future transportation

MDPI

Article

Assessment of Public Transportation Safety Measures in Yaoundé, Cameroon: Case of Collective Taxis

Idris Karel Seunda Ekwe [1], Stephen Kome Fondzenyuy [2,*], Steffel Ludivin Feudjio Tezong [2], Jean François Wounba [1], Davide Shingo Usami [2] and Luca Persia [2]

[1] Department of Transport Planning, National Advanced School of Public Works, Elig-Effa Street, Yaoundé P.O. Box 510, Cameroon; idrisseunda@gmail.com (I.K.S.E.); jfwounba@gmail.com (J.F.W.)
[2] Centre of Research for Transport and Logistics, Sapienza University of Rome, Via Eudossiana 18, 00184 Rome, Italy; steffelludivin.feudjiotezong@uniroma1.it (S.L.F.T.); davideshingo.usami@uniroma1.it (D.S.U.); luca.persia@uniroma1.it (L.P.)
* Correspondence: stephenkome.fondzenyuy@uniroma1.it

Abstract: Yaoundé, the capital of Cameroon, is one of the cities in the country most affected by road traffic crashes. Despite the measures taken by authorities, the human factor remains a major cause of these crashes. This study aimed to evaluate the measures taken to reduce the risk-taking behaviors of collective taxi drivers in Yaoundé. A survey of 144 collective taxi drivers was conducted to gather information on their driving habits, adherence to, and perceived effects of safety regulations. The study revealed the following prevalence of risky driving behaviors among collective taxi drivers: 41.33% for impaired driving; 67% for speeding, 62% for disobeying traffic lights, 68.86% for distraction; and 67% for risky maneuvering on the road. Significant associations were found between risk perceptions and involvement in risky driving behaviors. Associations were also established between the frequency of police inspections and involvement in risky behaviors, between the participation in training programs on safety issues and using poorly maintained vehicles, and between the frequency of awareness campaigns and poor maneuvering on the road. To address these issues, it is essential to strengthen preventive measures on risk factors, raise awareness on a large scale and on a regular basis, and strictly enforce the existing regulations.

Keywords: road crashes; collective taxi drivers; risky driving behaviors; risk perception; prevention measures; awareness-raising

Citation: Seunda Ekwe, I.K.; Fondzenyuy, S.K.; Feudjio Tezong, S.L.; Wounba, J.F.; Usami, D.S.; Persia, L. Assessment of Public Transportation Safety Measures in Yaoundé, Cameroon: Case of Collective Taxis. *Future Transp.* **2024**, *4*, 1402–1429. https://doi.org/10.3390/futuretransp4040068

Academic Editor: Luigi dell'Olio

Received: 9 August 2024
Revised: 6 November 2024
Accepted: 7 November 2024
Published: 11 November 2024

1. Introduction

1.1. Generality

Collective taxis have played a vital role in the socio-economic functioning of society since the 17th century. Given the importance of this mode of transport in people's lives, major cities such as Paris have played a major role in the production of passenger vehicles since the 1890s, widely used in collective taxis. Taxis evolved from the use of horses to the use of passenger cars at the same time as the advent of motorized vehicles in the 20th century [1]. Taxis have been defined in several ways in the literature, but in a broader sense, Dienel and Vahrenkamp [1] defined collective taxis as "service run in big sedan-style motor vehicles (or minibuses), carrying different customers together and stopping on demand, usually along a predefined route or inside an area of the city".

Collective taxis (also called shared taxis) are generally used in very large cities and connect cities with their hinterlands. They provide a transportation service that offers both exclusive rides and shared rides between cities [2]. In Europe, taxis account for about 50% of airport transfers and help increase mobility, which is particularly helpful for elderly and disadvantaged people [3]. Due to their flexibility, the lack of a clear regulatory framework, and the socio-economic status of the drivers, collective/shared taxis often operate in a semi-clandestine, underground economy, without set schedules, formal registrations, or a

proper legal framework [1]. For a long time, collective taxis were considered a second-rate service, relegated to underdeveloped regions. But Dienel and Vahrenkamp showed that they were already widely used in major developed cities, including the United States, as early as 1914 [1].

Today, collective taxis remain an important form of urban transport, particularly in developing countries like Lebanon, Nigeria, Ghana, South Africa [4], Morocco [5], and Cameroon [6].

Unfortunately, collective taxis face significant road safety challenges globally, particularly in low- and middle-income countries (LMICs). A primary safety concern for collective taxis worldwide is their high involvement in traffic crashes. Over time, collective taxis have exhibited the highest crash involvement rates among four-wheeled vehicles [3]. Road traffic deaths and injuries continue to be a major global health and development issue, with 1.19 million road traffic deaths reported in 2021, which corresponds to a rate of 15 road traffic deaths per 100,000 people [7]. Occupants of four-wheeled vehicles and those in vehicles carrying more than 10 people, such as public transportation and taxis, account for nearly one-third (30%) of fatalities [7]. The distribution of these crashes by world region is highly disproportionate, with nearly nine out of ten deaths occurring in low- and middle-income countries.

Taxi drivers are widely recognized as a significant contributor to road crashes [5]. Despite dealing with physical and mental challenges, long working hours, heavy traffic, and stressful environments, they often voluntarily adopt behaviors that compromise the safety of their passengers and other road users [5].

Crash data involving taxis indicate that taxis drivers are disproportionately represented in crashes and are one to two times more likely to be involved in a fatal crash [8]. For instance, in 1996, the crash involvement rate for collective taxis in Saudi Arabia was 3.3 times higher than that for other vehicles [2]. Factors influencing road traffic crashes among collective taxis are categorized according to the road environment, the vehicle, and human factors [9]. Road environmental factors include various types of infrastructure (geometry, traffic control, land use configuration, etc.) present on different categories of roads (urban and rural) and are critical in affecting road traffic injuries. These also encompass weather conditions. Vehicle factors primarily focus on the design of different vehicle modes and protective equipment that may lead to a reduction in injuries. Human factors encompass all causes linked to human actions that increase the risk of crashes [10]. The human factors are the most significant, and, in some cases, can account for approximately 98.55% of crashes during a given period [11].

Among human factors, the most critical, which determines the professionalism of drivers, is driver behavior [7], contributing to almost 92% of crashes involving collective taxi drivers [2]. In Hong Kong, the Transport Complaints Unit revealed that public transport services had been the major area of concern, with taxi services remaining the primary area of complaints among all public transportation modes for a decade (from 2005 to 2014), particularly regarding improper driving behaviors [12].

A considerable proportion of road traffic crashes are related to overloading and drunk driving [13]. According to the Global status report on road safety 2023 [7], about 10% of road traffic deaths are associated with drunk driving, corresponding to self-reported rates of 16–21% of individuals admitting to drunk driving in a survey by the European Survey Research Association (ESRA). Drowsiness at the wheel is another factor contributing to road crashes among collective taxi drivers, influenced by voluntary sleep deprivation, driving while tired [14] (often due to long working hours), or pathological causes. Additionally, studies have shown that 91.6% of road crash victims due to falling asleep at the wheel were men [5]. Traffic law violations have also been recognized as significant causes, including speeding (which, according to recent research [15], accounts for between 2% and 78% of total crashes and 5.2% and 80% of fatalities globally), running red lights, violating safe minimum distances, driving the wrong way, drunk driving, overloading, unsafe overtaking, driving with fatigue, driving under the influence of drugs, and distracted driving [16,17].

Diver distraction significantly impacts driving performance, and this impact is growing with the increasing number of connected objects in vehicles, particularly in collective taxi operations. According to Regan et al. [18], driver distraction is defined as the diversion of attention away from activities critical for safe driving toward a competing activity, which may result in insufficient or no attention to activities critical for safe driving. Distractions may collectively be divided into four types: visual, auditory, biomechanical or physical, and cognitive [19]. The rising use of smartphones and internet penetration, especially in developing countries, is of key concern. The smartphone is the only device that combines the four sources of distraction (auditory, physical, cognitive, and visual), and writing a message while driving can increase the risk of a crash by 23 times; it forces the driver to look away from the road for an average of 5 s [19]. The prevalence of distraction among car drivers is significant. According to a study by Feudjio et al. [20], in Yaoundé, Cameroon, the prevalence of distraction is as high as 13.03%. Generally, passenger vehicle drivers spend 25 to 30% of their driving time on distracting activities, particularly among young drivers [20].

The involvement in various hazardous road behaviors is influenced by several factors, including the desire to save time, to meet customer expectations, to ensure safety from potential hazards, and, most importantly, the perception of risk associated with these behaviors [21]. Risk perception is understood as the likelihood of personally experiencing the negative social and physical consequences that could result from a crash [17]. This perception of risk is subjective, as what one individual may consider dangerous, another might see as cautious [17]. According to [22], the level of risk perception is influenced by factors such as the driver's training, social and personal factors, age, and more. Kouabenan [23] adds that experience of risk and culture also play a role.

Numerous studies have been carried out to understand the perception of risk among collective taxi drivers. The analysis of the work by Dionne, Fluet, and Desjardins [24] and Réquillart [25] by Nkene Ndeme et al. [17] highlights an important relationship between communication policies and an individual's perception of risk. This analysis shows that effective communication policies that are credible and compatible with the direct information that individuals can obtain from their own experience can lead to changes in risk perception [17]. The study by Dadipoor et al. [26] on the predictors of safe driving behaviors among taxi drivers in Tehran revealed a relationship between the perceived severity of crashes and safe behaviors. Taxi drivers who perceived a higher risk of crashes occurring while performing a behavior and associated that with high consequences were less involved in that risky behavior.

The road safety situation in Cameroon, particularly in Yaoundé, is still a cause for concern, despite a recent decline in road traffic crashes from approximately 5000 in 2016 to around 3000 in 2020 [27]. The country is far from achieving the WHO's goal of reducing road crashes by 50% by 2030. Yaoundé, one of the fastest-growing cities in Central Africa, has seen a surge in the demand for urban travel due to increased motorization, population growth, and rapid urban expansion. The absence of a mass transit system, coupled with inadequate transport infrastructure and an aging fleet of taxis and minibuses, significantly affects mobility and road user safety. The safety issues are further compounded by widespread non-compliance with traffic regulations [20,28] and the increased engagement of road users, especially collective taxi drivers, in risky driving behaviors [6,17]. Despite efforts by the authorities in Yaoundé, the situation remains dire. According to the General Delegation for National Security (GDNS), between 2017 and 2020, 70.98% of road traffic crashes in the Center region of Cameroon were directly linked to driver behaviors [27]. While there are few studies on the behavior of taxi drivers in Cameroon [6,17,20,28], the existing literature does not extensively cover the evaluation of safety measures implemented to address these behaviors, nor does it provide a comprehensive overview of the prevalence of such behaviors and their motivations among collective taxi drivers in Yaoundé.

1.2. Aim

The aim of this research was to evaluate the application and effectiveness of measures put in place by road safety authorities to combat risky driving behaviors and violations of road traffic regulations among collective taxi drivers in the city of Yaoundé, Cameroon. The specific objectives of the work were as follows:

- Identify the behaviors and violations most at risk among collective taxi drivers, their prevalence, and the factors motivating drivers' involvement in these behaviors;
- Identify the measures put in place by the public authorities to fight against risky driving behaviors among collective taxi drivers in the city of Yaoundé;
- Evaluate the application and effectiveness of these measures to reduce the rate of involvement in risky driving behaviors among collective taxi drivers and encourage compliance with road traffic regulations.

