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Effect of Health Education on the Riding Habits of Commercial Motorcyclists in Uyo, Southern Nigeria

Effet de L'éducation a la Santé Sur Les Habitudes de Conduite de Motocyclistes a Uyo, Sud du Nigeria.

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ABSTRACT

BACKGROUND: **The increasing number of motorcyclists in Nigeria has led to a rise in poor road safety practices leading to increased rate of accidents. This study was conducted to implement and evaluate the effect of safety education on riding habits of motorcyclists in Uyo, Nigeria.**

METHODS: **The intervention study was conducted among commercial motorcyclists in Uyo with controls from another town in Akwa Ibom State. Baseline information was collected from both groups on their riding habits. Motorcyclists in Uyo were educated on appropriate road safety practices. Data was collected from both groups three months later and analysed using the Statistical Package for Social Sciences version 11.**

RESULTS: **A total of 200 respondents participated in the study, 100 per group. At 3 months post- intervention, those riding when tired reduced in the intervention group from 69% at baseline to 42% (p<0.05), while in the control group it increased from 74% to 79%. Furthermore, those who rested during riding hours increased from 30% at baseline to 93% (p<0.05) in the intervention group, while it reduced from 40% to 36% in the control group. Those riding within speed limit in the intervention group increased from 37.5% at baseline to 56.6% (p < 0.05), while in the control group, it remained the same. Use of psycho-active substances reduced in the intervention group, though the changes were not statistically significant at p<0.05.**

CONCLUSION: Safety education improved many riding habits of motorcyclists in the intervention group. Road safety education is recommended for all motorcyclists to ensure safer road use. WAJM 2012; 31(1): 39–46.

Keywords: **Road safety practices, safety education, speed limit, observing rest, psycho-active substance use.**

RÉSUMÉ

CONTEXTE : Le nombre croissant de motocyclistes au Nigeria a entrainé un accroissement de l'insécurité routière et du nombre d'accidents. Cette étude a été menée pour mettre en place une politique de sécurité routière et d'évaluer ses effets sur les habitudes de conduite des motocyclistes à Uyo, Nigeria.

MÉTHODES: L'étude interventionnelle a été conduite chez des motocyclistes de Uyo avec des témoins au niveau d'une autre ville dans l'état de Akwa Ibom. Les informations à l'état basal ont été recueillies au sein des 2 groupes concernant leurs habitudes de conduite. Les Motocyclistes de Uyo étaient formés aux pratiques de sécurité routière. Les données ont été recueillies au sein des 2 groupes 3 mois plus tard et analysées en utilisant le Package Statistique pour les Sciences Sociales Version 11.

RÉSULTATS: Un total de 200 personnes ont répondu et participé à l'étude, 100 par groupe. A 3 mois post intervention, la proportion de ceux qui conduisent en état de fatigue a baissé de 69% à l'état de base à 42% (p<0,05) dans le groupe d'intervention tandis que dans le groupe témoin cette proportion a augmenté de 74% to 79%. En plus la proportion de ceux qui se reposent aux heures de conduite avaient augmenté de 30% à l'état basal à 93% (p<0,05) dans le groupe d'intervention, tandis qu'il avait baissé de 40% à 36% dans le groupe témoin. Dans le groupe d'intervention ceux qui conduisent dans le respect des limitations de vitesse avaient augmenté de 37,5% à l'état de base à 56,6% (p < 0,05), tandis que dans le groupe témoin cette proportion n'a pas changé. L'utilisation de substances psycho actives avait baissé dans le groupe d'intervention bien que les changements n'étaient pas statistiquement significatives p>0,05.

