವುದಿಲ್ಲವೋ ಎಂದು ದಯವಿಟ್ಟು ನನಗೆ ತಿಳಿಸಿ: ನಾನು ಕೆಲಸ ಮಾಡುವ ಮ್ಯಾನೇಜ್ ಮೆಂಟ್ ಉದ್ಯೋಗಿಗಳಿಗೆ ಒತ್ತಡವನ್ನುಂಟುಮಾಡುವ ಅಗತ್ಯಗಳು, ಸಂಘರ್ಷಗಳು ಅಥವಾ ಇತರ ಸಮಸ್ಯೆಗಳ ಬಗ್ಗೆ ಸಾಕಷ್ಟು ಸಂವೇದನಾಶೀಲವಾಗಿದೆ.	1. ಬಲವಾಗಿ ಒಪ್ಪಿ 2. ಒಪ್ಪಿ 3. ಒಪ್ಪುವುದಿಲ್ಲ 4. ಬಲವಾಗಿ ಒಪ್ಪುವುದಿಲ್ಲ
13.	ನೀವು ಕೆಲಸ ಮಾಡುವ ನಿರ್ವಹಣೆಯ ಬಗ್ಗೆ ಯೋಚಿಸುತ್ತಾ, ದಯವಿಟ್ಟು ಈ ಕೆಳಗಿನ ಹೇಳಿಕೆಯನ್ನು ನೀವು ಬಲವಾಗಿ ಒಪ್ಪುತ್ತೀರೋ, ಒಪ್ಪುತ್ತೀರೋ, ಒಪ್ಪುವುದಿಲ್ಲವೋ ಅಥವಾ ಬಲವಾಗಿ ಒಪ್ಪುವುದಿಲ್ಲವೋ ಎಂದು ನನಗೆ ತಿಳಿಸಿ: ನಾನು ಕೆಲಸ ಮಾಡುವ ಮ್ಯಾನೇಜ್ ಮೆಂಟ್ ಉದ್ಯೋಗಿಗಳಿಗೆ ಒತ್ತಡವನ್ನುಂಟುಮಾಡುವ ಅಗತ್ಯಗಳು, ಸಂಘರ್ಷಗಳು ಅಥವಾ ಇತರ ಸಮಸ್ಯೆಗಳನ್ನು ಪರಿಹರಿಸುವಲ್ಲಿ ಸಾಕಷ್ಟು ಸಹಾಯಕವಾಗಿದೆ.	1. ಬಲವಾಗಿ ಒಪ್ಪಿ 2. ಒಪ್ಪಿ 3. ಒಪ್ಪುವುದಿಲ್ಲ 4. ಬಲವಾಗಿ ಒಪ್ಪುವುದಿಲ್ಲ
14.	ನಿಮ್ಮ ಬಾಸ್ ನ ಕೆಲಸವನ್ನು ನೀವು ಬಯಸುವಿರಾ?	1. ಹೌದು 2. ಇಲ್ಲ

ANNEXURE V

Information Sheet:

Title-Occupational stress and its effect on health status among KSRTC bus drivers of Kolar-A cross sectional study.

My name is Dr. Varun R, Postgraduate in the department of Community Medicine, Sri Devaraj Urs Medical College, Kolar. I am carrying out a study on Occupational stress and its effect on health status among KSRTC bus drivers of Kolar, Karnataka. The study will review by the local ethical review board and has been started only after their formal approval.

Bus driving is considered one of the most stressful occupations. Occupational risk factors to which professional drivers are exposed may be shift work, long working hours, loud noise, carbon monoxide and chemical materials that may lead to cardiovascular disease. There is paucity of data on stress factors and other morbidities among Karnataka State Road Transport Corporation (KSRTC). In this regard I will help you to find out problems facing due to stress by giving a simple questionnaire, you need not have to answer any questions that you do not want to answer. However, your honest answer to these questions will help us to understand the occupational stress among the bus drivers. We would greatly appreciate your help in responding to the questionnaire.

Participation in this study doesn't involve any cost for you. This study is not only beneficial to you but also to the community at large. The results gathered from this study will be beneficial in estimating the prevalence.

All the information collected from you will be strictly confidential and will not be disclosed to any outsider unless compelled by law. This information collected will be used only for research.

There is no compulsion to participate in this study. You will be no way affected if you don't wish to participate in this study. You are required to sign only if you voluntarily agree to participate in this study. Further, you are at a liberty to withdraw from the study at any time, if you wish to do so. It is up to you to decide whether to participate. This document will be stored in the safe locker in the department of Community Medicine in the college and a copy is given to you for information.

