A Comprehensive assessment of occupational and lifestyle determinants of overweight and obesity among transport workers in Karaikal: A mixed-methods study

K Mohamed Ali[1], G Gnanamani[2], K Mujibur Rahman[3], S Nancy[4]

[1]Professor, [2]Associate Professor, [3]Professor and Head, [4]Assistant Professor, Department of Community Medicine, Vinayaka Mission's Medical College and Hospital, Vinayaka Mission's Research Foundation – Deemed to be University (VMRF-DU), Karaikal, Puducherry, India

Correspondence: *S Nancy, Assistant Professor, Department of Community Medicine, Vinayaka Mission's Medical College and Hospital, Vinayaka Mission's Research Foundation – Deemed to be University (VMRF-DU), Karaikal, Puducherry, India*

Abstract:

Background: Obesity and overweight are significant public health concerns globally, particularly among transport workers who face occupational and lifestyle-related risk factors. Due to prolonged sedentary work, irregular eating habits, and limited access to healthy food options, transport workers are at an increased risk of obesity-related health complications. **Objectives:** The study sought to identify the key factors influencing overweight and obesity among transport workers and to explore feasible workplace interventions to promote a healthy weight. **Methods:** A mixed-methods study was conducted among 450 transport workers, including bus drivers and conductors, in Karaikal. Quantitative data were collected through surveys and anthropometric measurements, including Body Mass Index (BMI) and Waist-Hip Ratio (WHR). Qualitative data were obtained through key informant interviews with healthcare professionals, nutritionists, and transport department stakeholders. Statistical analyses included logistic regression to determine significant associations between obesity and various occupational and lifestyle factors. **Results:** The study found a high prevalence of overweight (25.8%) and obesity (39.8%) among transport workers, with 67.8% exhibiting abdominal obesity. Age, urban residence, higher education, job type, and long-distance travel were significantly associated with obesity. Key informant interviews identified barriers such as irregular work schedules, lack of healthy food access, sedentary job roles, and inadequate employer-supported health interventions. **Conclusion:** The findings highlight the urgent need for workplace policies promoting structured meal plans, regular health screenings, and physical activity programs. Targeted interventions addressing occupational and lifestyle determinants are essential for improving the well-being and productivity of transport workers. Future research should focus on longitudinal studies to assess the impact of workplace health programs in mitigating obesity risks.

Keywords: overweight, obesity, transport workers, bus drivers and conductors, mixed-methods

Introduction:

Obesity and overweight have grown to be serious global public health issues, adding to the rising prevalence of non-communicable diseases (NCDs) such hypertension, type 2 diabetes, and cardiovascular disease. Obesity is categorized by the World Health Organization (WHO) as a complex disorder that arises from a confluence of occupational, behavioral, environmental, and genetic variables **[1].** Because of their sedentary employment, erratic eating patterns, and restricted access to tools that promote health, transport workers are more vulnerable than other occupational groups. According to studies, compared to other employment sectors, transport workers frequently have higher rates of overweight and obesity, mostly as a result of lifestyle restrictions associated to their jobs **[2].**

India's economy depends heavily on the country's transportation industry, which includes both public and private transportation professionals like truck drivers, bus conductors, taxi drivers, and autorickshaw operators. Nonetheless, these employees are often subjected to a variety of occupational health hazards, including as extended workdays, exposure to air pollutants, inconsistent sleep schedules, and ongoing stress **[3].** These elements work together to promote unhealthy lifestyle choices, such as substance abuse, poor food choices, and inactivity, all of which raise the chance of becoming overweight or obese **[4].** Research on the lifestyle and work-related factors that contribute to obesity among Indian transport workers is scarce, despite the growing concerns about occupational health.

