

# Assessment of the Hazards Associated with the use of Mobile Telephones by Highway Motorists in Nigeria

<sup>1\*</sup> Wasiu John,

<sup>1\*</sup> Department of Civil Engineering ,  
Afe Babalola University,  
Ado-Ekiti, Nigeria.

<sup>2</sup> Popoola Oladele,

Department of Civil Engineering ,  
Afe Babalola University,  
Ado-Ekiti, Nigeria.

<sup>3</sup>Olowe Kayode Olufemi

Department of Civil Engineering ,  
Afe Babalola University,  
Ado-Ekiti, Nigeria

**Abstract:** This research examines the important potential risks in the use of mobile telephone by highway motorists. Rubbernecking, adjusting the radio, attending to children, talking to a passenger, eating and driving, reacting to conditions outside car are among the most notably activities which distracts drivers. Oral interview, on road visual observation, public opinion, external and internal data of cellular phone related cases revealed an increase in potential hazards of cellular phone use by highway motorists. It was concluded that public awareness of dangers associated with the use of cellular phones while driving should be encouraged through governmental bodies like FRSC, VIO.

**Keywords** - Cellular phones, GSM, reaction-time, highway, motorists

## 1.0 INTRODUCTION

The rapid growth of the Global System of Mobile Communication popularly known as GSM, has brought with it a change in the demographics of mobile phone users: from middle-aged business men to users encompassing all ages groups, social and economic classes, including those with less ability to task-share such as the elderly, novice and occasional drivers.

Mobile phones add a significant measure of convenience, safety and security to people. Nevertheless, concerns about their safe use are growing. Distractions have always been a factor in safe operation of a vehicle, and use of mobile phones is one of many activities that distract today's drivers.

The consequences of distractions can be catastrophic. The drivers react more slowly to traffic conditions or events. They fail to recognize potential hazards such as pedestrians, bicycles or debris on the road. Their "margin of safety" shrinks, which leads the driver to take risks not otherwise taken. All are common mistakes often associated with vehicle crashes or accidents. Whenever the focus of the driver is compromised, the driver's behavior is negatively impacted.

Rubbernecking, adjusting the radio, attending to children, talking to a passenger, eating and driving, reacting to conditions outside car are among the most notably activities which distracts drivers. With special reference to the increasing use of mobile phones by highway motorists, there is no doubt there is an emerging problem of safety on our highways in this regards. Thus, the need arose to identify and monitor the trends and to consequently evaluate the effectiveness of feasible counter measures in order to enhance greater safety.

### 1.1 Types of distraction faced by drivers

The type of distraction faced by drivers involves one or combination of the following:

- (1) Psychomotor: Those distractions that cause a driver to take his/her hands off the wheel or eyes off the road. Example includes tuning the radio or dialing a mobile phone. Even a momentary distraction can cause you to run off the road or miss a traffic signal.
- (2) Cognitive: Those activities that takes the driver's mind off the road. Examples include having conversations on a mobile phone or thinking about what to prepare for dinner or on an all –important meeting. Your eyes are on the road but your mind has wandered from the road.
- (3) Combination: Some activities take your hands, eyes and mind off the task. An example would be reading a map while driving.

There is a wide range of vehicles that ply our roads today, each vehicle with different operating characteristics in terms of speed, size, type and performance weight criteria. The operators of these vehicles also have abilities to comprehend and react to highway features and traffic events.

In Nigeria, there is a great deal of variability in the driving skills among drivers. The majority of Nigerian drivers has received no formal driving training but was taught by family or friends or was self –taught. For smooth and speedy traffic flow, highway engineers ensure that street and highway facilities are designed to accommodate

drivers with a wide range of age and skills-the young, the elderly and the novice as well as the experienced professional.

A driver's decisions and actions depend principally on information received through the senses. This information comes to the driver through the eyes, ears and the sensory nerve endings in the muscles, tendons, joints, skin and organs. The senses mostly used by drivers are: visual (sight), kinesthetic (movement), vesicular (equilibrium) and auditory (hearing).

