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CAR DRIVERS' ATTITUDES TOWARDS MOTORCYCLISTS IN A SEMI-URBAN COMMUNITY OF SOUTHWESTERN NIGERIA

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ABSTRACT

More than 20 million people are severely injured or killed on the world's roads each year and the burden falls most heavily on low income countries. The mortality from Road traffic injury in sub-Saharan Africa is among the highest in the world. Motorcycle crashes accounts for 54% of all road traffic injuries. The main type of conflict in which a motorcyclist is injured or killed is a collision between a motorcycle and a car. Research suggests that attitude of drivers towards motorcyclists may be important in how such interactions are treated on the road and hence has implications for road user safety. To assess car drivers' attitudes towards motorcyclists, a survey was undertaken in a semi urban area of south western Nigeria. Respondents filled in 26 general and motorcycle-related items. Four factors were extracted from the motorcycle items: negative attitudes, empathic attitudes, and awareness of perceptual problems and spatial understanding. Most of the respondents were dual driver/rider and they showed more of positive attitudes towards the motorcyclists. Further studies are suggested to know if the predominant attitude in this study is the actual behaviour of the drivers on the road.

INTRODUCTION

Globally, deaths and injury from road crashes are a major and growing public health problem. More than 20 million people are severely injured or killed on the world's roads each year and the burden falls most heavily on low income countries (Zwi, 1993). The mortality from Road traffic injury in sub-Saharan Africa is among the highest in the world. The overall road traffic injury rate in Nigeria is 41/1000 population and mortality from Road traffic injury was 1.6 per 1000. Motorcycle crashes accounted for 54% of all road traffic injuries (Labinjo *et al*., 2009). A motorcycle is a motorized two wheeled vehicle. The number of motorcycles has increased considerably in recent decades. Motorcycles are vulnerable in traffic; in comparism with drivers of motorized four wheeled vehicles, a motorcyclist has a relatively high risk of fatal or serious injury to a crash. The main type of conflict in which a motorcyclist is injured or killed is a collision between a motorcycle and a car (Craen *et al*., 2011). In depth study of motorcycle accident in the United Kingdom suggests that two of the three most prevalent types of collision are actually caused by the action of other road users. The two key collisions provide a good focus for this review. The first type is right of way violations (ROWVs), particularly with cars pulling out onto a main carriageway and colliding with oncoming motorcycles. The second type involves the driver failing to anticipate the possibility of a motorcycle appearing in certain situations, such as when a motorcyclist is filtering through traffic. The first type of collisions are often categorized as looked But Failed To See Errors (LBFTS), when a driver claims that they look in appropriate direction for conflicting traffic but did not see the approaching motorcycle. Though the attribution of such collision to LBFTS errors instead of simply failing to look or Misjudging the risk has been questioned (Brown, 2002 and Crundall *et al*., 2008). Research suggests that attitude of drivers towards motorcyclists may be important in how such interactions are treated on the road and hence has implications for road user safety. Crundal *et al*. (2008) suggests that the most negative attitude towards motorcyclists on the road tend to come from

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the least experienced drivers and this group in turn also has poorer skills in dealing with motorcyclists on the road. They suggest greatest empathy towards motorcyclists comes from drivers who are motorcyclists themselves. Empathy tends to be brought about by a perception of attachment to others and it is displayed by the deliberate attempt to take the other's perspective (Batson and Shaw, 1991). Car drivers who are also motorcyclists have fewer accidents with motorcyclists when driving than drivers with little or no motorcycling experience (Magazzu *et al*., 2006). It has been found that drivers who have family members or close friends who ride motorcycles are less likely to collide with motorcycles (Brooks and Guppy, 1990). It is generally acknowledged that risk taking and exaggerated self confidence in one's ability contribute to auto crash rate especially among young male drivers (Lin and Kraus, 2009).