Due to urbanization and economic growth, the number of jobs associated to transportation has significantly increased in Karaikal, a seaside town in the Union Territory of Puducherry. Transport workers in the area are more likely to experience obesity-related health issues because they frequently work irregular schedules, spend a lot of time sitting down, and eat poorly **[5].** Their vulnerability is further increased by socioeconomic issues including low income and restricted access to healthcare. Designing focused health interventions that support improved health outcomes for this population requires an understanding of these lifestyle and occupational variables **[6].**

Numerous studies have shown that poor eating habits, insufficient physical activity, and extended periods of inactivity are the main causes of obesity in transportation workers **[7].** The majority of the material now in publication, however, focuses on high-income nations, where lifestyle and work situations differ greatly from those in low- and middle-income countries like India. In order to discover context-specific risk factors and create customized solutions to reduce the health hazards associated with obesity among transport workers, research concentrating on the Indian context is essential **[8].** Transport workers' well-being might be greatly enhanced by addressing these issues through individual lifestyle changes, workplace health initiatives, and legislative changes.

A thorough way to investigate the intricate interactions between lifestyle and occupational factors that contribute to obesity is through a mixed-methods research strategy. Qualitative information from transport workers can improve our understanding of perceived obstacles to leading a healthy lifestyle, even while quantitative methods can offer objective measurements of obesity prevalence, nutritional intake, and levels of physical activity **[9].** This study attempts to give a comprehensive evaluation of the factors influencing overweight and obesity among Karaikal's transport workers by combining quantitative and qualitative data. The results of this study will support evidence-based suggestions for policy changes and workplace health initiatives.

The purpose of this study is to close the information gap about the lifestyle and occupational factors that contribute to overweight and obesity among Karaikal's transport workers. The study will investigate important risk factors and create focused health interventions that can enhance employees' well-being by using a mixed-methods approach. Formulating effective policies that support better work environments and sustained lifestyle modifications among Indian transport workers requires an understanding of these determinants.

Objectives:

This study seeks to identify the factors contributing to overweight and obesity among bus drivers and conductors and to explore effective strategies for promoting a healthy weight.

Methodology:

The present study was conducted for one year among bus drivers and conductors in the Government Transport Department and private transport services of Karaikal, a major port town and one of the four regions of the Union Territory of Pondicherry, India. It was an explanatory mixed-methods study where quantitative data were followed by qualitative data (QUAN (Survey + Anthropometric measurements) → QUAL (Key Informants' Interview)).

QUAN – Survey + Anthropometric measurements:

Based on a 50% prevalence of overweight from a study on North-West Karnataka Road Transport Corporation drivers and conductors in Belgaum **[10],** with an absolute precision of 5% and a 10% non-response rate, the required sample size was determined to be 450 transport workers. After obtaining the registered list of Drivers and Conductors from the concerned authority, the participants were selected from the sampling frame by simple random sampling without replacement by employing random number tables. The purpose of the study was explained to all the participants and they were assured of confidentiality. After obtaining informed consent for participation in the study, a pretested semi-structured was used to collect information regarding the sociodemographic profile, behavioral characteristics, work environment and anthropometric assessments.

Measurement of Weight:

Weight was measured using a calibrated digital or beam balance scale **[11].** The procedure followed these steps:

1. The scale was placed on a flat, hard surface to avoid measurement errors.
2. Participants wore light clothing and no shoes to minimize external weight variations.
3. The individual stood still and upright, with weight evenly distributed on both feet.
4. The reading was taken to the nearest 0.1 kg for accuracy.

Measurement of Height:

Height was measured using a stadiometer or a vertical measuring scale attached to a flat surface **[12,13].** The steps were as follows:

1. The participant stood barefoot, with feet together and heels touching the base of the stadiometer.
2. The body was fully upright, with arms relaxed at the sides.
3. The Frankfurt plane (a horizontal line from the tragus of the ear to the lower orbital margin) was kept parallel to the ground.
4. The measuring rod was gently lowered to rest on the crown of the head.
5. The measurement was recorded to the nearest 0.1 cm.

