

# Ibadan Journal *of the* Social Sciences

## Contents

Liquidity Premium Theory: an Empirical Support From Sukuk (Islamic Bonds) Yields and Profits Curves

*Adesina-Uthman Ganiyat A.*

Gender and Agricultural Adaptation Strategies to Climate Change in the Savanna Eco-Climatic Belts of Nigeria

*Godwin O. Atedhor*

Migratory Trajectory of Transnational Street Beggars in South Western Nigeria

*Usman Adekunle Ojedokun and Adeyinka Abideen Aderinto*

Effect of Work Systems and Workplace Hazards on Employee's Behaviour

*Solaja, Mayowa Oludele and Akeem Ayofe Akinwale*

External Debt Accumulation and Economic Growth: Evidence from West African

*Akanni O. Lawanson*

Comparison of Perception of HIV/AIDS Risk and Sexual Risk Behaviours Among Youths with and without Disabilities in Oyo State, Nigeria

*Umoren, Anietie M. and Adejumo, Adebayo A.*

Alcohol During Pregnancy and Lactation: Bridging Discordant and Equidistant Views on Maternal and Child Outcomes

*Ibora F.A. Ottu and Iniobong Ibora Ottu*

Prices and Output Response to Monetary Policy Variation in Nigeria

*Samuel Orekoya*

The Nature and Consequences of Physical Development under Overhead Electricity Power Lines (EPLs) in Ibadan

*Bolanle Wahab and Alaba Adediji*

Observed Automobile Drivers' Mobile Phone Use Rates in Ibadan Metropolis, Nigeria

*Olusiyi Ipingbemi and Olumami Oyemami*

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## Observed Automobile Drivers' Mobile Phone Use Rates in Ibadan Metropolis, Nigeria

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*The use of mobile phone while driving is a growing problem in both developed and developing countries. This problem was investigated among automobile drivers through fixed location observational survey in three residential densities in Ibadan Metropolis. The survey was undertaken for seven days between 7.00am and 7.00pm everyday. Both descriptive and inferential statistics were used for data analysis. The average phone use rates in low, medium and high densities were 4.3%, 4.2% and 4.2% respectively. Daily pattern showed two peak periods coinciding with the conventional traffic volume peaks in all the zones. Also, drivers were more likely to use mobile phones 2 times during weekdays compared to weekends. Males were five times more likely to use cell phone than females. One-way ANOVA showed significant difference ( $p > 0.05$ ) in the use of mobile phones among automobile drivers across the week. The paper advocates increased enlightenment on the dangers of phone use behind the wheels, improved surveillance, proper enforcement of existing legislation banning phone use while driving as well as tougher penalties.*

**Keywords:** Drivers, mobile phone, pattern, residential zones, traffic volume

### Introduction

Driving is a complex task, requiring the concurrent execution of various cognitive, physical, sensory and psychomotor skills. Despite these complexities, it is not unusual to observe drivers engaging in various non-driving related activities while driving. Mobile phone use, a non-driving related activity, is a source of distraction in traffic, which portends danger to traffic safety and is becoming an increasing concern to policy makers.

Drivers' distraction and its consequences have been subjects of debate over the years among researchers (Wang et al., 1996; Young and Regan, 2007; Lee et al, 2008; Sullman, 2012). For instance, Lee et al., (2008) see driver distraction as a diversion of attention away from activities critical for safe driving towards a competing activity. Treat (1980) believes that distraction occurs when a driver is delayed in the recognition of information needed to safely

accomplish the driving task because some events, activities, objects or persons within or outside the vehicle compelled or tended to induce the driver's shifting attention away from the driving task. In the same vein, Young and Regan (2007) opined that driver distraction has to do with voluntary or involuntary diversion of driver's attention away from the driving task by an event or object to the extent that the driver is no longer able to perform the driving task adequately and safely. There are many types of driver distraction, but the use of mobile phones while driving is a primary concern.