This study represents the first of its kind at the scale of a city in Cameroon and Central Africa to investigate both the prevalence of a wide range of risky driving behaviors, including their underlying motivations, and the application and impact of road safety measures on the behaviors of collective taxi drivers. As such, this study is expected to provide a valuable baseline contribution, offering empirical insights on the topic that are crucial for improving or proposing evidence-based strategies aimed at mitigating and monitoring risky driving behaviors.

The significance and relevance of this research lie in its potential to fill a critical gap in the knowledge and understanding of road safety issues amongst collective taxis in the context of Cameroon and Central Africa. The findings can inform the development of more effective and targeted interventions to address the persistent problem of risky driving behaviors among collective taxi drivers, which are a significant contributor to the high rates of road traffic crashes and fatalities in the region.

2. Materials and Methods

2.1. Procedure

The data used in this study were collected through a questionnaire distributed to collective taxi drivers in the city of Yaoundé. Prior to the use of the questionnaire, a general exploration of the city was carried out through documentary research. The documentary research consisted of consulting planning documents, policies, and reports from the various institutions involved in transportation in Yaoundé, such as the Ministry of Transportation, and Yaoundé city councils [27,29]. This research made it possible to identify the basic characteristics of the site, including its geographical, demographic, and socio-economicfeatures.

A visit around the city was also conducted. The site visits generally consisted of continuous observations made on the main roads in Yaoundé during daily journeys by collective taxi, motorbike taxi, and on foot. These observations focused on the apparent condition of the taxis and the behavior of all road users, with emphasis on the taxi drivers. This phase was of utmost importance, as its aim was to identify the various risk factors associated with collective taxi operations in Yaoundé, both in terms of the vehicle's condition and the taxi drivers' behavior. As there are no predefined routes for collective taxis, these stages allowed the researchers to understand how they operate and where taxi drivers congregate, which were potential locations for deploying the questionnaire.

Between 5 and 24 January 2024, questionnaires in English and French were administered to taxi drivers at common gathering places, including petrol stations, garages, and car washes. Before being distributed, the questionnaire was tested for clarity, and Cronbach's alpha was used to assess the internal consistency, particularly the sections on risk perception and frequency of involvement in risky behavior (a value greater than 0.5 was deemed acceptable) [30]. While this indicator may underestimate reliability for ordinal variables, it is employed in this research to ensure greater consistency among items. Items identified as consistent by this indicator are considered to exhibit enhanced reliability [31]. To ensure the reliability of the responses, each question was explained, taking into account

the respondents' level of education. In addition, only respondents with secondary or higher education completed the questionnaires themselves, while the questions were read to other respondents and their answers noted by the researchers themselves. This approach logically supported the consistency and reliability of the survey by ensuring that all respondents understood the questions in a uniform manner, thereby reducing variability and enhancing the dependability of the responses. No personal information was collected, and participants were informed that their answers would only be used for research purposes.

2.2. Sample Size Determination

The simple random sampling method was used to determine the sample size for the study, assuming that each taxi driver had the same chance of being included in the sample. In relation to the inability to accurately determine the total number of collective taxi drivers, the formula used to calculate the sample size was that given by Cochran's Sample Size Formula [32] for an unknown population, as follows:

$$n = \frac{z^2 p(1-p)}{E^2} \quad (1)$$

where

n = the required sample size;
p = the percentage occurrence of a state or condition;
E = the percentage maximum error required;
z = the value corresponding to level of confidence required.

E, which is the margin of error, is generally considered to be less than or equal to 10% [33]. In this study, the value considered was 8.5%. The percentage occurrence of a state or condition, p, provides estimation of the variance or heterogeneity of the population [34]. In this research, the value considered is 50% ($p = 0.5$, $1 - p = 0.5$,) as suggested by Bartlett et al. [34], who said that researchers should use 50% as an estimate of p, as this will result in the maximization of variance and produce the maximum sample size [35]; z, which is the targeted level of confidence, is equal to 1.96, corresponding to 95%. By applying these values, a sample size of 134 random respondents was found to be required for the validity of the data analysis.

2.3. Study Participants and Descriptive Statistics

The population studied comprised collective taxi drivers in the city of Yaoundé. The primary objective was to ascertain the behavioral characteristics of all types of collective taxi drivers in the area and the impact of road safety measures on their behaviors.

Table 1 presents demographic information and descriptive statistics related to driver characteristics. A total of 144 collective taxi drivers were successfully surveyed. In terms of gender, all respondents (100%) were male. Regarding the highest level of education, 1% (2 respondents) had not attended school, 30% (44 respondents) had not attended secondary school, 59% (84 respondents) had secondary school as the highest level, and 11% (16 respondents) had pursued higher education. All respondents were at least 21 years old, with 42% (60 respondents) aged between 31 and 40 years, and 24% (35 respondents) over 50 years old.

For driving experience, the respondents exhibited a wide range of experience levels as collective taxi drivers, ranging from less than 1 year (3%) to more than 35 years (3%). The most common experience bracket was 6 to 10 years, with 22% (32 respondents) falling into this category, followed by 10 to 15 years, with 21% of respondents. Overall, a significant majority of 83% of respondents had at least 6 years of experience in the profession, while the remaining 17% had less than 6 years of experience. In terms of working days, all the drivers reported working at least 3 times a week, with a majority (34%) working 7 days a week.

Table 1. Demographic characteristics of the respondents.

Characteristics	Frequency	Percentage
Distribution of respondents according to sex		
Male	144	100%
Female	0	0%
Total	144	00%
Distribution of respondents according to level of education		
Never been at school	2	1%
Primary	42	29%
Secondary	84	59%
Superior	16	11%
Total	144	100%
Distribution of respondents according to age		
Under 21 years old	0	0%
21–30 years old	14	10%
31–40 years old	60	42%
41–50 years old	36	25%
over 50 years old	34	24%
Total	144	100%
Distribution of respondents according to years of experience as collective taxi drivers in Yaoundé (in year)		
<1	4	3%
[1;3[	7	5%
[3;6[	13	9%
[6;10[	32	22%
[10;15[	30	21%
[15;20[	20	14%
[20;25[	16	11%
[25;30[	9	6%
[30;35[	9	6%
≥35	4	3%
Total	144	100%
Distribution of number of working days per week for collective taxi drivers		
1	0	0%
2	0	0%
3	26	18%
4	27	19%
5	10	7%
6	32	22%
7	49	34%
Total	144	100%

2.4. Questionnaire Design

The questionnaire was designed to assess safety measures, risk perception, and involvement in risky driving behaviors among collective taxi drivers. It consisted of five sections, each written in English and French, to accommodate the bilingual nature of the city. The formulation of specific questions was guided by prior research [12,16,36–39] on the topic.

2.4.1. Drivers Risk Perception

The first section dealt with the perception of risk in relation to driving behaviors among collective taxi drivers. It comprised 23 items, 20 of which required the

driver to assess the risk involved, using a 3-level Likert scale: 1 = it's not dangerous; 2 = it's dangerous; and 3 = it's very dangerous (internal consistency Alpha Cronbach =0.605). The 20 items were divided into 5 categories: The first was on perception of risk in relation to impaired driving (e.g., How dangerous is driving when tired?); the second was on driving in unsuitable environmental conditions (e.g., How dangerous is using a poorly maintained vehicle such as a vehicle with defective brakes, steering, direction lights, tires, etc.?); the third was on distraction with passengers (e.g., How dangerous is exchanging money with passengers while driving?); the fourth category was on distraction with objects (e.g., How dangerous is using a cell phone when you are driving?); the fifth category was on illegal maneuvering on the road (e.g., How dangerous is illegal parking and stopping on carriageways and walkways?); and the last category was on violation of traffic regulation (e.g., How dangerous is driving faster than the speed limit?). The other 3 items concerned: knowledge of the minimum safe distance that a driver must keep between himself and the vehicle directly in front of him; knowledge of the speed limits on the Yaoundé road network; and, finally, the driver's ability to check or not to check their speed using their dashboard.

2.4.2. Involvement in Risky Driving Behaviors

The second section of the questionnaire dealt with involvement in dangerous driving behaviors and the reasons for this involvement. This section consisted of 17 items divided into 6 categories as in the previous section, and each item represented a risky behavior in the previous section (internal consistency Alpha Cronbach = 0.719). Respondents were asked to give their frequency of involvement in each behavior using a 5-point Likert scale, from 1 to 5, where 1 = never, 2 = occasionally, 3 = fairly often, 4 = frequently, and 5 = almost all the time (e.g., How often are you involved in driving when tired?). For each item, the respondent was given the choice of whether or not to mention the reasons for their involvement in the risk behavior.

2.4.3. Compliance with Regulation and Application of Safety Measures

The third part dealt with compliance with regulations and the application of safety measures. Questions in this section were both multiple choice and open-ended. This section included eight (08) questions on the possession and age of the driving license (e.g., How long have you had a driving license?), the training leading to the driving license (e.g., Have you taken driving lessons at a driving school to obtain your driving license?), and compliance with the required frequency of technical inspections (e.g., Does your vehicle undergo a technical inspection every three months? Yes or no). The other questions looked at the application of police checks, alcohol tests, and drug tests, the application of remote and close-up awareness campaigns to encourage road users to comply with safe driving behaviors, and the application of training programs on safety issues related to collective taxis (e.g., How often do you take part in theoretical training programs on safety issues relating to the use of taxis?). For each question, the respondents were asked to give the frequency using a 5-point Likert scale from 1 to 5, where 1 = never, 2 = occasionally, 3 = quite often, 4 = frequently, and 5 = almost all the time (internal consistency Alpha Cronbach < 0.5, but assumed reliable, as the reliability of all questions was assured in the data collection process).

2.4.4. History of Fines in the Past Three Years

In the fourth part, respondents were asked to provide information about their history of fines relating to driving. The purpose of this section was to examine enforcement measures, in particular roadside police checks. It comprised eight (08) open-ended questions: the number of fines for speeding (e.g., How many Speeding fines have you had for the past three years?), for failing to obey traffic lights, for improper maneuvering on the road, for improper parking or stopping on the carriageway or pavement, for overloading, for failure to comply with technical inspections, and for driving just after taking alcohol or drugs.

2.4.5. Socio-Demographic Characteristics

The fifth and final section of the survey dealt with socio-demographic data, experience as a collective taxi driver, and daily and weekly working hours. It comprised six (06) multiple-choice and open-ended questions. The first concerned the age of the respondent, who had to choose from the following ranges: under 21; 21 to 30 years old; 32 to 41 years old; 41 to 50 years old; and over 50 years old. The second asked about the respondent's gender. The next two questions asked about the respondent's highest level of education; the respondent had to choose from "I have not studied", "Primary", "Secondary", and "Superior" and give their experience (in years). For the latter question, the respondent was asked to choose from: less than 1 year; between 1 and 3 years; between 3 and 6 years; between 6 and 10 years; between 10 and 15 years; between 15 and 20 years; between 20 and 25 years; between 25 and 30 years; between 30 and 35 years; and over 35 years. The two last questions dealt with the length of the working day and the number of days worked per week.

