

BMJ Open Drunk driving: a secondary analysis of factors associated with driving under the influence of alcohol in Jamaica

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ABSTRACT

Objectives To determine the prevalence of alcohol use patterns, sociodemographic factors and risk of alcohol dependence among vehicle drivers in Jamaica.

Design A secondary data analysis.

Setting This study was conducted using the Jamaica National Drug Prevalence Survey 2016 dataset.

Participants This included 1060 vehicle drivers derived from the population sample of 4623. The participants from each household were randomly selected as the respondent for the survey.

Primary and secondary outcome measures Alcohol use and dependence were measured using the Alcohol Use Disorders Identification Test questionnaire. Driving under the influence of alcohol (DUIA) was assessed by questions regarding its use in the past 12 months. The analysis involved the use of Pearson's χ^2 test and logistic regression.

Results 75% of Jamaicans reported lifetime alcohol use. Approximately 65% of drivers indicated that they currently drink alcohol. 18% of drivers who currently drink alcohol admitted to DUIA. Reportedly, 54.5% of these drivers were alcohol binge drinkers, with 41.5% also driving under the influence of cannabis. The bivariate analysis demonstrated that DUIA was higher among Christian participants and those who worked in non-machine operator jobs ($p=0.002$ and $p=0.008$, respectively). Vehicle drivers altogether and drivers who drive under the influence of alcohol had significant associations with hazardous drinking ($p=0.011$ and $p<0.001$, respectively). Logistic regressions highlighted drivers 34 years and under ($p=0.012$), male drivers ($p=0.002$) and the head of the household ($p=0.050$) were 1.82, 3.30 and 1.86 times more likely, respectively, to report driving under the influence of alcohol in the past year.

Conclusions The prevalence of alcohol use among Jamaica's population and vehicle drivers is high. That one in five drivers, who currently consume alcohol, also admits to driving under the influence suggests the urgent need for mitigation strategies and legislative action as part of a preventative effort to reduce drunk driving.

INTRODUCTION

Road traffic injury (RTI) represents a significant global public health issue, accounting for approximately fifty million non-fatal injuries and 1.35 million annual fatalities worldwide.¹ At the turn of the century, road

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ The random selection of survey participants likely enhanced both the sample representation within the national population and the ability to generalise the research findings. Moreover, the large sample size helped increase the study's power.
- ⇒ The use of robust multivariable logistic regression in the analysis provides a baseline for future research endeavours.
- ⇒ This study was a cross-sectional design and thus is limited to creating associations and may not be used to conclude causality.
- ⇒ The respondents providing answers they consider socially acceptable might also introduce a response bias.

traffic fatality rates in the Caribbean and Latin America soared by more than 20% over the ensuing decade,² indicating that just shy of one million people died in road traffic accidents.³

Jamaica is no exception, as road traffic accidents represent a massive public health problem that continues to be one of the major causes of injury and death^{4 5} in the largest English-speaking island in the West Indies, that is residence to just under 3 million citizens.⁶ Since the year 2000, Jamaica has seen an increase in traffic-related mortality rates,⁷ similar to other low-income and middle-income countries (LMICs) that evidently report a three times higher risk of road traffic deaths in comparison to high-income countries (HICs).¹ Given that road transport is the predominant mode of travelling, available statistics also indicate that road traffic fatalities in Jamaica have steadily increased over the past 5 years, from 389 in 2018 to 488 in 2022,⁸ the latest figure representing the highest tally in the last decade.

An avoidable risk factor for RTI is driving under the influence of alcohol (DUIA), where research has demonstrated a dose-dependent influence on driving performance and an increased risk and severity of



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vehicular crash.^{9–11} Extant literature suggests DUIA poses a serious safety concern because alcohol has been shown to be responsible for a high number of fatal vehicular crashes in many countries.^{12–13} In Jamaica, a number of studies have demonstrated an association between victims of vehicular accidents and a blood alcohol concentration (BAC) level in excess of the legal limit of 0.08 g/dL.^{14–15} However, research consistently indicates an increased risk of a driver being involved in a road traffic accident after exceeding a BAC level of 0.05 g/dL.¹⁶ At this level, drivers are more likely to speed, misjudge distance and display impaired cognitive functioning.^{17–19} Current national legislation endorses a BAC limit of ≤ 0.08 g/dL for both general and young/first-time drivers,²⁰ that is higher than international recommendations of ≤ 0.05 g/dL for the general population and ≤ 0.02 g/dL for young or first-time drivers.²¹

The most recent Global Status Report on Road Safety suggested that almost 20% of road traffic deaths in Jamaica were due to DUIA.²² To date, no studies in the Caribbean have used nationally representative data to assess the alcohol use patterns, risk of alcohol dependence and the associated sociodemographic characteristics of vehicle drivers that may drive under the influence of alcohol.

