

Dietary behaviors, diet quality and nutritional status of motorcycle taxi (zémidjan) drivers in Cotonou, Benin: a cross-sectional study

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Abstract

Background

Nutrition among informal transport workers remains poorly documented. In Cotonou, motorcycle taxi drivers spend their working days on the road and almost always eat away from home. This study aimed to describe their dietary behaviors, assess their diet quality and determine their nutritional status.

Methods

This analytical cross-sectional study included 253 motorcycle taxi drivers in Cotonou, Benin. Four districts and twelve neighborhoods were randomly selected; parking sites were then chosen for their high driver turnout, and consenting drivers were enrolled. Data were collected via a structured questionnaire, 24-hour dietary recalls, the World Food Programme 7-day food consumption module (Food Consumption Score, FCS) and anthropometric measurements. The individual dietary diversity score (IDDS) and food consumption score (FCS) were calculated. Nutritional status was classified via World Health Organization (WHO) body mass index (BMI) thresholds, and associated factors were assessed via logistic regression.

Results

The mean individual dietary diversity was 3.89 ± 0.96 , and 36.8% of the drivers consumed fewer than 4 food groups. The median energy intake was 2300 kcal/day, whereas the reference value was 2700 kcal/day. Carbohydrates alone provided 69.6% of the energy intake, which was well above the recommended level, whereas 8.9% of the energy intake from protein and 13.7% of the energy intake from fat were below the recommended range. The mean food consumption score (64.7 ± 13.9) classified 98.0% of the drivers as having acceptable food consumption. Underweight affected 8.3% of the drivers, 21.3% were overweight and 12.6% were obese; 33.9% were overweight (including obesity) overall. After adjustment, low dietary diversity remained associated with underweight (aOR = 3.69; 95% CI 1.36–10.03), and alcohol consumption was associated with overweight (aOR = 2.73; 95% CI 1.55–4.82).

Conclusions

Underweight and overweight (including obesity) coexist among motorcycle taxi drivers in Cotonou in a diet that is poorly diversified and carbohydrate-dominant. Nutritional interventions targeting this group must account for the constraints of mobile informal work; the determinants of this double burden remain to be established through longitudinal studies.

Background

Rapid urbanization in West African cities has been accompanied by a nutritional transition. Diets are becoming denser in energy, fat and sugar and lower in fiber, whereas energy expenditure linked to work, leisure and travel is declining [1]. Noncommunicable diseases (NCDs) caused 75% of deaths worldwide in 2021, with premature deaths concentrated in low- and middle-income countries [2]. Diet contributes to several of these conditions, both as a risk factor and a protective factor, and the World Health Organization (WHO) identifies the workplace as one of the settings in which to act [3].

Informal-sector workers are largely absent from this body of research, even though they make up the majority of the urban workforce in many sub-Saharan African countries, including Benin. Limited formal job creation and rising unemployment are pushing a growing share of the urban workforce into less skilled, less protected activities. These activities involve extended, irregular working hours, food eaten away from home, and direct dependence on daily income. A national survey conducted in Benin in 2008 reported widespread underconsumption of fruit and vegetables and an obesity prevalence that was more than twice as high in urban areas as in rural areas [4]. Long-distance truck drivers in southern Africa form a comparable occupational group, with similarly prolonged driving time and eating away from home; a cross-sectional study revealed that 69% were overweight or obese and 36% had hypertension [5].

In Cotonou, motorcycle taxis, commonly known as *zémidjans*, remain the dominant mode of urban transport, despite growing competition from app-based mobility platforms such as Gozem and Yango. Drivers spend most of their working day on the move without a fixed location or predictable mealtime. What they eat depends on their earnings for the day and on the food vendors they encounter along their routes. Earlier work in Cotonou has examined their exposure to air pollution and respiratory function [6]; to our knowledge, their dietary profile and nutritional status have never been documented in the indexed literature.

This study aimed to describe dietary behaviors, assess diet quality, determine the nutritional status of motorcycle taxi drivers in Cotonou, and identify the factors associated with their nutritional status.

Methods

Study setting and design

A descriptive and analytical cross-sectional study was conducted from 16 January to 29 February 2025 in the city of Cotonou, the economic capital of Benin, which is built on the coastal strip between Lake Nokoué and the Atlantic Ocean.

Study population

The source population included all motorcycle taxi drivers operating in the city of Cotonou.