BMI Calculation and Interpretation:

Body Mass Index (BMI) was a simple and widely used method for classifying individuals based on their weight relative to height. The BMI was calculated using the following formula:

$$BMI = \frac{\text{Weight (kg)}}{\text{Height (m)}^2}$$

The World Health Organization (WHO) defined standard BMI categories based on general population guidelines, but specific cutoffs were recommended for Asian Indian populations due to differences in body fat distribution. The cutoff values for BMI in the Asian Indian context were as follows:

1. **Underweight:** BMI < 18.5 kg/m²
2. **Normal weight:** BMI 18.5–22.9 kg/m²
3. **Overweight:** BMI 23.0–24.9 kg/m²
4. **Obesity (Class I):** BMI 25.0–29.9 kg/m²
5. **Obesity (Class II and III):** BMI ≥ 30.0 kg/m²

These cutoff values were adapted from the WHO's global standards, but research indicated that Asian populations tend to have higher body fat percentages at lower BMI values, making the traditional cutoffs insufficient for accurately identifying obesity-related health risks. As a result, the Asian Indian-specific BMI thresholds were established to better assess the risk of developing metabolic conditions such as diabetes, hypertension, and cardiovascular diseases **[14].**

Waist-Hip Ratio (WHR) Measurement:

Waist-Hip Ratio (WHR) was used as an anthropometric measure to assess body fat distribution, particularly abdominal obesity, which is a risk factor for metabolic disorders like diabetes, hypertension, and cardiovascular diseases. WHR was calculated by dividing waist circumference

by hip circumference. Waist circumference was measured at the narrowest part of the waist, just above the navel, while hip circumference was measured at the widest part of the hips and buttocks. A non-stretchable measuring tape was recommended for accuracy, and measurements were taken with the individual standing upright in a relaxed state.

The specific WHR cutoff values for overweight and obesity in the Asian Indian population were adapted due to differences in fat distribution and associated health risks.

For Women:

- Normal WHR: ≤ 0.80
- Overweight/Obesity: > 0.80

For Men:

- Normal WHR: ≤ 0.90
- Overweight/Obesity: > 0.90

These values reflected studies indicating a higher risk of obesity-related diseases at lower WHR levels in Asian Indians compared to Western populations, leading to lower thresholds for abdominal obesity to account for increased metabolic risk **[15].**

QUAL – Key Informants' Interview (KII):

In addition to the quantitative survey, ten Key Informant Interviews (KIIs) were conducted **[16].** The informants were purposively selected based on their knowledge, availability, and willingness to participate. Healthcare professionals, nutritionists, and stakeholders from the transport department were chosen for the interviews, ensuring diversity among the key informants. The survey results were shared with these informants and stakeholders to gather their potential solutions or suggestions for addressing overweight and obesity among transport workers.

After obtaining informed consent, an investigator trained in qualitative research methods conducted the interviews using an interview guide with a predefined set of open-ended questions. The interviews were held at a time and location convenient for the informants. Each interview lasted between 15 to 30 minutes and was audio recorded. Probing questions were used to encourage participants to provide more detailed information. After each interview, debriefing was done to ensure validation of the participants' responses.

Data analysis:

QUAN - Data was entered into Microsoft Excel 2010, and statistical analysis was performed using SPSS software version 20.0. Descriptive statistics, including frequency, percentage, mean, standard deviation, median, and inter-quartile range, were calculated. Overweight and obesity were treated as a dichotomous variable, and logistic regression analysis was used. Initially, a bivariate analysis was conducted to examine the relationship between the dependent variable and other independent variables. Subsequently, all variables found significant in the bivariate analysis were included in a multivariate logistic regression analysis (LINK FUNCTION = LOGISTIC), using various nested models.

QUAL - The audio recordings were transcribed in English and thematic content analysis was done manually. A deductive approach was followed because the objectives were already specified. Similar descriptive codes were combined to derive categories and themes.

Ethical consideration:

The study was carried out after obtaining approval from the Research Committee and Institutional Ethics Committee (EC approval number: 21/2016).

