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Physical, nutritional, and health challenges among motorbike taxi drivers in Douala, Cameroon: a cross-sectional observational survey

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Abstract
Motorbike taxi driving in Douala, Cameroon, is an intense occupation that exposes drivers to heavy physical workload, poor nutrition, and serious health problems, especially musculoskeletal disorders. This study assessed these challenges among motorbike taxi drivers to inform prevention and health promotion strategies. Motorbike taxis, locally called "bend-skin", are now a major transport mode in Douala but operate in precarious conditions with little health surveillance. The study aimed to describe the physical demands, eating habits, and recurrent musculoskeletal problems among these drivers. A cross-sectional observational survey was conducted in urban and peri-urban areas of Douala. Using a structured questionnaire, data were collected from 360 drivers on socio-demographics, work schedule and postures, diet and substance use, healthcare access, and self-reported musculoskeletal pain, then analyzed with descriptive statistics. Most drivers were young adults (20-40 years), worked 3-6 days a week for 8-11 hours per day, often in difficult urban/suburban traffic and with additional physically demanding jobs, indicating high overall physical strain. Risky nutritional and health practices were frequent, including street-based meals, very low fruit intake, high alcohol and hallucinogen use, short sleep duration, reliance on self-medication, and preference for informal street healthcare. All drivers reported pain in at least one body region, with very high rates of pain in arms, legs, back, feet, and joints such as knees and ankles, reflecting a heavy burden of musculoskeletal disorders. Motorbike taxi drivers in Douala face combined physical overload, inadequate diet, and hazardous health behaviors that contribute to widespread and recurrent musculoskeletal disorders. Targeted interventions are needed, including ergonomic measures, nutrition and health education, better access to formal healthcare, and policies to limit occupational stressors and risky substance use.

Keywords: Motorbike taxi drivers, Physical workload, Risky eating habits, Alcohol and substance use, Musculoskeletal disorders, Douala, Cameroon

1. Introduction
Motorbike taxi transport has become a popular mode of transportation in many developing countries. This mode of transport provides a flexible and convenient option for commuters, especially in areas with high traffic congestion (Cervero & Golub, 2011) [1]. The physical demands of motorbike taxi driving are extended periods of fixed posture, exposure to vehicle vibrations, extreme weather conditions, air pollution, continuous handlebar gripping, back and neck tension, and repetitive leg movements, among others (Madeleine *et al.*, 2013; Long *et al.*, 2021) [2, 3].

Nutritional challenges are also prevalent among motorbike taxi drivers, as many rely on street food due to time constraints and economic factors. The high-risk eating habits of motorbike taxi drivers are reflected in irregular eating schedules, limited access to balanced meals, dependence on street food, and poor nutritional quality. These eating options can lead to health implications such as nutritional deficiencies, digestive disorders, metabolic issues, and reduced immune function (Appiah *et al.*, 2020) [4]. Regarding risky eating health practices, studies have shown that the nature of the motorbike taxi profession can contribute to irregular meal patterns, poor nutritional intake, and increased substance use. A study in Nigeria found that 72.9% of motorbike taxi drivers consumed alcohol, and 35.4% used illicit drugs (Adebayo *et al.*, 2019)

[5]. Another study in Ghana reported that 68.2% of motorbike taxi drivers had an unhealthy diet, with low fruit and vegetable consumption (Amoah *et al.*, 2020) [6].