2.5. Data Analysis

The data collected through questionnaires were digitized and saved using Microsoft Excel 2016. After cleaning the data to eliminate missing values and outliers, the final dataset was prepared for analysis. Descriptive statistics, including proportions, means, and variances, were calculated in Excel. The Statistical Package for Social Sciences (SPSS) version 27 was then utilized to perform Chi-square tests of independence, correlation analyses, and cross-tabulations to better observe the relationships between the variables.

The Chi-square test of independence is a statistical method that assesses the association between two categorical variables, specifically determining whether knowledge of one variable influences the other [40]. In this study, it was employed to examine whether involvement in risky driving behaviors is dependent on drivers' perceptions of associated risks, attitudes toward regulations, and the implementation of safety measures aimed at reducing such behaviors among collective taxi drivers. For instance, regarding risk perception, we have the following:

H0 (null hypothesis): Risk perception for speeding (not dangerous/dangerous/very dangerous) and involvement frequency in speeding (never/occasionally/quite often/frequently/nearly all the time) are independent (p-value > 0.1).

H1 (alternative hypothesis): Risk perception for speeding (not dangerous/dangerous/very dangerous) and involvement frequency in speeding (never/occasionally/quite often/frequently/nearly all the time) are not independent (p-value < 0.1).

The indicators of the strength of the dependency between two variables used in this research is Cramér's V. Cramér's V is a widely used measure of association between nominal variables in social science, alongside other measures, such as Phi (φ) and Spearman's rank correlation (ρ). These metrics assess the existence, strength, and sometimes direction of relationships between variables. While commonly computed with Phi during Chi-square tests, Cramér's V offers advantages by allowing analysis of non-binary nominal variables and can also be applied to study relationships between nominal and ordinal variables, as is the case in this study, which primarily involves ordinal and nominal variables. This value ranges from 0 to 1 and is interpreted as presented in Table 2 [41].

Table 2. Association interpretation guide.

Cramér's V	Strength of the Dependence
0.01–0.09	Very weak
0.10–0.29	Weak
0.30–0.49	Medium
0.5–0.69	Strong
0.7–1	Very Strong

Given the limitation of Cramér's V, which does not indicate the direction of dependency, correlation analysis was employed. The Spearman rank correlation coefficient (ρ) was calculated to assess the direction of the relationship between the variables.

Correlation analysis was conducted to assess the relationship between two variables. The correlation coefficient quantifies the dependency (linear, positive, negative, or monotonic) and tests the statistical significance of this relationship. Various measures of association exist for continuous or discrete quantitative variables, including Pearson's correlation coefficient, which applies to linear relationships, and Spearman's correlation coefficient, suitable for both linear and monotonic relationships [42]. In this research, Spearman's coefficient was utilized to ensure the validity of results without concerns regarding linearity or monotonicity.

The significance parameter, or *p*-value, is crucial in statistical analysis, as it helps determine, within a defined tolerance threshold, whether the observed relationship in a sample is likely due to chance. Commonly used significance thresholds are summarized in Table 3. In this study, a relationship between two variables was considered significant if the *p*-value was less than 0.10, corresponding to a 10% significance level.

Table 3. Assossiation interpretation guide.

***p*-Value**	**Level of Significance**
>0.10	Not significant
0.05–0.10	Slightly significant (significant at the threshold of 10%)
0.01–0.05	Significant (significant at the threshold of 5%)
0.001–0.01	Very significant (significant at the threshold of 1%)
<0.001	Extremely significant (significant at the lower threshold than 1%)

All these parameters (Cramér's V, Spearman rank correlation coefficient (ρ), and *p*-value) were calculated using SPSS software version 27.

2.6. Ethics

This study was approved by the Ethical Committee of the National Advanced School of Public Works, Yaoundé, with code MPT 500. Participants were informed about the objectives of this study, and they were given assurances that their data would be kept confidential.

3. Results and Discussion

3.1. Compliance with Regulations

In the Cameroonian context, the regulations governing the activity of collective taxis place particular emphasis on several elements. These include possession of a driving license; the obligation to have taken driving lessons at a driving school; and the recommended frequency of technical inspections.

The results summarized in Table 4 show that only one respondent did not possess a driving license. For the remaining drivers, the age of first obtaining a driving license varied between 1 and 49 years, with an average of 18.44 years. This indicates a high compliance rate with the licensing regulation in contrast to findings from other contexts, which suggested that up to 70% of collective taxi drivers did not have a valid driving license [4].

Table 4. Driving license age distribution.

Driving License Age (in Years) for Taxi Drivers	
Mean	18.44097
Range	49
Minimum	0
Maximum	49
Count	144
Confidence Level (95.0%)	1.800609

Conversely, 24% of respondents reported that they had never taken a driving course at a driving school (see Table 5). Similar findings were reported in a study in Ondo State, Nigeria, which found that 25% had not taken such a course [4]. Regarding the required frequency of vehicle inspections, 17% of the drivers surveyed did not comply with this rule. In terms of working hours per day, the results (Table 6) showed that respondents' working hours varied between 6 and 24 h per day, with an average of 12 h and 16 min. The study also revealed that 72% (103) of respondents worked more than 8 h a day.

Table 5. Distribution of respondents according to compliance with regulation.

Modality	Frequency	Percentage
Have taken driving lesson at driving school		
No	35	24%
Yes	109	76%
Total	144	100%
Compliance with recommended frequency for technical inspections		
No	24	17%
Yes	120	83%
Total	144	100%

Table 6. Distribution of respondents according to daily work duration.

Daily Work Duration (in Hours)	
Mean	12.16319
Range	18
Minimum	6
Maximum	24
Count	144
Percentage above 8 h	72% (103)

3.2. Prevalence and Involvement Frequency in Risky Driving Behaviours, Risk Perception, and Application of Road Safety Measures

3.2.1. Prevalence and Involvement Frequency in Risky Driving Behaviors

By analyzing crash data from the General Delegation for National Security of Cameroon and the Ministry of Transport's road safety report, we were able to identify the behaviors that cause road crashes among taxi drivers in the city of Yaoundé. This led to an analysis of the prevalence and frequency of involvement of each factor among taxi drivers in the city of Yaoundé. The behaviors examined in this study include impaired driving, driving in unsuitable environmental conditions, distraction, illegal and dangerous maneuvers, distraction, illegal maneuvers, and disobeying traffic lights and speed limits.

The survey results indicated an average prevalence rate of 41% for impaired driving, encompassing behaviors such as driving while fatigued, drowsy, or shortly after consuming alcohol or drugs. Among these, driving while fatigued was the most prevalent (62%) and frequently reported (35% of drivers indicated they were involved quite often, and 10% reported frequent occurrences), followed closely by drowsy driving (40%). While

driving immediately after alcohol consumption was less prevalent (20%), it is noteworthy that none of the drivers involved had undergone breathalyzer or drug testing, indicating weak enforcement of drinking and driving laws.

Driving in challenging environmental conditions, such as adverse weather or the operation of inadequately maintained vehicles, was notably prevalent at 59%. Furthermore, an average of 33% of respondents indicated frequent involvement in such circumstances, with a noteworthy minority (2%) reporting engagement almost continuously.

Distracted driving was identified as highly prevalent among respondents, with an average prevalence rate of 68%. Specifically, 29% reported searching for items within the vehicle while driving, whereas the rates were significantly higher for other distractions: conversing with passengers while driving (93%), listening to music while driving (90%), eating or drinking while driving (83%), driving while looking at a map or GPS device, changing the radio station, etc. (77%), using a mobile phone while driving (58%), and exchanging money with passengers while driving (48%). These behaviors were also frequently observed; on average, 36% of respondents indicated they engaged in such activities almost continuously, 10% reported frequent involvement, and 14% stated they did so fairly often. Notably, eating or drinking while driving and conversing with passengers were reported almost continuously by 71% and 44% of respondents, respectively. Additionally, 22% and 10% reported using their phones fairly often and frequently, respectively.

Another element that has become widespread among taxi drivers is overloading. In fact, 96% of the drivers questioned had already been involved in this behavior, and 88% did it all the time.

In comparison to distraction, the average frequency of involvement in illegal maneuvers on the road is somewhat lower, with 36% of respondents reporting engagement quite often, 13% frequently, and 5% almost continuously. Nevertheless, these maneuvers remain prevalent among respondents, exhibiting an average prevalence rate of 67%. Among these behaviors, following the vehicle in front too closely (81%) was significantly more common than driving in the wrong direction, improper overtaking, veering off the road, and illegal stopping or parking, which were reported at a rate of 60%.

Among the most common behaviors are speeding (67%) and failing to stop at traffic lights (62%). Both of these behaviors are carried out with considerable frequency. Specifically, 32% and 27% of respondents, respectively, reported exceeding the speed limit and breaking traffic lights quite often. An investigation into the level of knowledge of speed limits on Yaoundé's roads revealed that 9% of collective taxi drivers had no idea of the maximum speed limit in built-up areas in Cameroon, and, according to 12% of drivers, the speed limit was between 70 and 100 km/h (see Figure 1) (3% for 70 km/h, 7% for 80 km/h, 1% for 84 km/h and 1% for 100 km/h as presented in Figure 1). Details of these results are summarized in Table 7.

3.2.2. Risk Perception

Overall, respondents demonstrated a variable perception of risk, identifying certain behaviors as associated with a higher potential for crashes while viewing others as less hazardous. Notably, an average of 77% of respondents regarded drunk driving as very dangerous, with only 3% perceiving it as entirely safe. Similarly, 55% viewed driving in poor environmental conditions as very dangerous, contrasted with 3% who considered it non-threatening. Speeding and disobeying traffic lights were viewed as very dangerous by 64% and 74%, respectively, and illegal maneuvers were deemed dangerous by 62% of respondents, with 34% categorizing them as very dangerous. In contrast, distracted driving was perceived as significantly less dangerous, with only 31% of respondents believing it to be very risky, while 40% felt it posed no danger at all. Overloading was perceived as dangerous by just 13% of respondents.

Table 7. Prevalence and frequency of involvement in risky behavior among shared taxi drivers.