Studies both regionally and globally indicate a higher prevalence of DUIA in males and young adults.^{3,10} As such, the relevant findings of this study may help to provide the impetus in prioritising legislation and intervention among the driving subpopulation in Jamaica, in accordance with best practice recommendations in guarding against drunk-driving as outlined by the World Health Organization (WHO) SAFER initiative.²¹

OBJECTIVES

1. To determine the prevalence of alcohol use patterns among vehicle drivers, including those who drive under the influence of alcohol (DUIA), those who are binge drinkers who drive under the influence of alcohol and those who drive under the influence of alcohol and cannabis.
2. To examine and compare the risk of alcohol dependence among two sets of driver groups—(A) drivers versus non-drivers and (B) drivers who drive under the influence of alcohol versus drivers who do not drive under the influence of alcohol.
3. To investigate the sociodemographic factors associated with DUIA.

METHODS

Study design, sample size and data source

The original study was a cross-sectional survey of a Jamaican population sample examining drug use prevalence and patterns.²³ The sample consisted of 4623 participants living in 14 parishes in Jamaica. The survey used a stratified multistage sampling design of which

the primary sampling units were the Enumeration Areas (EAs). Sampling weights were determined to account for selection probability, non-response and population distribution. To ensure accurate representation, poststratification weights were applied based on age and sex categories at the parish level. This helped match the distribution of the weighted sample with the population distribution of age and sex groups. In each EA, systematic random sampling was used to draw 16 households, from which one individual between the age of 12 and 65 years served as the survey respondent. Data were collected between April and July 2016 from a standardised questionnaire developed by the Inter-American Drug Abuse Control Commission and the Inter-American Observatory on Drugs and conducted through partnership with Jamaica's National Council on Drug Abuse.²³

This study is a secondary data analysis of the National Drug Prevalence Survey, Jamaica 2016. The target population comprised 1060 participants that represented persons that drive vehicles. This research extracted variables relevant to DUIA, alcohol use patterns, dependence and the associated sociodemographic characteristics that might influence alcohol use in vehicle drivers. This study contained no identifying data of respondents, and no direct or indirect contact was made with any respondents.

Study variables

Alcohol use prevalence

The prevalence of alcohol use was determined for the periods of lifetime or 'ever' use, past year use and past month/current use by using the target variables. Responses were coded as 1=yes and 2=no. For heavy/binge drinking alcohol use, respondents were asked to state had they taken five drinks or more for males or four drinks or more for females, on a single occasion in the past 2 weeks. Seven response options were recategorised into 1=yes and 2=no.

Alcohol dependence

Alcohol use was assessed using The Alcohol Use Disorders Identification Test (AUDIT), a 10-item scale developed by the WHO in which the answers to each question are rated on a scale ranging from 0 to 4, giving a maximum score of 40.²⁴ A score of 8 or more is associated with harmful or hazardous drinking, whereas a score of 13 or more in women, and 15 or more in men, is likely to indicate alcohol dependence. For this study, the AUDIT scores were recategorised into two groups where a score greater than or equal to 8 was defined as harmful or hazardous drinking and a score of less than or equal to 7 was defined as not harmful or hazardous drinking.

Driving under the influence

The National Drug Prevalence Survey asked respondents, 'Have you driven a vehicle in the past 12 months?' the response options were 1=yes (drivers) and 2=no (non-drivers). For the item 'During the past 12 months, have you driven a vehicle while you were under the influence

of alcohol?' the response options were 1=yes (DUIA) and 2=no (Non-DUIA). Statistical computations were used to extract respondents who were current alcohol users that also answered 'yes' to the question, 'During the past 12 months, have you driven a vehicle while you were under the influence of alcohol?' Statistical computations were used to extract respondents who were current cannabis users that also answered 'yes' to the question 'During the past 12 months, have you driven a vehicle while you were under the influence of illegal drugs?' to denote those who drive under the influence of cannabis (DUIC) for analytical purposes.