Highly experienced riders also tend to rate their own road abilities positively especially when compared to car drivers (Crundall *et al*., 2008). Either these older riders are still subject to the same self enhancement bias that may plague younger riders (Svenson, 1981) or it may indeed be the case that their skills are actually better than the average car driver (Groeger and Grande, 1996) it appears that objective levels of rider skill could be underestimated if one mainly looks at the accident statistics. In other words, while one may assume that motorcyclist high fatality risk reflects deficit in rider's skill this may not be the case when the fact that most of those fatalities are due to the fault of another road user is taken into account (Labinjo *et al*., 2009) Studies to compare motorcyclists' skills to those of car drivers have shown that motorcyclists respond faster to hazards than car drivers (Horswill and Helman, 2003). The aim of this study is to identify the predominant attitude of car drivers towards the motorcyclists in a semi urban area of south western Nigeria and the possible causal effect of this on car- motorcycle collisions. The study will also examine the various perceptual and visual problems that may arise from car- motorcycle interaction and the effect they have on the causation of collision.

MATERIALS AND METHODS

Participants

There were 199 questionnaires filled and returned. The questionnaires were distributed randomly to motor vehicle drivers in Ogbomoso- a semi urban area of Oyo state in the southwestern region of Nigeria

Items

The questionnaire included three key sections. The first section recorded demographic factors (age, driving history, educational qualification). The second section presented 26 items in the form of statements that respondents could agree or disagree with. Responses were recorded on a7-point Likert-type scale varying from 'disagree strongly' to 'agree strongly'. The first two questions were general items ('I find driving a car is enjoyable and rewarding' and 'I perform all appropriate visual checks when driving or riding.'). The next 24 items were developed to reflect potential attitudes (e.g. 'Car drivers are typically more law-abiding than motorcyclists'), basic knowledge (e.g. 'Motorcyclists are allowed to filter past stationary or slow moving traffic'), and perceptual skills and performance (e.g. 'It is difficult to estimate the speed of approaching motorcycles while waiting to turn at a junction onto a main carriageway).

Analysis

All statistical analyses were done using SPSS version 16.0. Results were presented in tables.

RESULTS

Table I shows the sociodemographic characteristics of the respondents. 41% of the respondents are within the age group of 50 years and above followed by 40-49 years (34.7%); <20 years accounted for the least number (1.5%).

Table 1. Socio-demographic Characteristics of the Respondents

Variable	Frequency	Percentage
AGE GROUPS (in years)		
< 20years	3	1.5
20-29years	11	5.5
30-39 years	33	16.6
40-49 years	69	34.7
50years and above	83	41.7
SEX		
Male	142	71.4
Female	57	28.6
EDUCATION		
None	39	19.6
Primary	37	18.6
Secondary	38	19.1
Tertiary	85	42.7
DRIVING DURATION		
<1 year	18	9.0
1-5 years	37	18.6
6-10 years	50	25.1
>10 years	94	47.2
VEHICLE TYPE		
Private	104	52.3
Commercial	95	47.7
DRIVE MOTORCYCLE SOMETIMES		
Yes	52	26.1
No	147	73.9

More than two-third of the respondents (71.4%) are male and almost half of them (42.7%) have tertiary education. Quite a number of them (47.2%) have driving experience of greater than 10years and they drive more of private vehicle (52.3%) than commercial vehicles (47.7%). Table II shows the various car drivers attitude towards motorcyclists. Almost all of the respondents (99%) perform appropriate visual checks while driving/ riding. More than three-quarter (81.4%) of the respondents agree that motorcycles are easily hidden from view by parked vehicles and road environment. Most of the respondents agree that car drivers are typically more law abiding than motorcyclists (94.5%) and more than three quarter (79.4%) agree motorcyclists often perform manoeuvres that are inappropriate. Table III shows the categorized attitudes and the basic knowledge of the car drivers. More than half (53.3%) of the respondents have positive attitude towards the motorcyclists. More than three quarter of the respondents have a good knowledge about the correct position the motorcycle should travel in a lane.