Globally, the use of mobile phone has risen exponentially over the past decades in all parts of the world. It grew from 5 per 100 inhabitants in 1998 to 67 per 100 inhabitants at the end of 2009 (ITU, 2010). Between 2008 and 2009, the use of mobile phone in developing countries exceeded 50% of the global population, reaching an estimated 57 per 100 inhabitants, while in high income countries; use has largely exceeded 100% (WHO/NHTSA, 2011). In Nigeria, connected lines of mobile phone increased from 266,461 in 2001 to 109,822,964 in 2011 while active lines stood at over 90,000,000 (NCC, 2012). This is corroborated by another survey conducted by Nigerian Bureau of Statistics which put total access to mobile phone in Nigeria in 2011 at 63.9% (NBS, 2011). Mobile phone use was introduced in Nigeria in 2001. Since then, mobile phones are used everywhere including behind the wheels. The Federal Road Safety Commission (FRSC) Establishment Acts 2007, Section 10(4FF) prohibits the use of hand-held mobile phone by motorists and imposes a fine of N4,000 (US\$25) on erring driver.

In spite of the safety concerns associated with the use of mobile phone while driving, the magnitude of this problem is not well known or researched in Nigeria, particularly in Ibadan. Except for the descriptive work of Akande and Ajao (2006) that investigated the hazards of phone use among non-commercial drivers in Ilorin, Nigeria, studies on phone

use among motorists behind the wheels are rare in the country in spite of its widespread use. It is in the light of this that this paper investigated the magnitude of mobile phone use among automobile drivers in Ibadan Metropolis.

### Literature Review

Observational studies in the past have found varying results for mobile phone usage rates. In the United States, different rates of phone use while driving have been obtained over the years. For instance, McCart et al (2003) found that 3.4% of New York City drivers were talking on mobile phones while driving. Similarly, 6.3% of drivers in Salt Lake City, Utah, were talking on mobile phones while driving (Strayer and Drews, 2004). In 2010, Eby and Vivoda found that on the average, about 4.8% and 4.4% of drivers at intersections and exit ramps in Minnesota respectively were talking on mobile phones while driving. Recent study in North Carolina, found a higher rate of 13.3% (Blumfield and Pulugurtha, 2011). The National Occupant Protection Survey in the United States in 2010 put the percentage of drivers using mobile phones while driving at 5% (NHTSA, 2010). A study in Canada found that 2.8% of drivers were using mobile phones at any given moment while driving in rural areas, but this figure was much higher in urban areas (Burns et al., 2008). Bedford et al. (2005) observed in Ireland that 3.6% of the drivers were using handheld phones while driving. The use was investigated by a direct observation of drivers.

In Australia, the percentage of vehicles drivers using hand-held mobile phones while driving increased from 1.5% to 3.4% over a decade (Horberry et al., 2001; Young et al, 2010). In Great Britain, in 2008, hand-held mobile phone use was observed to be 1.1% for car drivers and 2.2% for other drivers (Knowles et al., 2008). Asgarabad et al. (2012) found in Iran that 3.6% of observed drivers were using their hand-held mobile phones while driving. A rapid assessment of mobile phone use in Johannesburg (SA) showed

that 7.8% of drivers were seen holding a mobile phone either talking or texting (WHO/NHTSA, 2011). Except in Greece, the rate of mobile phone use among automobile drivers in European Union (EU) countries is less than 4% (IRTAD, 2012).

With respect to the daily and weekly pattern of phone use, Horberry et al (2001) found in Western Australia that the level of mobile phone use did not significantly differ during the day, though the highest period was between 11-12 hours. Taylor et al. (2007) found in Australia that there was greater use of mobile phone in the evening in 2002 but this changed in 2006 when the evening rate was significantly lower than the morning rate, which they attributed to change in the nature of calls e.g. more business calls in the morning. Recent study in Melbourne, Australia, showed that the activity was more likely to occur in late afternoon (Young et al, 2010). Weekly use of mobile phone by automobile drivers differs significantly between weekdays (1.2%) and weekends (0.4%) in London (Hill, 2004). This implies that car drivers were three times more likely to be using a hand-held phone on a weekday than on a Saturday.