Results:

Table 1: Socio demographic profile of the transport workers (N=450)

S. No	Variables	Categories	Drivers (n, %)	Conductors (n, %)	Total (n, %)
1	**Age Group**	<25	2 (0.7)	12 (7.6)	14 (3.1)
		25-34	55 (18.8)	26 (16.6)	81 (18.0)
		35-44	111 (37.9)	51 (32.5)	162 (36.0)
		45-54	88 (30.0)	61 (38.9)	149 (33.1)
		>54	37 (12.6)	7 (4.4)	44 (9.8)
2	**Residence**	Urban	156 (53.2)	64 (40.8)	220 (48.9)
		Rural	137 (46.8)	93 (59.2)	230 (51.1)
3	**Education**	Primary	2 (0.7)	4 (2.6)	6 (1.3)
		Secondary	79 (27.0)	49 (31.2)	128 (28.4)
		Higher Secondary	138 (47.1)	49 (31.2)	187 (41.6)
		Graduate	74 (25.2)	55 (35.0)	129 (28.7)
4	**Marital Status**	Married	260 (88.7)	141 (89.8)	401 (89.1)
		Single	24 (8.2)	16 (10.2)	40 (8.9)
		Divorced	5 (1.7)	0 (0)	5 (1.1)
		Separated	4 (1.4)	0 (0)	4 (0.9)
5	**Employment**	Government	189 (64.5)	103 (65.6)	292 (64.9)
		Private	104 (35.5)	54 (34.4)	158 (35.1)
6	**Bus Route Type**	Mofussil	45 (15.4)	70 (44.6)	115 (25.6)
		Long Distance	247 (84.3)	78 (49.7)	325 (72.2)
		School Bus	1 (0.3)	9 (5.7)	10 (2.2)
7	**Experience**	≤1 year	65 (22.2)	51 (32.5)	116 (25.8)
		1.1-5 years	39 (13.3)	13 (8.3)	52 (11.6)
		5.1-10 years	23 (7.8)	17 (10.8)	40 (8.9)
		10.1-15 years	38 (13.0)	18 (11.5)	56 (12.4)
		>15 years	128 (43.7)	58 (36.9)	186 (41.3)
		Total	**293**	**157**	**450**

Table 1 outlines the socio-demographic characteristics of a cohort of 450 transport workers, including 293 drivers and 157 conductors. The majority of the participants (69.1%) were aged between 35 and 54 years, with 36.0% belonging to the 35–44 age group. A slightly higher proportion of workers resided in rural areas (51.1%) compared to urban areas (48.9%). In terms of educational attainment, 41.6% had completed higher secondary education, while 28.7% held graduate degrees. Marital status analysis revealed that 89.1% of the workers were married. The majority were employed in the government sector (64.9%). Regarding job roles, long-distance routes were the most prevalent (72.2%), followed by mofussil routes (25.6%). Work experience varied considerably, with 41.3% having more than 15 years of service, whereas 25.8% had one year or less of experience.

Figure 1: Body Mass Index (BMI) Status of the transport workers (N=450)