Table 2. Car Drivers' Attitudes towards Motorcyclists

Variables	Attitude (%)		
	Agree	Indifferent	Disagree
I do find driving a car enjoyable	192 (96.5)	2 (1.0)	5 (2.5)
I perform all appropriate visual checks when driving/ riding	197 (99.0)	1 (0.5)	1 (0.5)
I am constantly aware that motorcycles can be more difficult to spot when driving in interweaving streams of fast moving traffic	171 (85.9)	10 (5.0)	18 (9.0)
It is easier for motorcyclists to make sudden swerves to avoid an accident	157 (78.9)	22 (11.1)	20 (10.1)
Motorcyclists are allowed to filter past stationary or slow moving traffic	143 (71.9)	18 (9.0)	38 (19.1)
It is difficult to estimate speed of approaching motorcycle	89 (44.7)	62 (31.2)	48 (24.1)
I do find riding a motorcycle enjoyable	56 (28.1)	48 (24.1)	95 (47.7)
Approaching motorcycles are as easy to spot as approaching cars	81 (40.7)	53 (26.6)	65 (32.7)
When riding a motorcycle taking risk is part of the thrill	150 (75.4)	27 (13.6)	22 (11.1)
Motorcycles are as easy to see at night as cars	123 (61.8)	29 (14.6)	47 (23.6)
Motorcycles tend to have headlights on, more often than car drivers in the day time	100 (50.3)	51 (25.6)	48 (24.1)
Other motorists should take extra care to look for motorcyclists	182 (91.5)	4 (2.0)	13 (6.5)
The average motorcyclist take greater precaution in wet weather	132 (66.3)	26 (13.1)	41 (20.6)
Motorcyclists often perform manoeuvres that are inappropriate	158 (79.4)	27 (13.6)	14 (7.0)
When a car and motorcyclists collide , it is typically the fault of the motorcyclist	163 (81.9)	18 (9.0)	18 (9.0)
On the open road you can be suddenly surprised by the appearance of a motorcycle coming	150 (75.4)	39 (19.6)	10 (5.0)
Motorcycles are easily hidden from view by parked vehicles and road environment	162 (81.4)	27 (13.6)	10 (5.0)
It is easier to pass the current motorcycle test than the car driving test	135 (67.8)	47 (23.6)	17 (8.5)
I have similar personal characteristics to the average motorcyclist	148 (74.4)	22(11.1)	29 (14.6)
Motorcycles are usually easy to spot even against a cluttered background	141 (70.9)	36 (18.1)	22 (11.1)
It costs less to repair the average motorcycle after a minor accident with car	178 (89.4)	10 (5.0)	11 (5.5)
Car drivers are typically more law abiding than motorcyclists	188 (94.5)	5 (2.5)	6(3.0)
When in slow moving traffic, I am often surprised by motorcyclists filtering through the traffic	180 (90.5)	8 (4.0)	11 (5.5)

Table 3. Categorized attitudes and the basic knowledge of the drivers

Variables	Frequency	Percentage
Categorized Attitude		
Negative	93	46.7
Positive	106	53.3
G30		
Pavement	162	81.4
Centre line	30	15.1
Not sure	7	3.5
G31		
Correct	63	31.7
Incorrect	118	59.3
Not sure	18	9.0
G32		
Correct	72	36.2
Incorrect	111	55.8
Not sure	16	8.0

Table 4. Relationship between the Categorized Attitude of Respondents and their Socio-Demographic Characteristics

Variables	Categorized Attitude (%)		Chi-square	df	p-value
	Negative	Positive			
Age groups (in years)					
< 20	0 (0.0)	3 (100.0)			
20 – 29	3 (27.3)	8 (72.7)			
30 – 39	12 (36.4)	21 (63.6)	7.7	4	0.10
40 – 49	38 (55.1)	31 (44.9)			
≥ 50	40 (48.2)	43 (51.8)			
Sex					
Male	66 (46.5)	76 (53.5)			
Female	27 (47.4)	30 (52.6)	0.01	1	0.91
Educational status					
None	23 (59.0)	16 (411.0)			
Primary	18 (48.6)	19 (51.4)			
Secondary	15 (39.5)	23 (60.5)	3.56	3	0.31
Tertiary	37 (43.5)	48 (56.5)			
Driving duration (in years)					
< 1	6 (33.3)	12 (66.7)			
1 – 5	15 (40.5)	22 (59.5)			
6 – 10	28 (56.0)	22 (44.0)	3.60	3	0.31
≥ 10	44 (46.8)	50 (53.2)			
Vehicle type					
Private	40 (38.5)	64 (61.5)			
Commercial	53 (55.8)	42 (44.2)	5.99	1	0.014
Rides motorcycles					
Yes	14 (26.9)	38 (73.1)			
No	79 (53.7)	68 (46.3)	11.10	1	0.001