Factors		Involvement Frequency					
			At Least Once				
		Never	Occasionally	Quite Often	Frequently	Nearly All the Time	Total
Impaired driving	Driving when tired	38%	17%	35%	10%	0%	62%
	Driving just after taking alcohol or drugs	80%	8%	10%	2%	0%	20%
	Drowsiness while driving	58%	14%	25%	3%	0%	42%
	Mean	59%	13%	23%	5%	0%	41%
Driving during unsuitable environmental conditions	Driving during bad weather conditions	40%	18%	32%	8%	2%	60%
	Using a poorly maintained vehicle	43%	12%	33%	10%	2%	57%
	Mean	41%	15%	33%	9%	2%	59%
Driver distraction	Eating or drinking while driving	17%	7%	21%	11%	44%	83%
	Using cell phone while driving	42%	19%	22%	10%	7%	58%
	Driving while looking at a map, GPS device, changing the radio station, etc.	23%	4%	15%	15%	43%	77%
	Searching for something in the vehicle while driving	71%	11%	8%	8%	2%	29%
	Listening to music while driving	10%	3%	5%	8%	74%	90%
	Talking to a passenger while driving	7%	6%	11%	5%	71%	93%
	Exchanging money with passengers while driving	52%	3%	17%	17%	11%	48%
	Mean	32%	8%	14%	10%	36%	68%
Overloading		4%	1%	3%	4%	88%	96%
Illegal maneuvering on the road	Performing illegal U-turns, bad overtaking, or driving the wrong way	40%	16%	32%	11%	1%	60%
	Illegal parking and stop	40%	10%	28%	15%	7%	60%
	Following the vehicle in front too closely	19%	13%	48%	14%	6%	81%
	Mean	33%	13%	36%	13%	5%	67%
Speeding		33%	11%	32%	22%	2%	67%
Disobeying traffic lights		38%	18%	27%	13%	4%	62%

In summary, as presented in Table 8, the most dangerous behaviors according to users are driving after taking alcohol or drugs (81%), drowsiness at the wheel (81%), eating or drinking while driving (90%), driving when tired (69%), speeding, and failing to stop at traffic lights. In contrast, the least dangerous behaviors, which represent no risk of crashes, are listening to music at the wheel (78%), talking to passengers (52%), overloading, and driving while looking at a map, changing the radio frequency, or consulting a GPS (49%).

Table 8. Collective taxi drivers' risk perception regarding the behaviors investigated.

Factors		Risk Perception		
		Not Dangerous	**Dangerous**	**Very Dangerous**
Impaired driving	Driving when tired	0%	31%	69%
	Driving just after taking alcohol or drugs	4%	15%	81%
	Drowsiness while driving	4%	15%	81%
	Mean	3%	20%	77%
Driving during unsuitable environmental conditions	Driving during bad weather conditions	3%	53%	44%
	Using a poorly maintained vehicle	4%	30%	66%
	Mean	3%	42%	55%
Driver distraction	Eating or drinking while driving	0%	10%	90%
	Using cell phone while driving	3%	48%	49%
	Driving while looking at a map, GPS device, changing the radio station, etc.	49%	40%	11%
	Searching for something in the vehicle while driving	10%	47%	43%
	Listening to music while driving	78%	16%	6%
	Talking to a passenger while driving	52%	45%	3%
	Exchanging money with passengers while driving	26%	56%	18%
	Mean	31%	38%	31%
Overloading		40%	47%	13%
Illegal maneuvering on the road	Performing illegal U-turns, bad overtaking, or driving the wrong way	4%	53%	43%
	Illegal parking and stop	4%	65%	31%
	Following the vehicle in front too closely	4%	69%	27%
	Mean	4%	62%	34%
Speeding		5%	31%	64%
Disobeying traffic lights		1%	25%	74%

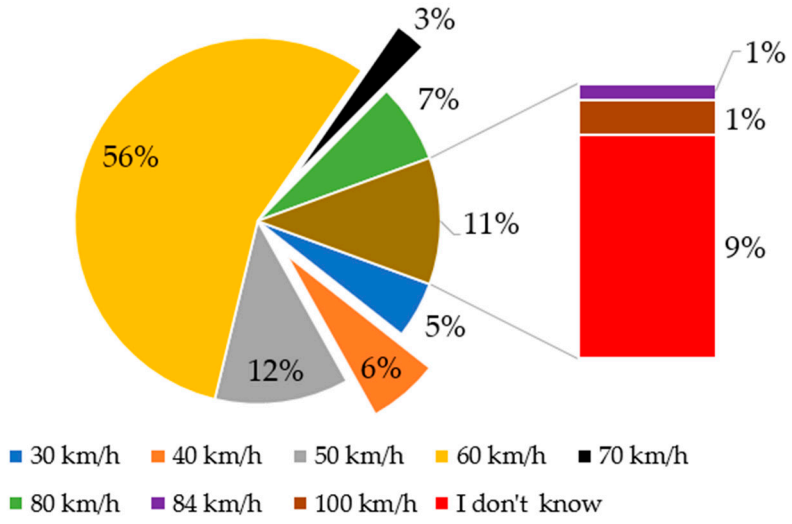

Figure 1. Perceived maximum speed limits in built-up areas by collective taxi drivers.

3.3. Results of Association and Correlation Analysis

Association of Risk Perception, Compliance with Regulation and Involvement Frequency in Risky Driving Behaviors

i. Relationship between risk perception and involvement frequency in risky driving behaviors

The analysis of the relationship between the perception of risk represented by the behaviors studied and involvement in these behaviors has enabled the identification of risk perception as an important factor that can significantly influence engagement in risky driving. As presented in Table 9, the Chi-square test of independence showed a dependency between risk perception and involvement frequency in risky behavior for 65% (11 out of 17) of the behaviors investigated.

Table 9. Association between risk perception and involvement in risky driving behaviors studied.

Behaviors	Chi-2 of Pearson (χ^2)	df	Cramer's V	*p*-Value
Eating or drinking while driving	31.138	8	0.329	<0.001
Violation of the safe minimum distance on the road	42.991	8	0.386	<0.001
Speeding	37.949	8	0.363	<0.001
Driving during bad weather conditions	21.624	8	0.274	0.006
Using a poorly maintained vehicle	20.249	8	0.265	0.009
Driving while looking at the map or GPS device, changing the radio channel, etc.	24.680	8	0.293	0.002
Searching for something in the vehicle while driving	29.812	8	0.322	<0.001
Talking to a passenger while driving	16.861	8	0.242	0.032
Exchanging money with passengers while driving	52.839	8	0.428	<0.001
Listening to music while driving	56.222	8	0.442	<0.001
Disobeying traffic lights	59.564	8	0.455	<0.001

Correlation analysis to determine the direction of these dependency relationships revealed a negative and significant relationship between risk perception and involvement frequency for all 11 behaviors. Specifically, the analysis showed a negative correlation for driving when tired ($\rho = -0.145$, $p = 0.081$), performing illegal maneuvering such as illegal U-turns, incorrect overtaking, and driving the wrong way ($\rho = -0.162$, $p = 0.056$), abusive parking and stopping ($\rho = -0.249$, $p = 0.003$), and overloading ($\rho = -0.222$, $p = 0.007$) (see Table 10).

Table 10. Correlation between risk perception and involvement in risky driving behaviors studied.

Behaviors	Spearman's Correlation Coefficient (ρ)	*p*-Value
Driving when tired	−0.145	0.081
Eating or drinking while driving	−0.247	0.003
Violation of the safe minimum distance on the road	−0.208	0.012
Speeding	−0.396	<0.001
Driving while looking at a map or GPS device, changing the radio station, etc.	−0.342	<0.001
Searching for something in the vehicle while driving	−0.323	<0.001
Listening to music while driving	−0.398	<0.001
Using a poorly maintained vehicle	−0.334	<0.001
Performing illegal U-turns, incorrect overtaking, driving the wrong way	−0.162	0.056
Talking to a passenger while driving	−0.241	0.004
Exchanging money with passengers while driving	−0.470	<0.001
Abusive parking and stopping	−0.249	0.003
Overloading	−0.222	0.007
Disobeying traffic lights	−0.242	0.003

These results suggest that a low perception of the risk represented by a behavior predisposes drivers to more frequent involvement in that behavior. In other words, drivers who are most often involved in these risky driving behaviors are those who do not perceive these behaviors as posing a significant crash risk.

In summary, the perception of risk represented by risky driving behaviors is a crucial factor in assessing the causes of the prevalence of such behaviors among collective taxi drivers. The negative direction of the observed relationships indicates that risk perception is an element that should be considered in efforts to reduce the frequency of involvement in risky driving behaviors. The introduction of measures and actions to increase the risk perceived by taxi drivers in relation to risky driving behaviors could have a positive impact on reducing their involvement in such behaviors.

ii. Relationship between compliance with regulation and involvement in risky driving behaviors

The Chi-square test conducted to assess the relationship between compliance with regulations of collective taxi activity in Yaoundé and involvement in risky driving behaviors among collective taxi drivers showed the following.

In contrast to risk perception, few tests confirmed a clear relationship between possession of a driving license (measured by the age of first obtaining one) and risky behaviors. Table 11 shows significant associations for discussions with passengers while driving (χ^2 = 159.256, V = 0.588, p = 0.030) and illegal maneuvers like U-turns and bad overtaking or driving the wrong way (χ^2 = 159.256, V = 0.589, p = 0.029). Correlation analysis (Table 12) indicated no significant direction between the age of the first license and passenger discussions (ρ = 0.638, p = 0.504). However, a negative correlation suggested that as the age of the first license increased, improper maneuvers decreased (ρ = −0.040, p = 0.057), indicating that older, more experienced drivers may engage in safer driving practices.

Table 11. Chi-2 test of independence between compliance with regulation and involvement in risky driving behaviors.

Regulations	Behaviors	Chi-2 of Pearson (χ^2)	df	Cramér's V	*p*-Value
Possession of driving license (assessed by the age of first driving license)	Performing illegal U-turns, bad overtaking or driving in the wrong way	195.673	160	0.589	0.029
	Talking to a passenger while driving	195.256	160	0.588	0.030
Origin of training received (have attended formal driving school or not for obtaining a driving license)	Driving just after taking alcohol or drugs	13.385	4	0.306	0.004
	Performing illegal U-turns, bad overtaking, or driving the wrong way	11.877	4	0.288	0.018
	Driving while drowsy	6.740	3	0.217	0.081
	Disobeying traffic lights	9.720	4	0.262	0.045

The analysis of independence between the origin of driving training (i.e., having received training at a driving school versus not) and the frequency of engagement in risky driving behaviors yielded significant results. As presented in Table 11, significant associations were found with the following: driving immediately after consuming alcohol or drugs (χ^2 = 13.385, V = 0.306, p = 0.004); involvement in improper maneuvers on the road (χ^2 = 11.877, V = 0.288, p = 0.018); and disobeying traffic signals (χ^2 = 9.720, V = 0.261, p = 0.045). Furthermore, correlation analysis revealed a significant relationship between the origin of training and engagement in risky driving behaviors. As detailed in Table 13, the training origin was negatively correlated with behaviors such as eating or drinking while driving (ρ = −0.162, p = 0.054), driving after alcohol consumption (ρ = −0.187, p = 0.025), and disobeying traffic signals (ρ = −0.243, p = 0.003). This indicates that drivers who attended driving school were less likely to engage in these behaviors compared to

those who did not. This finding underscores the positive impact of formal driving lessons on the adoption of safe driving habits, thereby contributing to a reduction in crash risk.

Table 12. Correlation between collective taxi drivers' work-related characteristics and involvement in risky driving behaviors.

Collective Taxi Drivers Work-Related Characteristics	Behaviors	Spearman's Correlation Coefficient (ρ)	*p*-Value
Possession of driving license (assess by the Age of first driving license)	Disobeying traffic lights	0.18	0.031
	Speeding	0.157	0.062
	Driving while drowsy	0.192	0.023
	Exchanging money with passengers while driving	0.169	0.046
	Performing illegal U-turns, bad overtaking, or driving the wrong way	−0.040	0.057
	Talking to a passenger while driving	0.638	0.504
Taxis divers' daily working duration	Eating or drinking while you are driving	0.178	0.032
	Using a poorly maintained vehicle	0.258	0.002
Origin of training received (Have attended formal driving school or not for obtaining a driving license)	Eating or drinking while driving	−0.162	0.054
	Driving just after taking alcohol or drugs	−0.187	0.025
	Disobeying traffic lights	−0.246	0.003
Experience as taxi driver	Exchanging money with passengers while driving	0.150	0.072
	Illegal parking and stops	−0.154	0.065
	Speeding	0.180	0.022
Weekly days of work	Daily number of hours of work	0.280	0.002

Table 13. Application of road safety measures.