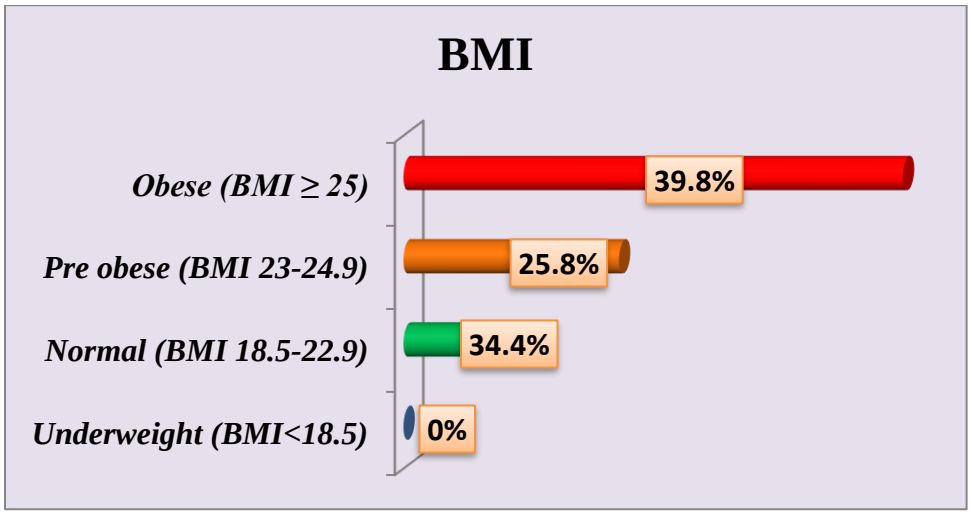

Figure 1 depicts the BMI distribution among 450 transport workers, comprising bus drivers and conductors. A substantial proportion of workers were classified as obese (n=179, 39.8%), followed by those in the pre-obese category (n=116, 25.8%). About 155 (34.4%) transport workers had a normal BMI, while no individuals fall into the underweight category. Notably, the high combined prevalence of overweight and obesity (65.6%) highlighted the potential health risks among this occupational group.

Figure 2: Waist Hip Ratio (WHR) Status of the transport workers (N=450)

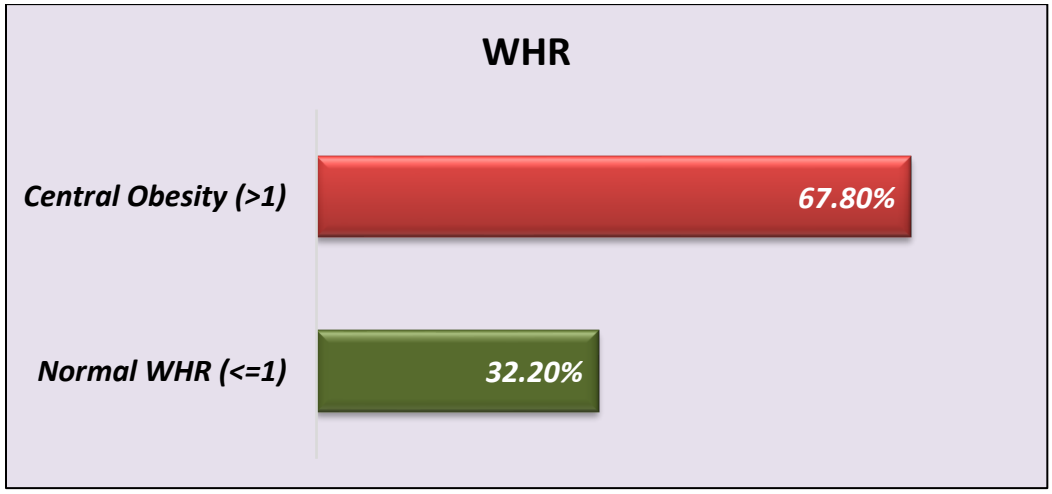

Figure 2 illustrates the WHR status of transport workers. The majority of the participants, 305 (67.8%), exhibited central/ abdominal obesity, while 145 (32.2%) had a normal WHR. This indicates that more than two-thirds of the transport workers in the study had an increased risk of obesity-related health complications.

Table 2: Bivariate and Multivariate logistic regression models of Obesity and Overweight among bus drivers and conductors (N = 450)

Independent Variable	Overweight and Obesity n (%)	COR (95% CI)	P value	AOR (95% CI)	P value
AGE					
>35 (355)	253 (71.3)	3.13 (1.96 – 4.99)	**0.001***	2.56 (1.20 – 4.01)	**0.007***
≤35 (95)	42 (44.2)	1			
PLACE OF LIVING					
Urban (220)	175 (79.5)	3.56 (2.35 – 5.41)	**0.001***	2.97 (1.59 – 4.40)	**0.006***
Rural (230)	120 (52.2)	1			
EDUCATION					
Higher secondary & Graduate (316)	230 (72.8)	2.84 (1.87 – 4.32)	**0.001***	1.78 (1.08 – 3.90)	**0.007***
Primary & Secondary (134)	65 (48.5)	1			
MARITAL STATUS					
Married (401)	256 (63.8)	0.45	**0.042***	0.88	0.075