For any further clarification you are free to contact the principal investigator,

Dr. Varun R

Mob No: 8289922869

ಅನುಬಂಧ -VI

ಮಾಹಿತಿ ಪತ್ರ:

ಶೀರ್ಷಿಕೆ-ಕೋಲಾರದ ಕೆಎಸ್‌ಆರ್‌ಟಿಸಿ ಬಸ್ ಚಾಲಕರಲ್ಲಿ ಔದ್ಯೋಗಿಕ ಒತ್ತಡ ಮತ್ತು ಆರೋಗ್ಯ ಸ್ಥಿತಿಯ ಮೇಲೆ ಅದರ

ಪರಿಣಾಮ-ಎ ಅಡ್ಡ-ವಿಭಾಗ ಅಧ್ಯಯನ.

ನನ್ನ ಹೆಸರು ಡಾ.ವರುಣ್ ಆರ್, ಕೋಲಾರದ ಶ್ರೀ ದೇವರಾಜ ಅರಸು ವೈದ್ಯಕೀಯ ಕಾಲೇಜಿನ ಸಮುದಾಯ ಔಷಧ ವಿಭಾಗದಲ್ಲಿ ಸ್ನಾತಕೋತ್ತರ ಪದವಿ. ಕರ್ನಾಟಕದ ಕೋಲಾರದ ಕೆಎಸ್‌ಆರ್‌ಟಿಸಿ ಬಸ್ ಚಾಲಕರಲ್ಲಿ ಔದ್ಯೋಗಿಕ ಒತ್ತಡ ಮತ್ತು ಆರೋಗ್ಯ ಸ್ಥಿತಿಯ ಮೇಲೆ ಅದರ ಪರಿಣಾಮದ ಬಗ್ಗೆ ನಾನು ಅಧ್ಯಯನ ನಡೆಸುತ್ತಿದ್ದೇನೆ. ಅಧ್ಯಯನವನ್ನು ಸ್ಥಳೀಯ ನೈತಿಕ ಪರಿಶೀಲನಾ ಮಂಡಳಿಯು ಪರಿಶೀಲಿಸುತ್ತದೆ ಮತ್ತು ಅವರ ಔಪಚಾರಿಕ ಅನುಮೋದನೆಯ ನಂತರವೇ ಪ್ರಾರಂಭಿಸಲಾಗಿದೆ.

ಬಸ್ ಚಾಲನೆಯನ್ನು ಅತ್ಯಂತ ಒತ್ತಡದ ಉದ್ಯೋಗಗಳಲ್ಲಿ ಒಂದೆಂದು ಪರಿಗಣಿಸಲಾಗಿದೆ. ವೃತ್ತಿಪರ ಚಾಲಕರು ಒಡ್ಡಿಕೊಳ್ಳುವ ಔದ್ಯೋಗಿಕ ಅಪಾಯದ ಅಂಶಗಳು ಶಿಫ್ಟ್ ಕೆಲಸ, ದೀರ್ಘ ಕೆಲಸದ ಸಮಯ, ದೊಡ್ಡ ಶಬ್ದ, ಇಂಗಾಲದ ಮಾನಾಕ್ಸೈಡ್ ಮತ್ತು ರಾಸಾಯನಿಕ ವಸ್ತುಗಳು ಹೃದಯರಕ್ತನಾಳದ ಕಾಯಿಲೆಗೆ ಕಾರಣವಾಗಬಹುದು. ಕರ್ನಾಟಕ ರಾಜ್ಯ ರಸ್ತೆ ಸಾರಿಗೆ ನಿಗಮದಲ್ಲಿ (ಕೆಎಸ್‌ಆರ್‌ಟಿಸಿ) ಒತ್ತಡದ ಅಂಶಗಳು ಮತ್ತು ಇತರ ಕಾಯಿಲೆಗಳ ಬಗ್ಗೆ ಮಾಹಿತಿಯ ಕೊರತೆಯಿದೆ. ಈ ನಿಟ್ಟಿನಲ್ಲಿ ಸರಳ ಪ್ರಶ್ನಾವಳಿಯನ್ನು ನೀಡುವ ಮೂಲಕ ಒತ್ತಡದಿಂದಾಗಿ ಎದುರಿಸುತ್ತಿರುವ ಸಮಸ್ಯೆಗಳನ್ನು ಕಂಡುಹಿಡಿಯಲು ನಾನು ನಿಮಗೆ ಸಹಾಯ ಮಾಡುತ್ತೇನೆ, ನೀವು ಉತ್ತರಿಸಲು ಬಯಸದ ಯಾವುದೇ ಪ್ರಶ್ನೆಗಳಿಗೆ ನೀವು ಉತ್ತರಿಸಬೇಕಾಗಿಲ್ಲ. ಆದಾಗ್ಯೂ, ಈ ಪ್ರಶ್ನೆಗಳಿಗೆ ನಿಮ್ಮ ಪ್ರಾಮಾಣಿಕ ಉತ್ತರವು ಬಸ್ ಚಾಲಕರಲ್ಲಿನ ಔದ್ಯೋಗಿಕ ಒತ್ತಡವನ್ನು ಅರ್ಥಮಾಡಿಕೊಳ್ಳಲು ನಮಗೆ ಸಹಾಯ ಮಾಡುತ್ತದೆ. ಪ್ರಶ್ನಾವಳಿಗೆ ಪ್ರತಿಕ್ರಿಯಿಸುವಲ್ಲಿ ನಿಮ್ಮ ಸಹಾಯವನ್ನು ನಾವು ಬಹಳವಾಗಿ ಪ್ರಶಂಸಿಸುತ್ತೇವೆ.

