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Illicit Drug Use among Commercial ‘Boda Boda’ Motorcyclists in Uganda

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ABSTRACT

Background: Illicit drug use is a global public health problem with grave health and socio-economic consequences. Related intoxication has been associated with accidental injuries and fatalities. In Uganda, 67% of road traffic accidents are attributed to motorcyclists. **Methods:** This study assessed the prevalence and determinants of illicit drug use among commercial motorcyclists in Uganda, using a cross-sectional survey research design. We interviewed 785 commercial motorcyclists in the divisions of Nakawa, Rubaga, Makindye, and Kawempe of Kampala district. We used an on-spot saliva drug test kit to screen and detect the presence of illicit drugs. Data were analyzed using frequency distributions, cross tabulations and multi variable logistic regression. **Results:** Findings show that 11% of the cyclists used illicit drugs. The use of illicit drugs was associated with division of operation, religiosity, and whether a cyclist resided with a family. The odds of use of illicit drugs were higher among cyclists from Nakawa division compared to cyclists from Kawempe. Cyclists who went to places of worship on a weekly basis compared to those who were less frequent, and cyclists who lived with their families compared to those who did not, had reduced odds of use of illicit drugs. There are variations in the distribution of cyclists that use illicit drugs in Kampala. Religious commitment and residence with families had a mitigating influence on illicit drug use among commercial cyclists. **Conclusion:** Illicit drug use prevention, treatment, and harm reduction programs among cyclists should collaborate with faith-based organizations and other key stakeholders, and promote stable family relations.

Acronyms: LMICs: Low and Middle Income countries; WHO: World Health Organization; SDG: Sustainable Development Goals; UNODC: United Nations Office on Drugs and Crime; MoH: Ministry of Health; NDP: National Development Plan; RTA: Road Traffic accidents

KEYWORDS

Illicit drug use; road safety; commercial motorcyclists; boda boda

Introduction

Globally, road traffic accidents (RTAs) are a leading cause of morbidity and mortality in both developing and developed countries, with major socioeconomic costs (Anjuman et al., 2020; Coleman, 2014; Jain et al., 2019; Shahbazi et al., 2019). According to the World Health Organization (WHO), globally, road traffic accidents account for an estimated 1.35 million deaths and 20 to 50 million cases of severe injuries each year. A disproportionate burden of RTAs is borne by low- and middle-income countries (LMICs). More than 90% of road traffic accidents occur in LMICs and the highest number of deaths occur on the African continent, with a rate of 26.6 deaths per 100,000 inhabitants (World Health Organization, 2018, 2021). Current trends suggest that by 2030 road traffic fatalities will become the fifth leading cause of death (Ryan-Coker et al., 2021).

The economic impact of RTAs is significant. Costs per injury are estimated to range between \$119 USD and \$178,634 USD (Ryan-Coker et al., 2021). Driving under the

influence of psychoactive substances including illicit drugs and alcohol is among the main causes of road traffic accidents (Heydari et al., 2016; Nelson et al., 2018; World Health Organization, 2018). In this study, we define illicit drug use as the non-medical use of drugs such as opium, cannabis and heroine that are prohibited by law (The Republic of Uganda, 2015).

The United Nations Office on Drugs and Crime 2012 report estimated that 3.4%–6.6% of the world's population age 15 to 64 years had used illicit drugs at least once in the previous year (Merz, 2018). The use of illicit drugs has adverse effects on the physical and mental health of persons that use drugs, with repercussions at family, community and national levels. Persons who use drugs have a shorter life expectancy compared with the general population (Glei & Preston, 2020; Peacock et al., 2018). Drug use can result in transmission of HIV and hepatitis B and C through unsafe injection practices contribute to interpersonal violence, criminal activity and can be lethal (Levitt et al., 2020; United Nations, 2021).

The narcotic drugs and psychotropic substances (control) act, no. 3 of Uganda (2015) prohibits possession of, and trafficking in narcotic drugs and psychotropic substances and cultivation of associated plants. The government is responsible for instituting measures to prevent drug abuse. The police has authority to search persons and vehicles and to arrest persons who abuse or attempt to abuse drugs (The Republic of Uganda, 2015). Cultivation of cannabis for export in Uganda (for medical purposes) was approved in 2020, with precautions to limit its use among the general population (Africanews, 2020). Motorcyclists contribute significantly to RTAs in Uganda; more than two thirds (67%) of road traffic accidents and 31% of road fatalities are attributed to motorcyclists (UBOS & ICF, 2018; Uganda Police Force, 2020).