More than half of the respondents were not correct about the distance that should be kept between a car and a passing motorcycle (59.3%) and also about the proportion of the width of a car that a motorcycle occupies (55.8%). Table IV shows the relationship between the Categorized Attitude of Respondents and their Socio-Demographic Characteristics**.** Almost all the age groups have more of positive attitude towards the motorcyclists with 100 % positive response from the respondents < 20years. Both male and female participants have more of positive attitude towards the motorcyclists. Respondents with no educational qualification had negative attitude while those with educational qualification had positive attitude however this is not statistically significant (p value- 0.31). Private vehicle drivers have positive attitude while those with commercial vehicle have negative attitude; this is statistically significant (p value- 0.014). Less than half of the respondents ride motorcycle and this is statistically significant (p value- 0.001)

DISCUSSION

Attitudes are considered to be a predisposition to behave positively or negatively. Towards an individual, group, event or even an object (Forward, 2006). In relation to driving, attitudes could relate to other road users (e.g. 'motorcyclists deserve what they got') or to one's own behavior (e.g. 'speeding is okay if you're a good enough driver'). The items of the study's questionnaires were developed to reflect potential attitudes, the basic knowledge, and the perceptual skills and performance of the car drivers with respect to the motorcyclists. The potential attitudes can either be predominantly negative attitudes towards motorcyclists or responsible attitudes, suggesting an understanding of the difficulties faced by motorcyclists. The latter is also termed an empathic factor. The perceptual skills and performance involve the perceptual problems that might arise with car–motorcycle interactions and the spatial understanding of drivers in relation to motorcycles (Crundall *et al*., 2008).

Almost all the age groups in this study have more of positive attitude towards the motorcyclists with 100 % positive response from the respondents < 20years. Both male and female participants have more of positive attitude towards the motorcyclists. This is not in agreement with the works of Crundall *et al*. (2008) in the United Kingdom where analysis performed suggested that all driver groups have higher negative attitudes towards motorcyclists compared to the dual drivers, and in some cases it is the drivers with between 2 and 10 years experiences who have the most negative attitudes towards motorcyclist. 76.1% of the respondents agree that motorcyclists often perform inappropriate manoeuvres and 81.9% agreed that when a car and motorcycle collide it is typically the fault of the motorcycle. Clarke *et al* identified a sub-group of collision that were specifically related to the way motorcyclists manoeuvre. When all accident cases were examined where the rider was judged to be at fault, 16.5% involved a motorcyclist overtaking other vehicles. 'At-fault' riders had a tendency to be slightly younger than the rest of the riders, and also were found to be riding machines of a higher engine capacity than other accident-involved riders (Clarke *et al*., 2004). Motorcycle accidents also occurred when riders took the opportunity to pass slow-moving or stationary traffic, which is often referred to as 'filtering. 90.5% of the drivers in the index study are often surprised by motorcycles filtering through slow moving traffic. Other drivers were more than twice as likely to be considered at fault in such accidents as the motorcyclists involved. 'At-fault' drivers typically failed to take effective rear observation before manoeuvring out of (or between) lines of stationary or slow moving traffic (Clarke *et al*., 2004) 75.4% of the respondents agree that while riding a motorcycle taking risk is part of the thrill. The enjoyment of taking risks and the enjoyment of speed, in particular, are earlier discovered to be higher for motorcyclists than they are for car drivers who in general are more risk averse (Broughton, 2007 and Fuller *et al*., 2008). Transport Research Laboratory (TRL) in the United Kingdom has reported an analysis of police reports of 717 fatal crashes involving motorcycles that occurred between 1986 and 1995. The analysis used a system devised by TRL for identifying those factors that contributed directly to the occurrence of the crash**.** None of the 345 motorcycle crashes examined in detail were filtering between traffic or waiting to overtake. Overall, 6 of the 345 crashes involved 'close following' – these were mostly riders in groups for pleasure or to a social event (Lynam *et al*., 2001).