ಈ ಅಧ್ಯಯನದಲ್ಲಿ ಭಾಗವಹಿಸುವುದರಿಂದ ನಿಮಗೆ ಯಾವುದೇ ವೆಚ್ಚವಾಗುವುದಿಲ್ಲ. ಈ ಅಧ್ಯಯನವು ನಿಮಗೆ ಮಾತ್ರವಲ್ಲ, ಸಮುದಾಯಕ್ಕೂ ಪ್ರಯೋಜನಕಾರಿಯಾಗಿದೆ. ಈ ಅಧ್ಯಯನದಿಂದ ಸಂಗ್ರಹಿಸಿದ ಫಲಿತಾಂಶಗಳು ಹರಡುವಿಕೆಯನ್ನು ಅಂದಾಜು ಮಾಡುವಲ್ಲಿ ಪ್ರಯೋಜನಕಾರಿಯಾಗಿದೆ.

ನಿಮ್ಮಿಂದ ಸಂಗ್ರಹಿಸಿದ ಎಲ್ಲಾ ಮಾಹಿತಿಯನ್ನು ಕಟ್ಟುನಿಟ್ಟಾಗಿ ಗೌಪ್ಯವಾಗಿಡಲಾಗುತ್ತದೆ ಮತ್ತು ಕಾನೂನಿನಿಂದ ಒತ್ತಾಯಿಸದ ಹೊರತು ಯಾವುದೇ ಹೊರಗಿನವರಿಗೆ ಬಹಿರಂಗಪಡಿಸಲಾಗುವುದಿಲ್ಲ. ಸಂಗ್ರಹಿಸಿದ ಈ ಮಾಹಿತಿಯನ್ನು ಸಂಶೋಧನೆಗಾಗಿ ಮಾತ್ರ ಬಳಸಲಾಗುತ್ತದೆ.

ಈ ಅಧ್ಯಯನದಲ್ಲಿ ಭಾಗವಹಿಸಲು ಯಾವುದೇ ಒತ್ತಾಯವಿಲ್ಲ. ನೀವು ಈ ಅಧ್ಯಯನದಲ್ಲಿ ಭಾಗವಹಿಸಲು ಬಯಸದಿದ್ದರೆ ನಿಮ್ಮ ಮೇಲೆ ಯಾವುದೇ ರೀತಿಯಲ್ಲಿ ಪರಿಣಾಮ ಬೀರುವುದಿಲ್ಲ. ಈ ಅಧ್ಯಯನದಲ್ಲಿ ಪಾಲ್ಗೊಳ್ಳಲು ನೀವು ಸ್ವಯಂಪ್ರೇರಿತವಾಗಿ ಒಪ್ಪಿದರೆ ಮಾತ್ರ ನೀವು ಸಹಿ ಮಾಡಬೇಕಾಗುತ್ತದೆ. ಇದಲ್ಲದೆ, ನೀವು ಹಾಗೆ ಮಾಡಲು ಬಯಸಿದರೆ, ಯಾವುದೇ ಸಮಯದಲ್ಲಿ ಅಧ್ಯಯನದಿಂದ ಹಿಂದೆ ಸರಿಯಲು ನಿಮಗೆ ಸ್ವಾತಂತ್ರ್ಯವಿದೆ. ಭಾಗವಹಿಸಬೇಕೆ ಅಥವಾ ಬೇಡವೇ ಎಂದು ನಿರ್ಧರಿಸುವುದು ನಿಮಗೆ

ಬಿಟ್ಟದ್ದು. ಈ ಡಾಕ್ಯುಮೆಂಟ್ ಅನ್ನು ಕಾಲೇಜಿನ ಸಮುದಾಯ ಔಷಧ ವಿಭಾಗದ ಸೇಫ್ ಲಾಕರ್ ನಲ್ಲಿ ಸಂಗ್ರಹಿಸಲಾಗುತ್ತದೆ ಮತ್ತು ಮಾಹಿತಿಗಾಗಿ ಒಂದು ಪ್ರತಿಯನ್ನು ನಿಮಗೆ ನೀಡಲಾಗುತ್ತದೆ.