Attempts to evaluate gender difference in mobile phone use while driving have yielded inconsistent results. While some studies have shown that more males than females use mobile phone behind the wheels (USDOT 1997; Sullman et al, 2004; Zhou et al, 2009; Braitman and McCatt, 2010; Olukoga et al, 2011), other studies have shown the opposite (Cross et al., 2010; NHSTA, 2010). In a nutshell, most studies concluded that males are more likely to use mobile phone when compared to their female counterparts.

The widespread use of mobile phones by automobile drivers has generated safety concerns over the years (Haigney, 1997; Haigney and Westerman, 2001). A large body of literature suggests that handheld cell phone use while driving impairs driver performance (Reldemeier and Tibshrani, 1997; Strayer and Drews, 2004; Ranney, 2005). Handheld cell phone use while driving imposes no less than three tasks upon drivers:

locating/glancing at the phone, which draws the eyes away from the road; reaching for the phone and dialing, which impairs control of the vehicle and conversing via the phone, which distracts attention during driving (Klauer et al., 2006). Strayer and Drews (2004) reported that hand-held cell phone use while driving increases braking time by 18%, following distance by 12% and increases time for speed resumption after braking by 17%. Later study by Strayer et al (2006) observed that talking on a cell phone increases crash risk by four times and texting while driving increases car risk by eight times. They compared these values to drunk-driving which increases crash risk by about four times.

Legislation banning phone use by drivers has been found to be effective. For instance, a study in United Kingdom attributed a decrease in the rate of mobile phone use from 1.85% to 0.97% to legislation (Johal et al., 2005). Similar decreases in the rates of phone use among drivers were also found in both Washington DC and New York after legislative ban (McCartt and Hellinga, 2007; McCartt and Geary, 2004). Furthermore, increased enforcement has a positive effect on the use of mobile phone while driving. McCartt et al (2010) found a decline of between 24% and 65% in the use of mobile phones in seven states in US many years after the implementation of the legislation banning the use of mobile phone behind wheels, which they attributed to sustained enforcement. However, similar studies in the United Kingdom and North Carolina (US) only had a modest positive effect (Walter et al, 2011; Godwin et al, 2012). While most of these studies took place in developed economies, research in mobile phone use among drivers in developing countries particularly in Nigeria is limited.

### **The Study Area and Methodology**

The study area is Ibadan metropolis comprising of five local government areas with a population of 1,338,659 inhabitants in 2006. Traditionally, the occupation of the Ibadan people is made up of trading, crafting and

farming. Farming activities are now popular due to favourable climate that encourages agricultural practice. Both arable and perennial crops are cultivated. Ibadan city which used to be a war camp grew without consideration for effective planning, resulting in both planned and unplanned areas. The unplanned areas are the core of the city which are predominantly inhabited by the indigenous population and is made up of areas such as Beere, Oja'ba, Labiran, Oje among others. The middle density zone came into existence as a result of the indigenous population who are now rich and can afford to buy land in this zone. These include locations like Sango, Mokola and Dugbe. The low density zone areas (at the outskirts) are usually Government Reservation Areas and Government Estates. Almost all the houses have fences around with flower beds and gardens in place. These inhabitants are top civil servants, business executives, educationists and professionals. These categories of people earn high income and are usually mobile. The low density zone comprises areas such as Bodija Estate (Old and New), Agodi GRA and Oluyole Estate.

Ibadan is an example of a typical African city in terms of the provision of transport infrastructure. The roads are poor and there is near absence of ancillary facilities such as road shoulders and walkways. Road signs and markings are in deplorable condition on road sections, where they are available. Pedestrians compete with moving traffic for the use of roads due to absence of pedestrian facilities, putting pedestrians at risk. Similarly, because there are no public parking facilities vehicles are parked indiscriminately on road shoulders and carriageway, causing traffic disruption and congestion.