Selection criteria

Eligible drivers had been operating in Cotonou for at least 6 months, were present at the survey sites on the day of data collection, and gave oral consent. Drivers who had been active for less than 6 months, those who declined to participate, and those whose questionnaires were incomplete were excluded from the analysis.

Sample size

The sample size was calculated via the Rea and Parker formula: $n = [tp^2 \times P(1 - P) \times N] / [tp^2 \times P(1 - P) + (N - 1) \times y^2]$, with a 95% confidence interval ($tp = 1.96$), a margin of error of 3.1% ($y = 0.031$), and a source population of $N = 9857$ motorcycle taxi drivers registered with the Cotonou City Council for 2024. The prevalence used ($P = 0.931$) corresponded to the proportion of adults consuming 5 or fewer servings of fruit and vegetables per day, as reported by the national STEPS survey conducted in Benin in 2015 [7]. This calculation yielded a minimum sample size of 250 drivers; 253 drivers were surveyed and included in the analysis.

Sampling

Recruitment relied on two-stage random sampling followed by convenience selection. First, four districts were randomly selected from the fourteen districts that make up the city of Cotonou (3rd, 6th, 7th and 12th). Three neighborhoods were then randomly selected within each of these districts, for a total of twelve neighborhoods. Within these neighborhoods, the busiest motorcycle taxi parking sites, generally located near markets and bus stations, were purposively selected.

Data collection techniques and tools

Data were collected through a structured questionnaire administered on tablets (KoboCollect), supplemented by 24-hour dietary recall, the WFP 7-day food consumption module (FCS), and anthropometric measurements. Data collection was conducted by nutrition and dietetics students trained in anthropometric measurement and questionnaire administration in the local language during drivers' breaks at their parking sites. This article was prepared in accordance with the STROBE statement for cross-sectional studies [8].

Study variables

Independent variables included sociodemographic characteristics (age, sex, marital status, ethnicity, religion, educational level, area of origin) and occupational characteristics (previous occupation, length of time in the activity, monthly income, availability of an additional source of income, and daily working hours). The dietary behaviors included meal organization (meal timing and setting, number of daily

meals), food choice criteria, and sociocultural aspects, including food taboos. The dependent variables were consumption by food group, overall diet diversity and quality (IDDS, FCS, energy and macronutrient intake), and nutritional status (BMI).

Indicator construction

The individual dietary diversity score (IDDS) includes 9 food groups consumed over the preceding 24 hours on a scale of 0–9, following the FAO guidelines for measuring dietary diversity [9]; drivers who consumed fewer than 4 of the 9 groups were considered to have low dietary diversity. The FCS was derived from the standard 7-day food consumption module of the World Food Programme, which was not developed for this study [10]. Drivers reported the number of days (0–7) on which they had consumed foods from each of eight food groups during the previous 7 days, using food examples adapted to the local diet. Each group frequency was multiplied by the WFP weight (main staples 2; pulses 3; vegetables 1; fruit 1; meat, fish and eggs 4; milk and dairy products 4; sugar 0.5; oils and fats 0.5), and the weighted frequencies were summed (range 0–112). Food consumption was classified as poor, borderline or acceptable using the WFP thresholds of 21 and 35 [10].

Energy and macronutrient intake were estimated from two 24-hour recalls, the second conducted by telephone over a weekend, via the FAO mixed method and the West African Food Composition Table [11]. Nutritional status was classified using BMI thresholds [12].

Statistical analysis

Qualitative variables are presented as frequencies and percentages. Energy and nutrient intakes, which were not normally distributed, were described using medians and interquartile ranges; IDDS and FCS scores are presented as the means and standard deviations. Bivariate associations between body mass index and variables of interest were explored via the χ^2 test at a 5% significance threshold.

To identify independently associated factors, two binary logistic regression models were built from the individual-level dataset. The first compared drivers who were underweight with those who were normal weight; the second compared drivers who were overweight (including obese) with those who were normal weight. Candidate variables were selected via simple logistic regression at a 20% threshold and then entered simultaneously into the corresponding multivariable model. The results are expressed as adjusted odds ratios (aORs) with 95% confidence intervals (CIs) and Wald p values. Model fit was assessed via the Hosmer–Lemeshow test. All analyses were performed via SPSS version 21.