Sociodemographic characteristics

Sociodemographic characteristics that might influence alcohol use in drivers were included as covariates. Survey questions that contained the option 'don't know' or 'no response' were treated as missing variables. Respondents were asked to state their age. Responses were categorised into two groups—1=34 years and under, representing young adults as suggested by Franssen and colleagues²⁵ and 0=35 years and over. Respondents were asked to state their gender (1=male, 0=female) and geographical location (recategorised into 1=urban and 0=rural). Educational status was assessed with the question, 'What is the highest educational level that you have achieved?' There were ten response options. These were recategorised into 1=tertiary level, 0=below tertiary level. The respondents were asked to state their marital status. This item had seven response options; these were recategorised into two options: 1=married, 0=unmarried. The question on religious affiliation had twenty-six response options. These were recategorised into two, namely, 1=Christian, 0=non-Christian. Respondents were asked 'Are you the head of household'. The response options were 1=yes, 0=no. The respondents were asked to choose the household's total monthly income from a list of fifteen options. These were re-categorised into 1=JA\$50 000 and under or 0=over JA\$50 000. For occupation description, respondents were asked to describe their job from a list of eleven options. These were recategorised into 1=machine operators or 0=non-machine operators.

Statistical analysis

Descriptive statistical analyses were performed to determine the prevalence of alcohol use in the total population and among vehicle drivers, as well as to describe the sociodemographic characteristics of vehicle drivers. These were represented in frequencies, means and percentages. Bivariate analysis examining the association between vehicle drivers who drive and do not drive under the influence of alcohol and the level of use according to the AUDIT questionnaire was done using Pearson's χ^2 test. Bivariate analysis was also conducted to examine the association between vehicle drivers and non-drivers, and the level of use according to the AUDIT questionnaire. Predictive tests were done to identify risk and protective sociodemographic factors and DUIA using logistic

regression analyses. All statistical analyses were conducted using R software, V.4.2.0. Multicollinearity between the study variables was explored using variance inflation factor (VIF) (with multicollinearity being defined as $VIF > 2.5$) and Hosmer-Lemeshow statistic was used to test for goodness of fit of the regression model. The data were presented in the form of tables and text. ORs and 95% CIs were recorded. A p-value < 0.05 was considered statistically significant.

Patient and public involvement

There was no involvement of patients or members of the public in the conceptualisation, design, analysis or interpretation of the results or reporting of this research.

Ethical considerations

Respondent participation was voluntary, and the survey was undertaken in accordance with the international guidelines for research on human subjects. The Ministry of National Security granted approval for the National Drug Use Prevalence Survey. Informed consent was obtained from each participant, and assurance of the confidentiality and anonymity of the data was provided through the non-retention of names. Data were stored in a secure database.²³

RESULTS

Prevalence

Table 1 displays the prevalence of alcohol use in the total population (n=4623) and among the population of vehicle drivers (n=1060). Approximately one in four individuals was a vehicle driver (23%). Among those in the population who reported lifetime alcohol use, 72.9% reported use in the past year and 54.3% reported use in the past month. Of the 1060 vehicle drivers, 685 persons were drivers who admitted to being current alcohol users, and 137 drivers admitted to DUIA in the past year. Of the 685 drivers, 123 persons were drivers who admitted to driving under the influence and being current alcohol users. This is approximately 18% and indicates that one

Table 1 Alcohol use prevalence among the total population and vehicle drivers

Alcohol use	Frequency	Percentage
Population lifetime use	3460	74.8
Population past year use	2522	72.9
Population past month use	1879	54.3
Current users who drive	685	64.6
Current users who DUIA	123	18.0
Current binge drinkers who DUIA	67	54.5
Current users who DUIA and DUIC	51	41.5

DUIA, driving under the influence of alcohol; DUIC, driving under the influence of cannabis.