### 1.2. *Driver perception – reaction time*

Driver perception –reaction time is defined as the interval between seeing, feeling, or hearing a traffic or highway situation and making an initial response to what is being perceived. This reaction time tends to be increased due to distractions caused by using mobile phone while driving which may jeopardize drivers' abilities to react to traffic situations on time.

### 1.3. *Mobile phone use as a distracter*

Hand-held mobile phones are readily visible to other drivers and most of them are frustrated when they see inconsiderate, inattentive drivers talking on mobile phones. However, it is more difficult to determine if a driver is distracted because he/she is talking to a passenger, tuning a radio or eating.

What about hands-free phones? While a hands-free phone offers the driver a more convenient mode of operating a phone and talking while driving, research tells us that it is not risk-free. According to NASS case studies in the US, hands-free mobile phones distract drivers the same way as hand-held phones. It is the conversation that distracts the driver and not the device. The major distraction associated with mobile phone use is intellectual, so the driver can be similarly distracted when using either hand-held or hands-free phones. The public should not be lulled into a sense of false security that they are somehow less distracted if they engage in a complex conversation that takes their attention away from driving.

### 1.4 *Legislative initiatives*

Opinion as to the viability of outright banning of mobile phones is divided, largely because the public is divided on their use. Mobile phones provide drivers with a sense of security that cannot be ignored. Attempts have been made to enact laws limiting the use of cellular telephones while driving in some states in the U.S and in Nigeria. But, none thus far has been successful. It thus appears that banning hand-held mobile phone use while driving will have little or no effect on safety overall. California Highway Patrol, (1987).

## 2.0 *Literature review*

A number of research investigations have examined driving behavior and performance during telephone use.

The earliest published study on mobile phone use and its impact on drivers was that of Brown, Tickner and Simmonds (1969). They point out that mobile phone use may involve two sources of interference. The first source is the manual-visual demand of dialing. The second source is the attention demand of communication task.

Kames (1978) also made use of an instrumented vehicle on a closed course to examine the effects of three types of dial (rotary, dial, push-button dial and push-button dial-in-handset) on driving performance and behavior while concurrently dialing. 18 test participants drove a 4.4-mile course on a deserted airfield and each worked with six different versions of dials over six different sessions. At predetermined locations, an experimenter asked the participants to dial a number. Measures taken concurrently included lane position, range of speed, reaction time to a subsidiary task, steering the wheel movement rate, and range and duration of head move movements and dialing completion time. Kames found out that drivers can maintain reasonable control over a path control function like lane keeping while driving and drivers sometimes nevertheless express concern about concurrent dialing and driving.

Brook, de Vries and de Waard (1991) studied the effects of driving in three different conditions, i.e light traffic on quiet roadway, in heavy traffic on a four- lane ring road and in city traffic. They discovered the following;

1. Talking on a mobile phone while driving significantly decrease standard deviation of lateral position.
2. Talking on a mobile phone reduces the delay reaction time in adapting to speed of variation of a car in front by 600 milliseconds.
3. In city driving, steering wheel movement was affected by mobile phone use.

## 3.0 MATERIALS AND METHOD.

### 3.1 *Materials*

The materials used in this research include; cellular phone, camera and questionnaire.

### 3.2 *Method*

The method adopted in this research include; on the road visual observation, issuance of questionnaire and oral interviews.

#### 3.2.1 *On the road visual observation*

This provides the greatest degree of realism. This actually involves capturing drivers' behavior and performance Wasiu (2003) . The question is how much riskier would drivers act with regards to cellular telephone use. Of particular interest was the manual dialing task under light and heavy traffic.

#### 3.2.2 *Issuance of questionnaires and oral interviews*

An opportunity is also given to members of the public to describe their personal experiences and observations of cellular telephone use via questionnaire and oral interviews. Although some of the information presented are

not scientifically based but useful in reflecting public attitudes and beliefs.