Relevant data were obtained from observatory survey. The field survey was conducted to determine the rate and pattern of mobile phone use among automobile drivers in Ibadan Metropolis. The field survey was carried out at a fixed location observing passing automobile vehicles along randomly selected roads in the three residential zones (densities) in the

study area. The fixed location method that observes passing vehicles along road section seems to be more relevant to traffic safety compared to surveys carried out at junctions or intersections by researchers (Eby and Vivoda, 2010; Young et al, 2010; Blumfield and Pulugurtha, 2011). This is so because at junctions or intersections, most vehicles are stationary or at low speed particularly during the peak periods, therefore, they constitute less traffic risk or danger either to themselves or other road users compared to locations along the road section where vehicles are most likely to be driven at high speed. Also, since drivers are at low speed at junctions or intersections (especially signalized intersections) they are prone to the use of mobile phone in such locations. Therefore, observing drivers for the use of mobile phones at such junctions or intersections implies that you are looking for the obvious.

The locations where the traffic survey took place were in Bodija (along Bodija – Secretariat Road), Mokola (along Mokola- Dugbe Road) and Oja'ba (along Oja'ba – Beere Road) representing the Low, Medium and High residential zones respectively. Automobile drivers were observed for mobile phone use as they passed the fixed locations along these roads. The observations took place for seven days (Monday-Sunday) and were made during the day light between 7.00am to 7.00pm to ensure the visibility of mobile phone use. The field observers were trained rigorously on the methodology and the field data collection procedure. Traffic surveyors were instructed to stand where possible on the sidewalks or median to see and be able to record correctly the level of mobile phone use. Only when this is not possible due to safety concerns were the traffic surveyors instructed to stand on the passenger's side of the vehicle. Observations were made on one lane of the road. A team comprising two traffic surveyors took the volumetric count of cars, while the second team also with two traffic surveyors observed the drivers of the passing cars that use mobile

phone on wheel. Data were analyzed using both descriptive and inferential statistics.

#### Pattern of Traffic Volume and Rate of Mobile Phone Use in Different Residential Zones

The volume of traffic seems to follow a similar pattern in the three residential zones. For instance, the highest volume of traffic for the week was recorded on Monday in the three residential densities. Figure 1 showed that the volumes of traffic on Monday in the low, medium and high densities were 4851, 4957 and 4729 vehicles respectively. The traffic volume decreased steadily in the three zones from Monday to Thursday. However, the volume of traffic on Friday was higher than those of Wednesday and Thursday. Saturday and Sunday recorded the lowest volume of traffic throughout the week. The high traffic on Friday may be associated with cultural events such as wedding and burial as well as religious activities because it is the day set aside by Muslim faithful to worship Allah. Furthermore, weekly trend showed high traffic volume on weekdays compared to weekends. This may not be unconnected with work-related travels. It is also the period that both private and public offices open for activities, which ultimately result in high traffic generation. The higher traffic volume on Sunday compared to Saturday in both low and medium zones could be due to religious activities which make people

drive their cars to churches, because car ownership is still seen as a symbol of wealth and status in Nigeria. In a nutshell, the Average Daily Traffic (ADT) for the

The rate of phone use while driving (rate of violation) as shown in table 1 indicated that low density had the highest violation of 5.5% on Friday, while the corresponding rates for medium and high densities were 4.8% and 5.0% on Wednesday and Monday respectively. This is surprising because substantial number of the rich, educated and enlightened members of the society resides in the low density zone and they should be aware of the risks associated with phone use while driving. Incidentally, this is where we have the highest percentage of automobile drivers using phone while driving. In other words, education and wealth may exacerbate the use of mobile phone while driving.