Road Safety Measures	Application Levels				
	Never	Occasionally	Quite Often	Frequently	Nearly All the Time
Public awareness campaign through field work, according to collective taxi drivers	59%	12%	15%	14%	0%
Public awareness campaign using telecommunications means, according to collective taxi drivers	39%	17%	15%	29%	0%
Theoretical training programs on safety issues relating to the use of taxis, according to collective taxi drivers	74%	11%	6%	9%	0%
Police inspections of collective taxis	1%	6%	26%	34%	33%

The dependency test examining compliance with the recommended frequency of vehicle technical inspections and the use of poorly maintained vehicles was inconclusive. However, correlation analysis revealed a significant negative correlation between the two variables ($\rho = -0.213$, $p = 0.012$). This indicates that drivers who adhered to inspection regulations were significantly less likely to use poorly maintained vehicles compared to those who did not comply.

While taxi drivers' experience increased with a reduction in the likelihood of abusive parking and stopping ($\rho = -0.154$, $p = 0.065$), it contributed to an increase in the frequency

of involvement in speeding (ρ = 0.180, p = 0.022) and exchanging money with passengers while driving (ρ = 0.150, p = 0.072). This can be explained by the fact that long years of driving in the city give drivers the feeling that they have a good command of the road network and make them overconfident in their driving skills. On the other hand, lack of experience may lead drivers to be more cautious (During the field survey, a driver with more than 35 years' experience said: "We old-timers like that can afford to do certain things because we have experimented, but young people can't do that").

The same observation was made for the age of the driving license, which increased with the frequency of involvement in traffic light violations (ρ = 0.180, p = 0.031); speeding (ρ = 0.157, p = 0.062); drowsiness at the wheel (ρ = 0.192, p = 0.023); and exchanging money with passengers while driving (ρ = 0.169, p = 0.046). With the exception of drowsiness at the wheel, this can be explained by the tendency to engage in uncivil behavior (During the field survey, a number of drivers said: "When I started out, I wanted to show that I respected the rules too much, but I very quickly realised that it would be pointless because no one did"), as drivers initially fight to comply with the rules but over time become discouraged by their colleagues' failure to comply. As for drowsiness at the wheel, this is due to the fact that the age of the license increases with the age of the driver and the reduction in physical capacity, which leads to quicker fatigue (impairment).

This study also showed that the frequency of use of poorly maintained vehicles (ρ = 0.258, $p < 0.001$) and eating or drinking while driving (ρ = 0.178, p = 0.032) increased with longer working hours (Table 12). Long daily working hours may be driven by the pursuit of increased profitability and the optimization of time. In this context, drivers may prioritize cost savings over vehicle maintenance, opting to operate poorly maintained vehicles as long as they remain functional. Additionally, this focus on efficiency may lead drivers to view stopping for meals as a time-consuming activity, resulting in the practice of consuming food and beverages while driving.

In summary, the attitude of taxi drivers towards the regulation of collective taxis in the city of Yaoundé is a significant determinant of risky driving behavior. Compliance with this regulation could be a very good predictor of responsible behavior among taxi drivers. Therefore, these factors should be given special attention by the authorities when analyzing the causes of risky driving behavior and developing safety measures to improve road safety.

3.4. Assessment of Road Safety Measures

3.4.1. Application of Road Safety Measures

The study evaluation of strategies to promote good driving practices and penalize offenders included analyzing drivers' perceptions of the enforcement of these measures. The results, summarized in Table 13 show that 67% of the taxi drivers surveyed were subject to regular police checks, with 34% experiencing them frequently and 33% almost constantly, indicating significant enforcement of this measure. However, the implementation of other measures is considerably lower. For instance, 74% had never participated in a training program on safety issues related to their work; 59% had not been informed of these issues through field campaigns; and 39% had not been reached by media campaigns on TV, social networks, or radio. These figures point to a substantial shortfall in the application of these measures, with many collective taxi drivers not engaged in discussions about their driving behavior or provided with tools for improvement, potentially due to the insufficient deployment of such measures.

3.4.2. Involvement in Risky Driving Behaviors and History of Fines

The evaluation of enforcement measures involved an analysis of the history of fines of the taxi drivers who took part in the survey. The fines concerned speeding, failure to obey traffic lights, illegal maneuvering on the road, overloading, failure to have a technical inspection, and driving just after taking alcohol or drugs.

For speeding, only 1.4% of respondents admitted to having received a single fine for exceeding speed limits in the past three years, and as shown in Table 14, these drivers also reported engaging in this behavior on an occasional basis. In contrast, a significant proportion of drivers, 65.28%, admitted to speeding without ever receiving a fine for it.

Table 14. Involvement Frequency in Risky Driving Behaviors and History with Fines.

Behaviors	Number of Fines Receive During the Last Three Years	Involvement Frequency					
			At Least Once				
		Never	Occasionally	Quite Often	Frequently	Nearly All the Time	Total
Speeding	0	33.33%	9.72%	31.94%	22.22%	1.4%	65.28%
	1	0%	1.4%	0%	0%	0%	1.4%
Illegal parking and stop	0	33.3%	8.3%	20.8%	6.9%	4.2%	40.2%
	1	0.0%	2.8%	1.4%	3.5%	0.0%	7.7%
	2	0.0%	1.4%	0.7%	1.4%	1.4%	4.9%
	3	0.0%	0.7%	0.7%	0.7%	0.0%	2.1%
	4	0.0%	0.0%	1.4%	0.0%	0.7%	2.1%
	5	0.0%	0.0%	0.0%	0.7%	0.7%	1.4%
	Uncountable	0.0%	3.5%	3.5%	1.4%	0.0%	8,4%
Performing illegal U-turns, bad overtaking, or driving the wrong way, etc.	0	35.9%	12.7%	24.6%	9.9%	0.7%	47.9%
	1	0.0%	4.2%	4.2%	0.0%	0.0%	8.4%
	2	0.0%	0.7%	1.4%	1.4%	0.0%	3.5%
	3	0.0%	0.7%	1.4%	0.0%	0.0%	2.1%
	4	0.0%	0.7%	0.0%	0.0%	0.7%	1.4%
	5	0.0%	0.7%	0.0%	0.0%	0.0%	0.7%
Disobeying traffic lights	0	35.7%	14.7%	22.4%	10.5%	4.2%	51.8%
	1	0.0%	3.5%	2.8%	0.7%	0.0%	7%
	2	0.0%	1.4%	1.4%	1.4%	0.0%	4.2%
	4	0.0%	0.7%	0.0%	0.0%	0.0%	0.7%
	5	0.0%	0.7%	0.0%	0.0%	0.0%	0.7%
Overloading	0	2.8%	0.7%	1.4%	0.7%	21.5%	24.3%
	1	0.0%	0.0%	0.0%	0.7%	1.4%	2.1%
	2	0.0%	0.0%	0.7%	0.0%	3.5%	4.2%
	3	0.0%	0.0%	0.0%	0.0%	0.7%	0.7%
	4	0.0%	0.0%	0.0%	0.0%	1.4%	1.4%
	5	0.0%	0.0%	0.7%	0.0%	0.7%	1.4%
	6	0.0%	0.0%	0.0%	0.0%	0.7%	0.7%
	uncountable	0.0%	0.0%	0.0%	4.2%	58.2%	62.4%

The survey indicated that 47.9% of respondents had engaged in illegal driving maneuvers, such as illegal U-turns, driving the wrong way, and bad overtaking, without ever receiving a penalty. Notably, 24.6% reported doing so frequently, while 9% did so regularly. A similar pattern was observed for illegal stopping and parking, with 40.2% of respondents admitting involvement without penalties. Additionally, 20.8% indicated they engaged in these behaviors quite often, and 4.2% reported doing so almost constantly, all without facing any repercussions.

The results as shown in Table 14 indicate that 51.8% (This value involves all percentages at the row for 0 fine in Table 14, except the first value which refers to those who had never violate traffic lights) of the drivers surveyed have run red lights without being penalized. This behavior sharply contrasts with the practices of overloading and ignoring the recommended frequency of technical inspections. The results of Table 14 also shows that 24.3% (This value involves all percentages in Table 14 at the row of 0 fine except the first value which refers to those who had never violate traffic lights) have driven an overloaded

taxi without being sanctioned. In addition, other findings (Table 15)shows that only 4.3% of the drivers have operated a taxi with an expired technical inspection report without facing any consequences. This disparity may be attributed to the requirement for taxi insurance, which is only issued with a valid technical inspection certificate that verifies the vehicle is in acceptable condition. Consequently, this requirement likely results in a lower rate of drivers disregarding the prescribed technical inspection schedule.

Table 15. Difference between involvement in disobeying recommended frequency for technical inspection and fines for lack of technical inspection.

Strict Adherence to the Recommended Frequency (Every Three Months) for Vehicle Technical Inspections	Number of Fines Receive During the Last Three Years			
	0	**1**	**2**	**5**
NO	4.3%	5.7%	3.6%	0.7%
YES	85.6%	0.0%	0.0%	0.0%

Generally, this study indicates that despite efforts to curb risky driving behaviors among drivers, the rate of impunity remains high and is a cause for concern, especially considering the significant number of road crashes associated with such behaviors, poor driving skills, and mechanical faults. However, the enforcement against illegal taxis is not insignificant, although it is often the case that these apprehensions are settled informally and fines are not imposed (Most of the drivers who reported having already been stopped said that the arrests were settled out of court with the officers). This situation could be a fundamental reason for the drivers' almost routine involvement in highway code and regulatory violations, as the penalties they face when caught are frequently inconsequential.

3.4.3. Relationship Between Application of Road Safety Measures and Involvement Frequency in Risky Driving Behaviors

Analysis of the implementation of road safety measures introduced to reduce road crashes by tackling risky driving behavior revealed the impact that these measures could have on the behavior of taxi drivers. Generally speaking, the implementation of these measures was shown to be associated with the frequency of involvement in risky driving behavior among collective taxi drivers.

Statistical tests of independence showed a significant association between the level of implementation of police inspections of collective taxis and involvement frequency in bad maneuvering on the road (χ^2= 31.559; V = 0.234; p = 0.011), talking to passengers while driving (χ^2 = 33.979; V = 0.243; p = 0.005), and driving in bad weather conditions (χ^2= 30.158; V = 0.224; p = 0.017). Correlation analysis also showed the existence of statistically significant negative relationships between the frequency of police checks or inspections and the use of poorly maintained vehicles, illegal parking and stopping, and overloading (Table 16). The findings suggest that drivers who reported more frequent police inspections were less likely to engage in these behaviors. This can be explained by the fact that police checks are specifically aimed at apprehending users in an irregular situation, by checking, among other things, the technical inspection report, compliance with the maximum number of passengers authorized in a taxi, and adherence to the highway code. This result demonstrates the importance of police checks, but it also highlights the areas where this measure could have a significant impact, as well as those areas where the measure needs to be improved in order to increase user safety.