CONCLUSION: Une éducation sur la sécurité routière peut améliorer les habitudes de conduite des motocyclistes dans le groupe d'intervention. L'éducation à la sécurité routière est recommandée à tous les motocyclistes pour assurer une meilleure sécurité routière. **WAJM 2012; 31 (1): 39–46.**

Mots clés: Pratiques de sécurité routière, éducation à la sécurité, limitation de vitesse, observation de repos, usage de substances psycho actives

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Abbreviations:

INTRODUCTION

The motorcycle commonly called "okada" in Nigeria has become increasingly popular as a means of commercial transportation.[1] Motorcyclists constitute an important group of those road users globally who are extremely vulnerable to road traffic accidents. A large percentage of road accidents involve motorcycles.[2] Moreover, commercial motorcyclists have been observed to pay little attention to road safety regulations leading to road traffic accidents involving other road users. A study carried out in in western Nigeria reported that only 28.5% of motorcyclists who scored high on road safety practice observation scale could be considered safe for their passengers and other road users.[3]

Risk taking was found to account for 20.8% of the causes listed on the motorcycle accident database in London and included riding without license, travelling at inappropriate speed for conditions, driving recklessly, driving while tired or under the inûuence of alcohol, and speciûc manoeuvres such as overtaking in inappropriate situations or close following.[4] In Nigeria, similar findings have been reported by researchers in studies conducted in different parts of Nigeria.[3,5,6] Alcohol/substance abuse and fatigue were some of the risk factors implicated among 221 motorcycle-injured Nigerian maxillofacial patients in a prospective multicenter study.[7]

Studies have shown that many motorcyclists do not have a valid motorcycle license. In the Hurt study carried out in United States of America (USA), it was reported that motorcycle riders involved in accidents were significantly more likely to have been without motorcycle license or had had their license revoked.[8] Data from the US Department of Transportation's Fatal Accident Reporting System (FARS) show that about 43% of motorcyclists killed on public roads or highways in the US did not hold a valid license.[9] Also, in a study of 2,723 injured motorcyclists in California it was reported that only 33% of the crash involved riders had valid licenses.[10] In Nigeria, a few studies have documented license ownership among motorcyclists.[3,5,6]

Excessive and inappropriate speed contribute to around 30% of all fatal crashes in high income countries.[11] Speed studies in various countries have shown that an increase of 1km/hr in mean traffic speed typically results in a 3% increase in the incidence of injury crashes.[12] In China in 1999, speed was the main reported cause of road traffic crashes.[13] Excessive speed for the prevailing conditions was found to occur in 23% of crashes in a study carried out by Haworth *et al,* in Victoria, Australia.[14] Speed was also identified as the main contributory factor in 50% of road crashes in Ghana between 1998 and 2000.[15] Over speeding was one of the negative riding patterns observed among the motorcyclists in Ondo State, Nigeria by Okedare.[3]

Use of psychoactive substances while riding is also a documented risky practice among motorcyclists. Data from National Highway Traffic Safety Administration, Washington showed that in 2003, 10.9% of drivers/motorcyclists in fatal motor vehicle crashes were under the influence of alcohol, drugs, or medication.[16] Similarly, in New Delhi, India, a study showed that a third of motorized two wheeler riders taken to hospital admitted to driving under the influence of alcohol.[17] A previous study by Sunderstrom et al reported that the use of alcohol and cocaine was found to be higher among injured motorcyclists than among injured car drivers.[18] In Nigeria, a study done in Oyo State stated that 20.4% of motorcyclists reported current use of alcohol.[6]

In Nigeria, the rise in use of motorcycles has led to an accompanying rise in poor risky practices among motorcyclists leading to increased rate of accidents. Despite this situation little has been done to improve the road practices of motorcyclists. Therefore this study was conducted to implement and evaluate the effect of safety education on the riding habits of motorcyclists in Uyo, south eastern Nigeria.

SUBJECTS, MATERIALS AND METHODS

Study Area

Akwa Ibom State, one of the 36 states in Nigeria is located in the south eastern part of the country. The major means of intra city transportation in this area is the motorcycle. There are 31 local government areas (LGA) in the state with Uyo as the state capital. The estimated population of Uyo metropolis as at 2006 was 304,000.[19] The intervention group in this study was selected from this town. The second town used in the study was Ikot Ekpene, a similar town situated about 30 kilometers from Uyo with an estimated population of 142,377.[19]

Study Population

This consisted of commercial motorcyclists in Uyo metropolis with those in Ikot Ekpene, a comparable town serving as control. The two towns were chosen due to the large number of motorcyclists and the similarity in riding patterns of motorcyclists in these two towns. According to the president of the motorcyclists association in the state, there were about 30,000 motorcyclists in Uyo and 15,000 in Ikot Ekpene at the time of this study.