Commercial motorcycles locally known as “boda boda” are a popular means of persons and cargo transportation in urban and rural Uganda. They constitute a significant proportion of overall traffic. Their flexibility and versatility makes them popular (Galukande et al., 2009; Naddumba, 2004; Uganda Police Force, 2020). Boda bodas are usually fast, convenient, rarely affected by traffic jams, and are relatively affordable (Howe, 2003). Boda boda cyclists are mainly male youth. Cyclists and their passengers rarely wear helmets for their safety (Galukande et al., 2009; Kamulegeya et al., 2015; Siya et al., 2019), thus, increasing their vulnerability to severe road traffic injury (Kerns & McCullough, 2008). Siya et al. (2019) also established that competition for passengers, and negligence of road safety laws and regulations increased the risk of RTAs. The accidents additionally expose individuals to adverse health outcomes including morbidity, disability and death. RTAs strain the social service sector and retard the country’s development. The fatalities and disability take a huge toll on families and communities in terms of loss of productive time, and health care costs. The estimated average cost of care per injured patient in Uganda is \$300 USD (Galukande et al., 2009). This presents a challenge to Uganda’s achievement of the Sustainable Development Goal (SDG) 3, target 3.6, which aims to halve the number of road injuries and deaths, and 11.2, which aims at providing access to safe, affordable, accessible and sustainable transport systems for all by 2030.

Factors associated with illicit drug use include being single, young, male, and sensation-seeking (Hasan et al., 2022; Ssewanyana et al., 2020). Peer acceptance is an important factor in influencing initiation and subsequent use of illicit drugs in most of the sub populations, drivers inclusive. Truckers participate in drug use to fit the trucking “image” (Davey et al., 2007; Hasan et al., 2022). However, the most important reason for illicit drug use among truck drivers is to reduce fatigue (Davey et al., 2007). Similarly among commercial motorcyclists in Nigeria, drug use is attributed to stress, fatigue and exhaustion (Nelson et al., 2018). Findings of various studies show that socio economic disadvantage or a low socio economic status is associated with illicit drug use among young persons (Archie et al., 2013; Hasan et al., 2022; Redonnet et al., 2012).

In Uganda, illicit drug use increased by 1.3% between 2017 and 2018 (Uganda Police Force, 2018). Anecdotal sources indicate that some commercial boda boda cyclists use illicit drugs. However, the magnitude is unknown. While existing research focused on alcohol (on-spot testing using a Breathalyzer) and road use behavior, the magnitude and severity of accidents, and associated costs (Naddumba, 2004; Tumwesigye et al., 2016; Wanume et al., 2019), there is no scientific evidence on the magnitude and determinants of illicit drug use among commercial cyclists in Uganda. Evidence elsewhere indicates that some boda boda cyclists use illicit drugs. A study among commercial motorcyclists in Tanzania alluded to the association between RTAs and drug use (Kiwango et al., 2021). Similarly, a study by Osifo et al. (2012) in Nigeria found an association between drug use and RTAs among motorcyclists. These studies were based on self-reports rather than drug tests. Whereas the 2020 Uganda Police Crime reports show an increase in crimes involving use of illicit drugs, these crimes are not disaggregated by population sub groups (Uganda Police Force, 2020). This study fills a critical knowledge gap by assessing the magnitude and determinants of illicit drug use among boda boda cyclists using an on-spot saliva test kit.