Results

Sociodemographic and occupational characteristics

Among the 253 drivers surveyed, 251 (99.2%) were men. The age distribution was 21.7% under 30 years, 53.8% between 30 and 50 years, and 24.5% over 50 years. Most were married (87.7%), of Fon or related ethnicity (85.0%), or Christian faith (84.2%). One-third came from Cotonou (36.0%), and one-third came from Abomey-Calavi (36.0%). Educational level remained low: 15.5% had received no education, 39.9% had received primary education, 37.6% had received secondary education, and 7.1% had received higher education (Table 1).

Table 1
Sociodemographic and occupational characteristics of motorcycle taxi drivers in Cotonou (N = 253)

Variable	Category	n	%
Age (years)	< 30	55	21.7
	30–50	136	53.8
	> 50	62	24.5
Sex	Male	251	99.2
	Female	2	0.8
Marital status	Married	222	87.7
	Single	24	9.5
	Widowed	4	1.6
	Divorced	3	1.2
Ethnicity	Fon and related	215	85.0
	Adja and related	15	5.9
	Yoruba and related	13	5.1
	Other	10	4.0
Religion	Christian	213	84.2
	Atheist	17	6.7
	Traditional	14	5.5
	Muslim	9	3.6
Educational level	None	39	15.46
	Primary	101	39.92
	Secondary	95	37.55
	Higher	18	7.11
Area of origin	Cotonou	91	36.0
	Abomey-Calavi	91	36.0
	Bohicon	21	8.3
	Porto-Novo	16	6.3

n, number of drivers; %, column percentage. XOF, West African CFA franc. Percentages are calculated within each variable and may not sum to exactly 100 because of rounding.

Variable	Category	n	%
	Ouidah	11	4.3
	Other	23	9.1
Previous occupation	Artisan	177	69.96
	Driver	27	10.67
	Farmer	17	6.72
	None	15	5.93
	Civil servant	11	4.35
	Student/pupil	6	2.37
Length of time in activity (months)	≥ 120	113	44.7
	13–36	54	21.3
	37–60	42	16.6
	1–12	23	9.1
	61–119	21	8.3
Monthly income (XOF)	51,000–100,000	107	42.3
	101,000–150,000	80	31.6
	12,000–50,000	45	17.8
	151,000–200,000	11	4.3
	> 200,000	10	4.0
Additional source of income	No	174	68.8
	Yes	79	31.2
Daily working hours (h)	7–10	177	70.0
	> 10	45	17.8
	2–6	31	12.3
Night work	No	149	58.9
	Yes	104	41.1

n, number of drivers; %, column percentage. XOF, West African CFA franc. Percentages are calculated within each variable and may not sum to exactly 100 because of rounding.

Seven of the ten drivers (70.0%) had worked in a skilled trade before driving a motorcycle taxi. The monthly income was less than XOF 100,000 ($\approx$ USD 165) for 60.1% of the drivers, and 31.2% had an additional source of income. Nearly half (44.7%) had been engaged in this activity for at least 10 years. Daily working hours exceeded 7 hours for 87.8% of the drivers, and 41.1% also worked at night (Table 1).

Dietary behaviors

Meals were eaten alone by 75.9% of the drivers and were prompted by hunger rather than a fixed time for 80.6% of them. Among the 49 drivers who organized their meals at set times (19.4% of the sample), 87.8% ate breakfast, 85.7% ate lunch, and 100.0% ate dinner. Across the whole sample, 75.5% of the participants ate at least 3 meals per day.

Food choice was driven first by preferences and cravings (49.0%), then by affordability (27.3%); portion size (9.9%), personal satisfaction (7.1%), hunger (4.0%) and fast food (2.8%) played a more marginal role. A food taboo was reported by 35.2% of the drivers, attributed to a declared allergy or illness in 29.2% of the cases and, less often, to religious prescription (20.2%) (Table 2). Only 17.8% of the drivers reported having ever received information on healthy eating, most often via the media, and 52.2% reported alcohol consumption.