Study Design and Sampling Size

An intervention study was carried out among registered motorcyclists. The study was in three phases: the baseline, health education intervention and post-intervention phases. The motorcyclists in Ikot Ekpene, another urban town with similar characteristics as Uyo served as control. The sample size was calculated using the sample size formula for comparison of two related group proportions and reference was made to a London study where risk taking was found to account for 20.8% of the causes listed on the motorcycle accident database.[4] It was assumed that at the end of the study, there would be a reduction in risky riding habits by at least 12%. This gave a calculated sample size of 94 respondents per group which was rounded up to 100.

Sampling Technique

Respondents were selected using the multi stage sampling technique. The motorcyclists in both towns operated in clusters. A list of the total number of clusters in each town was obtained from the chairmen of the motorcyclists associations in the two towns involved in the study and four clusters were

selected by simple random sampling. A list of motorcyclists registered in the selected clusters in both towns was also obtained and 25 motorcyclists were selected from each cluster by simple random sampling technique, using table of random numbers. This gave a total of 100 motorcyclists in each group.

Data Collection

The names of all selected motorcyclists were documented in a register by the chairman of the motorcyclists union in each town. This was in order to prevent the participants from getting mixed up with those who were not selected. The purpose of the study and all activities that would take place during health education were fully explained to these chairmen and they in turn communicated the information to the selected motorcyclists in their respective towns. Convenient dates were fixed for the interview in each town. The selected motorcyclists were told that they would be entertained and all of them turned up on the fixed date.

Data collection was carried out using a semi-structured, interviewer administered questionnaire with the help of thirty community health officers in training who served as research assistants and had gone through a two-day training session on how to administer the instrument. The questionnaire was pre-tested on a small group of motorcyclists in one of the urban towns not used for the study. Baseline information was collected from both groups on their socio-demographic characteristics, and specific riding habits. Information obtained included hours of duty, observing rest during the riding hours, riding when tired, use of psychoactive substances, ownership of driving license and observing speed limits.

Intervention

The participants in Uyo were given safety education on correct riding habits. The intervention was in the form of lecture and interactive session. All lectures were given by the principal investigator in the local language of the respondents in each of the two towns with some assistance from three community health officers. All riding habits and road safety practices mentioned in the questionnaire were discussed. The relationship between poor safety practices and occurrence of accident was also thoroughly explained. During the interactive session, the content of the health education was revised and feedback was obtained through a question and answer session. The participants were encouraged to make comments and ask questions until all points were clarified.

The motorcyclists in the control town were given health education on the route of transmission and methods of preventing Human Immune deficiency Virus. Data collection was done on separate dates in the two towns. Data was subsequently collected from both groups 3 months post intervention. There was no attrition in both groups due to effective coordination by the union chairmen in both towns under the supervision of the state president of motorcyclists association.

Data Analysis

Data was analysed using the Statistical Package for the Social Sciences (SPSS) version 11. Chi square test was used to test for differences in riding habits of the motorcyclists before and after the training. Level of significance was set at 5%.

Ethical Considerations

Permission to carry out the study was obtained from Akwa Ibom State Ministry of Health and Commercial Motorcycle Association in the State. Informed consent was obtained from respondents after explaining the purpose of the study and what it entailed. Respondents who did not wish to participate had the right to decline being interviewed and suffered no consequence for such decision.

RESULTS

A total of 200 respondents were interviewed, 100 each in the intervention and control groups. The mean age of respondents in the intervention and control groups were respectively 33.4 (±8.7) and 33.5 (±8.3) years. In both groups most respondents were married, intervention group, 64 (64%) and control, 60 (60%) respectively. Seventy five percent of the respondents in the intervention group and 66% in the control group reported that they owned the motorcycles they were riding. Also, 57 (57%) of the respondents in the intervention group and 59 (59%) in the control groups reported having no other job apart from riding motorcycle. About half, 52 (52%), of the respondents in the intervention group and 65 (65%) in the control group reported working for six days in a week. As regards daily riding hours, 81 (81%) of motorcyclists in the intervention group and 78 (78%) of those in the control group reported working for 11–12 hours daily. Regarding who taught them how to ride, 50 (50%) of those in the intervention and 46 (46%) in the control groups reported being taught by a friend. Only 2 (2%) in the intervention group and 1(1%) in the control group claimed to have been taught in a driving school. (Table 1).