ಯಾವುದೇ ಹೆಚ್ಚಿನ ಸ್ಪಷ್ಟೀಕರಣಕ್ಕಾಗಿ ನೀವು ಪ್ರಧಾನ ಪರಿಶೋಧಕರನ್ನು ಸಂಪರ್ಕಿಸಲು ಮುಕ್ತರಾಗಿದ್ದೀರಿ,

ಡಾ.ವರುಣ್ ಆರ್.

ಜನಸಮೂಹ ಸಂಖ್ಯೆ: 8289922869

ANNEXURE-VII

INFORMED CONSENT-EMPLOYEE OF KSRTC

SL No:

**TITLE: OCCUPATIONAL STRESS AND ITS EFFECT ON HEALTH STATUS AMONG
KSRTC BUS DRIVERS OF KOLAR, A CROSS SECTIONAL STUDY**

I, the undersigned, agree to participate in this study and to undergo counselling and disclosure of my personal information and as outlined in this consent form.

I have been read out/ explained in my local language i.e. in Kannada and understand the purpose of this study and the confidential nature of the information that will be collected and disclosed during the study.

I have had the opportunity to ask questions regarding the various aspects of this study and my questions have been answered to my full satisfaction. The information collected will be used only for research.

I understand that I remain free to withdraw from this study at any time. Participation in this study is under my sole discretion and does not involve any cost to me.

Subject's name and signature /thumb impression

Name and signature of witness

1.

Date:

2.

Name and signature of interviewer:

Name and signature of Principal Investigator: Dr.Varun R

ANNEXURE-VIII

ಕೆಎಸ್‌ಆರ್‌ಟಿಸಿ ಮಾಹಿತಿಯುತ ಸಮ್ಮತಿ-ಉದ್ದೇಗಿ

SL ಸಂಖ್ಯೆ:

ಶೀರ್ಷಿಕೆ: ಕೆಎಸ್‌ಆರ್‌ಟಿಸಿ ಬಸ್ಸಲಲ್ಲಿ ಔದ್ದೇಗಿಕ ಒತ್ತಡ ಮತ್ತು ಆರೋಗ್ಯ ಸ್ಥಿತಿಯ ಮೇಲೆ ಅದರ ಪರಿಣಾಮ ಕೋಲಾರದ ಚಾಲಕರು, ಒಂದು ಅಡ್ಡ ವಿಭಾಗ ಅಧ್ಯಯನ

ಕೆಲಗೆ ಸಹಿ ಮಾಡಿದ ನಾನು, ಀ ಅಧ್ಯಯನದಲ್ಲಿ ಭಾಗವಹಿಸಲು ಮತ್ತು ಀ ಸಮ್ಮತಿ ನಮೂನೆಯಲ್ಲಿ ವಿವರಿಸಿದಂತೆ ನನ್ನ ವೈಯಕ್ತಿಕ ಮಾಹಿತಿಯ ಸಮಾಲೋಚನೆ ಮತ್ತು ಬಹಿರಂಗಪಡಿಸುವಿಕೆಗೆ ಒಳಗಾಗಲು ಒಪ್ಪುತ್ತೇನೆ.

ನನ್ನ ಸ್ಥಳೀಯ ಭಾಷೆಯಲ್ಲಿ ಅಂದರೆ ಕನ್ನಡದಲ್ಲಿ ನನ್ನನ್ನು ಓದಲಾಗಿದೆ/ವಿವರಿಸಲಾಗಿದೆ ಮತ್ತು ಀ ಅಧ್ಯಯನದ ಉದ್ದೇಶ ಮತ್ತು ಅಧ್ಯಯನದ ಸಮಯದಲ್ಲಿ ಸಂಗ್ರಹಿಸಲಾಗುವ ಮತ್ತು ಬಹಿರಂಗಪಡಿಸಲಾಗುವ ಮಾಹಿತಿಯ ಗೌಪ್ಯ ಸ್ವರೂಪವನ್ನು ಅರ್ಥಮಾಡಿಕೊಂಡಿದ್ದೇನೆ. ಀ ಅಧ್ಯಯನದ ವಿವಿಧ ಅಂಶಗಳ ಬಗ್ಗೆ ಪ್ರಶ್ನೆಗಳನ್ನು ಕೆಲಳಲು ನನಗೆ ಅವಕಾಶವಿತ್ತು ಮತ್ತು ನನ್ನ ಪ್ರಶ್ನೆಗಳಿಗೆ ನನ್ನ ಸಂಪೂರ್ಣ ತೃಪ್ತಿಯ ರೀತಿಯಲ್ಲಿ ಉತ್ತರಿಸಲಾಗಿದೆ. ಸಂಗ್ರಹಿಸಿದ ಮಾಹಿತಿಯನ್ನು ಸಂಶೋಧನೆಗೆ ಮಾತ್ರ ಬಳಸಲಾಗುತ್ತದೆ.