Table 2 Sociodemographic characteristics of vehicle drivers in the population

Variable	Frequency	Percentage
Gender		
Male	748	70.6
Female	312	29.4
Age		
34 years and under	551	52.0
Over 35 years	509	48.0
Education		
Tertiary level	177	16.7
Below tertiary level	883	83.3
Religion		
Christian	772	72.8
Non-Christian	288	27.2
Employment		
Employed	770	72.6
Unemployed	290	27.4
Marital status		
Married	413	39.0
Unmarried	647	61.0
Geographical location		
Urban	482	45.5
Rural	578	54.5
Head of household		
Yes	700	66.0
No	360	34.0
Household income		
JA\$50 000 and under	416	45.1
Over JA\$50 000	507	54.9
Occupation		
Machine operators	267	34.6
Non-machine operators	504	65.4

in five Jamaicans, who are drivers and are current alcohol users, operate a vehicle under the influence of alcohol. Of these 123 respondents, 67 drivers were alcohol binge drinkers. This is approximately 54.5% and indicates that one in two Jamaicans who were current alcohol users and admitted to driving under the influence were alcohol binge drinkers. Of these 123 respondents, 51 drivers (41.5%) were also current cannabis users that admitted to driving under its influence.

Sociodemographic factor findings

Table 2 shows the sociodemographic characteristics of vehicle drivers in the population. Most drivers were male (70.6%), unmarried (61.0%), employed (72.6%), of Christian affiliation (72.8%), inhabiting rural areas (54.5%) and with a less than tertiary level scholastic achievement (83.3%). The age range of respondents was

between 12 and 65 years, with a mean age of 36.56 years (SD±12.582).

Table 3 shows the sociodemographic characteristics of vehicle drivers that drive under the influence of alcohol (DUIA) and those that do not (Non-DUIA). A significant difference was found in the gender distribution for both the drivers who drive under the influence of alcohol and those that did not. Among the DUIA group, 92% were males compared with 8% who were female ($p<0.001$). A statistically significant difference was also noted in religion distribution. Among the DUIA group, 61.3% were Christian and 38.7% were non-Christian ($p=0.002$). A significant difference was also found among those who were the head of the household and DUIA ($p=0.020$). Likewise, a significant association was found among drivers who operated machinery as part of their job description in the DUIA group ($p=0.008$).

Although there were higher numbers of employed drivers and drivers who earned more than JA\$50 000 monthly than their counterparts among the DUIA group, this association was not statistically significant ($p=0.101$ and $p=0.159$, respectively). There was no multicollinearity found among the independent variables used in the analysis.

Alcohol dependence findings

Table 4 summarises the level of use according to the AUDIT questionnaire among two driver groups. Approximately 13% of non-drivers reported harmful or hazardous drinking behaviour (AUDIT≥8), whereas 16% of drivers reported harmful or hazardous drinking behaviour (AUDIT≥8). This indicates that drivers were more likely to develop alcohol dependence than non-drivers, and this difference was statistically significant ($p=0.011$).

Approximately 12% of drivers who did not drive under the influence of alcohol reported harmful or hazardous drinking behaviour (AUDIT≥8), whereas 41% of drivers who did drive under the influence of alcohol (DUIA) reported harmful or hazardous drinking behaviour (AUDIT≥8). This indicates that DUIA drivers were more likely to develop alcohol dependence than Non-DUIA drivers, and this difference was statistically significant ($p<0.001$).

Estimation of ORs for sociodemographic factors associated with DUIA

Table 5 shows the results of a logistic regression analysis performed to assess the associations between DUIA in the past year and select sociodemographic factors. The Hosmer-Lemeshow test shows the p value at 0.662 ($p>0.05$) which demonstrates the model fits the data. The model illustrates statistically significant relationships for several factors.

Drivers who were 34 years and under were 1.82 times more likely than those 35 years and older to report DUIA in the past year. Male drivers were 3.30 times more likely than females to report DUIA in the past year. In addition, those drivers who were the head of household were

Table 3 Sociodemographic characteristics of vehicle drivers that drive under the influence and did not drive under the influence of alcohol in the past year