Materials and methods

Study design and procedure

The study utilized a cross-sectional survey research design. It was conducted in four divisions of Kampala district namely Nakawa, Rubaga, Makindye, and Kawempe. Kampala district was purposively selected because it has the highest number of commercial cyclists and road traffic accidents in the country (Uganda Police Force, 2018). The target sample size of 784.1 boda boda cyclists computed using the Kish formula (Kish, 1965) was representative of Kampala district. Data were collected from 785 cyclists operating within Kampala district, age 18 years and above irrespective of ownership of the motorcycle. The computation took into account the design effect of 1.96 at 95% confidence level. In each division, interviewers flagged cyclists that were not transporting passengers and interviewed those that consented. Additional consent was sought for drug testing. We conducted drug tests only among respondents that voluntarily consent to the tests. Interviews and tests were conducted in four random locations of each division. Flagging was done upon completion of interviews which took approximately 30 minutes. In each study location, to ensure privacy, the research team conducted drug tests in a private place. The study used a saliva drug test kit. The device is a simple-to-use kit that instantly screens and detects the presence of drugs. The test kit is highly reliable, efficient, hygienic, and non-clinical. The project trained research assistants to collect samples of saliva from the respondents. The swab was inserted in the respondents’ mouths and had to be saturated with saliva. Results were obtained within 5–10 minutes. Owing to resource constraints, the research team had 450 test kits, which were equitably distributed

within the division. The approach to interviews and drug test was piloted in a similar setting (Wakiso district) prior to data collection.

Out of the 785 cyclists, 450 were tested for illicit drugs and 401 tests were valid. Invalid results were attributed to failure to saturate the swab and were dropped during the analysis. The saliva test kit (12-Panel Oral Cube Device) tested the following substances: Marijuana (THC), Cocaine (COC), Amphetamine (AMP), Methamphetamine (mAMP), Opiates (OPI), Phencyclidine (PCP), Benzodiazepines (BZO), Barbiturates (BAR), Methadone (MET), Oxycodone (OXY), Buprenorphine (BUP) and Alcohol.

This study obtained ethical approval from The AIDS Support Organization (TASO) research ethics committee (approval number: TASOREC/0003/19-UG-REC-009), and was registered by the Uganda National Council for Science and Technology (UNCST registration number: SS5220). Additional authorization to conduct the study was obtained from the leaders of the boda boda cyclists in the four divisions prior to approaching individual participants. Participation in the study was voluntary. Given the sensitivity of drug tests, for purposes of maintenance of confidentiality, consent was verbal. Compensation for participants' time was approximately \$3 USD.

Data collection methods and tools

A predominantly structured questionnaire was developed based on a validated tool—"Motorcycle Rider Behaviors Questionnaire" (MRBQ) (Elliott et al., 2007) for studying illicit drug use and motorcycle rider behavior. The questionnaire was translated to the main local language—Luganda, for participants that do not understand English. Data collection took place in May 2021 using computer assisted personal interviews (CAPI) that utilizes the Open Data Kit (ODK) software.

Variables and measurements

The dependent variable for this study is illicit drug use established through saliva tests. The variable was coded as 0 "No" if the test result is negative for all drugs and 1 "Yes" if the test result is positive for any of the drugs. For this analysis, alcohol was excluded.

Key independent variables included age, marital status, level of education, religiosity, property ownership, residence with a family, years of commercial boda boda riding and ownership of a valid driving permit. Age was coded as <25, 25–29, 30–34, and 35+. Marital status was coded as not in union, and currently in union. Religiosity was measured in terms of frequency of attendance of place of worship on a weekly basis. It was categorized as never, once and twice or more. Education level (none/primary, and secondary+). Property ownership, i.e. land, house, or business, living with a family was each coded as "no" or "yes." Years of boda boda riding were categorized as 0–2 years, 3–6 years, 7–9 years and 10+ years. Ownership of a valid driving permit was coded as "yes-seen," "yes-not seen," and "no."

Data analysis

Analysis was conducted using Stata statistical software version 15. We used frequency distributions to present findings on the characteristics of the motorcyclists, and cross tabulations to examine the association between background characteristics and drug use using Pearson chi squared tests. We used multivariable logistic regression analysis to establish the determinants of illicit drug use. Inclusion of variables in the final model was based on their significance at bivariate level of analysis and their importance in literature. We tested for multicollinearity and excluded variables that were highly correlated. These included religion (retained religiosity); ownership of land (retained ownership of a house), and has a family (retained living with a family). The results are presented in the form of adjusted Odds Ratios (aOR), reporting 95% confidence intervals (the level of significance was set at $p < 0.05$).