ಯಾವುದೇ ಸಮಯದಲ್ಲಿ ಀ ಅಧ್ಯಯನದಿಂದ ಹಿಂದೆ ಸರಿಯಲು ನಾನು ಸ್ವತಂತ್ರನಾಗಿದ್ದೇನೆ ಎಂದು ನಾನು ಅರ್ಥಮಾಡಿಕೊಂಡಿದ್ದೇನೆ. ಀ ಅಧ್ಯಯನದಲ್ಲಿ ಭಾಗವಹಿಸುವುದು ನನ್ನ ಸ್ವಂತ ವಿವೇಚನೆಗೆ ಒಳಪಟ್ಟಿದೆ ಮತ್ತು ನನಗೆ ಯಾವುದೇ ವೆಚ್ಚವನ್ನು ಒಳಗೊಂಡಿರುವುದಿಲ್ಲ.

ಪ್ರಯೋಗಾಧೀಯ ಹೆಸರು ಮತ್ತು ಸಹಿ/ಹೆಬ್ಬರಳಿನ ಗುರುತು

ಸಾಕ್ಷಿದಾರನ ಹೆಸರು ಮತ್ತು ಸಹಿ

1. ದಿನಾಂಕ:

2. ಸಂದರ್ಶಕರ

ಸಹಿ:

ಹೆಸರು ಮತ್ತು

ಪ್ರಧಾನ ತನಿಖಾಧಿಕಾರಿಯ ಹೆಸರು ಮತ್ತು ಸಹಿ: ಡಾ.ವರುಣ್ ಆರ್

ANNEXURE-IX

INFORMED CONSENT-DEPOT MANAGER OF KSRTC

SL No:

**TITLE: OCCUPATIONAL STRESS AND ITS EFFECT ON HEALTH STATUS
AMONG KSRTC BUSDRIVERS OF KOLAR, A CROSS-SECTIONAL STUDY**

I, the undersigned, agree to participate my employees in this study and to undergo counselling and disclosure of their personal information and as outlined in this consent form.

I have been read out/ explained in my local language i.e. in kannada and understand the purpose of this study and the confidential nature of the information that will be collected and disclosed during the study.

I have had the opportunity to ask questions regarding the various aspects of this study and my questions have been answered to my full satisfaction. The information collected will be used only for research.

It is informed that my employees understand that they remain free to withdraw from this study at any time. Participation in this study is under my sole discretion and does not involve any cost to me.

KSRTC Kolar depot manager name and signature /thumb impression

Name and signature of witness

Date:

1.

2.

Name and signature of interviewer:

Name and signature of Principal Investigator: Dr. Varun

ಅನುಬಂಧ-IX

ಕೆ.ಎಸ್.ಆರ್.ಟಿ.ಸಿ.ಯ ಮಾಹಿತಿಯುತ ಸಮ್ಮತಿ-ಡಿಪೋ ವ್ಯವಸ್ಥಾಪಕರು

SL ಸಂಖ್ಯೆ:

ಶೀರ್ಷಿಕೆ: ಕೋಲಾರದ ಕೆಎಸ್‌ಆರ್‌ಟಿ‌ಸಿ ಬಸ್ ಚಾಲಕರಲ್ಲಿ ಔದ್ಯೋಗಿಕ ಒತ್ತಡ ಮತ್ತು ಆರೋಗ್ಯ ಸ್ಥಿತಿಯ ಮೇಲೆ ಅದರ ಪರಿಣಾಮ,
ಅಡ್ಡ-ವಿಭಾಗ ಅಧ್ಯಯನ

ಕೆಳಗೆ ಸಹಿ ಮಾಡಿದ ನಾನು, ಈ ಅಧ್ಯಯನದಲ್ಲಿ ನನ್ನ ಉದ್ಯೋಗಿಗಳನ್ನು ಭಾಗವಹಿಸಲು ಮತ್ತು ಅವರ ವೈಯಕ್ತಿಕ ಮಾಹಿತಿಯ ಸಮಾಲೋಚನೆ ಮತ್ತು ಬಹಿರಂಗಪಡಿಸುವಿಕೆಗೆ ಒಳಗಾಗಲು ಮತ್ತು ಈ ಸಮ್ಮತಿ ನಮೂನೆಯಲ್ಲಿ ವಿವರಿಸಿದಂತೆ ಒಪ್ಪುತ್ತೇನೆ.

