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Full Length Research Paper

Relationship between road traffic law violation, accident and psychoactive substance use among commercial motorcycle operators in Kano, Northwestern Nigeria

Mustapha Ibrahim Gudaji* and Faisal Saleh Dankishiya

Department of Psychiatry, College of Health Sciences, Faculty of Clinical Sciences, Bayero University Kano, Nigeria.

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Motorcycle operators who drive under the influence of psychoactive substances are at high risk for road traffic violations and accidents. Despite the high level of morbidity associated with psychoactive substance use, it is not a well-researched area in Northwestern Nigeria. The aim of the study was to determine the relationship between psychoactive substance use and road traffic violations and accidents among motorcycle operators in Kano, Northwestern Nigeria. It was a descriptive cross-sectional study. Instrument used for data collection included socio-demographic questionnaire and Schedule for Clinical Assessment in Neuropsychiatry (SCAN). Data analysis was done using Statistical Package for Social Sciences (SPSS) 17th edition. Three hundred and ninety-four subjects participated in the study. Their age ranged between 22 to 60 years, with mean age of 32.7 years ± 6.6. Motorcycle operators who used substances were more likely to violate traffic laws (P < 0.001; O.R = 1.6 (0.8 – 3.1) and to have road traffic accidents (P = 0.004; O.R = 2.6 (1.4 – 4.7) compared to those who did not use substances. Positive correlation was found between road traffic violations, road traffic accidents and substance use status at 99% confidence interval. There was also significant relationship between specific substance use, road traffic violations and accidents. Psychoactive substance use increases the risk of road traffic violations and road traffic accidents among motorcycle operators. Public health measures should be instituted to reduce the rate of substance use among motorcycle operators and cut down its associated morbidity.

Key words: Psycho-active substance, road traffic accidents, road traffic violations, motorcycle operators, Schedule for Clinical Assessment in Neuropsychiatry (SCAN), Nigeria.

INTRODUCTION

Commercial motorcycle operation is widely adopted in Kano, perhaps for both logistic and socio-economic

*Corresponding author. E-mail: mgudaji@yahoo.com.

reasons. It is possible that commercial motorcyclists who use psychoactive substances are at higher risk of road traffic accident compared to the general population. However, this is not a well-researched area. Road traffic accident (RTA) represents a major epidemic of non-communicable diseases in Nigeria. It has been recognized as an important public health problem in both developed and developing nations (Adogu et al., 2009).

Among fatal accidents, motorcycle accidents rank first globally (Ozdemir et al., 2005). A large proportion of vehicles involved in accidents are two wheelers, which when compared to cars, are unstable and provide little protection for their riders in accidents (Adogu et al., 2009). RTA and death among motorcyclists is further heightened by apparent reckless speeding, meandering in traffic and show of little regard for other road users. Studies reported that the use of psychoactive substances was found to be associated with the occurrence of road traffic accidents among motorcyclists in Northwestern Nigeria (Crilly, 1998; Marks, 1982; Alti-Muazu and Aliyu, 2008). Motorcycles have a sevenfold increase in accident rate for vehicle person per mile and a 17-fold fatality rate compared with motorcars (Sabey and Stoughton, 1980; Makanjuola et al., 2007). Previous studies have suggested a possible link between psychoactive substance use and accidents (Makanjuola et al., 2007; Lasebikan, 2010).

The relationship between cannabis use and car crash is controversial. Studies have reported increased risk of crash associated with cannabis use (Lasebikan, 2010; Mura, 2003). Some cannabis users who drive on a set course show little or no impairment under the influence of the substance, except if it is combined with alcohol (Lasebikan, 2010). Nigeria has an estimated lifetime consumption of cannabis of 10.8% of which commercial drivers and other motor park operative seem vulnerable (Makanjuola et al, 2007; UNODC, 2007; Lasebikan, 2010). It has been reported that experimentation, curiosity, alertness for study, the belief that psychoactive substance increases the strength for physical work, are the main reasons that people use drugs (Suleiman et al., 2006). Studies showed that the effects of psychoactive substances on the brain could lead to emotional instability, poor impulse control and poor intellectual functioning (SAMHSA, 2009). Berghaus et al. (1995), in a meta-analysis of 60 experimental studies, found that behavioural and cognitive skills related to driving performance were impaired in a dose dependent fashion with increased cannabinoids blood levels. The authors reported that impairment increased significantly when cannabis was combined with alcohol.