The combination of these factors can lead to various musculoskeletal disorders, including pain in the back, arms, and legs, which are commonly reported among drivers (Maduagwu *et al.*, 2022) [7]. The prevalence of musculoskeletal disorders among motorbike taxi drivers has been reported in various studies. A study conducted in Vietnam found that 92.9% of motorbike taxi drivers experienced musculoskeletal pain, with the most common areas being the lower back, neck, and shoulders (Tran *et al*., 2016) [8]. Similarly, a study in India reported that 88.9% of motorbike taxi drivers had musculoskeletal disorders, with the most affected regions being the lower back, knees, and ankles (Diatta *et al.*, 2020) [9]. High rates of alcohol consumption, limited access to quality healthcare, inability to afford regular medical check-ups, dependence on informal healthcare solutions, lack of health insurance, limited healthcare knowledge, and reliance on self-medication further exacerbate their health risks (Patel *et al.*, 2010; Lahti *et al.*, 2013) [10, 11]. Moreover, the nature of the work exposes drivers to risks such as accidents and injuries, which further complicate their health status. Motorbike taxi transport has become a key component of urban mobility in Cameroon, particularly in cities like Douala, where traffic congestion and public transport limitations create a demand for alternative transportation methods (Lourdes *et al*., 2012) [12]. It is locally known as "*bend-skin*" in reference to a dance practiced by the grass-field people, which combines strength, speed, endurance, flexibility, equilibrium, ability, and agility. The motorbike taxi sector offers flexible employment opportunities for many individuals, particularly youth, who face challenges in accessing formal job markets (Diatta *et al*., 2020) [9]. However, the socio-economic context of this profession is often marked by precarious working conditions, low income, and limited access to healthcare services, leading to significant health challenges (Etoh & Awa, 2020) [13]. This phenomenon has become increasingly significant in Douala, Cameroon's economic capital. However, the physical, nutritional, and health challenges faced by motorbike taxi drivers have not been well-studied. Therefore, this study investigates the physical demand, risky eating practices, and recurrence of musculoskeletal disorders among motorbike taxi drivers in Douala, Cameroon.

2. Methodology

2.1. Study Design and Participants

This cross-sectional study was conducted in Douala, Cameroon, from January to June 2024. Douala is the largest city in Cameroon and a major economic hub, with a population of over 3 million people. The city is known for its high traffic congestion and the widespread use of motorbike taxis as a mode of transportation. A total of 360 motorbike taxi drivers were selected to participate in the study using a simple random sampling method. The study participants were recruited from various motorbike taxi stands and terminals located throughout Douala. The researchers approached the drivers, explained the purpose of the study, and obtained their informed consent before administering the questionnaire.

2.2. Data Collection

The data were collected through a structured questionnaire that covered the following domains:

- **Socio-demographic characteristics:** Age, cultural belonging, educational level, marital status, and work experience.
- **Work-related factors:** Working days per week, hours worked per day, work zones (urban, suburban, or both), and associated physical activity.
- **Eating habits:** Number of meals per day, meal locations (home or street), fruit, vegetable, alcohol, and substance consumption, and the consumption of meat, eggs, milk, and dairy products;
- **Healthcare access issues:** Alcohol, hallucinogen, and painkiller use; healthcare preference; place of healthcare; and reliance on self-medication
- **Musculoskeletal disorders:** Self-reported pain in different body regions (arms, legs, back, kidney, headache, feet, and neck) and the presence of joint pains (ankles, knees, elbows, wrists, and shoulders);

The questionnaire was developed based on a review of the relevant literature and input from a panel of experts in occupational health and ergonomics. It was translated into French, the primary language used in the region, and pilot-tested with 35 motorbike taxi drivers to ensure the clarity and relevance of the items. The final questionnaire was administered by six (6) trained research assistants.

2.3. Data Analysis

The collected data was analyzed using Sphinx v.4.5.0.19 statistical software. Descriptive statistics, including frequencies and percentages, were used to summarize physical, nutritional, and health challenges faced by motorbike taxi drivers. The results were presented in tables and figures.

2.4. Ethical Considerations

The study protocol was reviewed and approved by the Institutional Review Board of the University of Ngaoundéré, Cameroon. All participants provided written informed consent before participating in the study.