Results

Characteristics of the respondents

Results presented in Table 1 show that 55% of the cyclists were over 30 years. The majority were Christians (76%), had primary or no formal education (52%), were married (74%), lived with their family members (66%), and had access to the internet (54%). Only 39% owned a house.

Table 1 further presents results on factors concerning the boda boda industry. With respect to experience in boda boda riding, 37% had three or more years of riding. Only 3% learnt riding from a driving school and the majority (81%) did not own a valid driving permit. About two-thirds (65%) owned the motorcycle and about half (51%) had loans to pay.

The results show that 11% of cyclists tested positive for illicit drugs. According to Figure 1, the most commonly used illicit drugs were Methamphetamine (Tina/Thinner), cannabis (marijuana) and cocaine (crack/coke).

Reasons for illicit drug use

Respondents were asked why boda boda cyclists used illicit drugs. Results in Figure 2 show that the main reasons (multiple responses allowed) were: enhancing work performance (52%), followed by pleasure (51%), and the need to relieve stress (46%). Other important reasons were peer pressure (38%) and addiction (34%).

Association between illicit drug use and background factors

Table 2 presents results of a cross tabulation of use of illicit drugs and selected background factors. The findings show that testing positive for illicit drugs was significantly associated with division of operation, religiosity, and whether a cyclist lived with his family. This proportion of persons who use illicit drugs was higher in Nakawa division (20%), cyclists that never went to places of worship on a weekly

Table 1. Socio-demographic characteristics of respondents (n = 785).

Variables	Percent	Total
Division		
Kawempe	25.0	196
Makindye	24.5	192
Rubaga	25.0	196
Nakawa	25.6	201
Age		
<25	18.2	143
25–29	26.6	209
30–34	21.8	171
35+	33.4	262
Religion		
Anglican	24.7	194
Catholic	34.0	267
Muslim & others	23.7	186
Pentecostal/SDA	17.6	138
Religiosity		
Never	15.5	122
Once	56.8	446
Twice or more	27.6	217
Education level		
None or primary	52.1	409
Secondary+	47.9	376
Marital status		
Not in union	26.5	208
In union	73.5	577
Lives with his family		
No	34.5	271
Yes	65.5	514
Internet		
No	54.4	427
Yes	45.6	358
Owns a house		
No	61.5	483
Yes	38.5	302
Using illicit drugs (result of test)—(401)		
No	89.0	357
Yes	11.0	44
Years in boda boda industry		
0–2 years	14.7	115
3–6 years	36.8	289
7–9 years	13.6	107
10+ years	34.9	274
Place of learning motorcycle		
Driving school	3.0	24
Friends	76.6	601
Self-learning/ relative	20.4	160
Has a valid driving permit		
Yes, seen	10.6	83
Yes, not seen	8.4	66
No	81.0	636
Owns motorcycle		
No	35.2	276
Yes	64.8	509
Has a loan to pay		
No	49.3	387
Yes	50.7	398
Days of work in a week		
1–5 days	11.3	89
Six days	39.6	311
Seven days	49.0	385
Total	100	785

basis (18%) and those who did not live with their families (18%).

Determinants of illicit drug use

Table 3 shows the results of the logistic regression that examined the determinants of illicit drug use.

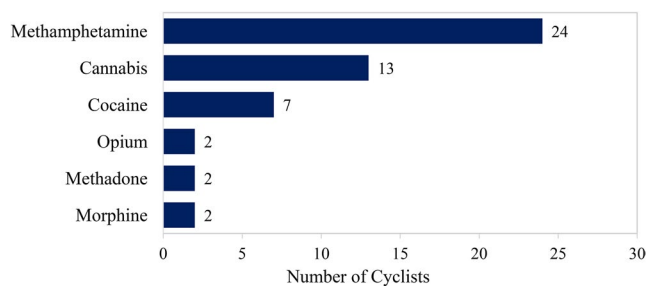


Figure 1. Number of cyclists testing positive for each illicit drug (n = 50, multiple test results allowed). *Includes cases where the respondent tested positive for more than one drug.