Spatial pattern of phone use in the study area indicated that in the low density zone, the rate of use decreased from 5.4% on Monday to 2.4% on Thursday, then rose to 5.5% on Friday and dropped to 2.4% on Sunday. In the medium density zone, the rate of phone use increased from 4.7% on Monday to 4.8% on Wednesday then decreased to 2.9% on Saturday and rose to 3.0% on Sunday. The pattern in the high density zone indicated that the rate of phone use among automobile drivers decreased from 5.3% on Monday to 4.6% on Tuesday, then rose to 5.0% on Wednesday and dropped to 2.6% on Saturday. It then went up to 2.8% on Sunday. On the average, the rate of violation of phone use in the low, medium and high densities were 4.3%, 4.2% and 4.2% which are higher than the rate of phone use in most developed countries (IRTAD, 2012). Furthermore, the day to day variation in phone use throughout the week showed that drivers were more likely to use mobile phones about 2 times during the weekdays compared to weekends.



Fig 1: Volume of Traffic in Different Residential Zones

Source: Field Survey, 2011

Table 1: Rate (%) of Phone Use by Automobile Drivers in Three Residential Zones

Days	Low		Medium		High	
	Freq	%	Freq	%	Freq	%
Monday	261	5.4	232	4.7	250	5.3
Tuesday	220	4.6	233	4.7	215	4.6
Wednesday	222	4.9	219	4.8	216	5.0
Thursday	191	4.4	208	4.6	190	4.7
Friday	255	5.5	214	4.5	205	4.5
Saturday	79	3.1	106	2.9	68	2.6
Sunday	74	2.4	103	3.0	83	2.8
Total	1302	4.3	1315	4.2	1227	4.2

Source: Author's survey, 2011

### Daily Pattern of Mobile Phone Use While Driving

A further breakdown of rate of mobile phone use among automobile drivers in different residential densities reveals two peak periods- morning and evening. Figure 2 indicated that the periods between 8.00-10.00am and 5.00-7.00pm recorded the highest number of automobile drivers spotted using mobile phone in both low and high density zones. However, in the medium density zone, there is only one peak period -morning. In contrast, the period between 11.00am and 2.00pm recorded the lowest rate of violation in the use of mobile phone in medium and high densities while the lowest figure was recorded between 2.00pm and 3.00pm in the low density area. These hours are the periods when people settle down to work in their respective offices and businesses.

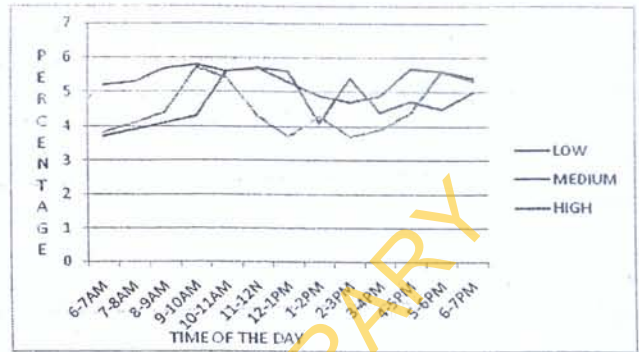


Fig 2 Daily Pattern of Mobile Phone Use while Driving

Source: Field Survey, 2011

### Weekly Distribution of the Rate of Mobile Phone Use While Driving

The weekly distribution of the rate of mobile phone use while driving revealed that out of the automobile drivers that violated phone use throughout the week, Monday accounted for the highest rate of 18.5% compared to other days in the week. Also, 16.6% of all the phone use occurred on Tuesday, 16.2% on Wednesday and 14.5% on Thursday respectively. The lowest rate of use (8.7%) was recorded on Sunday as shown in Table 2. It can be deduced from the foregoing that automobile drivers made use of phone more during working days compared to weekends, probably because business activities usually take place during working days. Furthermore, in all the residential zones, Monday recorded the highest percentage of phone use; 19.4%, 17.3% and 18.8% for low, medium and high residential density areas respectively. Conversely, the lowest percentage of phone use for the week was recorded on Sunday in the three residential densities.



**Gender Pattern of Mobile Phone Use in the Metropolis**

The gender pattern of mobile phone use while driving indicated that more males make use of mobile phone behind the wheels than females. Tables 3 and 4 show the percentage of violation of each sex. For instance, 238 males and 23 females representing 8.6% of males and 1.2% of females respectively violated mobile phone use while driving on Monday. Throughout the week and in all the three residential density zones males made more calls while driving than females.