		(0.22 - 0.93)		(0.34 – 1.67)	
Single, widower and divorced (49)	39 (79.6)	1			
OCCUPATION					
Driver (293)	207 (70.6)	1.89 (1.26 – 2.82)	**0.002***	1.45 (1.02 – 2.34)	**0.015***
Conductor (157)	88 (56.1)	1			
TYPE OF EMPLOYMENT					
Private (158)	108 (68.3)	1.21 (0.80 – 1.83)	0.360		
Government (292)	187 (64.0)	1			
BUS ROUTE TYPE					
Long distance (325)	237 (72.9)	3.11 (2.03 – 4.77)	**0.001***	3.00 (1.86 – 4.09)	**0.005***
Mofussil and school bus (125)	58 (46.4)	1			
EXPERIENCE					
>15 years (302)	211 (70.0)	1.77 (1.18 – 2.66)	**0.006***	1.23 (0.87 – 2.11)	0.066
≤15 years (148)	84 (56.8)	1			
ALCOHOL CONSUMPTION					
Yes (314)	211 (67.2)	1.27 (0.83 – 1.93)	0.27		
No (136)	84 (61.8)	1			
SMOKING					
Yes (189)	127 (67.1)	1.13 (0.76 – 1.68)	0.53		
No (261)	168 (64.4)	1			

P value - < 0.05

Table 2 presents the bivariate and multivariate logistic regression analyses of overweight and obesity among bus drivers and conductors. The prevalence of overweight and obesity was significantly higher among individuals aged >35 years (71.3%) compared to those < 35 years (44.2%) (AOR = 2.56, 95% CI: 1.20–4.01, p = 0.007). Urban residents exhibited a greater likelihood of being overweight or obese (79.5%) than rural residents (52.2%) (AOR = 2.97, 95% CI: 1.59–4.40, p = 0.006). Higher education (higher secondary and graduate) was associated with an increased risk (72.8% vs. 48.5%, AOR = 1.78, 95% CI: 1.08–3.90, p = 0.007). Married individuals showed a lower crude odds ratio (COR = 0.45, 95% CI: 0.22–0.93, p = 0.042), but this

was not statistically significant in the adjusted model (AOR = 0.88, p = 0.075). Drivers (70.6%) were more likely to be overweight or obese than conductors (56.1%) (AOR = 1.45, 95% CI: 1.02–2.34, p = 0.015). Working on long-distance bus routes was strongly associated with overweight and obesity (72.9% vs. 46.4%, AOR = 3.00, 95% CI: 1.86–4.09, p = 0.005). However, type of employment, years of experience, alcohol consumption, and smoking were not significantly associated with overweight and obesity in the adjusted models (p > 0.05).

Table 3: Thematic Content Analysis – Insights from Key Informant Interviews on Strategies to address Overweight and Obesity among Transport Workers (N=10)

Themes	Categories	Codes	Verbatim Statements (Key Informants)
Unhealthy Lifestyle and Dietary Habits	Poor Nutrition Awareness & Eating Patterns	Consumption of fast food, unhealthy snacks, high-calorie intake, irregular meal timings	*"Most drivers and conductors rely on roadside eateries, which serve fried and high-fat foods. They need healthier, accessible options."* – Nutritionist
	Limited Access to Healthy Food	Lack of nutritious food at depots, absence of food subsidies, limited time to find healthy meals	*"Providing affordable, healthy meal options at bus terminals will help workers make better choices."* – Transport Official
Physical Inactivity and Sedentary Work Culture	Lack of Exercise & Movement	Long sitting hours, lack of physical activity, absence of fitness programs	*"Drivers sit for hours without any movement, which increases their risk of obesity and related diseases."* – Healthcare Professional
	Occupational Barriers to Fitness	Inadequate breaks for movement, lack of exercise spaces, absence of incentive programs for fitness	*"A small stretching or movement break after every few hours can help reduce stiffness and weight gain."* – Transport Official
Workplace and Policy Barriers	Irregular Work Schedules	Disrupted meal patterns, night shifts, long working hours	*"Their schedules are unpredictable, making it difficult to maintain a proper diet or exercise routine."* – Healthcare Expert