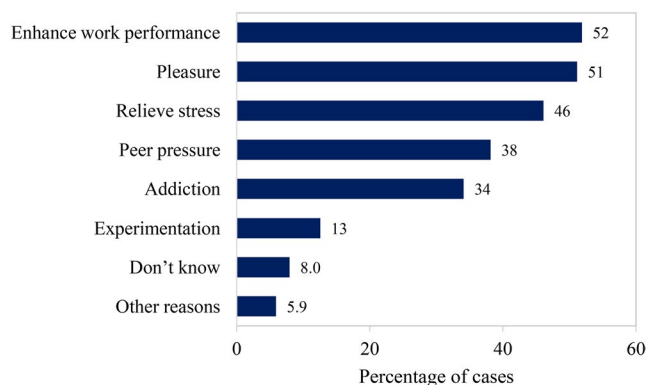


Figure 2. Reasons for illicit drug use among cyclists (% of cases, n = 248, multiple responses allowed).

Results in Table 3 show that illicit drug use was associated with division of operation, religiosity, and whether a cyclist lived with a family. Cyclists from Nakawa division had higher odds of illicit drug use (aOR = 2.94, CI 1.15–7.52) compared to cyclists from Kawempe. Cyclists who went to places of worship at least once a week had lower odds of drug use (aOR = 0.40, CI 0.17–0.94) compared to those who did not attend on a weekly basis. Those who lived with their families had lower odds of use of illicit drugs (aOR = 0.32, CI 0.15–0.66) compared to those who did not.

Discussion

The main objective of the study was to assess the prevalence and determinants of drug use among boda boda cyclists. The prevalence of illicit drug use of 11% is quite high given the fact that drug testing was voluntary. This prevalence is comparable to Nigeria's 19% among commercial cyclists, which included alcohol and tobacco (Yahaya & Dantsoho, 2020). Inclusion of alcohol for the current study raises the prevalence to 17%. It was not possible to ascertain whether the kit had the capacity to test for locally consumed substances such as *khat* or *kuba*. Therefore, there is need to develop a tailor made on-spot test kit that isolates commonly consumed local substances such as *khat* and *kuba*.

The most commonly used illicit drugs among cyclists were stimulants to enable them work for longer hours. Indeed, the most frequently reported reasons for illicit drug

Table 2. Percentage distribution of respondents by illicit drug use (n = 401).

Variables	Illicit drug use		Frequency	p-value
	Percent (Yes)	Percent (No)		
Division				0.005
Kawempe	7.3	92.7	96	
Makindye	11.9	88.1	101	
Rubaga	4.9	95.1	102	
Nakawa	19.6	80.4	102	
Age				0.575
<25	13.5	86.5	74	
25–29	9.4	90.6	106	
30–34	7.7	92.3	78	
35+	12.6	87.4	143	
Religion				0.130
Anglican	15.4	84.6	110	
Catholic	9.3	90.7	129	
Muslim/others	5.7	94.3	88	
Pentecostal/SDA	13.5	86.5	74	
Religiosity				0.023
Never	18.3	81.7	60	
Once	7.4	92.6	229	
Twice or more	14.3	85.7	112	
Education level				0.336
None or primary	12.3	87.7	228	
Secondary+	9.3	90.7	173	
Marital status				0.137
Not in union	15.0	85.0	100	
In union	9.6	90.4	301	
Lives with his family				0.002
No	17.9	82.1	134	
Yes	7.5	92.5	267	
Internet				0.892
No	11.2	88.8	224	
Yes	10.7	89.3	177	
Owens a house				0.569
No	11.7	88.3	230	
Yes	9.9	90.1	171	
Years in boda boda industry				0.089
0–2 years	12.9	87.1	62	
3–6 years	8.0	92.0	150	
7–9 years	20.8	79.2	48	
10+ years	9.9	90.1	141	
Place of learning motorcycle				0.306
Driving school	14.3	85.7	14	
Friends	9.7	90.3	310	
Self-learning/ relative	15.6	84.4	77	
Owens motorcycle				0.666
No	10.0	90.0	130	
Yes	11.4	88.6	271	
Has a loan to pay				0.871
No	10.7	89.3	196	
Yes	11.2	88.8	205	
Has a valid driving permit				0.841
Yes, seen	8.7	91.3	46	
Yes, not seen	12.5	87.5	40	
No	11.1	88.9	315	
Days of work in a week				0.954
1–5 days	11.6	88.4	43	
Six days	9.9	90.1	172	
Seven days	11.8	88.2	186	
Total	11.0	89.0	401	

use were work related. Work related pressure is high since about half of the cyclists had loans to pay. Our findings are in consonance with studies in Nigeria among cyclists (Yahaya & Dantsoho, 2020), Tanzania among construction workers (Mushi & Manege, 2018), and Australia among long haul truck drivers (Davey et al., 2007). Most boda boda cyclists are of a low socio economic status, which is a risk factor for illicit drug use (Redonnet et al., 2012). Riding under the influence of drugs by cyclists who lack professional

Table 3. Multivariate analysis of the factors associated with use of illicit drugs among motorcyclists.