This study also found a significant dependency between the frequency with which taxi drivers attend theoretical training programs on safety issues relating to taxis and involvement frequency in various risky behaviors. Specifically, there was an association with instances of speeding (χ^2= 25.590; V = 0.243; p = 0.012), using a poorly maintained vehicles (χ^2= 23.220; V = 0.232; p = 0.026), overloading (χ^2= 34.372; V = 0.282; $p < 0.001$), and listening to music while driving (χ^2= 21.332; V = 0.222; p = 0.046). Additionally, increased

participation in these training programs correlated with fewer distractions from interacting with objects like maps, GPS devices, or the radio ($\rho = -0.207$; $p = 0.013$). As shown in Table 16, similar correlations were found with reduced conversations with passengers ($\rho = -0.176$; $p = 0.034$), listening to music ($\rho = -0.202$; $p = 0.015$), and eating or drinking while driving ($\rho = -0.192$; $p = 0.021$). More frequent attendance at these programs was linked with less mobile phone use ($\rho = -0.236$; $p = 0.004$) and overloading ($\rho = -0.346$; $p < 0.001$). In Yaoundé, these programs are conducted by taxi driver unions and local authorities (The unions organize meetings at various intervals during which their members are made aware of the issues and trained on them. This information comes from discussions with taxi drivers and union officials in Yaoundé during the survey). These results underscore the potential of safety training to significantly reduce the prevalence of risky behaviors among collective taxi drivers. The observed correlations suggest that proper implementation of these measures could lead to a decrease in risky driving behaviors.

Table 16. Correlation analysis between application of road safety measures and involvement frequency in risky driving behaviors.

Safety Measures	Behaviors	Spearman's Correlation Coefficient (ρ)	*p*-Value
Take part in theoretical training programs on safety issues relating to the use of taxis	Driving while looking at a map or GPS device, changing the radio station, etc.	−0.207	0.013
	Using cell phone	−0.236	0.004
	Eating or drinking while you are driving	−0.192	0.021
	Talking to a passenger while driving	−0.176	0.034
	Overloading	−0.346	<0.001
	Listening to music while driving	−0.202	0.015
Been made aware of the need to comply with safety measures through public awareness programs using TV, social media, telecommunications network, etc.	Using cell phone	−0.223	0.007
Been made aware of the need to comply with safety measures through public awareness programs using field work	Exchanging money with passengers while driving	−0.197	0.018
	Illegal parking and stops	−0.163	0.052
Vehicle inspection by the police	Using a poorly maintained vehicle	−0.213	0.012
	Illegal parking and stops	−0.142	0.092
	Overloading	−0.143	0.087

For awareness campaigns that employ technological telecommunication methods, a significant dependency was noted in various behaviors under study. Specifically, Table 17 indicates that the frequency of drivers eating or drinking while driving ($\chi^2 = 20.752$; V = 0.219; *p*-value = 0.054), speeding ($\chi^2 = 37.328$; V = 0.294; $p < 0.001$), driving during bad weather conditions ($\chi^2 = 21.630$; V = 224; $p = 0.042$), performing illegal maneuvers on the road ($\chi^2 = 27.221$; V = 0.251; $p = 0.007$), and overloading vehicles ($\chi^2 = 31.239$; V = 0.269; $p = 0.002$) is highly influenced by how frequently telecommunication tools are used to promote safety awareness, according to collective taxi drivers. This relationship is highlighted

in Table 17 of the correlation analysis, which reveals that taxi drivers who consistently listen to awareness and educational programs about safe driving broadcasted via radio, television, and social networks are less likely to use their phones while driving ($\rho = -0.223$; $p = 0.007$). Radio emerges as the most utilized medium among these options. This preference is likely due to the drivers' long hours spent in their taxis.

Table 17. Chi-2 test of independency between application of road safety measures and involvement frequency in risky driving behaviors.

Safety Measures	Behaviors	Chi-2 of Pearson (χ^2)	df	Cramér's V	*p*-Value
Police inspections of vehicle	Driving during bad weather conditions	30.158	16	0.224	0.017
	Performing illegal U-turns, bad overtaking, or driving the wrong way	31.559	16	0.234	0.011
	Talking to a passenger while driving	33.979	16	0.243	0.005
Theoretical training programs on safety issues relate to taxis	Speeding	25.590	12	0.243	0.012
	Using a poorly maintained vehicle	23.220	12	0.232	0.026
	Overloading	34.372	12	0.282	<0.001
	Listening to music while driving	21.332	12	0.222	0.046
Awareness campaigns using telecommunications means	Eating or drinking while driving	20.752	12	0.219	0.054
	Violating the safe minimum distance on the road	18.839	12	0.209	0.092
	Speeding	37.328	12	0.294	<0.001
	Using phone while driving	19.759	12	0.214	0.072
	Driving during bad weather conditions	21.630	12	0.224	0.042
	Using a poorly maintained vehicle	19.331	12	0.212	0.081
	Performing illegal U-turns, bad overtaking, or driving the wrong way	27.221	12	0.251	0.007
	Overloading	31.239	12	0.269	0.002
	Listening to music while driving	19.882	12	0.215	0.0698
Awareness campaigns using field work	Using phone while driving	18.807	12	0.209	0.093
	Using a poorly maintained vehicle	37.194	12	0.293	<0.001
	Exchanging money with passengers while driving	19.119	12	0.210	0.086
	Listening to music while driving	27	12	0.251	0.007

Of all the measures considered in this research, the independence tests between the frequency with which collective taxi drivers were exposed to awareness campaigns carried out in the field by public authorities showed the least association with risky driving behaviors. As shown in Table 17, the use of poorly maintained vehicles ($\chi^2 = 37.194$; $V = 0.293$; $p < 0.001$) and listening to music while driving ($\chi^2 = 27$; $V = 0.251$; p-value = 0.007) were found to be related to the frequency with which collective taxi drivers witnessed these campaigns. The correlation analysis showed that the frequency of participation in these road safety awareness campaigns increases as the use of mobile phones while

driving ($\rho = -0.163$; p-value < 0.052) and exchanging money with passengers while driving ($\rho = -0.197$; p-value $= 0.018$) decrease (see Table 16). This result suggests that an increase in these awareness campaigns could have a positive impact on promoting good driving practices among taxi drivers.

3.5. Reasons for Involvement in Risky Driving Behaviors Among Collective Taxi Drivers

The local context gives collective taxi activity a particular characteristic that sets it apart from what is generally observed elsewhere in the world. The legal, economic, and social situation puts significant pressure on taxi drivers, which has a considerable impact on their driving habits. To understand the reasons for the widespread lack of civic-mindedness among taxi drivers, they were questioned about the main factors that lead them to adopt risky driving behaviors on the road.

Several factors were identified by the drivers as being the primary contributors to their risky driving behaviors. Involvement in risky driving behaviour was motivated by a large number of factors, beyond just the perception of risk and impunity as highlighted in the previous analyses. According to collective taxi drivers in Yaoundé, the desire to earn more money, save time, satisfy customer demands, and the feeling of being in control and relaxed are among the factors that encourage involvement in driving while tired and drowsy, eating, drinking, or listening to music at the wheel, driving just after taking alcohol or drugs, overloading, using the telephone at the wheel, and other forms of distraction at the wheel.

Furthermore, the desire to earn more money and optimize time results in increased competition among drivers to attract more customers. This competition manifests in behaviors such as speeding, illegal parking, and violations of safe following distances, disobeying traffic lights. These risky behaviors are further exacerbated by the absence or the occupation of sidewalks and taxi stops by street vendors, as well as by passengers hailing taxis anywhere, often stopping directly in the roadway. The pressure from passengers, which may include inquiries directed at drivers or disputes with other passengers, compels drivers to engage in discussions or even confrontations while driving.

In addition to these factors, ignorance of the regulations, the desire to be safe, the desire to escape the police in a situation of irregularity, the absence of garages or trailers, and various emergencies are significant motivators of dangerous maneuvers on the road, using a poorly maintained vehicle, and driving in dangerous weather conditions.

These findings provide a comprehensive understanding of the motivators behind risky driving behaviors among collective taxi drivers. In addition to factors related to the drivers' personal motivations, external influences (including passenger behavior, public interactions, road infrastructure management, and the conduct of other road users, particularly fellow taxi drivers) play a significant role in shaping driver actions. Consequently, these results underscore the necessity for public education on road safety and adherence to traffic regulations.

3.6. Summary of Findings

The previous sections have highlighted important and significant results concerning the prevalence of risky behavior among collective taxi drivers in the city of Yaoundé, as well as the road safety measures implemented to combat this behaviour on the road. This section highlights the main findings of this study.

- Almost all (99%) of the collective taxi drivers questioned had a driving license. However, 24% of the drivers questioned had never been to a driving school to learn and obtain their license. In addition, 17% of the drivers questioned did not comply with the frequency required for roadworthiness tests, while the prevalence of the use of poorly maintained vehicles in collective taxis was 57%.
- The prevalence of overloading was 97%, for impaired driving was 41%, was 62% for driving while tired, 42% for drowsiness at the wheel, and 20% for driving just after taking alcohol or drugs.

- Distraction was very high: 58% for using mobile phone; 77% for looking for something in the vehicle while driving; 83% for eating or drinking while driving; 90% for listening to music; 93% for talking to passengers; and 58% for exchanging money with passengers.
- The prevalence of disobeying traffic lights was 63% and that of speeding at 67%, while 21% of drivers questioned had no idea of the maximum speed limit in urban areas in the city of Yaoundé. Added to this, the prevalence of illegal maneuvers on the road was 60%, particularly for poor overtaking, driving the wrong way, and abusive stops, and that of violating the minimum safety distance between two vehicles was 81%.
- Generally, the statistical analysis showed a significant association between the perception of risk represented by a behavior and the frequency of involvement in that behavior (65%, 11 out of 17 behaviors studied). It also showed the existence of a negative and significant correlation between the perception of risk represented by a behavior and the frequency of involvement in that behavior, as with abusive parking and stopping. In addition to risk perception, the age of the first driving license was related to the frequency of involvement in risky behavior such as speeding and illegal maneuvers on the road. The origin of the training received to obtain a driving license was also associated with the frequency of involvement in these risky behaviors, such as driving immediately after taking alcohol or drugs.
- The application of safety measures was very weak, with 74% of drivers having never taken part in a training program on road safety issues, 39% having never been made aware of these safety issues through telecommunications, and 59% having never witnessed a close awareness campaign on road safety issues. Although 99% of the drivers questioned said that they had had their vehicles checked by the police, their current controls are not effective, as drivers regularly violate traffic rules without being questioned, such as speeding (65.28%), illegal maneuvers (47.97%), disobeying traffic lights (51.8%), and overloading (24.3%).
- The level of application of the road safety measures studied is related to the frequency of involvement in risky driving behavior. The frequency of participation in the road safety training program was negatively correlated with the frequency of involvement in risky behaviors such as using the telephone while driving, looking for something in the vehicle while driving, or eating or drinking while driving.
- The frequency with which drivers are made aware of road safety issues by means of telecommunication was negatively correlated with the frequency of mobile phone use while driving. As for proximity awareness campaigns, it is negatively correlated with the frequency of involvement in abusive parking and stopping and the exchange of money with passengers while driving.
- In addition to the perception of risk, administrative tolerance, or the very poor application of road safety measures, the desire to save time, earn more money, satisfy passengers, the need for safety, the absence of trailers, the need to relax, the feeling of being in control, the absence of parking, and the occupation of the pavement by street vendors are important motivators of risky driving behavior among collective taxi drivers in the city of Yaoundé.