The national highway traffic safety administration in America, in a study among fatally injured drivers reported that 18% tested positive for psychoactive substances (NHTSA, 2009). A report by SAMHSA (2009) showed that 4.2% of people in America drive under the influence of psychoactive substances. Alcohol and cannabis were the most prevalent psychoactive substances detected among impaired drivers. In a responsibility study of main illicit psychoactive substance use among commercial drivers in France, Gadegbeku et al. (2011) reported that the effect of alcohol and cannabis on fatal car crashes responsibility were significant compared to amphetamine, cocaine and opiates. The authors reported a causal relationship between cannabis and road accidents.

In Australia, Drummer et al. (2003) reported a prevalence of 26.7% of psychoactive substance use among fatally injured drivers. The substances used included alcohol (18.6%), cannabis (13.5%), opiates (4.9%), stimulants (4.1%) and benzodiazepines (4.1%). In a study of motorcycle injuries in Tanzania, Chalya et al. (2010) reported that motorcycle accidents constitute 37.2% of all road traffic injuries. They found that there was high use of psychoactive substances among the respondents. Lasebikan and Baiyewu (2009), in a study in Ibadan, south western Nigeria, of problems associated with psychoactive substance use among long distance commercial drivers, reported a prevalence of alcohol use as 77.5%, tobacco (60.5%), cannabis (52.5%) and inhalants (8.1%). The authors reported that road accidents were the most common problems among the respondents, with a prevalence of 26.8%, and were commonest among those respondents with alcohol use disorders.

In a study in Benin-city, Nigeria, of morbidity and mortality among road users, Nzegwu et al. (2008) reported that commercial drivers had an average of BAC of 54.16 mg/dl among those that died in accidents. However, the study was limited to alcohol use. Iribhogbe and Odai (2009), in Benin, Nigeria, in a study of driver related risk factors in commercial motorcycle crashes, reported a prevalence of alcohol use to be 39.8%, tobacco (34.6%), cannabis (0.6%) and cocaine (0.003%).

The only study on substance use among motorcycle operators in Northern Nigeria was by Alti-Mu'azu and Aliyu (2008) in Zaria, North western Nigeria, and it reported a high prevalence (59.5%) of road traffic accidents associated with the use of psychoactive substances. However, the authors did not use standard questionnaire to assess for substance use.

To the best of our knowledge, this is the first study on road traffic accidents among commercial motorcycle operators in Kano, Northwestern Nigeria. The current study aimed to determine the relationship between psychoactive substance use, road traffic violations and accidents among motorcycle operators in Kano, Northwestern Nigeria. We hypothesized that motorcyclists who used psychoactive substances would have more traffic law violations and accidents compared to those who do not use substances.

METHODOLOGY

This was a descriptive cross-sectional study carried out among 394

commercial motorcycle operators who are registered with the Tarauni Local Government Area branch of Amalgamated Commercial Motorcycle Owner's and Riders Association of Nigeria (ACOMORAN). This is the only umbrella body that registers motorcyclists. However, a good number of the commercial motorcycle operators are not under any association.

Ethical clearance was obtained from the Research Ethical Committee of Aminu Kano Teaching Hospital. Permission for the study was obtained from National Patron of ACOMORAN. Informed consent was also obtained from each of the participants before administering the questionnaires.

Sample size determination

The sample size was determined using the formula

$$N = \frac{z^2\, p\, q}{d^2}$$

Where N=minimal sample required, Z=Standard normal deviate at 95%, Confidence interval = 1.96
P =34.3% (prevalence of substance use obtained from a previous study in Kano city conducted by the Community Medicine Department of the AKTH), (Kabir et al., 2004). q=Complementary probability to P=1 – P = 1- 0.34 = 0.66, d=precision of the study = 5% = 0.05.

$$n = \frac{(1.96)^2\ (0.34 \times 0.66)}{(0.05)^2} = 338.$$

The sample size was 338. However, it was increased to 400 which was about 20% for greater precision.