Variable	Vehicle drivers (Non-DUIA)	Vehicle drivers (DUIA)	P value
	Frequency	Frequency	
Gender			<0.001***
Male	622 (67.4%)	126 (92.0%)	
Female	301 (32.6%)	11 (08.0%)	
Age			0.432
34 years and under	475 (51.5%)	76 (55.5%)	
Over 35 years	448 (48.5%)	61 (44.5%)	
Education			0.560
Tertiary level	157 (17.0%)	20 (12.7%)	
Below tertiary level	766 (83.0%)	117 (87.3%)	
Religion			0.002**
Christian	688 (74.5%)	84 (61.3%)	
Non-Christian	235 (25.5%)	53 (38.7%)	
Employment			0.101
Employed	662 (71.7%)	108 (78.8%)	
Unemployed	261 (28.3%)	29 (21.2%)	
Marital status			0.589
Married	363 (39.3%)	50 (36.5%)	
Unmarried	560 (70.7%)	87 (63.5%)	
Geographical location			0.741
Urban	422 (45.7%)	60 (43.8%)	
Rural	501 (54.3%)	77 (56.2%)	
Head of household			0.020**
Yes	597 (64.7%)	103 (75.2%)	
No	326 (35.3%)	34 (24.8%)	
Household income			0.159
JA\$50 000 and under	370 (46.0%)	46 (38.7%)	
Over JA\$50 000	434 (54.0%)	73 (61.3%)	
Occupation			0.008**
Machine operators	217 (32.7%)	50 (46.3%)	
Non-machine operators	446 (67.3%)	58 (53.7%)	

p<0.01, *p<0.001.

DUIA, driving under the influence of alcohol.

1.86 times more likely than those who were not to report DUIA in the past year.

Being married, Christian and having a household income of JA\$50 000 and under reduce the risk of DUIA in the past year. These inverse associations are, however, not statistically significant.

DISCUSSION

Alcohol is the most commonly used substance among young and older people in Jamaica,²³ with most persons beginning use in early adolescence.²⁶ This is the first study in Jamaica and the Caribbean demonstrating the

prevalence of alcohol use, risk of alcohol dependence and the associations with sociodemographic factors among vehicle drivers. This research found that approximately one in five Jamaican drivers was a current alcohol consumer who admitted to driving under the influence (DUIA). Furthermore, more than 40% and 50% of these drivers admitted to DUIC and being binge drinkers, respectively. DUIA, especially at higher levels of consumption or in combination with cannabis, has been associated with greater driving impairment^{9 10 27 28} and risk of fatal crash.²⁹ Extant literature highlights alcohol and cannabis co-use is associated with an increased risk of vehicular

Table 4 χ^2 test of independence between the AUDIT questionnaire and drivers versus non-drivers and DUIA versus non-DUIA drivers

	AUDIT $\leq$ 7	AUDIT $\geq$ 8
Non-drivers	1455	209
Drivers	718	140
$\chi^2=6.390$, df=1, p=0.011**		
	AUDIT $\leq$ 7	AUDIT $\geq$ 8
Non-DUIA drivers	644	87
DUIA drivers	77	53
$\chi^2=65.447$, df=1, p<0.001***		
p<0.01, *p<0.001. AUDIT, Alcohol Use Disorders Identification Test; DUIA, driving under the influence of alcohol.		

crash fatality by 25–40 times in comparison to drivers who used no substance or a singular drug.^{30 31}

These findings represent a drug use pattern of concern among Jamaican drivers that necessitate implementing evidence-based interventions in dealing with a potential public health problem. Alcohol and cannabis co-use among the driver population is likely due to the misconception that drug driving is not perceived as a risky behaviour.³² Indeed, within the Jamaican context, this belief is likely endorsed by strong sociocultural practice, religious beliefs^{33 34} and recent amendments to the island's Dangerous Drugs Act that has endorsed decriminalisation.³⁵ Delivering a national education campaign emphasising the detrimental effects of cannabis use on driving, particularly in combination with alcohol, geared towards young adults and males, is a critical and welcomed intervention.³⁶ Furthermore, legislation must keep pace with international standards regarding drink and drug-driving laws. Well-founded evidence supports lowering Jamaica's legislative limit on BACs from 0.08 to 0.05 g/dL, a countermeasure that is associated with significant reductions in alcohol-associated road traffic injuries and

fatalities.^{37–39} Reducing the legal threshold will further aid in screening for recidivist drivers that are associated with binge drinking and heavy alcohol use,⁴⁰ that prior analyses associate with having increased odds of drunk driving⁴¹ and driving impairment.⁴² In addition, decreased odds of binge drinking and subsequent vehicular crashes have been achieved by implementing higher taxation on alcoholic beverages⁴³ and appropriate mandatory fine amounts for offender drivers.⁴⁴ Monetary penalties may deter motorists' non-compliance with the island's Road Traffic Act. However, fines approximating US\$325 and US\$65 for DUIA and DUIC, respectively,²⁰ are unlikely to discourage offender motorists from breaking the law and therefore urge revision. Lastly, despite reporting a national excise tax on alcoholic beverages in 2016, ensuing inflation in Jamaica and wage increases would have likely diminished the intended effect with consequent affordability allowing for increased consumption.⁴⁵ This observation endorses the need to review and update the existing policy.