3.2.3 Internal data

A survey of accident reports on our highways as kept by the Nigerian Police Force (NPF) and the federal road safety corp (FRSC) was made. The reported cases of road accidents within five years were recorded and ranges from minor to very fatal ones where many lives and properties

Table 1: Analysis of questionnaires

FIGURE	DESCRIPTION	NO.	%
4a	Vehicle owners	69	69
	Non-vehicle owners	31	31
4b	Vehicle owners with cellular phone	66	96
	Vehicle owners without cellular phone	3	4
	Cell phone use while driving	39	59
	Non-cell phone use while driving	27	41
	Cell phone use:		
	I. While stopped	26	40
		16	24
	II. Anyplace	24	36
	III. Light traffic		
	Calls involved:		
	I. Business	13	20
		3	5
	II. Family emergency	50	75
	III. Anything needed at a time		
4c	Involvement in hazardous situation	8	12
	Non-involvement in hazardous situation	45	67
	Near cases	13	21
	Aware of road mishaps related to cellular phone use	34	52
	Not aware	32	48
	Opinion with regards to hands-free;		
	I. Safety advantages	55	83
	II. No safety advantages	11	17

were lost. The causes of these accidents according to report were due to various distractions on the road.

4.0 RESULTS AND DISCUSSIONS

The rationale behind the distribution of questionnaires is to help us ascertain the frequency of cellular telephone use as an antecedent to a motor vehicle crash. During the period of study, 100 recipients were identified and the results presented in table I below;

4d	Effect of phone use on Driver performance		
	I. Temporary lane keeping problem	5	8
	II. Sudden change in driving speed	8	12
	III. Loss of concentration	16	24
	IV. All of the above	34	51
	V. None of the above	3	5
	Support for Cellular phone use while driving	0	0
	Non-support	66	100
	Age group of respondents		
	I. 24-29	16	24
	II. 30-39	34	52
	III. 40-49	16	24
	IV. 50-above	0	0

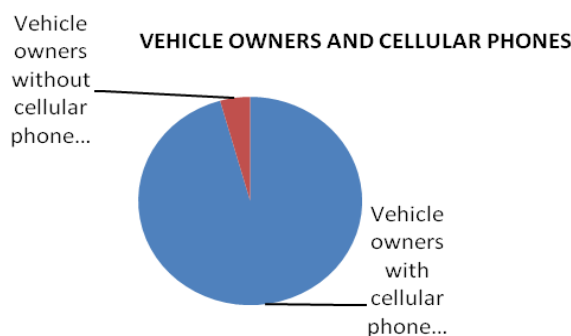


Figure 1: Vehicle owners and cellular phones

### CELL PHONE USE AND DRIVING

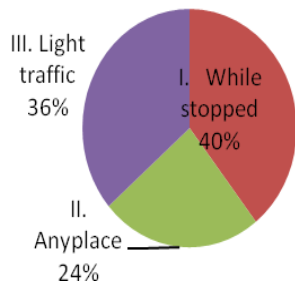


Figure 2: Cell phone use and driving

### CELL PHONE USE

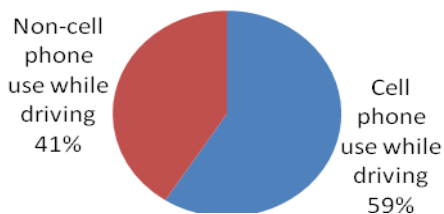


Figure 3: Cell phone use and driving

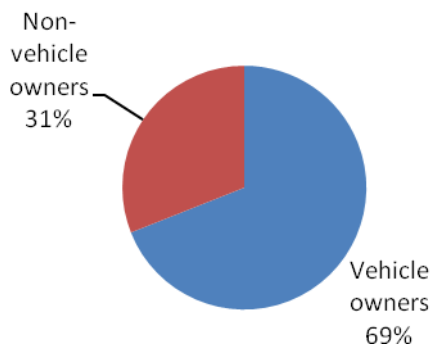


Figure 4: Vehicles and Ownership.