Variable	Illicit use of drugs (tested)		
	Odds Ratio	p-value	[95% Confidence interval]
Division			
Kawempe	1.00		
Makindye	1.44	0.479	0.52–3.97
Rubaga	0.59	0.389	0.18–1.97
Nakawa	2.94*	0.025	1.15–7.52
Age of cyclist			
15–24	1.00		
25–29	1.06	0.915	0.38–2.91
30–34	0.93	0.907	0.28–3.11
35+	1.90	0.217	0.69–5.23
Education level			
None/primary	1.00		
Secondary+	0.63	0.204	0.31–1.29
Religiosity			
Never	1.00		
Once	0.40*	0.035	0.17–0.94
Twice or more	0.67	0.385	0.27–1.65
Internet			
No	1.00		
Yes	1.18	0.636	0.59–2.39
Owens a house			
No			
Yes	0.86	0.685	0.42–1.76
Cyclist lives with family			
No			
Yes	0.32**	0.002	0.15–0.66
Total observations	401		

P value = 0.0016.

Ref: Reference category.

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

training in riding increases the risk of RTAs. Cyclists need to be sensitized about the dangers of drug use and the fact that drug use is illegal, more so during working hours. Professional training in riding that involves understanding of traffic rules and regulations is essential.

The use of illicit drugs varied significantly by division of operation. The higher odds of drug use in Nakawa are attributed to ready access owing to the diversity of hotspots of illicit drug suppliers. Nakawa hosts the main inland container depot for long distance truck drivers who are renown for using illicit drugs (Dini et al., 2019). Enhancement of road safety requires regular random mandatory on-spot drug tests for cyclists and drivers. The anti-narcotics department of the Uganda police force should follow-up and stem or prevent supply of drugs by the known sources. This study was limited to four divisions of Kampala City. There is need to conduct studies on use of illicit drugs among road users in all regions of Uganda, and use the network and other relevant behavioral theories to explore the supply chain and users involved.

Similar to findings elsewhere (Felipe et al., 2015; Ford & Hill, 2012; Gomes et al., 2013), religiosity was associated with the use of illicit drugs. Many mainstream religions such as Protestantism, Islam and Pentecostalism preach against intoxication. Frequenting places of worship leads to adherence to religious values, and participation in religious activities improves their psychological wellbeing (Kelly et al., 2015; Ssewanyana et al., 2020). Hence, the need for drug consumption to relieve stress does not feature. This highlights the important role of religious leaders in behavioral change. They should be actively

engaged in illicit drug use prevention and rehabilitation. Living with a stable family is protective in that the family provides a context for physical and mental health, stability and accountability, thus reducing the odds of illicit drug use (Davey et al., 2007; Schlauch et al., 2013; Thomas, 2016).

Limitations of the study

The test kit results tend to lump substances together for example Opiates, making it difficult to isolate specific drugs. Since drug tests were voluntary, it is possible that some of the cyclists that use illicit drugs declined to test.

Conclusion

The prevalence of drug use among boda boda cyclists at 11% is comparable to other sub-Saharan countries. The determinants of illicit drug use were division of operation, living with a family and religiosity. The odds of illicit drug use were higher in specific locations especially Nakawa division, among less religious cyclists, and those that did not live with their families. Improvement of road safety requires preventive and harm reduction interventions with emphasis on these categories of cyclists. The interventions should be collaborative, involving the relevant government and non-government actors, including faith based organizations.

Consent to publish

All authors consented to the publication of the article.

Declaration of interest

The authors declare that they have no competing interests.

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Data availability statement

The dataset is available upon reasonable request from the corresponding author.

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