Typically, males who drive frequently produce the highest violation scores. This demonstrates one area in which greater experience is not necessarily reflected in better behaviour. Whereas novice drivers may have increased accident liability due to a lack of skills, the more experienced drivers are actually more likely to break the rules. This does not mean that young inexperienced drivers will not perform stupid behaviours on the road, just that these behaviours are more likely to arise from misperceived levels of control and perceived norms (especially when other young people are in the car) (O¨zkan *et al*., 2006). 91.5% of respondents agreed that other motorists should take extra care to look for motorcyclists and 73.1% of respondents that also ride motorcycles have positive attitudes towards the motorcyclists. There is evidence that dual drivers (those who drive cars and ride motorcycles) have alower likelihood of accidents involving motorcycles (Magazzu *et al*., 2006) and car drivers who have close friends or relatives whoride motorcycles are also less likely to be involved in collisions with motorcycles, and demonstrated better observation of motorcycles than drivers without such family and friend connections (Brooks and Guppy, 1990).

Hurt *et al*. found that, in multiple vehicle accidents, the driver of the other vehicle violated the motorcyclist's right of way and caused the accident in two-thirds of all such collisions (Hurt *et al*., 1981). 44.7% of the respondents agreed that it is difficult to correctly estimate the speed of an approaching car while 24.1% disagree with it. It is possible that a driver looks at an approaching motorcycle, and even perceives the motorcycle, yet still makes a manoeuvre that leads to a collision. This could occur because they misjudge whether it poses a potential risk, or fail to correctly appraise the approaching motorbike. One of the key theories is the 'size-arrival effect'. According to this theory, approaching speed is related to the size of the vehicle. The consequence of this is that the narrower image of the motorcycle compared to the car may result in the driver over-estimating the time of arrival

(Crundall *et al*., 2008). The visual skills are especially important, and previous research has demonstrated that drivers with inappropriate or incomplete driving schemas will have poorer visual skills compared with expert drivers (Underwood *et al*., 2002). 99% of the respondents perform all necessary visual checks while driving or riding. Attitudes towards general violations (tailgating, undertaking, etc.) have also been related to accident rates (Parker *et al*., 1995 and O¨zkan *et al*., 2006). The direct link with failures to complete all necessary visual checks however is limited. One possible influence of violation propensity upon visual search might manifest in such drivers being less likely to consciously practice explicit routines (such as 'look right, look left, look right again'). As the impact of these taught strategies (requiring conscious effort on the driver's part) is unknown, it is impossible to estimate how important a disregard for such strategies might be. Lawton *et al* noted that intention to speed varied across different road types and that this was related to the perceived negative consequences.

For instance, the perceived negative consequences of speeding in a busy shopping street mirrored the low intention to speed on such a road. They found, however, that younger respondents and those respondents with less regard for the negative consequences reported greater intentions to speed. Higher speeds can, in turn, have an effect upon visual search (Labinjo *et al*., 2009). Rogers *et al* noted that increased speed greatly constrained eye movements. The most obvious influence of speed upon eye movements is that either the sampling rate must increase or the number of fixations must decrease for any given portion of road. For instance, a speeding driver approaching a T-junction may not want to stop if at all possible. By approaching the junction at a faster than average speed however, they reduce the amount of time that they have to make the required visual checks before making this decision. They could then carry on through the give-way line without adequately sampling the main carriageway for traffic, risking a collision (Rogers *et al*., 2005).

If drivers are more concerned with making a specific pattern of eye movements (look right, look left, look right again) then they may forget to actually process what they look at. A pertinent theory to the current issue is presented in Findlay and Walker's model of saccade generation. Their model suggests that eye movements are controlled by two processing centres that are in constant competition. The fixate centre keeps the eyes in one place, and continues to process the current stimulus, while the move centre continually places demands on the oculomotor system for the eyes to move to a new area of interest. These two centres actively inhibit each other, so if the information at the point of fixation is extremely important the fixate centre will inhibit the move centre. However, if the move centre is more active, then the eyes will be dragged away from the point of fixation, potentially before the viewer has finished processing what they were looking at. It is possible that explicitly learned strategies ('look right, look left, look right again') artificially inflate activation in the move centre to the detriment of the fixate centre. In other words, if drivers are more concerned about where to look next according to some trained pattern, they might be less likely to process what they actually look at (Findlay and Walker, 1999).