3. Results and Discussion

3.1. Socio-demographic parameters

The socio-demographic characteristics of the study participants are presented in table 1. The majority of the motorbike taxi drivers were between 20 and 40 years old (78.3%), with a secondary-level education (48.3%) and single marital status (86.7%). Regarding cultural belonging, the drivers were from diverse backgrounds, including Grassfield (35%), Sahelian (36.6%), and Fan Betis (15.5%). Most of the drivers had 5 to 15 years of work experience (81.7%). These findings are consistent with other studies conducted in sub-Saharan Africa, which have reported that motorbike taxi drivers tend to be young. In contrast, this research found limited education and relatively short work experience (Acheampong & Siiba, 2019; Solomon *et al.*, 2023) [14, 15].

Table 1: Socio-demographic parameters

Variables	Modalities	Percent (%)
Age	Under 20 years	5
	20 to 30 years	40.80
	30 to 40 years	37.50
	40 years and above	16.70
Cultural affiliation	Grass field	35
	Sawa	7.52
	Sahelian	36.58
	Fan betis	15.5
	Foreigners	5.4
Studies level	None	5.80
	Primary	16.70
	Secondary	48.30
	University	29.20
Marital status	Maried	12.50
	Single	86.70
	Divorced	0.80
	Widowed	0
Work experience	Less than 5 years	5
	5 to 10 years	44.20
	10 to 15 years	37.50
	More than 15 years	13.30

3.2. Physical demands of motorbike taxi driving

The results showed that motorbike taxi driving can be considered an intense physical activity (Table 2, Figure 1). The majority of the drivers worked 3 to 6 days per week (64.2%) and 8 to 11 hours per day (63.3%). The work zones were predominantly in urban and suburban areas (65.8%), which often involve navigating through heavy traffic, steep hills, and poor road conditions.

In addition to the long working hours and extensive time spent on the road, the physical demands of motorbike taxi driving are multifaceted. The job requires a high level of physical strength, speed, flexibility, and dexterity. The qualities required for top-level sport. Drivers must frequently apply significant force to control the motorbike, especially when maneuvering through traffic, accelerating, and braking. The need for quick reflexes and the ability to make rapid adjustments to the handlebars and posture are essential for maintaining control of the motorbike and responding to unexpected situations (Nantulya & Reich, 2002; Diatta *et al.*, 2020) [16, 9].

Moreover, motorbike taxi driving involves a significant amount of whole-body vibration exposure, which can lead to musculoskeletal stress and fatigue. The drivers must also maintain a constant state of vigilance and mental focus to navigate the busy urban and suburban environments, further contributing to the physical and cognitive demands of the job. Many drivers (70%) were also engaged in other physically demanding occupations, such as farming and general technician work, further exacerbating the physical strain on their bodies. These findings are consistent with studies conducted in other developing countries, which have reported that motorbike taxi driving is a physically demanding job that often involves long working hours and exposure to various physical stressors (Nantulya & Reich, 2002; Tran *et al.*, 2016; Diatta *et al.*, 2020) [16, 8, 9]. Such physical demands require a specific diet.

Table 2: Motorbike taxi driving physical and cognitive demands

Variables	Modalities	Percent (%)
Working days per week	1 to 3 days	0.80
	3 to 6 days	64.20
	Every day	35
Hours worked per day	Less than 5 hours	0
	5 to 8 hours	32.50
	8 to 11 hours	63.30
	More than 11 hours	2.50
Work zone	Urban area	18.30
	Suburban area	15.80
	Urban and suburban area	65.80
Associated physical activities	Masonry	11.70
	Farmer	20.80
	Electrician	14.20
	Tailor	5.80
	General technician	16.70

Fig 1: Various postures of motorbike taxi drivers in traffic jams (1), carrying 3 to 4 passengers (2) or heavy loads (3)