**Table 2: Weekly Percentage Distribution of Mobile Phone Use While Driving**

Days	Low		Medium		High	
	Freq	%	Freq	%	Freq	%
Monday	261	19.4	232	17.3	250	18.8
Tuesday	220	15.9	233	17.3	215	16.5
Wednesday	222	16.1	219	16.4	216	16.4
Thursday	191	13.8	208	15.3	190	14.4
Friday	255	18.7	214	12.0	205	15.6
Saturday	79	8.8	106	12.1	68	9.2
Sunday	74	7.3	103	9.7	83	9.1
Total	1302	100	1315	100	1227	100

Source: Author's survey, 2011

**Table 3: Gender Pattern of Volume of Traffic and Proportion of Mobile Phone Violation**

Day	Low Density				Medium Density				High Density			
	TV		Violation		TV		Violation		TV		Violation	
	Male	Fem	Male	Fem	Male	Fem	Male	Fem	Male	Fem	Male	Fem
Mon	2740	2111	238	23	2939	2018	204	28	2700	2029	231	19
Tue	2824	1971	203	17	2879	2069	202	31	2751	1944	194	21
Wed	2816	1720	212	10	2756	1816	197	22	2434	1890	203	13
Thur	2339	2010	183	8	2597	1929	192	16	2432	1616	178	12
Fri	2616	2031	257	18	2912	1840	202	12	2671	1904	197	8
Sat	1343	1226	71	8	2142	1539	93	13	1459	1138	59	9
Sun	1598	1487	68	6	1816	1605	97	6	1704	1271	76	7

**Table 3: Percentage Difference in Gender Violation of Mobile Phone Use while driving**

Day	Low Density		Medium Density		High Density	
	Male	Female	Male	Female	Male	Female
Mon	8.6	1.2	6.9	1.4	8.5	0.9
Tue	7.2	0.8	7.0	1.5	7.0	1.0
Wed	7.5	0.6	7.1	1.2	8.3	0.7
Thur	7.8	0.4	7.4	0.8	7.3	0.7
Fri	9.8	0.9	6.9	0.6	7.4	0.4
Sat	5.3	0.6	4.3	0.8	4.0	0.4
Sun	4.2	0.4	5.3	0.3	4.5	0.5

Source: Author's survey, 2011

Further analysis indicated that the use of mobile phone among drivers differed significantly across the week. Result of ANOVA from Table 5 indicated that there is significant difference ( $p < 0.5$ ) in the use of mobile phone throughout the week. The reason is not clear but may not be unconnected with the differences in the use of mobile phone by drivers between weekdays and weekends.

**Table 5: Result of ANOVA between mobile phone use by drivers across the week**  
Descriptives

Percentage of Drivers using Mobile Phone

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min	Max
					Lower Bound	Upper Bound		
Mon	3	5.1333	.37859	.21858	4.1929	6.0738	4.70	5.40
Tue	3	4.6333	.05774	.03333	4.4899	4.7768	4.60	4.70
Wed	3	4.7667	.25166	.14530	4.1415	5.3918	4.50	5.00
Thur	3	4.5667	.15275	.08819	4.1872	4.9461	4.40	4.70
Fri	3	4.8333	.57735	.33333	3.3991	6.2676	4.50	5.50
Sat	3	2.8667	.25166	.14530	2.2415	3.4918	2.60	3.10
Sun	3	2.7333	.30551	.17638	1.9744	3.4922	2.40	3.00
Total	21	4.2190	.97397	.21254	3.7757	4.6624	2.40	5.50