Table 2
Dietary behaviors of motorcycle taxi drivers in Cotonou (N = 253)

Variable	Category	n	%
Meal setting	Alone	192	75.9
	In a group/with family	61	24.1
Meal timing	Driven by hunger	204	80.6
	At set times	49	19.4
Number of meals per day	≥ 3	191	75.5
	1–2	62	24.5
Food choice criteria	Preference/cravings	124	49.0
	Affordability	69	27.3
	Portion size	25	9.9
	Personal satisfaction	18	7.1
	Hunger	10	4.0
	Fast food	7	2.8
Food taboo	No	164	64.8
	Yes	89	35.2
Source of taboo (n = 89)	Personal conviction	45	50.6
	Declared allergy or illness	26	29.2
	Religion	18	20.2
<i>n, number of drivers; %, column percentage.</i>			

Food consumption and nutrient intake

Over the 7 days preceding the survey, cereals and tubers were consumed daily by 90.5% of the drivers; oils and fats were consumed by 62.1%; meat, fish and eggs were consumed by 52.2%; and vegetables were consumed by 37.2%. Milk and dairy products (3.6%), legumes and nuts (12.3%) and fruit (14.2%) were consumed less frequently (Table 3).

Table 3
Proportion of drivers consuming each food group every day of the week (N = 253)

Food group	Daily consumption (7/7 days), %
Cereals and tubers	90.5
Oils and fats	62.1
Meat, fish and eggs	52.2
Vegetables	37.2
Fruit	14.2
Legumes and nuts	12.3
Sugar and sugary products	5.5
Milk and dairy products	3.6
<i>The values are the percentages of drivers reporting the consumption of each food group on all 7 days preceding the survey.</i>	

The median energy intake was 2300 kcal/day (IQR 1623–3197), which was below the reference value of 2700 kcal/day. Carbohydrates constituted 69.6% of the total energy intake, which is well above the recommended 50–55%, whereas protein (12–15%) and fat (30–35%) are recommended for 8.9% and 13.7%, respectively (Tables 4 and 5). The median intakes of magnesium (326 mg versus 420 mg) and calcium (449 mg versus 1000 mg) also remained below the reference values; iron intake exceeded the reference values (12 mg versus 9 mg).

Table 4
Median energy, macronutrient and selected micronutrient intakes (N = 253)

Parameter	Median	Interquartile range	Reference
Energy (kcal/day)	2300	1623–3197	2700
Carbohydrates (g/day)	400.4	271.3–555.6	337.5–371.25
Protein (g/day)	51.4	37.0–87.8	81–101.25
Fat (g/day)	35.0	25.8–61.2	90–105
Iron (mg/day)	11.7	7.5–21.3	9
Magnesium (mg/day)	326.3	175–586	420
Calcium (mg/day)	449	135–1209	1000
<i>IQR, interquartile range.</i>			

Table 5
Contribution of macronutrients to total energy intake (N = 253)

Macronutrient	Contribution to total energy (%)	Recommendation (%)
Carbohydrates	69.63	50–55
Protein	8.93	12–15
Fat	13.70	30–35

Diet quality

The mean individual dietary diversity score was 3.89 ± 0.96 out of 9 possible groups, and 36.8% of the drivers consumed fewer than 4 groups. This threshold was used here to define low dietary diversity. The mean food consumption score was 64.7 ± 13.9 , with 98.0% of the drivers classified as having acceptable food consumption, 1.2% as borderline, and 0.8% as poor.

Nutritional status

In terms of BMI, 8.3% of the drivers were underweight, 57.7% were normal weight, 21.3% were overweight, and 12.6% were obese; 33.9% were classified as overweight (including obesity) (Fig. 1).

Figure 1. Distribution of motorcycle taxi drivers in Cotonou by body mass index category (N = 253)

Factors associated with nutritional status

According to the bivariate analysis, the BMI distribution differed significantly according to the availability of an additional source of income ($p = 0.016$) and dietary diversity ($p = 0.029$). The number of daily meals was borderline significant ($p = 0.05$). Age ($p = 0.160$), nutritional knowledge ($p = 0.309$), food taboos ($p = 0.614$) and food choice criteria ($p = 0.149$) were not associated with BMI.

In the model comparing drivers who were underweight to those who were normal weight ($n = 167$), low dietary diversity (IDDS < 4 groups) remained associated with underweight after adjustment for the availability of an additional source of income and number of daily meals (aOR = 3.69; 95% CI 1.36–10.03; $p = 0.010$), with adequate model fit (Hosmer–Lemeshow $p = 0.716$) (Table 6).