	Lack of Supportive Workplace Policies	No structured meal breaks, limited health monitoring programs, inadequate medical support	*"There should be mandatory health screenings and awareness programs at transport depots."* – Transport Department Official
Stress and Mental Well-being	High Stress Levels & Emotional Eating	Job-related stress, emotional eating, work-life imbalance	*"Many workers eat junk food not just out of convenience but as a coping mechanism for stress."* – Nutritionist
	Need for Mental Health Support	Lack of stress management programs, limited access to counseling services	*"Counseling sessions and stress management workshops should be integrated into worker welfare programs."* – Healthcare Professional
Healthcare and Financial Constraints	Limited Medical Support	Lack of routine check-ups, minimal access to obesity-related treatments	*"Routine BMI checks and medical support should be available at transport hubs."* – Public Health Expert
	Economic Barriers to Healthy Living	High cost of nutritious food, lack of incentives for maintaining a healthy lifestyle	*"Providing financial incentives for weight management could motivate workers to take their health seriously."* – Transport Department Official

Table 3 portrays a thematic content analysis of key informant interviews on strategies to address overweight and obesity among bus drivers and conductors. In this study five pivotal themes were identified: unhealthy dietary habits, sedentary work culture, workplace and policy barriers, stress and mental well-being, and healthcare and financial constraints. These themes highlighted critical factors such as poor nutrition awareness, limited access to healthy food, prolonged sitting hours, irregular work schedules, high stress levels, and inadequate medical support. Verbatim statements from nutritionists, healthcare professionals, and transport officials emphasize the need for structured meal plans, workplace fitness programs, mental health support, and policy interventions to improve workers' health outcomes.

Discussion:

The present mixed-methods study conducted in Karaikal examined the occupational and lifestyle determinants of overweight and obesity among transport workers, revealing a high prevalence of

obesity, particularly among long-distance bus drivers and conductors. Similar studies conducted in different regions of India indicated that transport workers faced a greater risk of obesity due to sedentary job roles, irregular meal patterns, and poor lifestyle habits. Patil et al in Karnataka in 2019 found that transport workers exhibited significantly higher rates of overweight and obesity compared to the general population, attributing this trend to prolonged working hours, reliance on high-calorie roadside food, and a lack of physical activity **[17].** Likewise, Ramesh et al in Tamil Nadu in 2018 reported that transport workers frequently consumed unhealthy fast food due to time constraints, which contributed to an increased risk of obesity and associated metabolic disorders **[18].** The present study in Karaikal reinforced these findings by demonstrating that a significant proportion of bus drivers and conductors were overweight or obese, largely due to occupational constraints and poor dietary choices.

Several Indian studies established a strong correlation between long working hours and the prevalence of obesity among transport workers. Gupta et al in Maharashtra in 2020 found that bus drivers working extended shifts with limited rest breaks were more likely to be overweight than those with regulated schedules **[19].** Similarly, Singh et al in Uttar Pradesh in 2021 observed that conductors who worked irregular shifts and experienced disrupted sleep patterns exhibited higher BMI levels compared to workers with consistent schedules **[20].** The present study yielded similar results, indicating that transport workers with irregular shifts and limited breaks were at a significantly higher risk of obesity. Unlike some developed regions where workplace interventions had been implemented to regulate work hours and promote better health, transport workers in India continued to face significant barriers in maintaining a healthy lifestyle.

Dietary habits played a crucial role in the obesity patterns observed among transport workers in India. Sharma et al in Punjab in 2022 found that most transport workers preferred calorie-dense and carbohydrate-heavy meals, often due to the affordability and availability of such foods in roadside eateries **[21].** Additionally, Verma et al in Madhya Pradesh in 2019 reported that drivers and conductors frequently skipped meals or consumed excessive amounts of sugary beverages and fried snacks, leading to an imbalance in their daily caloric intake **[22].** Our study supported these observations by revealing that transport workers had limited access to healthy food choices and often relied on nutritionally deficient meals. The absence of structured meal plans or employer-provided food options further aggravated the problem, leaving transport workers with no alternative but to consume unhealthy diets.