Sampling technique

The sampling technique adapted was multistage.
Stage I - Systematic probabilistic selection of 4 political wards from the 12 existing wards (Marhaba, Kasuwa, Dangi, and Bawo wards). At the time of the study there were 126 registered commercial motorcycle stands within Tarauni LGA, with 5040 registered members, and 14-66 members per stand.
Stage II – Systematic selection of 3 stands on each selected wards, bringing the total number of randomly selected stands to twelve.
Stage III – Whole population study of the commercial motorcyclists in each selected stand after being identified by their identity card of the association, until when the required sample size was achieved.

Inclusion criteria

1. Age ≥ 18 years.
2. Registered membership of ACOMORAN in Tarauni LGA.
3. Consent to participate in the study.

Exclusion criteria

1. Motorcyclists with a history of mental illness.
2. Absence from the stand during data collection after 3 return visits.

Instrument for data collection

Modules in schedules for clinical assessment in neuropsychiatry (SCAN), Alcohol and psychoactive substance use sections

The Modules in Schedules for Clinical Assessment in Neuropsychiatry (SCAN) on use of Alcohol and use of psychoactive substances other than alcohol was adapted for the study (WHO, 1999). The SCAN system is a set of instrument and manuals aimed at assessing, measuring and classifying the psychopathology and behaviour associated with major psychiatric disorders of adult life. The SCAN text has three components: the tenth edition of the Present State Examination, the Item Group Checklist and the Clinical History Schedule.

In its complete form, the SCAN text is intended for use only by clinicians with an adequate knowledge of psychopathology who have taken a course at a WHO-designated SCAN training centre. The lead author had formal trainings in SCAN.

Data analysis

Data analysis was done with the Statistical Package for the Social Sciences (SPSS), 17th edition. Simple descriptive data were presented with frequencies, proportions and percentages. Categorical (nominal) variables were compared with student X^2. Correlations between psychoactive substance use and road traffic violations and accidents were also explored using Spearman's correlation. All tests were two tailed, with p value <0.05 taken as significant.

RESULTS

Age distribution of the participants

There were 394 participants, aged 22 to 60 years, with mean age of 32.7 years ± 6.6. The modal age group was 22 to 30 years (Figure 1).

Gender distribution of the participants

All of the participants were males. The lifetime use of psychoactive substances is presented in Table 1. Tobacco had the highest prevalence with 76 respondents (19.3%), followed by stimulants with 47 respondents (11.9%). All of the participants who used psychoactive substances used tobacco. Most of the participants were on at least two substances. Participants did not report use of alcohol, heroin, cocaine and benzodiazepines.

Table 2 shows the relationship between road traffic accidents, road traffic violation and substance use. It shows that substance users were more likely to have road traffic accidents (P = 0.004; O.R = 2.6 (1.4-4.7) and road traffic violations (P < 0.001; O.R = 1.6 (0.8-3.1) than non-users.

Table 3 shows the spearman's correlation between substance use status, road traffic violation and accidents. Positive correlation was obtained between road traffic violations, road traffic accidents and substance use status at 99% confidence interval. Higher rates of road

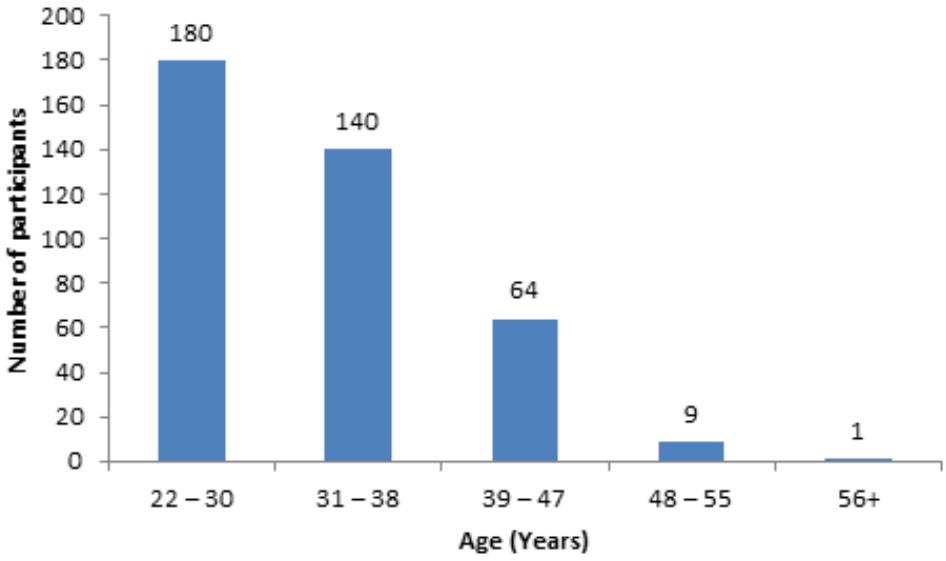

Figure 1. Age distribution of the participants

Table 1. Prevalence of substance use among respondents (n = 394).