#### 4.1 Results

1. Cellular telephone use is rapidly expanding worldwide and is increasingly being used by all age group for personal communication, while business use continues unabated.
2. These trends have both positive and negative safety implications. Some users will place calls while driving, which may lead to greater exposure to cellular phone related distractions.
3. The distraction potential may be reduced if drivers are aware of the hazards and use their cellular phones carefully while on the road. Distraction can also be reduced by ergonomically sound cellular telephone designs and new intelligent Transportation System(ITS) technologies that may capable of compensating for driver distraction by alerting drivers when traffic conflicts are present.
4. The safety benefits of cellular phones are well recognize as user frequently make calls to report disable vehicles, accidents, medical emergencies and

,crime in progress. However, the safety benefits are not without drawbacks such as traffic safety itself being degraded somewhat if more drivers are distracted while making such calls in hazardous driving situations e.g slowed or stop-and-go traffic, and rubbernecking.

5. Survey results indicate that most people perceive cellular telephone use while driving as distracting and a sizeable minority report they never use the cellular telephone while driving because it is too risky. This is encouraging because awareness of risk is necessary.
6. From the internal data, one could see that traffic hazards linked with the use of cell phones have high probabilities of occurring. This reflected in the estimates obtained from the analysis of questionnaire.

#### 4.2 DISCUSSION

Comparisons between talking on the cellular phone and conversing with a passenger in the car have been made frequently. It has been suggested that phone use conversation is less than or no more disruptive of driving than in-vehicle conversation. However, data does not indicate that a passenger in a vehicle can accommodate the conversation to the driving situation. It is often argued that cell phone use provides so many safety and high travel benefits that to limit or restrict their use would be counterproductive.

Nonetheless, it is somewhat tempered by the fact that such use is often carried out from a stopped or slowed vehicle and any restriction on their use from moving vehicle would have a minimal impact on safety or highway travel benefits.

The increasing use of cell phones by highway motorist has led to dramatic increase in duplicate emergency. In view of this problem, cellular safe driving tips are suggested;

- a. Position your phone where it is easy to see and easy to reach.
- b. Always buckle up, keep your hands on the wheel and your eyes on the road.
- c. Always use a hands-free telephone while driving.
- d. Always use the speed-dialing feature to program in case of frequently called numbers.
- e. When dialing manually without the speed-dialing feature, dial only when stopped.
- f. Never take notes while driving.
- g. Use wireless device to pick up calls when it is unsafe to answer call.
- h. Be a cellular Samaritan.

#### 5.0 CONCLUSIONS

1. The available evidence is adequate to support the conclusion that cellular telephone use while driving increase the risk of a crash or an accident.
2. The data reviewed are inconclusive as to the magnitude of traffic safety problem related to cellular telephone use while driving, but cannot be interpreted to mean that there is no problem of sufficient magnitude to warrant action.

3. Crashes are likely to increase with increasing numbers of cellular telephones in use.
4. People in general are finding it harder to keep up with all the tasks and activities for which they are responsible. Motorists in particular spend substantial amounts of their day in automobiles, vans, trucks and buses. It is not surprising that people will attempt to optimize their time in their vehicle by doing other things. It is unrealistic and ill-advised to suppose that drivers should have no advanced in-vehicle information systems, including cellular telephone technology, as compatible with safe driving as the state-of-art allows through the application of good engineering and human factor design practice, and educating drivers about potential risks associated with using this technology while driving. This must be done while addressing possible adverse safety implications for the population as a whole.

#### ACKNOWLEDGEMENT

Authors are very grateful to Civil Engineering laboratory, Afe babalola University and other parties who had helped by providing data and useful information as well as giving various thought in this research.

#### REFERENCES

- [1] Department of the California Highway Patrol, (1987): A report to the legislature on the findings of the mobile telephone safety study.
- [2] Brown, I.D, Tickner, A.H and Simmonds, D.C (1969). "Interference between concurrent tasks of driving and telephoning" Journal of applied psychology, vol. 53 (5), pp 419-424
- [3] Kames (1978). "The effect of in-vehicle distraction on driver's response".
- [4] Brook, K.A; d Vries, G; andde Waard, D. (1991)
- [5] "The effects of mobile telephoning on driving performance, Accident analysis and prevention, vol. 23 (4) pp. 309-316.
- [6] Wasiu J., (2003) "Hazards associated with telephone use by highway motorists. B.Eng, Undergraduate Thesis.