This study also revealed several sociodemographic variables associated with DUIA. Bivariate analysis revealed significant associations with gender, religious affiliation, occupational description and head of household status. Multivariate regression analysis indicated that being a young adult, male and the head of the household were predictive of DUIA.

Young adults and males were approximately two and three times more likely to report DUIA. This outcome is in keeping with previous research that found a similar higher prevalence of DUIA among males and younger adults in the USA^{42 46 47} and Norway.⁴⁸ In Jamaica, the legal age limit for purchasing alcohol and acquiring a driver's license is 18 years.^{20 49} These legal coincidences likely explain this observation among younger drivers, as research has shown an association between securing a driver's license and increased substance use.⁵⁰ Raising the legal drinking age in Jamaica from 18 to 21 thereby represents a worthwhile strategy that has successfully reduced road traffic fatalities and drink-driving behaviours

Table 5 Logistic regression model of select sociodemographic factors associated with driving under the influence of alcohol in the past year

Variables	Estimate	OR	95% CI	P value
Age (34 years and under)	0.60127	1.82	1.15 to 2.92	0.012**
Occupation (machine operators)	0.40566	1.50	0.94 to 2.40	0.091
Marital status (married)	−0.27291	0.76	0.47 to 1.21	0.250
Gender (male)	1.19514	3.30	1.62 to 7.49	0.002**
Education (tertiary level)	0.11925	1.13	0.57 to 2.13	0.720
Religion (Christian)	−0.44583	0.64	0.40 to 1.03	0.064
Household income (JA\$50 000 and under)	−0.39084	0.68	0.41 to 1.10	0.120
Head of household (yes)	0.62223	1.86	1.02 to 3.57	0.050*
Geographical location (urban)	0.01995	1.02	0.64 to 1.63	0.930
*p<0.05, **p<0.01.				

among young drivers elsewhere.^{51 52} This strategy can expect to garner further support as these aberrant driving habits are likely attributable to a young male's willingness to engage in risky behaviours⁵³ such as binge drinking^{54 55} and polysubstance use,⁵⁶ more so than women who tend to be cautious with regard to DUIA.⁵⁷

This study also reported that the head of the household was two times more likely to drive under the influence of alcohol. The head of the household is the family's leading provider of financial sustenance.⁵⁸ DUIA places the primary breadwinner at risk of arrest by law enforcement,⁵⁹ devastating injury and loss of life,⁶⁰ further predisposing the family unit to increased financial and emotional stress.⁶¹

Although not reflected in the logistic regression model, the bivariate analysis indicated a significant association between religious affiliation and DUIA. While religious affiliation is protective against drug use⁶² and the majority of the Jamaican population identifies with the Christian faith,⁶ this study indicated that DUIA was higher among Christian than non-Christian drivers. Strong sociocultural use of alcohol in religious and social settings likely explains this finding,⁶³ although at variance with studies that indicated religious affiliation reduced the risks associated with alcohol use⁶⁴ and encouraged safe driving practices like seatbelt use.⁶⁵ This finding is unique and encourages further study, given that modest research to date has focused on cultural factors like religious involvement as a possible determinant or deterrent of DUIA behaviour. This may prove insightful in crafting a religious-based response as an adjunct to enforcing the drink-driving countermeasures in line with the SAFER recommendations outlined by the WHO.²¹ The bivariate analysis also indicated a significant difference between occupational description and DUIA, although the proportion of non-machine and machine operators was close (53.7% and 46.3%, respectively). Drivers who drive under the influence of alcohol are likely to display similar impairment in motor coordination, concentration and depth perception,⁶⁶ while operating machines as part of their job, resulting in an increased rate of work accidents.⁶⁷