Support for 'over-learned' visual strategies in driving was reported by Van Elsande *et al*. They undertook a case study of a number of accidents where drivers reported high familiarity with the road, and high driving experience in general. In the analysis of accidents where the driver crossed an intersection without giving way, one of the key factors they reported was a reliance on a rigid series of visual checks. These inflexible search strategies were employed regardless of deterioration in the context (e.g. poorer visibility, perhaps due to weather or failing light), which would normally require a modified search strategy. Unfortunately, then typical quick glances that these drivers had used on previous journeys through the junction were not sufficient and led to a collision (Van Elsande and Faucher-Alberton, 1997). 61.8 % of the respondents agreed that motorcycles are as easy to see at night as cars and 50.3 %. agreed that motorcycles tend to have headlight on more often than cars at daytime An epidemiological study by Well *et al*. (2004) reported that after adjustment for potential confounding variables, riders wearing reflective or fluorescent clothinghad a 37% lower risk of motorcycle-crash-related injury, compared with otherriders.

The work of Hole *et al* is however, a warning not to rely solely on the traditional advice to motorcyclists to make themselves more conspicuous. From studies of participants searching static images for motorcycles, they found that the success of conspicuity aids depended on the background context. For instance, luminance contrast appeared to be more important than luminance per se [20]. Research into motorcycle conspicuity has produced mixed results and deliberately increased conspicuity in general has been found not to have been as effective an aid in avoiding accidents as might have been assumed (Yuan, 2000) With regard to motorcycles, one of the key recommendations is to use daytime running lights (DRL). In a critical appraisal of a Europeanre view of research into DRL, Knight *et al* concluded that mandatory DRL would indeed reduce accidents, though they acknowledged that the size of the effect was debatable. One problem with mandatory DRL for both cars and motorcycles, noted is that if an oncoming motorcycle obscures one of the headlights of a car following behind, then this may further confuse a driver waiting to pull out at a junction (Knight *et al*., 2006).

70.9% agreed that it is usually easy to spot a motorcycle against a cluttered background. Previous studies done however shows that motorcycles present a very narrow and detailed image which can be harder to spot against a cluttered background with a high frequency texture (such as road markings, traffic signposts and trees; an example of a relatively high spatial frequency, whereby low spatial frequency information (in this case cars) tends to be processed before high spatial frequency information (motorcycles) (Hughes *et al*., 1996 and Loftus and Harley, 2004). On the vast majority of occasions a quick glance down the road may succeed in spotting a car as this low frequency object is likely to 'pop out' of the visual scene (Sagi, 1988) 81.4% of the respondents agree that motorcyclists are to travel on the pavement while 30% agreed that they should travel in the centre line. The idea of shared space for riders is met with a mixed response from riders themselves, but largely reduces the concept of the road as being shared space and rather reflects

the dominant car drivers perception that the road is for them and them alone (Musselwhite *et al*., 2012).

Conclusion and Recommendation

In conclusion, most of the respondents in this study have positive attitudes towards the motorcyclists although the figure is not statistically significant, this may be probably due to a relatively small sample size. Most of the respondents are dual drivers and this may be responsible for the empathic attitude that is predominant among them in keeping with previous studies done in the United Kingdom. This paper has been unable to transfer the various attitudes of the car drivers into their actual behaviour on the road. It has also been unable to relate the car- motorcycle collisions in the region directly to the attitudes of the car drivers. Further studies are recommended to find out if there is really a direct relationship between the negative attitudes of car drivers and the car-motorcycle collision in the region and also the possible effect of cultural norms on this..

Conflicts of Interest

"The authors declare no conflict of interest concerning this article. The authors are solely responsible for financing the research work"

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