Table 6
Factors associated with nutritional status: adjusted binary logistic regression models

Model	Variable	Category	aOR	95% CI	p
Underweight vs normal weight (n = 167)	Dietary diversity (IDDS)	≥ 4 groups	1.00 ^a	–	–
		< 4 groups	3.69	1.36–10.03	0.010
	Additional source of income	No	1.00 ^a	–	–
		Yes	0.16	0.02–1.29	0.085
	Meals per day	1–2	1.00 ^a	–	–
≥ 3		0.46	0.17–1.26	0.131	
Overweight (including obesity) vs normal weight (n = 232)	Age (years)	–	1.02	1.00–1.05	0.083
	Additional source of income	No	1.00 ^a	–	–
		Yes	1.58	0.88–2.83	0.124
	Alcohol consumption	No	1.00 ^a	–	–
		Yes	2.73	1.55–4.82	< 0.001
aOR, adjusted odds ratio; CI, confidence interval. a Reference category. Underweight model adjusted for the availability of an additional source of income and the number of daily meals (Hosmer–Lemeshow p = 0.716). Overweight model adjusted for age and availability of an additional source of income (Hosmer–Lemeshow p = 0.749).					

In the model comparing overweight drivers (including obese drivers) with normal weight drivers (n = 232), alcohol consumption remained associated with overweight after adjustment for age and the availability of an additional source of income (aOR = 2.73; 95% CI 1.55–4.82; p < 0.001), with adequate model fit (p = 0.749) (Table 6).

Discussion

Among these 253 motorcycle taxi drivers in Cotonou, underweight (8.3%) and overweight (including obese individuals, 33.9%) coexist within the same occupational group, alongside a poorly diversified, carbohydrate-dominant, protein-poor diet. This is the configuration of the double burden of malnutrition,

which is increasingly described among urban workers in sub-Saharan Africa undergoing the nutrition transition.

Carbohydrates provided 69.6% of the energy intake, which was above the recommended 50–55%, whereas protein (8.9%) and fat (13.7%) both remained below their respective recommendations. This pattern follows the predominance of cereals and tubers in the daily diet (90.5%) and the underconsumption of meat, fish and legumes, which cost more, in a group where six in ten drivers earned less than XOF 100,000 per month. A 2017 comprehensive food security and vulnerability analysis revealed the same predominance of cereals and tubers in the general population of Cotonou, regardless of household economic status [15]. This determinant is therefore likely shared with the surrounding urban population.

Overweight (including obesity) affected one in three drivers (33.9%), roughly half the proportion reported by Lalla-Edward and colleagues among long-distance truck drivers in southern Africa (69% overweight or obese, 36% hypertension) [5]. In both groups, prolonged seated driving time combines with energy-dense, macronutrient-imbalanced food eaten away from home, and the resulting cardiometabolic risk is not confined to a single national context. The prevalence of underweight observed here (8.3%), however, was markedly higher than the 1.97% reported in an earlier study of motorcycle taxi drivers in Cotonou focused on hypertension [13]. The survey period, recruitment procedure and sample composition may help explain this discrepancy.

After adjustment, low dietary diversity remained associated with underweight (aOR = 3.69; 95% CI 1.36–10.03), whereas its association with overweight was weak and nonsignificant. This finding points to both qualitative and quantitative undernutrition among the least dietarily diverse drivers. Having an income that does not depend solely on the day's earnings may allow for a more diversified diet, a hypothesis already put forward in an analysis of the economic determinants of motorcycle taxi work in Cotonou [14].

Alcohol consumption, for its part, was associated with overweight after adjustment for age and availability of an additional source of income (aOR = 2.73; 95% CI 1.55–4.82). This pattern echoes findings among South African truck drivers, where alcohol consumption and overweight coexisted within the same occupational group [5].

The Food Consumption Score classified 98.0% of drivers as having acceptable food consumption, which appears to contradict the limited dietary diversity and macronutrient imbalance measured in the same population. This discrepancy stems from how the indicator is constructed. The score, which is designed to assess household food security over 7 days, quickly reaches a ceiling once a staple food and a source of fat are consumed daily, regardless of the nutritional quality of the diet. Compared with Malian households, in which both scores were jointly analyzed, this interpretation is supported by the fact that among the rural population, which widely practices market gardening, only 2.4% have low dietary diversity, whereas 36.8% of our urban drivers have no food production of their own [16]. The FCS should therefore be read here as a secondary indicator, not as a measure of diet quality in this population.