Substance	Number	Percent
Tobacco	76	19.3
Stimulants	47	11.9
Cannabis	15	3.8
Inhalant	8	2.0
Opiates	5	1.3

Table 2. Relationship between road traffic accidents, road traffic law violation and substance use (n = 394).

Variable	Drug use status		*Statistics test*		
	Users	Non users	X^2	p value	0.R (95% C.I)
Road traffic accident	**n (%)**	**n (%)**			
Yes	69 (89.6)	240 (75.7)			
No	8 (10.4)	77 (24.3)	7.08	0.004*	2.6 (1.4 – 4.7)
Road traffic violation					
Yes	66 (85.7)	190 (59.9)			
No	11 (14.3)	127 (40.1)	18.09	< 0.001*	1.6 (0.8 – 3.1)

*= statistically significant.

Table 3. Correlation between substance use status and road traffic violations and accidents Spearman's correlation coefficient.

Variable	rho (ℓ)
Road traffic violation	0.157*
Road traffic accident	0.197*

* = p<0.01.

Table 4. Relationship between specific substance use status and road traffic violations (n = 394).

Substance		Road traffic violations		X^2	P
		Yes	No		
Inhalants	Users	8 (100.0)	0 (0.0)	4.402	0.031*~
	Non-users	248 (64.2)	138 (35.8)		
Tobacco	Users	61 (80.3)	15 (19.7)	9.671	0.002*
	Non-users	195 (61.3)	123 (38.7)		
Cannabis	Users	15 (100.0)	0 (0.0)	8.406	0.004*
	Non-users	241 (63.6)	138 (36.4)		
Opiates	Users	5 (100.0)	0 (0.0)	2.730	0.114~
	Non-users	251 (64.5)	138 (35.5)		
Stimulants	Users	43 (91.5)	4 (8.5)	16.486	<0.001*
	Non-users	213 (61.4)	134 (38.6)		

*= Statistically significant (p <0.05), ~ = Fisher's p value.

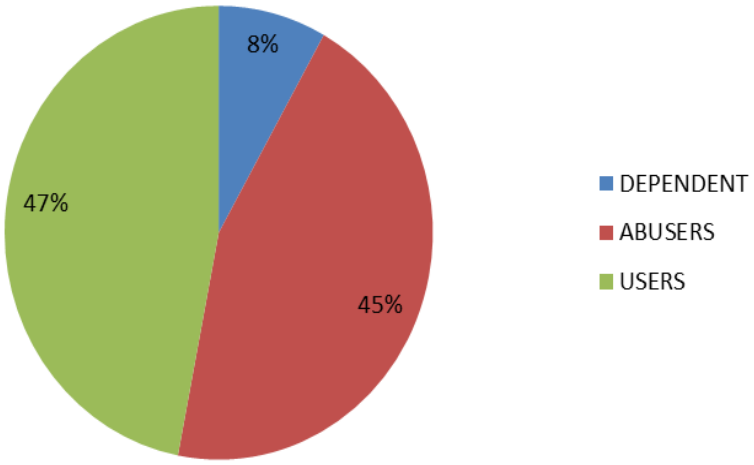

Figure 2. SCAN substance diagnosis of the study participants

traffic violations were observed among motorcycle operators who used inhalants (X^2 = 4.402, p = 0.031), tobacco (X^2 = 9.671, p = 0.002), cannabis (X^2 = 8.406, p = 0.004), and stimulants (X^2 = 16.486, p < 0.001), compared to those who did not use them (Table 4).

Highest rate of accident was reported among tobacco users (84.2%) followed by users of inhalants, while lowest accident rate was found among users of stimulants (17.0%). The rate of accident among cannabis users was 46.7%. None of the five users of opiates had accident. Road traffic accident was commoner among participants who did not use cannabis (X^2= 9.296, p = 0.006), and those who did not use opiates (X^2= 18.410, p < 0.001) compared to those who use the substances (Table 5).