Three months post intervention, information was again obtained from the motorcyclists concerning their riding habits. The result showed that respondents observing rest during the riding hours in the intervention group increased from 30 (30%) at baseline to 93 (93%) at three months post intervention, while in the control group it reduced from 40 (40%) to 36 (36%). Furthermore, the number of motorcyclists who rode when tired in the intervention group reduced from 69 (69%) at baseline to 42(42%) at three months post intervention, while in the control group it increased from 74(74%) at baseline to 79 (79%) three months later. The changes mentioned in the intervention group were statistically significant at $p<0.05$. The number of motorcyclists who reported possessing valid licences in the intervention group increased from 31(31%) to 44 (44%). The difference was however not statistically significant at $p<0.05$. In the control group, it only changed from 21 (21%) compared to 19 (19%) (Table 2).

The number of motorcyclists who were aware of speed limit increased from 40 (40%) at baseline to 83 (83%) three months later in the intervention group, while it only changed from 36 (36%) to 43 (43%) in the control group. Those who never exceeded speed limit in the

Table 1: Personal Data and Work Characteristics of Respondents by Study Group

Characteristics	Intervention N = 100 n (%)	Control N = 100 n (%)	Statistics χ^2	p-value
Age group (years)				
<30	34 (34)	38(38)		
30–39	42 (42)	33 (33)		
≥ 40	24 (24)	29 (29)		
Age range (years)	17–58	18–54	1.77	0.4
Highest Level of Education				
Nil formal education	8 (8)	9 (9)		
Primary	46 (46)	48 (48)		
Secondary	40 (40)	35 (35)		
Post secondary	6 (6)	8 (8)	0.72	0.86
Marital Status				
Single	33 (33)	35 (35)		
Married	64 (64)	60 (60)		
Separated/divorced	3 (3)	5(5)	0.69	0.71
Respondent's Ownership of Motorcycle				
Yes	75 (75)	66 (66)		
No	25 (25)	34 (34)	1.95	0.96
Having another job by Motorcyclists				
Yes	43 (43)	41 (41)		
No	57 (57)	59 (59)	0.80	0.7
Number of days of work per week				
≤4	20 (20)	10 (10)		
5	11 (11)	15 (15)		
6	52 (52)	65 (65)		
7	17 (17)	10 (10)	7.36	0.20
Daily Hours of Work				
≤ 10	9 (9)	10 (10)		
11–12	81(81)	78 (78)		
>12	10 (10)	12 (12)	0.29	0.86
Respondents Taught to Ride by				
Friend	50 (50)	46 (46)		
Brother/Father	26 (26)	28 (28)		
Nobody	12 (12)	13 (13)		
Others	10 (10)	12 (12)		
Driving School	2 (2)	1 (1)	0.8	0.9

intervention group increased from 15 (37.5%) at baseline to 47 (56.6%) at 3months post intervention (p = 0.00), while in the control group, only 12 (27.9%) never exceeded speed limit at 3 months post baseline check compared to 10 (27.8%) at baseline. Regarding the number of passengers carried at a time, the number of respondents who carried two passengers in the intervention group reduced from 70 (70%) at baseline to 58 (58%) at three months post intervention compared to a reduction from 83 (83%) to 81 (81%) in the control group. (Table 3).

Generally in the intervention group, there was a slight decrease in use of most substances 3 months post intervention compared to baseline. Seventeen (17%) of the respondents reported using a combination of gin and hemp in the intervention group compared to 27 (27%) at baseline, while usage in the control group increased from 32 (32%) at baseline to 38 (38%) three months later. Similarly, usage of tobacco in the intervention group reduced from 50 (50%) at baseline to 43 (43%) at 3 months post intervention, while it increased slightly in the control group from 54 (54%) at baseline to 56 (56%) 3 months later. All changes in both groups were however not statistically significant at $p<0.05$ (Table 4).