Only 17.8% of the drivers had ever received information on healthy eating, and more than half consumed alcohol. Diet is therefore only one piece of a broader set of occupational health behaviors to consider among informal-sector professional drivers.

These findings have implications for occupational health and for nutrition policy targeting the informal transport sector. An intervention limited to individual nutrition information is unlikely to succeed unless it also addresses the food supply available at parking sites, where meals are eaten and where cost, alongside preference, remains the main stated selection criterion. Driver associations, already identified as potential channels for chronic disease screening in this setting, offer a realistic entry point for joint action with health services: improving the local food supply and providing information on meal composition rather than quantity alone.

This study has several limitations. The cross-sectional design establishes no causal relationship between dietary behaviors and nutritional status, only associations. Recruiting drivers at the busiest parking sites, among those presenting and consenting, constitutes a convenience selection within the randomly selected sites and may favor the drivers most available at the time of data collection. The conditions reported during the survey were based on participant self-reports, without clinical or biological confirmation.

The strength of this study lies in the documentation, for the first time to our knowledge in the literature, of the detailed dietary and nutritional profile of an important occupational group not previously studied from this angle in Cotonou. It combines 24-hour recalls, the WFP food consumption module (FCS) and anthropometric measurements and relies on an adjusted analysis of individual-level data. The consistency between limited dietary diversity, macronutrient imbalance, and the coexistence of underweight and overweight individuals within the same sample supports the central finding, despite the limitations noted above.

Conclusions

Underweight and overweight (including obesity) coexist among motorcycle taxi drivers in Cotonou in the context of mobile work and eating away from home, resulting in a poorly diversified, carbohydrate-dominant, protein-poor diet. Low dietary diversity was associated with underweight, and alcohol consumption was associated with overweight, independent of other measured factors. Interventions designed with informal transport-sector stakeholders and addressing food supply and alcohol consumption alongside individual information appear more promising than those relying on information alone. Longitudinal studies incorporating repeated measures of dietary intake and physical activity assessment will help clarify the determinants of this double burden and evaluate interventions for this occupational group.

Abbreviations

aOR: Adjusted odds ratio

BMI: Body mass index

CI: Confidence interval

FAO: Food and Agriculture Organization of the United Nations

FCS: Food consumption score

IDDS: Individual dietary diversity score

IQR: Interquartile range

NCD: Noncommunicable disease

SPSS: Statistical Package for the Social Sciences

STROBE: Strengthening the Reporting of Observational Studies in Epidemiology

USD: United States dollar

WFP: World Food Programme

WHO: World Health Organization

XOF: West African CFA franc

Declarations

Ethics approval and consent to participate

This study was not submitted to a research ethics committee or institutional review board. Before data collection, the study protocol was reviewed by researchers of the Comlan Alfred Quenum Regional Institute of Public Health (IRSP-CAQ), University of Abomey-Calavi. Data collection among motorcycle taxi drivers was authorized by the City of Cotonou (Executive Secretariat, Mairie de Cotonou; authorization No. 056/MCOT/SE/DDLP/SEPUZA/DRSE of 16 January 2025), on condition that it complied with Article 4 of Law No. 2009-09 of 22 May 2009 on the protection of personal data in the Republic of Benin, the provisions of which are now governed by Book V of Law No. 2017-20 of 20 April 2018 on the Digital Code. All methods were carried out in accordance with relevant guidelines and regulations and with the principles of the Declaration of Helsinki. The study consisted of an interviewer-administered questionnaire, 24-hour dietary recalls and non-invasive anthropometric measurements (weight and height, used to compute body mass index); no biological samples were collected and no intervention was delivered. Participants were informed of the objectives and procedures of the study and of their right to decline or withdraw at any time without consequence, and gave oral informed consent before enrollment. Oral consent was used because it is standard practice for field surveys conducted among informal-sector workers under the operational conditions of data collection at parking sites; no

separate documentation of individual consent, such as a signature or a dedicated checkbox, was recorded beyond the conduct of the interview itself. Data were anonymized before analysis and used solely for research purposes.

Consent for publication

Not applicable

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Conflict of interest

The authors declare that they have no conflicts of interest.

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Authors' contributions

Conceptualization, CSA, GRH, FIRB; Methodology, GRH, FIRB, CM; Investigation, FIRB, SG; Formal analysis, GRH; Data curation, FIRB; Writing original draft, FIRB; Writing, review, and editing, CSA, GRH, SG, CM; Supervision, CSA; Validation, CSA, GRH. All the authors read and approved the final manuscript.