ನನ್ನ ಸ್ಥಳೀಯ ಭಾಷೆಯಲ್ಲಿ ಅಂದರೆ ಕನ್ನಡದಲ್ಲಿ ನನ್ನನ್ನು ಓದಲಾಗಿದೆ/ವಿವರಿಸಲಾಗಿದೆ ಮತ್ತು ಈ ಅಧ್ಯಯನದ ಉದ್ದೇಶ ಮತ್ತು ಅಧ್ಯಯನದ ಸಮಯದಲ್ಲಿ ಸಂಗ್ರಹಿಸಲಾಗುವ ಮತ್ತು ಬಹಿರಂಗಪಡಿಸಲಾಗುವ ಮಾಹಿತಿಯ ಗೌಪ್ಯ ಸ್ವರೂಪವನ್ನು ಅರ್ಥಮಾಡಿಕೊಂಡಿದ್ದೇನೆ

ಈ ಅಧ್ಯಯನದ ವಿವಿಧ ಅಂಶಗಳ ಬಗ್ಗೆ ಪ್ರಶ್ನೆಗಳನ್ನು ಕೇಳಲು ನನಗೆ ಅವಕಾಶವಿತ್ತು ಮತ್ತು ನನ್ನ ಪ್ರಶ್ನೆಗಳಿಗೆ ನನ್ನ ಸಂಪೂರ್ಣ ತೃಪ್ತಿಯ ರೀತಿಯಲ್ಲಿ ಉತ್ತರಿಸಲಾಗಿದೆ. ಸಂಗ್ರಹಿಸಿದ ಮಾಹಿತಿಯನ್ನು ಸಂಶೋಧನೆಗೆ ಮಾತ್ರ ಬಳಸಲಾಗುತ್ತದೆ.

ಯಾವುದೇ ಸಮಯದಲ್ಲಿ ಈ ಅಧ್ಯಯನದಿಂದ ಹಿಂದೆ ಸರಿಯಲು ಅವರು ಸ್ವತಂತ್ರರಾಗಿದ್ದಾರೆ ಎಂದು ನನ್ನ ಉದ್ಯೋಗಿಗಳು ಅರ್ಥಮಾಡಿಕೊಂಡಿದ್ದಾರೆ ಎಂದು ತಿಳಿಸಲಾಗಿದೆ. ಈ ಅಧ್ಯಯನದಲ್ಲಿ ಭಾಗವಹಿಸುವುದು ನನ್ನ ಸ್ವಂತ ವಿವೇಚನೆಗೆ ಒಳಪಟ್ಟಿದೆ ಮತ್ತು ನನಗೆ ಯಾವುದೇ ವೆಚ್ಚವನ್ನು ಒಳಗೊಂಡಿರುವುದಿಲ್ಲ.

ಯಾವುದೇ ಸಮಯದಲ್ಲಿ ಈ ಅಧ್ಯಯನದಿಂದ ಹಿಂದೆ ಸರಿಯಲು ನಾನು ಸ್ವತಂತ್ರನಾಗಿದ್ದೇನೆ ಎಂದು ನಾನು ಅರ್ಥಮಾಡಿಕೊಂಡಿದ್ದೇನೆ. ಈ ಅಧ್ಯಯನದಲ್ಲಿ ಭಾಗವಹಿಸುವುದು ನನ್ನ ಸ್ವಂತ ವಿವೇಚನೆಗೆ ಒಳಪಟ್ಟಿದೆ ಮತ್ತು ನನಗೆ ಯಾವುದೇ ವೆಚ್ಚವನ್ನು ಒಳಗೊಂಡಿರುವುದಿಲ್ಲ.

ಕೆಎಸ್‌ಆರ್‌ಟಿ‌ಸಿ ಕೋಲಾರ ಡಿಪೋ ಮ್ಯಾನೇಜರ್ ಹೆಸರು ಮತ್ತು ಸಹಿ / ಹೆಚ್ಚರಳಿನ ಗುರುತು

ಸಾಕ್ಷಿದಾರನ ಹೆಸರು ಮತ್ತು ಸಹಿ

1. ದಿನಾಂಕ:

2. ಸಂದರ್ಶಕರ

ಸಹಿ:

ಹೆಸರು ಮತ್ತು

ಪ್ರಧಾನ ತನಿಖಾಧಿಕಾರಿಯ ಹೆಸರು ಮತ್ತು ಸಹಿ: ಡಾ.ವರುಣ್ ಆರ್

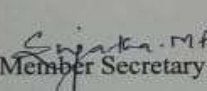
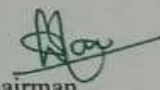
ANNEXURE -X