## **Discussion of Results**

This study has shown that the use of mobile phone while driving is higher in Ibadan compared to the average in some developed countries. For instance, this rate is higher than what is obtainable in some jurisdictions globally (Knowles et al., 2008; Young et al, 2010; IRTAD, 2012). However, studies carried by Blumfield and Pulugurtha (2011) showed higher percentages than the present study. This rate was high probably because the studies took place at intersections where motorists had enough time to make calls. Data on the rate of phone use by motorists in Africa is very difficult to come by. However, a rapid assessment of the phone use by automobile drivers in South Africa indicated that the percentage is 7.8%, which is also higher than the present study (WHO/NHTSA, 2011). The relatively high percentage of drivers using mobile phone while driving in this study compared to most European countries is due to poor enforcement and weak penalty. It is common to see some drivers making calls on the roads being patrolled by traffic agencies, yet such drivers are not prosecuted. Many studies have also shown that poor enforcement is a major factor in the use of mobile phone by drivers while driving (McCartt and Geary, 2004; Nikolaev et al, 2010). In rare occasions where motorists are arrested, they only pay the penalty of N4,000 (US\$25) which many motorists can easily afford. This is far less than the penalty found in Taiwan and Melbourne (Australia) where erring drivers pay \$90 and \$145 as well as a three point deduction from their license respectively (Woo and Lin, 2002; Taylor et al, 2007). In most European countries, the penalty is not less than \$100 per incident (IRTAD, 2011).

The pattern of daily use of mobile phone by automobile drivers in this study is consistent with other findings (Taylor, 2007; Young et al, 2010). For instance, Taylor et al. (2007) found in Australia that there was greater use of mobile phone in the evening in 2002, but this changed in 2006 when the evening rate was significantly lower than the morning rate. Similarly,

Young et al. (2010) also observed that drivers' use of mobile phone while driving was more likely to occur in late afternoon, than any other time.

Weekly pattern of mobile phone use by automobile drivers in this study showed that drivers are two times more likely to use mobile phone during weekdays compared to either Saturday or Sunday. These findings are also consistent with a study in London, which found a three time fold (Hill, 2004). Business and work based activities are the likely reasons for high rate of phone use during the weekdays compared to weekends.

In terms of gender analysis, the higher use of mobile phone while driving by males compared to females is consistent with earlier studies (Sullman and Baas, 2004; Zhou et al, 2009; Braitman and McCatt, 2010; Olukoga et al, 2011). The reason might not be unconnected with the fact that males are less careful in obeying traffic laws, more confident behind the wheels and believe that they can drive safely under any traffic condition.

## **Recommendations and Conclusion**

In view of the findings above, the following strategies for curbing the use of mobile phone by automobile drivers are recommended.

Motorists, particularly automobile drivers, must be sensitized further on the dangers of mobile use while driving so as to reduce the rate of mobile phone use on wheel in the study area. This has become necessary because of the higher rate of mobile phone in the study area compared to many developed countries. The Federal Road Safety Commission (FRSC), in conjunction with other traffic agencies, should be strengthened their mobile phone use awareness programme. Also, the National Orientation Agency (NOA) that is responsible for sensitizing the public on government activities can also help in disseminating information on the consequences of mobile phone use on wheel. Furthermore, such information can be further disseminated through both electronic and print media. The drivers should be advised to pull over when making



or receiving calls. The enlightenment programmes should be targeted more at males compared to females because of higher percentage of males that engage in driving and calling.

In view of the fact that weekdays record higher rate of phone use compared to weekends, it is, therefore, imperative that the FRSC steps up the enforcement activities during weekdays in order to reduce the rate of mobile phone use during the period. Similarly, the increased enforcement should be extended to conventional peak periods (Morning and Evening) during the day time.

Furthermore, stiffer penalty should be meted against any driver caught using mobile phone while driving. The current penalty of N4,000 (US\$25) for offending driver should be increased to meet up to international standard so as to serve as deterrent to other drivers. When drivers are charged with amount that they cannot easily afford, they would be forced to comply with any traffic rule. However, this option should be the last resort after other measures have failed.

Conclusively, it could be deduced from the foregoing that despite legislation being in place, drivers' handheld mobile phone use is still a major road safety concern in the country, particularly in Ibadan metropolis. Therefore, it is imperative for government to explore further strategies for reducing the use of mobile phones such as improved sensitization and surveillance as well as increased enforcement.

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