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Figures

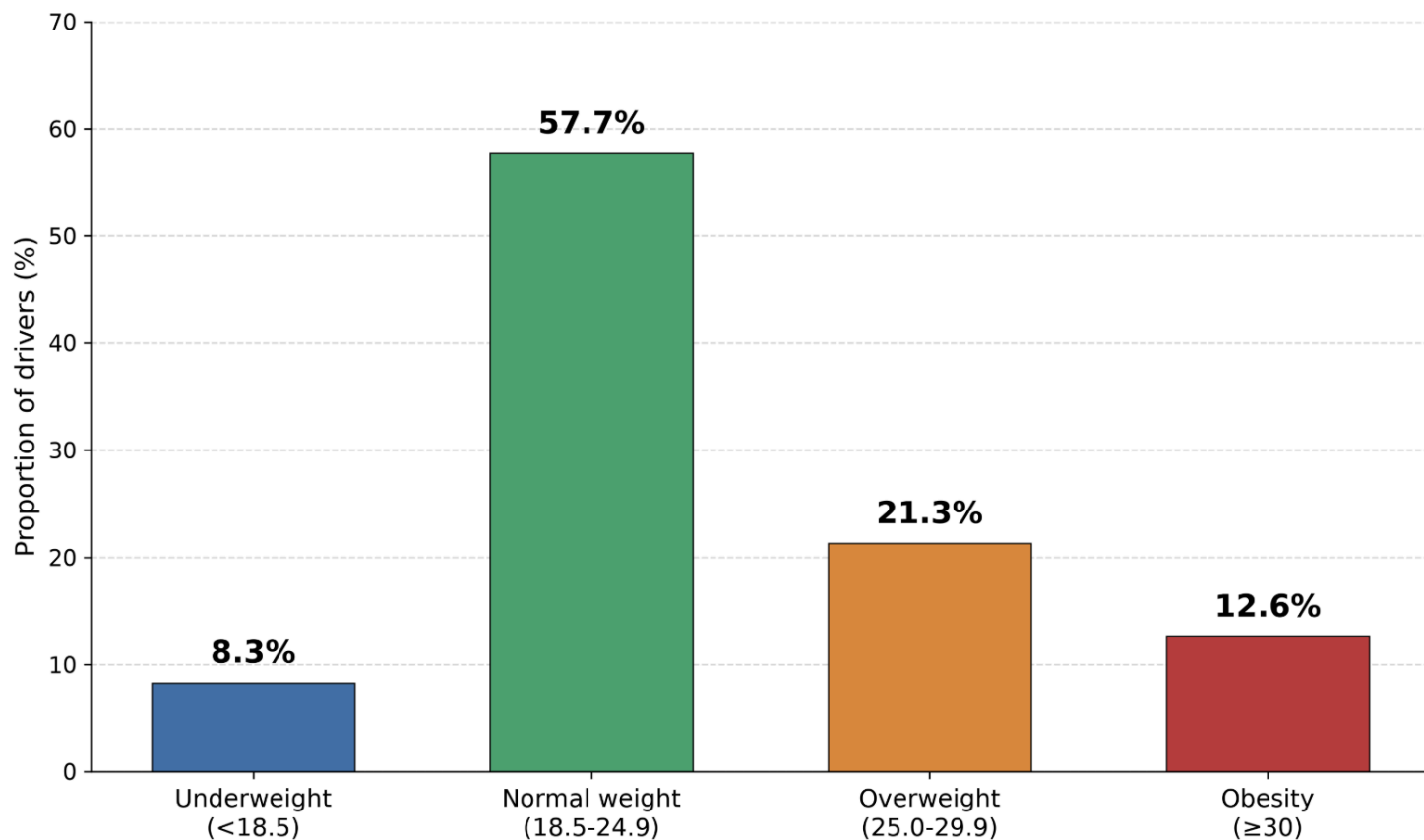


Figure 1

Distribution of motorcycle taxi drivers in Cotonou by body mass index category (N = 253)

The bars show the percentage of drivers in each body mass index (BMI) category, using WHO BMI thresholds: underweight (<18.5 kg/m²), normal weight (18.5–24.9 kg/m²), overweight (25.0–29.9 kg/m²) and obese (≥30 kg/m²) [12].