GANTT CHART

STEP	ACTIVITY	TIME PERIOD											
		2022			2023				2024				
		MAY-JUNE	JUNE	JULY	March	APRIL –MAY	JULY-SEP	OCT-DEC	JAN-FEB	FEB –MARCH	MARCH - APRIL	MAY –JUNE	JUNE – JULY
1	Topic search, selection & synopsis writing												
2	Synopsis submission												
3	Approval by IEC*												
4	Proforma Preparation and validation												
5	Pilot project												
6	Review of literature												
7	Data collection												
8	Data analysis												
9	Dissertation writing												
10	Submission of dissertation												

1

ANNEXURE -XI

 SRI DEVARAJ URS ACADEMY OF HIGHER EDUCATION & RESEARCH SRI DEVARAJ URS MEDICAL COLLEGE Tamaka, Kolar INSTITUTIONAL ETHICS COMMITTEE 	
Members 1. Dr. D.E.Gangadhar Rao, (Chairman) Prof. & HOD of Zoology, Govt. Women's College, Kolar 2. Dr. Sujatha.M.P, (Member Secretary), Prof. Dept. of Anesthesia, SDUMC 3. Mr. Gopinath Paper Reporter, Samyukth Karnataka 4. Mr. G. K. Varada Reddy Advocate, Kolar 5. Dr. Hariprasad S, Assoc. Prof Dept. of Orthopedics, SDUMC 6. Dr. Abhinandana R Asst. Prof. Dept. of Forensic Medicine, SDUMC 7. Dr. Ruth Sneha Chandrakumar Asst. Prof. Dept. of Psychiatry, SDUMC 8. Dr. Usha G Shenoy Asst. Prof., Dept. of Allied Health & Basic Sciences SDUAHER 9. Dr. Munilakshmi U Asst. Prof. Dept. of Biochemistry, SDUMC 10. Dr. D. Srinivasan, Assoc. Prof. Dept. of Surgery, SDUMC 11. Dr. Waseem Anjum, Asst. Prof. Dept. of Community Medicine, SDUMC 12. Dr. Shilpa M D Asst. Prof. Dept. of Pathology, SDUMC	No. SDUMC/KLR/IEC/242/2022-23 Date: 20-07-2022 PRIOR PERMISSION TO START OF STUDY The Institutional Ethics Committee of Sri Devaraj Urs Medical College, Tamaka, Kolar has examined and unanimously approved the synopsis entitled “Occupational stress and its effect on health status among KSTRC bus drivers - A Cross sectional study” being investigated by Dr. Varun R & Dr. Muninarayana C in the Department of Community Medicine at Sri Devaraj Urs Medical College, Tamaka, Kolar. Permission is granted by the Ethics Committee to start the study.  Member Secretary Institutional Ethics Committee Sri Devaraj Urs Medical College Tamaka, Kolar.  Chairman CHAIRMAN Institutional Ethics Committee Sri Devaraj Urs Medical College Tamaka, Kolar

ANNEXURE -XII



Conducting Interviews with KSRTC Bus Drivers to Assess Occupational Stress and Health Effects in Kolar, Karnataka

ANNEXURE -XIII
DEFINITION OF VARIABLES

Operational definitions

- a). Age:** The age was recorded as stated by the subject and also from the bus depot register.
- b). Urban:** Areas characterized by higher population density and vast human features in comparison to areas surrounding it. For the purpose of this study, an urban area is defined as any town or city with a population of 10,000 or more people. Participants residing in municipal corporations, municipalities as per government records.¹⁴⁸
- c). Rural-**Areas characterized by lower population density and small settlements with a significant proportion of the population engaged in agriculture or other primary sector activities. For the purpose of this study, a rural area is defined as any village or town with a population of less than 10,000 people. Participants residing in gram panchayats, villages, or other rural areas as per government records.¹⁴⁹
- d). Smoking of Cigarette/Beedi Smoking and Chewable Tobacco:**

Definition: The act of inhaling and exhaling the smoke of burning tobacco encased in cigarettes, beedis, or using chewable forms of tobacco.

1.Cigarette/Beedi Smoking:

- **Never smoked:** Participants who have never smoked cigarettes or beedis.
- **Current smoker:**
 - **No. of cigarettes/beedis per day:** Number of cigarettes/beedis smoked per day.
 - **Duration of smoking in years:** Total number of years the participant has been smoking.
- **Ex-smoker:** Participants who previously smoked but have quit. Duration of smoking in years is recorded.

2. Chewable Tobacco:

- **Never chewed:** Participants who have never used chewable tobacco.
- **Current chewer:**
 - **No. of times per day:** Number of times chewable tobacco is used per day.
 - **Duration of chewing in years:** Total number of years the participant has been chewing tobacco.
- **Ex-chewer:** Participants who previously chewed tobacco but have quit. Duration of chewing in years is recorded.

e). Alcohol Drinking:

Never: Participants who have never consumed alcohol.