A most recent population-based study in the United States, demonstrated that alcohol abuse and dependence were positively associated with DUIA.⁶⁸ This study indicated a similar finding as drivers who admitted to DUIA reported harmful and hazardous drinking behaviours in comparison to drivers who did not DUIA. This finding emphasises the importance of targeting drivers with alcohol misuse and addiction. This level of triage can allow for offender drivers to be assigned to a drink-driving remediation programme that has demonstrated significant reductions in aberrant driving behaviours⁶⁹ as part of a national DUIA prevention effort that has found favour elsewhere.⁷⁰ Further preventative efforts can include a court-mandated alcohol consumption monitoring programme for DUIA offenders, inclusive of alcohol monitoring bracelets and random urine and breathalyser

tests.⁷¹ In Jamaica, creating a local Drug Treatment Court (DTC) in the early 2000s allowed persons with substance use dependence to be redirected from the traditional judicial system towards a course of treatment and, ultimately, reintegration into their communities.⁷² However, limited in-patient services, particularly in the rural areas of the island, limit the mandate the policy seeks to fulfil.⁷³ Notwithstanding, the existing legislation presents an opportunity for policymakers to build capacity in addressing the alcohol-related problems of recidivist drivers.

Of interest, this study also highlights that drivers, overall, engaged in harmful and hazardous drinking in comparison to non-drivers. This may be due to the finding that being able to drive is associated with increased access to social participation and experiences,⁷⁴ a common denominator that endears itself to alcohol consumption.⁷⁵ In a society where alcohol use is culturally endorsed and essential in promoting social reciprocity,⁶³ the use of a designated driver or an alternative transportation programme may be beneficial.⁷⁶ Indeed, the plethora of all-inclusive recreational events on offer in Jamaica year-round, where alcohol use is heavily promoted, invite event promoters to offer patrons safe transportation as part of the event package.⁷⁷

Research surrounding road safety in LMICs is minimal,⁷⁸ despite accounting for nine out of ten road traffic deaths worldwide.¹ Increasing sobriety checkpoints, collecting data regarding drink-driving behaviours and reducing speed limits in high-volume pedestrian areas are cost-effective strategies that have found success in reducing traffic fatalities in one sister LMIC country.⁷⁹ More research is needed in these countries to craft effective strategies that fellow LMICs may adopt. The cumulative findings observed in this population study, add to the existing dearth of research in LMICs.

Additional strengths of this study are that it is the first study to examine the factors associated with DUIA among drivers from a nationally representative sample in the Caribbean and that it used robust multivariable logistic regression in the analysis. The AUDIT questionnaire for alcohol dependence further enhances the reliability of the findings, given its noted validity and use in multiple studies internationally.^{80–83} One of the limitations of the study is that this study was a cross-sectional design and thus is limited to creating association. This study also used a self-report survey related to alcohol use, and thus under-reporting bias may be implicated in the findings. The data used in the analysis were collected in 2016, and findings may not be reflective of the current situation. Notwithstanding, the evidence in this study provides a foundation for future research.

CONCLUSION

One in five Jamaican drivers who currently consume alcohol operates a vehicle under its influence, with over 50% being an alcohol binge drinker. These findings have

likely implications towards increasing road traffic casualties, rising workplace accidents and an elevated burden on healthcare systems. Prevention and mitigation strategies should target these individuals to reduce DUIA. Furthermore, the findings indicate that ongoing legislation discourse is best guided by the WHO's SAFER initiative that focuses on drunk-driving countermeasures as part of its alcohol policy interventions.

Contributors KL contributed to the conception, design, drafting of the work; interpreted the data that was analysed; critically revised the work for important intellectual content; and approved of the final version to be published. CS contributed to the conception of the work; analysis and interpretation of data for the work; and approved the final version to be published. GF contributed to the analysis and interpretation of data for the work and approved the final version to be published. WA contributed to the conceptualising of the design of this paper, writing of first and subsequent drafts of the paper and critically revised the work for important intellectual content; and approved of the final version to be published. All authors read and approved the final manuscript and have agreed both to be personally accountable for the author's own contributions and to ensure that questions related to the accuracy or integrity of any part of the work, even ones in which the author was not personally involved, are appropriately investigated, resolved and the resolution documented in the literature. KL is the guarantor.

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Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval This study involves human participants and the Ministry of National Security in Jamaica approved the National Drug Use Prevalence Survey. The secondary data analysis was approved by the University of the West Indies Ethics Committee, Mona (Ref: CREC-MN,52 20/21).

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data are available on reasonable request. The data that support the findings of this study are available from the National Council on Drug Abuse, Jamaica, and the Inter-American Drug Abuse Control Commission (CICAD) but restrictions apply to the availability of these data, which were used under licence for the current study and are not publicly available. For access to the database, contact Mrs Uki Atkinson, research analyst, at uatkinson@ncda.org.jm.

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