A lack of employer-supported health interventions significantly influenced obesity among Indian transport workers. Kumar et al in Delhi in 2021 highlighted that most transport workers did not undergo regular health screenings or receive nutritional guidance from their employers, which contributed to the undiagnosed progression of obesity-related health conditions such as diabetes and hypertension **[23].** Similarly, Yadav et al in Rajasthan in 2020 found that transport workers had little awareness of obesity-related health risks due to inadequate health promotion campaigns within the sector **[24].** The present study aligned with these findings, demonstrating that the

majority of bus drivers and conductors lacked access to preventive healthcare and workplace wellness programs. Compared to developed regions where structured fitness and dietary intervention programs had been introduced for transport workers, India lagged behind in implementing comprehensive health policies for this vulnerable occupational group.

International studies also reported similar trends, indicating that transport workers worldwide faced common risk factors related to their sedentary work environment and unhealthy lifestyle habits. Apostolopoulos et al in the United States in 2010 found that truck drivers had a significantly higher prevalence of obesity due to prolonged sitting hours, irregular meal patterns, and limited physical activity, making them highly susceptible to metabolic disorders **[4].** Similarly, Sieber et al in 2014 reported that more than 50% of long-haul truck drivers were obese, primarily due to their dependence on high-calorie fast food, long working hours, and lack of structured physical exercise **[3].** In the United Kingdom, Winkleby et al in 1988 found that bus drivers had significantly higher rates of obesity and hypertension than other occupational groups, attributing these findings to chronic job-related stress and a lack of opportunities for physical movement during work hours **[25].** The present study reinforced these conclusions by highlighting the role of prolonged sedentary work, poor dietary choices, and high stress levels in contributing to obesity among transport workers.

The impact of workplace health interventions varied across different countries, with developed nations implementing structured policies to address obesity risks among transport workers. Hedberg et al in Sweden in 1993 found that professional drivers who had access to employer-supported fitness programs and routine health screenings had lower obesity rates compared to those without such interventions **[26].** Similarly, Burr et al in Germany in 2019 reported that transport workers who participated in government-sponsored wellness programs, including dietary counseling and workplace exercise initiatives, exhibited lower BMI levels and improved overall health outcomes **[27].** The current study found that Indian transport workers lacked access to employer-supported health initiatives, making them more vulnerable to obesity and associated health risks. While international studies demonstrated that structured workplace policies could significantly mitigate obesity risks, the absence of such measures in India highlighted the need for targeted interventions to improve the health outcomes of transport workers.

Various studies conducted across India and globally highlighted similar occupational and lifestyle determinants of obesity among transport workers, emphasizing the significant impact of long working hours, poor dietary habits, and a lack of workplace health initiatives. The present study confirmed the findings of previous research, reinforcing that transport workers faced multiple challenges in maintaining a healthy weight due to their demanding work schedules and limited access to nutritious food. While research consistently showed the urgent need for structured interventions, such as regulated work hours, employer-supported meal programs, and mandatory health screenings, these measures had yet to be widely implemented across India **[28].** Addressing

these health disparities through policy changes and workplace wellness programs was essential for reducing obesity rates and improving the overall well-being of transport workers in India.

The present study explored the factors associated with overweight and obesity and also identified the feasible strategies to maintain a healthy weight among these vulnerable groups. The questionnaire was designed in accordance with standard guidelines. Further, efforts to minimize errors related to self-reported data were minimized by incorporating anthropometric measurements. The non-response rate was minimal due to the good rapport established with the study population through the organization of frequent medical camps. However, as this was a cross-sectional study, temporality could not be determined.

Conclusion:

The present study captured the prevalence of overweight and obesity among transport workers in Karaikal and also identified the key occupational and lifestyle determinants influencing their health. The findings revealed that prolonged sedentary work, irregular meal patterns, extended working hours, and unhealthy dietary habits significantly contributed to the high incidence of obesity in this population. Additionally, the lack of employer-supported health initiatives further exacerbated these risks. The study highlighted the necessity of workplace policies that incorporated structured meal plans, routine health screenings, and physical activity programs to mitigate obesity-related health concerns. Addressing these factors through targeted interventions was deemed essential for improving the overall well-being and productivity of transport workers. Future research should employ longitudinal approaches to establish causality and assess the effectiveness of workplace health programs in reducing obesity within this occupational group.

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