Seventy six (76%) of motorcyclists in the intervention and 60 (60%) in the control group had been involved in road traffic accidents since they started riding. Out of this,50 (65.8%) in the intervention and 28 (46.7%) in the control group had an accident in the last three months prior

Table 2: Work Practices of Motorcyclist Post-Intervention by Study Phases

Characteristics	Intervention Group				Control Group			
	Baseline N=100 n (%)	3 months Post-Intervention N=100 n (%)	Statistic χ^2	p-value	Baseline N=100 n (%)	3 months after N=100 n (%)	Statistic χ^2	p-value
Observing Rest								
Yes	30 (30)	93 (93)			40 (40)	36 (36)	0.34	0.56
No	70 (70)	7 (7)	83.81	0.00	60 (60)	64 (64)		
Riding when tired								
Yes	69 (69)	42 (42)			74 (74)	79 (79)		
No	31 (69)	58 (58)	14.76	0.00	26 (26)	21 (21)	0.70	0.40
Possession of valid license								
Yes, license seen	15 (15)	21 (21)			10(10)	11(11)		
Yes, license not seen	16 (16)	23 (23)	0.61	0.16	9(9)	10(10)	0.13	0.93
No	69 (69)	56 (56)			81(81)	79(79)		

Table 3: Road Safety Practices of Motorcyclists by Study Phase

Characteristics	Intervention Group				Control Group			
	Baseline N=100 n (%)	3 months Post-Intervention N=100 n (%)	Statistic χ^2	p-value	Baseline N=100 n (%)	3 months after N=100 n (%)	Statistic χ^2	p-value
Awareness of Speed Limit								
Yes	40 (40)	83 (83)			36 (36)	43 (43)	1.03	0.31
No	60 (60)	17 (17)	39.05	0.00	64 (64)	57 (57)		
Exceeding Speed Limit	N= 40*	N= 83*			N= 36*	N= 43*		
Never	15 (37.5)	47 (56.6)			10 (27.8)	12 (27.9)	2.7	0.26
Sometimes	8 (20.0)	28 (33.7)	18.04	0.00	14 (38.9)	10 (23.3)		
Most Times	17 (42.5)	8 (9.7)			12 (33.3)	21 (48.8)		
No. of passengers carried per time								
1	30(30)	42(42)	3.13	0.07	17 (17)	19 (19)	0.14	0.71
>1	70(70)	58(58)			83 (83)	81 (81)		

**Those who were aware of the existence of speed limit at different phases of the study*

Table 4: Current use of Psycho-active Substances during Working Hours by Study Phases

Use of Psycho-Active Substances	Intervention Group				Control Group			
	Baseline N=100 n (%)	3 months post intervention N=100 n (%)	Statistic χ^2	p-value	Baseline N=100 n (%)	3 months after N=100 n (%)	Statistic χ^2	p-value
Tobacco (e.g. Snuff, Cigarettes)								
Yes	50 (50)	43 (43)	0.98	0.32	54 (54)	56 (56)	0.08	0.77
No	50 (50)	57 (57)			46 (46)	44 (44)		
Alcohol								
Yes	41(41)	35 (35)	0.76	0.38	45 (45)	48 (48)	0.18	0.67
No	59 (59)	65 (65)			55 (55)	52 (52)		
Gin and Hemp								
Yes	27 (27)	17 (17)	2.91	0.08	32 (32)	38 (38)	0.79	0.33
No	73 (73)	83 (83)			68 (68)	62 (62)		
Marijuana								
Yes	12 (12)	8 (8)	0.89	0.34	17 (17)	12 (12)	1.01	0.31
No	88 (88)	92 (92)			83 (83)	88 (88)		
Hypno-sedative Anxiolitic (e.g Valium, Barbiturate, Lexotan)								
Yes	6 (6)	8 (8)	0.31	0.57	4 (4)	8 (8)	1.42	0.23
No	94 (94)	92 (92)			96 (96)	92 (92)		

to the study. At three months post intervention, the number of motorcyclists who were involved in accident reduced to 29 (38.1%) in the intervention group with only a slight change from 28 (46.7%) to 24 (40%) in the control group.(Table 5).