3.3. Nutritio1nal challenges of motorbike taxi driving

The study found that motorbike taxi drivers in Douala, Cameroon, exhibited several risky eating health practices (Table 3). The dietary patterns observed in this study reveal critical insights into the health risks faced by motorbike taxi drivers. Notably, 59.20% of them consume three meals a day; however, the majority of these meals are eaten on the street (95.80%), highlighting the lack of access to home-cooked meals. This dependence on roadside food often leads to poor nutritional choices, as evidenced by the low rates of fruit consumption (5.80%) and the high prevalence of unhealthy eating habits. Recent studies have shown that reliance on fast food or street food can lead to increased health risks, including obesity and chronic diseases (Appiah *et al.*, 2020; Maduagwu *et al.*, 2022) [4, 7]. A diet low in fruits and vegetables has been associated with an increased risk of chronic diseases (Aune *et al.*, 2017) [17].

Furthermore, alcohol consumption is alarmingly high, with 97.50% of motorbike taxi drivers reporting regular intake. The types of alcohol consumed further raise concerns, as 47.20% reported drinking beer and 29.00% consuming spurious whisky, which may pose additional health risks. This high rate of alcohol consumption is particularly problematic, as it can impair the drivers' cognitive and physical abilities, leading to an increased risk of traffic accidents and injuries (Rehm *et al.*, 2017) [18].

Table 3: Eating habits of motorbike taxi drivers in Douala

Variables	Modalities	Percent (%)
Number of meals per day	01	0
	02	35
	03	59.20
	More than 03	5.80
Meal location	House	4.20
	Street	95.80
Fruit consumption	Yes	5.80
	No	94.20
Meat consumption per week	Very often	0.80
	Often	15.80
	Rarely	51.70
	Never	31.70
Egg consumption per week	Very often	3.30
	Often	70.80
	Rarely	21.70
	Never	4.20
Milk and milk products consumption	Very often	0.80
	Often	25.80
	Rarely	36.70
	Never	36.70
Alcohol consumption	Yes	97.50
	No	2.50
Type of alcohol consumed	Beer	47.2
	Spurious whisky	29
	Traditional alcoholic drinks	23.8

3.4. Health challenges of motorbike taxi driving

Table 4 presents some aspects of the healthy lifestyle of motorbike taxi drivers in Douala, Cameroon. The data also indicate significant sleep deprivation, with 91.70% of drivers sleeping less than six hours a night. Insufficient sleep can negatively impact physical health, cognitive function, and overall well-being, further exacerbating the health risks faced by this population (Maduagwu *et al.*, 2022) [7]. Chronic sleep deprivation is linked to numerous health problems, including increased susceptibility to chronic diseases (Appiah *et al.*, 2020) [4].

In addition to poor dietary habits, alcohol consumption, and insufficient sleep, the study also found that the motorbike taxi drivers used hallucinogens and painkillers. The prevalence of hallucinogen consumption (98.00%) indicates a potential coping mechanism for the stresses associated with their demanding work. This aligns with findings that suggest high-risk behaviors are often adopted by individuals facing occupational stressors (Lourdes *et al.*, 2012) [12]. The use of these substances can have severe consequences for the drivers' health and safety, as they can cause impaired judgment, slowed reaction times, and decreased physical coordination (Pearson *et al.*, 2013) [16]. They also use painkillers (89.2%) on a regular basis. However, the long-term use of these medications without medical supervision can lead to adverse side effects, such as gastrointestinal bleeding, liver damage, and kidney problems (Machado *et al.*, 2017) [19].The health-seeking behaviour of drivers is also concerning. A staggering 77.10% of participants reported seeking healthcare on the street rather than in hospitals, indicating barriers to accessing formal healthcare services. This reluctance to seek professional healthcare may be due to a variety of factors, including the cost of medical services, lack of access to healthcare facilities, or a belief that the pain and discomfort are a normal part of the job (Amoah *et al.*, 2020) [6]. This is compounded by the high preference for conventional medicine (59.00%), suggesting that many drivers may not have adequate knowledge or resources to pursue proper medical care (Etoh & Awa, 2020) [13].