Distribution of participants by SCAN substance diagnoses

Figure 2 shows the distribution of the participants by SCAN substance diagnoses. In all, 8% of the respondents met the criteria for SCAN substance dependence diagnosis, while 45% had a diagnosis of substance abuse using SCAN.

DISCUSSION

The psychoactive substance users had significantly more violations of road traffic regulations compared to those who did not use drugs. Similarly, users of psychoactive

Table 5. Relationship between specific substance use status and road traffic accidents (n = 394).

Substance		Road traffic accident		X^2	P
		Yes	No		
Inhalants	Users	5 (62.5)	3 (37.5)	1.224	0.378
	Non-users	304 (78.8)	82 (21.2)		
Tobacco	Users	64 (84.2)	12 (15.8)	1.862	0.172
	Non-users	245 (77.0)	73 (23.0)		
Cannabis	Users	7 (46.7)	8 (53.3)	9.296	0.006*
	Non-users	302 (79.7)	77 (20.3)		
Opiates	Users	0 (0.0)	5 (100.0)	18.410	<0.001*
	Non-users	309 (79.4)	80 (20.6)		
Stimulants	Users	8 (17.0)	39 (83.0)	0.654	0.419
	Non-users	77 (22.2)	270 (77.8)		

* = Statistically significant ($p < 0.05$); Fisher's p value.

substances had significantly more road traffic accidents than the non-drug users. It has been shown that using drugs was relatively prevalent among injured motor-cyclists, which served as a predisposing factor in accidents (Adogu, 2009). Our finding is in line with previous studies among motorcyclists which reported that the use of psychoactive substances was associated with the occurrence of road traffic accidents (Crilly, 1998; Marks, 1982; Alti-Muazu and Aliyu, 2008).

In this study, the rate of road traffic accidents among substance users was 89.6%. Similarly, 22.3% of road traffic accidents were found to be associated with psychoactive substance use. This was a little higher than the result from a study done in Iran to determine addiction role in motorcycle accidents which found that out of 400 motorcyclists that had accidents, 17.3% had a history of drug use (Araghi and Vahedian, 2007). On the other hand, it was much lower than what was found in a study on prevalence of psychoactive substance use among commercial motorcyclists in Zaria, north western Nigeria, which reported a prevalence of 59.5% accident rate (Alti-Muazu and Aliyu, 2008). However, the Zaria study did not use standard instrument for diagnosis and assessment of substance use.

Road traffic violations and accidents were associated with use of inhalants, tobacco, cannabis and stimulants. This agrees with previous studies that linked use of these psychoactive substances with road traffic accidents among motorcycle operators (Gadegbeku et al., 2011; Drummer et al., 2003; IribhogbeandOdai, 2009). It has been found that behavioural and cognitive skills related to driving performance were impaired in a dose dependent fashion with increased cannabinoids blood levels (Berghaus et al., 1995).

Substance dependence and substance abuse were the only SCAN diagnoses made in the respondents. Many of the subjects who met dependence diagnosis had increased desire to consume the substance, time wastage in using the substance and increased use of the substance to achieve the desired effect. The subjects did not meet the criteria for other SCAN diagnoses.

This study has some limitations. We could not establish a causal relationship between the psychoactive substances, road traffic accidents and violations due to the study design. Similarly, it is possible that some of the road traffic accidents and violations were due to other factors, like operator competence which we did not explore in this study. In addition, the study was limited to registered commercial motorcycle operators and may not be generalized to entire commercial motorcycle operators. Future studies should explore these limitations and improve on our findings.

Conclusion

This study has shown that psychoactive substance use is associated with road traffic violations and accident among commercial motorcycle operators. Clinicians attending to motorcycle operators involved in road traffic accidents should be alert to the possibility of psychoactive substance use among them, and where required interventional measures should be instituted early. There is need for more epidemiological studies, especially community based, covering wider areas, involving various medical specialties, psychologists, sociologists, so as to

have a more comprehensive picture of psychoactive substance use problems among different population groups, especially commercial motorcycle operators.

Conflict of Interests

The authors have not declared any conflict of interests.

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