DISCUSSION

This intervention study was conducted to assess the effect of safety education on the riding habits of commercial motorcyclists in Uyo, southern Nigeria. The motorcyclists in the control town, Ikot Ekpene were selected due to the similarity of the two towns and the similar riding patterns of the motorcyclists in both locations. The negative riding habits of the motorcyclists in the two towns included failure to obtain licenses, riding when tired, not observing rest during the riding hours, use of psycho-active substances and over speeding.

The low level of ownership of valid licenses among motorcyclists in both groups was not surprising as most of them did not receive proper training in a training school which could have given them opportunity to obtain licenses. There is no known training school in Nigeria for motorcyclists. Similar findings were reported in a study in a rural community in western Nigeria among motorcyclists where only a quarter of them could produce a driving license on

Table 5: Prevalence of Road Traffic Accidents among Motorcyclists

History of Accident	Intervention N=100 n (%)	Control N=100 n (%)	Statistic χ^2	p-value
Ever being involved in Accident				
Yes	76 (76)	60 (60)		
No	24 (24)	40 (60)	5.88	0.02

	Intervention Group N = 76				Control Group N = 60			
Involvement in Accident in last 3 months	**Baseline** n (%)	**3 months post intervention** n (%)	**Statistic χ^2**	**p-value**	**Baseline** n (%)	**3 months after** n (%)	**Statistic χ^2**	**p-value**
Yes	50 (65.8)	29 (38.1)	23.63		28 (46.7)	24 (40)	0.54	0.46
No	26 (34.2)	71 (61.9)		0.00	32 (53.3)	36 (60)		

demand.[5] Similarly, in a rural-urban comparative study done in Oyo State, Nigeria, less than 10% in both areas reported owning valid licenses.[6] A study conducted in Benin city, Nigeria among motorcyclists, however reported that up to 73.5% of drivers possessed drivers licenses, but only 27.2% had taken a road test before being given a license.[20] This means that majority of those with licenses in the cited study may not have qualified for it as no form of training on the use of motorcycle was reported to be received by 45% of drivers before they commenced operations.[20] In an in-depth study carried out in London among motorcyclists, of the 1,259 riders whose records were held on the motorcycle database, 80% were holders of a full motorcycle license, 13% were provisional license holders while less than 5% had no license.[4] These findings might have been due to the fact the riders attended formal riding institutions after which licenses were obtained. It may also have been due to enforcement penalties against those without licenses.

Three months post intervention there was an increase of 13% in license ownership among motorcyclists in the intervention group compared to 2% in the control group. Safety education has been shown to improve license ownership among motorcyclists. In a community based program for motorcycle rider education in three randomly selected sub districts in northern Thailand, Swaddiwuhipong *et al* reported that two years after the program, 69.7% of motorcyclists in the intervention group were more likely to have valid licenses compared to 46.5% in the control group.[25] The lack of a large increase in license ownership may have been due to the fact that the motorcyclists may not have been willing to spend money and time to obtain the required licenses despite the knowledge acquired during the training. Secondly the duration between the intervention and the evaluation was shorter in this study. It may also have been due to lack of enforcement penalties against those without licenses by the government.

Almost two thirds of motorcyclists in the intervention and control groups were not aware of speed limit and out of those who knew, majority did not obey it. Similar findings were reported in a study done in London, with 58% of the motorcyclists admitting to always, or frequently, breaking the speed limit.[4] In a rural-urban comparative study of commercial motorcyclists conducted in Oyo State, Nigeria, over speeding was identified as a common cause of road traffic accidents by 28.2% of the motorcyclists in the rural and 37.3% of the motorcyclists in the urban area.[6] This may have been in an attempt to make many trips and carry as many passengers as possible so as to make more money.

Post intervention, knowledge about speed limit increased in the intervention group. The proportion of respondents in that group who reported never exceeding speed limit increased by about twenty percent. Reduction and control of speed on the roads lead to reduction in road deaths, some by as high as 24% after lower speeds are enforced.[12] A study conducted in Ghana showed that speed control measures on a major highway reduced crashes by 35% and fatalities along this stretch by 55%.[15]

Concerning psycho-active substance uses, about a third to half of the respondents in both groups reported current use of tobacco, alcohol and a concoction which was a combination of gin and hemp. The use of psychoactive substances by these motorcyclists may have been due to the fact that the respondents felt these substances would make them more alert and less tired so that they could ride for longer periods of time and earn more money. It however could have affected their sense of judgment while riding which would make them more prone to accidents.