Table 4: Health lifestyle of motorbike taxi drivers in Douala, Cameroon

Variables	Modalities	Percent (%)
Place of Health care	Hospital	22.90
	Street	77.10
Health care preference	Conventional	59
	Non-conventional	41
Painkillers use	Yes	100
	No	0
Sleep duration	Less than 6 hours	91.70
	6 to 8 hours	3.30
	8 to 10 hours	5.0
	More than 10 hours	0
Hallucinogen use	Yes	98
	No	2

3.5. Musculoskeletal disorders among motorbike taxi drivers in Douala

The prevalence of musculoskeletal disorders (MSDs) among motorbike taxi drivers in Douala is alarmingly high. Our study found that all participants (100%) reported experiencing pain in at least one region of their body, indicating a significant health concern within this occupational group. The data reveal specific areas of pain, with many drivers suffering from multiple symptoms that adversely affect their daily activities and overall quality of life (table 5).

The results show that pain is widespread among drivers, with specific body regions consistently reported as problematic. Notably, the arms (94.20%) and legs (94.30%) are among the most affected areas, likely due to the sustained posture and repetitive motions inherent in motorbike operation. Moreover, back pain was reported by 82.50% of the participants, which aligns with findings from other studies indicating that physically demanding occupations often lead to back-related health issues (Maduagwu *et al*., 2022) [7].

The prevalence of joint pain was also notable, with 98.30% of drivers reporting discomfort in various joints. The knees (93.30%) and ankles (92.50%) were the most commonly affected joints, suggesting that the physical demands related to riding and manoeuvring motorbikes contribute significantly to these complaints (Appiah *et al*., 2020) [4]. These findings are consistent with other literature that highlights the high incidence of musculoskeletal disorders among transport workers who engage in manual labour and repetitive tasks (Maduagwu *et al.*, 2022) [7]. The recurrence of musculoskeletal disorders among the drivers is a major concern, as it can lead to chronic pain, disability, and a reduced quality of life. Studies have shown that the lack of proper medical treatment and rehabilitation can contribute to the persistence and exacerbation of these conditions (Bovenzi, 1994; Hoy *et al*., 2012; Bevan, 2015) [20, 21, 22]. The implications of these findings are significant, as musculoskeletal disorders can lead to chronic pain, decreased productivity, and increased healthcare costs. Addressing these health challenges through ergonomic interventions, increased awareness, and nutritional and health education programs is essential to improve the well-being of motorbike taxi drivers.

Table 5: Musculoskeletal disorders among taxi drivers in Douala

Variables	Modalities	Percent (%)
Pain areas in taxi motorbike drivers	Arms	94.20
	Legs	94.30
	Back	82.50
	Head	94.20
	Feet	96.70
	Neck	80.0
Joint pains	Yes	98.30
	No	1.70
Joint pain regions	Ankles	92.50
	Knee	93.30
	Elbow	47.50
	Wrists	95.80
	Shoulders	67.50

4. Conclusion

This study provides important insights into the physical, nutritional, and health challenges faced by motorbike taxi drivers in Douala, Cameroon. The findings reveal that motorbike taxi driving is an intense physical activity, with drivers often working long hours in the hazardous postures. The study also identified several risky eating health practices among the drivers, including poor dietary habits, high alcohol consumption, and substance abuse in self-medication. The high prevalence of musculoskeletal disorders, particularly in the arms, legs, back, and feet, is a significant concern. These disorders can be attributed to the physical demands of the job, as well as the drivers' poor nutritional status, reluctance to seek professional healthcare, and substance use. To address these challenges, a multifaceted approach is needed. Interventions should focus on promoting nutrition education and healthy meals, providing access to healthcare services, limiting vibrations, and reinforcing traffic rules, regulations and road infrastructures. Future research will be necessary to explore the long-term health consequences of the intense physical demands and risky health behaviours associated with motorbike taxi driving.

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Conflict of interest: The authors declare that they have no conflict of interest.

Disclaimer (Artificial intelligence): Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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