This study provides significant insights with both practical and theoretical implications. Theoretically, it represents one of the first investigations of its kind in Cameroon and Central Africa, examining the application of safety measures to mitigate risky behavior among shared taxi drivers. It quantifies the prevalence and frequency of risky driving behaviors within this demographic and identifies weaknesses in regulatory frameworks, particularly regarding the issuance of driving licenses and the quality of training provided by driving schools.

Furthermore, the findings underscore the impact of risk perception, the inadequate implementation of safety measures, and the insufficient enforcement of regulations on the frequency of risky driving behaviors among collective taxi drivers. Additionally, the study highlights often-overlooked external factors, including the behavior of other

road users, financial and social pressures, poor management of road infrastructure, and a general lack of public education regarding road safety and the highway code. These insights contribute to a more comprehensive understanding of the complexities surrounding risky driving behavior in this context, paving the way for future research and effective policy interventions.

Overall, the study provides a foundation for decision-making aimed at enhancing safety measures and their implementation. It supports reviewing the quality of training in driving schools, reinforcing regulations for driving tests, and developing targeted awareness campaigns to improve public understanding of road safety and traffic regulations. Additionally, it advocates for improving the framework for obtaining driving licenses and enhancing the capacity of collective taxi drivers' associations. By addressing these areas, stakeholders can work toward creating a safer driving environment and reducing risky behaviors among taxi drivers.

4. Comparison of Findings with Other Studies

This study focuses on evaluating road safety measures aimed at reducing risky driving behavior among collective taxi drivers by examining the extent of the phenomenon, analyzing its potential causes, evaluating the implementation of these measures, and assessing their association with risky behaviors.

The analysis of collective taxi drivers' compliance with regulations revealed nearly unanimous support for the necessity of a driving license for this profession (99%). This might suggest a diligent adherence to this rule, which contrasts with findings from previous studies in another context [2,4]. However, further examination of the drivers' training indicates that a significant number (24%) had never attended driving school. While this is in line with the literature [4], it suggests that many drivers may hold driving licenses of dubious origins. This issue extends beyond Africa; in Iran, taxi drivers emphasize the lack of solid training for obtaining driving licenses [43]. They call for continuous training even after obtaining the license. This study also revealed that a large proportion of collective taxi drivers in Yaoundé (21%) do not know the speed limit in built-up areas. Lack of knowledge on speed limits has been reported in similar studies carried out in Yaoundé [28] and is a common situation in developing countries, especially in Sub Saharan Africa [44]. About 72% of collective taxi drivers in Yaoundé spend more than 8 h driving per day, with an average of 12 h, supporting findings from existing literature [2].

The prevalence of risky driving behaviors among collective taxi drivers is alarmingly high. Excluding driving shortly after consuming alcohol or drugs (20%), drowsiness at the wheel (42%), and exchanging money with passengers (48%), the prevalence of other behaviors exceeds 57%. This includes not maintaining a safe distance (81%), using the phone while driving (57%), driving while tired (62%), speeding (67%), and failing to stop at traffic lights (62%), consistent with previous studies in other countries [4,36,45].

This high prevalence of risky driving behaviors turned out to be motivated by several factors. In line with previous studies [37,46], this study showed that drivers have a fairly high perception of the risks they are taking by engaging in the behaviors considered in this study. In addition, perception was shown to be a potential motivator of risky behavior, as indicated by the various negative correlations observed. These findings are in line with existing literature [8,36,37,46], particularly regarding speeding [8] and driving after consuming alcohol or drugs [46].

The results of this study also indicated that experience in collective taxi driving could significantly affect drivers' behaviors. Correlation analysis showed that the most experienced drivers were more involved in exchanging money with customers while driving and speeding, but less involved in improper parking and stopping on the road. While these findings seem to contradict some previous research [47] indicating that taxi driving experience positively influences driver behavior, this detailed investigation clarifies the impact of experience on various risk behaviors among taxi drivers, thereby reinforcing the existing literature [48–51]. This difference in effect may be explained by the impact of

self-esteem on involvement in risky behavior. Drivers reported taking risks on the road due to their seniority in the profession and their perceived ability to do so without being involved in a crash.

This research highlights the influence of several external factors on the behavior of shared taxi drivers, including the social pressure such as financial issue [43], use of road infrastructure, pressure from passengers, and competition and conflicts with other drivers. These results further elucidate previous research that established a direct relationship between conflicts taxi drivers experience with passengers or other road users and the frequency of their involvement in risky driving behaviors [47].

This study also revealed that measures to reduce risky driving behaviors among collective taxi drivers are poorly implemented, according to the driver's perspective. Besides police checks, which 99% of drivers reported undergoing, 59% had never been approached for road safety awareness, 39% had never been informed about road safety via telecommunications, and 74% had never participated in a road safety training program for collective taxi driving. While police checks are common, they do not significantly impact behavior, as shown by the analysis of the difference between the frequency of risky behavior and the history of fines received. Except for overloading, where regularly involved respondents reported numerous detentions over the past three years, other behaviors are practiced with near impunity. Respondents also indicated that when they are detained, the situation is generally settled informally without the application of regulatory penalties. This lack of enforcement or impunity is also seen as a potential motivator for risky driving, as some respondents admitted. However, statistical analysis showed that drivers who reported a high frequency of enforcement of these measures were the least involved in behaviors such as distraction, poor maneuvering on the road, and overloading. This highlights the importance of these safety measures, consistent with the literature [39].

5. Conclusions

The reduction in road crashes will require a profound change in the behavior of road users in general and drivers of public transport, such as collective taxis in particular. To achieve such a change in attitude and behavior, strong and effective measures must be put in place, along with ongoing monitoring and evaluation, without which it would be difficult to achieve such an objective. In the Cameroonian context, there is very little literature on the analysis of road user behavior and on the evaluation of measures already put in place to combat risky behavior, which may justify the country's delay in achieving the objectives of the United Nations Decade of Action for Road Safety. To fill this gap, the main aim of this research was to evaluate public transport safety measures in the city of Yaoundé in Cameroon, particularly collective taxis. This involved evaluating the prevalence of risky driving behaviors of collective taxis and their motivators and evaluating the application and effectiveness of road safety measures put in place by the city's road safety authorities to reduce the involvement of collective taxi drivers in risky driving behavior and improve their compliance with road traffic regulations.

This work was carried out using a mixed methodology, combining qualitative and quantitative techniques. This methodology consisted of documentary research to understand the regulatory and institutional framework and the operation of the collective taxi business in Yaoundé. The surveys were carried out with the aim of highlighting the involvement of collective taxis in road traffic crashes, the prevalence of risky driving behaviors among taxi drivers, road safety measures, and their effectiveness. The final part consisted of an analysis of the data collected to achieve the research objectives.

This research has shown that, overall, the prevalence of risky driving behavior is very high among collective taxi drivers in the city of Yaoundé. There are many factors motivating collective taxi drivers to engage in risky driving behavior. Among them, the major factors are risk perception, the low level of enforcement, and, more generally, the very poor application of safety measures. In fact the Chi-square test of independence and correlation analysis showed that there is a dependency and significant negative relationship

between risk perception and involvement in risky behaviors for at least 65% (11 out of 17) of the risky behaviors under investigation. The results also highlighted the very poor application of awareness-raising measures. Apart from the police checks that are carried out on the city's roads, 74%, 59%, and 39% of collective taxi drivers had never been made aware of road safety issues via close-up campaigns, distance campaigns, or training programs, respectively. To improve this situation, the authorities responsible for urban mobility urgently need to step up awareness campaigns, raise the standard of driver training, and strictly enforce regulations, among other things.

This study has some limitations that must be acknowledged, which include the consideration of only awareness-raising measures and that opinions on the use of collective taxi services were not exploited in this study. This study had a small sample size, though statistically significant, due to the unavailability of data on traffic crashes occurring in 2022. With regard to data analysis, only statistical Chi-square test of independence and correlation analysis was used to study the relationships between variables. Despite these limitations, this study offers significant and important insights for the development of the best policies to improve road user safety. The absence of categorization for the various degrees of each factor studied (e.g., a Likert scale from 1 = not tired to 5 = very tired) represents a limitation of this research, potentially affecting its authoritative nature. Future studies should consider incorporating such scales to yield more precise results. Another potential limitation of this study, to be covered in future research, is the need to correlate self-reported risky behaviors with actual crash outcomes and to classify the risk factors to better prioritize areas for action.

Future studies could use a larger sample size and be extended to other modes of road transport, such as private car drivers, motorcycle taxis, and buses, among others. They could also be extended to other cities in the country and examine the behaviors of users of rural roads. The aim is to gain a general understanding of the prevalence of risky behaviors among road users and to take targeted action to improve road safety.

Author Contributions: Writing—original draft preparation, I.K.S.E.; conceptualization, writing—review and editing, S.K.F.; investigation, S.L.F.T.; writing—review and editing, J.F.W.; Methodology, D.S.U.; Supervision, L.P. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki, and approved by the Ethical Committee of the National Advanced School of Public Works, Yaoundé, (Protocol: code MPT 500 and approved on 20 September 2023).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data presented in this study are available on request from the corresponding author due to privacy reasons.

Conflicts of Interest: The authors declare no conflicts of interest.

References

1. Dienel, H.-L.; Vahrenkamp, R. For a social history of shared taxi services: Some notes. *J. Transp. Hist.* **2018**, *39*, 7–11. [CrossRef]
2. Ai-Ghamdi, A.S. Taxi Service Characteristics and Involvement in Road Traffic Crashes in Riyadh. *J. King Saud Univ.* **1999**, *12*, 199–216. [CrossRef]
3. Bidasca, L.; Townsend, E. *Making Taxis Safer. Managing Road Risks for Taxi Drivers, Their Passengers and Other Road Users*; European Transport Safety Council (ETSC): Brussels, Belgium, 2016.
4. ARIYO, A.O. Perceived Predictors of Effective Safety Strategies Among Taxi Drivers in Akure South Local Government Ondo State, Nigeria. *Afr. J. Humanit. Contemp. Educ. Res.* **2022**, *3*, 95–106.
5. Asraoui, O.; El Mastour, R.; El Bakkouchi, M. Le facteur humain: Premier responsable des accidents de la route des grands taxis de la région rabat-kénitra. *Int. J. Account. Financ. Audit. Manag. Econ.* **2023**, *4*, 1052–1069.
6. Daniels, B. An Crash Waiting to Happen: A Study of Taxi Driving Mentality in Yaounde, Cameroon. Available online: https://digitalcollections.sit.edu/isp_collection/898 (accessed on 15 May 2022).
7. WHO. Global Status Report on Road Safety 2023. 2023. Available online: https://www.who.int/publications/i/item/9789240086517 (accessed on 20 July 2024).