Similar findings were reported in studies in other parts of Nigeria. A study in Ondo State, Nigeria among motorcyclists reported that up to a third of them engaged in drunk riding.[3] Another study to determine driver-related risk factors in commercial motorcycle crashes in Benin City, Nigeria reported regular intake of alcohol by 39.8% of the drivers.[20] In a study carried out to determine the prevalence of psycho-active substance use among commercial motorcyclists in Zaria, Nigeria, commonly identified psychoactive substances/drugs used were: marijuana 25.8%, solution 24.5%, caffeine (Kola) 15.8%, and coffee 4.8%. Keeping awake, suppression of fatigue, and peer group effect were the identified factors influencing psychoactive substance use.[22]

Three months post-intervention, there was a decrease in use of almost all

the substances in the intervention group compared to baseline whereas no such decrease was noted in the control group. This decrease was most pronounced in the use of the combination of gin and hemp. The changes were however not statistically significant. The reason for this may have been because these substances are dependence forming drugs that may need an extended programme intervention before significant changes can be observed. A single day safety education was therefore not sufficient to significantly change such an addictive habit.

Up to two thirds of motorcyclists in the intervention and control groups admitted to riding even when tired. Tiredness was to be expected as most of them worked for 11–12 hours daily. Secondly four out of every ten motorcyclists in this study had other jobs in addition to riding motorcycle for commercial purposes. This was probably due to the desire to make as much money as possible. In a similar study in Nigeria, Okedare reported that a review of the riding patterns observed among the motorcyclists included riding for over 10 hours continuously in a day.[3] It is therefore not surprising that such motorcyclists become tired and accident prone. This is in contrast to the findings of an in-depth study done in London, where less than 10% of the respondents admitted to regularly riding their motorcycles while they considered themselves to be tired.[4]

The 3 month post- intervention assessment showed that the number of motorcyclists who admitted to observing rest during their riding hours increased by three folds in the intervention group, while those who rode when tired reduced by up to twenty seven percent. This would most likely lead to more alert riders whose judgment on the road would be better than those that were not rested. The fact that no such changes were observed in the control group, suggested that the reported changes in the intervention group were likely to be due to the safety education that that group received.

Most of the motorcyclists in both groups admitted to carrying more than one passenger at a time. This was most probably in an attempt to satisfy passengers' wishes, thus enhancing patronage. Similar findings were reported in a study conducted in Ondo State, Nigeria, where one of the riding patterns observed among the motorcyclists was also carrying two or more passengers at a time.[3] Among 363 motorcycle patients admitted in three tertiary hospitals in southwest Nigeria for road traffic injuries, 15.0% admitted to carrying more than two persons at a time.[23] This risky practice undoubtedly increases the vulnerability of both riders and the passengers to road traffic injury.

Post intervention there was a much greater increase in those who adhered to the practice of carrying one passenger at a time in the intervention group compared to the control group but this difference was not statistically significant. Many more would probably have changed that habit if there was a penalty attached to the offence by government in the city of study.

The reduction in the number of accidents recorded among motorcyclists in the intervention group was not surprising since post intervention, there were some significant reduction in many of the factors which predisposed to accident in this group. Similar findings were reported in a community based program for motorcycle rider education in three randomly selected sub districts in northern Thailand, where Swaddiwuhipong *et a*l reported that two years after the program, injury rate was significantly lower in the intervention than the control population. [24] Motorcycle rider education may therefore be a promising intervention for prevention of motorcycle related injuries.

Limitation

The issue of self reporting was considered a limitation in this study since one had to rely on the information given by the motorcyclists in drawing conclusions concerning their riding habits.

Conclusion

Safety education significantly improved specific riding habits among the motorcyclists in the intervention group resulting in a reduction in the number of accident recorded post-intervention. A similar pattern was not demonstrated in the control group as both baseline and three months findings were approximately the same. Periodic road safety education should be organized for motorcyclists by the government as it has been found to be a useful tool in ensuring safe riding habits among motorcyclists. Enforcement of penalties against those without licenses and extended programme intervention for those using psychoactive substances are also recommended along with safety education.

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