Alcohol Drinker:

- **No. of years of consumption of alcohol:** Total number of years the participant has been drinking alcohol.
- **No. of times alcohol is consumed per week:** Frequency of alcohol consumption per week.
- **Average No. of pegs (30 ml) consumed per week:** Average number of standard drinks (30 ml) consumed per week.¹⁴⁷

Chronic Alcoholic: Participants who consume alcohol daily and in the morning.

f). Hypertension: A medical condition where the blood pressure in the arteries is persistently elevated. According to the American Heart Association, hypertension is defined as having a systolic blood pressure (SBP) of 130 mm Hg or higher or a diastolic blood pressure (DBP) of 80 mm Hg or higher. Participants with a documented diagnosis of hypertension or having blood pressure measurements meeting the above criteria during the study period.¹⁵⁰

g). Hypertension Medication Taking Participants: Participants who self-report taking

antihypertensive medication or have medical records indicating current prescription and consumption of such medication.

h). Diabetes: A chronic medical condition where the body is unable to properly process blood glucose, leading to high levels of blood sugar. For the purpose of this study, diabetes is defined as having a fasting blood glucose level of 126 mg/dL or higher, a 2-hour postprandial blood glucose level of 200 mg/dL or higher, or an HbA1c level of 6.5% or higher. Participants with a documented diagnosis of diabetes or meeting the above laboratory criteria during the study period.¹⁵⁰

i). Diabetes Medication Taking Participants- Participants who self-report taking antidiabetic medication or have medical records indicating current prescription and consumption of such medication.

j). Work Shift:

The specific schedule or time period during which a bus driver is assigned to work. Shifts can be categorized based on time of day and duration.

Criteria: Participants' work schedules categorized as:

- **Day Shift:** Shifts starting between 6:00 AM and 6:00 PM.
- **Night Shift:** Shifts starting between 6:00 PM and 6:00 AM.
- **Rotating Shift:** Alternating between day and night shifts within a specific period.¹⁵¹

k). Work Experience:

The total number of years a participant has been employed as a bus driver. The duration in years from the time the participant started working as a bus driver to the date of data collection. This will be self-reported by participants and verified with employment records where available.

l). Marital Status: The legally recognized state of being in a domestic relationship.

Categories:

- **Unmarried:** Participants who have never been married.
- **Married:** Participants who are currently legally married.
- **Widow:** Participants whose spouse has passed away and have not remarried.
- **Divorced:** Participants who have legally dissolved their marriage.
- **Separated:** Participants who are living apart from their spouse but are not legally divorced.¹⁵²

m). Education: The highest level of formal education completed by the participant.

Categories:

- **Illiterate:** Participants who cannot read or write.
- **Primary:** Participants who have completed up to 5th grade.
- **Secondary:** Participants who have completed up to 10th grade.
- **PUC (Pre-University Course):** Participants who have completed up to 12th grade.
- **Diploma:** Participants who have completed a technical or vocational course after secondary education, usually lasting 1-3 years.
- **Graduate:** Participants who have completed a bachelor's degree.
- **Professional Degree:** Participants who have completed professional courses such as engineering, medicine, law, etc¹⁵³

n). Waist-Hip Circumference Ratio (males): A measure of the distribution of body fat, calculated by dividing the circumference of the waist by the circumference of the hips.

Categories:

- **Lower risk:** Waist-Hip Ratio (WHR) less than 0.95.
- **Moderate risk:** Waist-Hip Ratio (WHR) between 0.96 and 1.00.
- **High risk:** Waist-Hip Ratio (WHR) greater than 1.00.

Measurement of waist and hip circumference using a measuring tape, with the waist measured at the narrowest part and hips at the widest part.¹⁵⁴

o). Modified B G Prasad classification (2023)

Definition: The BG Prasad Classification is a socioeconomic classification system used in India, which is updated periodically to account for inflation and changes in the cost of living. It categorizes individuals into socioeconomic classes based on their monthly per capita income.

Categories (Updated to October 2023):

Social class	Socio economic class	Monthly income in Rupees
Class 1	Upper class	>9098
Class 2	Upper middle class	4549-9097
Class 3	Middle class	2729-4550
Class 4	Lower middle class	1365-2728
Class 5	Lower class	<1365

Criteria for Classification:

- **Monthly Per Capita Income:** The total monthly income of the household divided by the number of members in the household.
- **Income Calculation:** Includes all sources of income for all household members.
- The CPI directly impacts the BG Prasad Classification as it affects the cost of living. Inflation, as measured by the CPI, can change the real value of income. Periodic updates to the BG Prasad Classification account for these changes to maintain accurate classification.¹⁵⁵

[illegible]

[illegible]

[illegible]