8. Rowland, B.D.; Freeman, J.; Davey, J.; Wishart, D. A Profile of Taxi Drivers' Road Safety Attitudes and Behaviours: Is Safety Important? 2007. Available online: http://eprints.qut.edu.au (accessed on 15 May 2022).
9. Elefteriadou, L. *An Introduction to Traffic Flow Theory*; Springer: Berlin/Heidelberg, Germany, 2014.
10. Mohan, D.; Tiwari, G.; Varghese, M.; Bhalla, K.; John, D.; Saran, A.; White, H. PROTOCOL: Effectiveness of road safety interventions: An evidence and gap map. *Campbell Syst. Rev.* **2020**, *16*, e1077. [CrossRef]
11. Jean Francois, W.; Tingang Ulrich Cabrel, T.; Charles, B.; George Elambo, N. The impact of road signs on road traffic crashes: Case of Yaounde, Cameroon. *Int. J. Appl. Sci. Res.* **2021**, *4*, 189.
12. Hung, B.K.H. Road safety attitudes, perceptions and behaviours of taxi drivers in Hong Kong. *HKIE Trans.* **2018**, *25*, 255–272. [CrossRef]
13. Girma, M.; Woldetensae, B. Passengers' Perceptions on Security and Safety in Public Transportation in Ethiopia: A Case Study of Addis Ababa. *Sci. J. Silesian Univ. Technol. Ser. Transp.* **2021**, *113*, 61–73. [CrossRef]
14. Rad, E.H.; Hosseinnia, M.; Mousavi, N.; Shekari, A.; Kouchakinejad-Eramsadati, L.; Khodadadi-Hassankiadeh, N. Fatigue in taxi drivers and its relationship with traffic accident history and experiences: A cross-sectional study in the north of Iran. *BMC Public Health* **2024**, *24*, 1–9. [CrossRef]
15. Fondzenyuy, S.K.; Turner, B.M.; Burlacu, A.F.; Jurewicz, C. The contribution of excessive or inappropriate speeds to road traffic crashes and fatalities: A review of literature. *Transp. Eng.* **2024**, *17*, 100259. [CrossRef]
16. Cordazzo, S.T.; Scialfa, C.T.; Ross, R.J. Modernization of the Driver Behaviour Questionnaire. *Accid. Anal. Prev.* **2016**, *87*, 83–91. [CrossRef] [PubMed]
17. Ndeme, R.N.; Mbassi, J.; Mayouotain, N.M. Road Safety Communication and Road Users' Behavior: The Role of Perceived Risk. *Les Cah. Sci. Transp. Sci. Pap. Transp.* **2023**, 76–77. [CrossRef]
18. Regan, M.A.; Hallett, C.; Gordon, C.P. Driver distraction and driver inattention: Definition, relationship and taxonomy. *Accid. Anal. Prev.* **2011**, *43*, 1771–1781. [CrossRef] [PubMed]
19. Tombeuxas. Securite Routiere: Sensibilisation des Conducteurs aux Dangers Liés à L'utilisation du Téléphone au Volant les 16, 17 et 18 Décembre à Lille. 2014. Available online: https://www.nord.gouv.fr/Actions-de-l-Etat/Transports-Education-routiere-et-deplacements/Securite-routiere-operation-du-16-au-18-decembre-a-Lille-sur-les-dangers-du-telephone-au-volant (accessed on 8 May 2022).
20. Feudjio, S.L.T.; Tchinda, B.J.F.; Fondzenyuy, S.K.; Usami, D.S.; Persia, L. Evaluating Distraction Safety Performance Indicators in an Urban Area of a Low- or Middle-Income Country: A Case Study of Yaoundé, Cameroon. *Futur. Transp.* **2024**, *4*, 491–517. [CrossRef]
21. Stewart, D.; Biggs, H.; Davey, J. Rushing ruins lives 1 Rushing ruins livelihoods: Road safety in the taxi industry. In Proceedings of the Conference of the Australian Institutes of Transport Research, Brisbane, Australia, 7–9 December 2005.
22. Ram, T.; Chand, K. Effect of drivers' risk perception and perception of driving tasks on road safety attitude. *Transp. Res.* **2016**, *42*, 162–176. [CrossRef]
23. Kouabenan, D.R. Des croyances aux comportements de protection. 2e partie: Quels apports des études sur la perception des risques au diagnostic de sécurité et aux campagnes de prévention. In *Psychologie du Risque: Identifier, Évaluer, Prévenir*; Kouabenan, D.R., Cadet, B., Hermand, D., Munoz Sastre, M.T., Eds.; De Boeck: Bruxelles, Belgium, 2006; pp. 259–289.
24. Dionne, G.; Fluet, C.-D.; Desjardins, D.; Messier, S. La Perception des Risques D'crash et D'arrestation Lors de Conduite Avec Facultés Affaiblies. 2004. Available online: https://ideas.repec.org/p/ris/crcrmw/2004_002.html (accessed on 8 May 2022).
25. Réquillart, D. «Savoir plus, risquer moins » de la communication publique comme enjeu stratégique. *Commun. Organ.* **2001**, *20*, 1–11. [CrossRef]
26. Dadipoor, S.; Ranaei, V.; Ghaffari, M.; Rakhshanderou, S.; Safari-Moradabadi, A. Safe driving behaviors among taxi drivers: A predictive cross-sectional study based on the health belief model. *Arch. Public Health* **2020**, *78*, 1–6. [CrossRef]
27. Ministry of Transport of Cameroon. *Transport Statistics Yearbook*; Edition 2021; Ministry of Transport of Cameroon: Yaoundé, Cameroon, 2021.
28. Fondzenyuy, S.K.; Fotso, C.S.F.; Feudjio, S.L.T.; Usami, D.S.; Persia, L. Self-Reported Speed Compliance and Drivers Speeding Behaviour in Cameroon. *Futur. Transp.* **2024**, *4*, 659–680. [CrossRef]
29. Mobilize Your City. Plan de Mobilité Urbaine Soutenable Pour la Communauté Urbaine de Yaoundé, Rapport Technique, Version Finale Septembre 2019. Available online: https://www.mobiliseyourcity.net/sites/default/files/2020-01/PMUS%20Yaound%C3%A9%20-%20Septembre%202019.pdf (accessed on 8 May 2022).
30. Alphas de Cronbach des Variables dérivées—Parties A, B et Celles Issues du Questionnaire sur la Santé Mentale et l'Inadaptation à l'Adolescence (MIA). Septembre 2021. Available online: https://canadacommons.ca/artifacts/3712113/alphas-de-cronbach-des-variables-derivees/4517959/ (accessed on 8 May 2022).
31. Gadermann, A.M.; Guhn, M.; Zumbo, B.D. Estimating ordinal reliability for Likert-type and ordinal item response data: A conceptual, empirical, and practical guide. *Pract. Assess. Res. Eval.* **2012**, *17*, n3.
32. Cochran, W.G. *Sampling Techniques*, 2nd ed.; John Wiley and Sons, Inc.: Hoboken, NJ, USA, 1963.
33. Obodo, S.C.; Toher, D.; White, P. The Just-About-Right Pilot Sample Size to Control the Error Margin. *Int. J. Stat. Probab.* **2023**, *12*. [CrossRef]
34. Taherdoost, H. Sampling Methods in Research Methodology; How to Choose a Sampling Technique for Research. *Int. J. Acad. Res. Manag. (IJARM)* **2016**, *5*, 18–27. [CrossRef]

35. Bartlett, J.E.; Kotrlik, J.W.; Higgins, C.C. Organizational Research: Determining Appropriate Sample Size in Survey Research. *Learn. Perform. J.* **2001**, *19*, 43–50.
36. Razmara, A.; Aghamolaei, T.; Madani, A.; Hosseini, Z.; Zare, S. Risky behaviours of taxi drivers in Bandar Abbas, Iran. *Electron. Physician* **2018**, *10*, 6588. [CrossRef]
37. Harbeck, E.L.; Glendon, A.I.; Hine, T.J. Young driver perceived risk and risky driving: A theoretical approach to the "fatal five". *Transp. Res. Part F Traffic Psychol. Behav.* **2018**, *58*, 392–404. [CrossRef]
38. Guerrero, T.E.; Ortuzar, J.d.D.; Raveau, S. Traffic accident risk perception among drivers: A latent variable approach. *Transp. Plan. Technol.* **2020**, *43*, 313–324. [CrossRef]
39. Aghabayk, K.; Rejali, S.; Samerei, S.A.; Shiwakoti, N. Evaluating Safety Issues for Taxi Transport Management. *J. Adv. Transp.* **2021**, *2021*, 6638640. [CrossRef]
40. McHugh, M.L. The Chi-square test of independence. *Biochem. Med.* **2013**, *23*, 143–149. [CrossRef]
41. Learn Statistics Easily. Cramer's V and Its Application for Data Analysis. Available online: https://statisticseasily.com/cramers-v/ (accessed on 23 July 2024).
42. McClave, J.T.; Sincich, T. *A First Course in Statistics*; Pearson: London, UK, 2018.
43. Shams, M.; Shojaeizadeh, D.; Majdzadeh, R.; Rashidian, A.; Montazeri, A. Taxi drivers' views on risky driving behavior in Tehran: A qualitative study using a social marketing approach. *Accid. Anal. Prev.* **2010**, *43*, 646–651. [CrossRef]
44. Nordfjærn, T.; Jørgensen, S.; Rundmo, T. A cross-cultural comparison of road traffic risk perceptions, attitudes towards traffic safety and driver behaviour. *J. Risk Res.* **2011**, *14*, 657–684. [CrossRef]
45. Asefa, N.G.; Ingale, L.; Shumey, A.; Yang, H. Prevalence and Factors Associated with Road Traffic Crash among Taxi Drivers in Mekelle Town, Northern Ethiopia, 2014: A Cross Sectional Study. *PLoS ONE* **2015**, *10*, e0118675. [CrossRef]
46. Kelly, E.; Darke, S.; Ross, J. A review of drug use and driving: Epidemiology, impairment, risk factors and risk perceptions. *Drug Alcohol Rev.* **2004**, *23*, 319–344. [CrossRef] [PubMed]
47. Havârneanu, C.-E.; Măirean, C.; Popuşoi, S.-A. Workplace stress as predictor of risky driving behavior among taxi drivers. The role of job-related affective state and taxi driving experience. *Saf. Sci.* **2018**, *111*, 264–270. [CrossRef]
48. Vahedi, J.; Shariat Mohaymany, A.; Tabibi, Z.; Mehdizadeh, M. Aberrant driving behaviour, risk involvement, and their related factors among taxi drivers. *Int. J. Environ. Res. Public Health* **2018**, *15*, 1626. [CrossRef] [PubMed]
49. Newnam, S.; Mamo, W.G.; Tulu, G.S. Exploring differences in driving behaviour across age and years of education of taxi drivers in Addis Ababa, Ethiopia. *Saf. Sci.* **2014**, *68*, 1–5. [CrossRef]
50. Peltzer, K.; Renner, W. Superstition, risk-taking and risk perception of accidents among South African taxi drivers. *Accid. Anal. Prev.* **2003**, *35*, 619–623. [CrossRef]
51. Davey, J.; Wishart, D.; Freeman, J.; Champness, P. *Telstra Fleet Safety Project Progress Report*; CARRSQ: Kelvin Grove, Australia, 2006; Unpublished Manuscript.