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Perceived Health Implications in the Use of Mobile Devices by Undergraduate Students of Nigerian Universities

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Abstract **- This study investigated responses by undergraduate students to the perceived health implications in the use of mobile devices. The survey research design using the qualitative approach was adopted for the study. Five faculties common to both Lead City University and University of Ibadan, Nigeria, were purposively selected for the study while convenience sampling was used in selecting the respondents. Interview was conducted and responses analyzed on forty-eight respondents using the Nvivo software for analyzing qualitative data. Findings showed that many of the respondents had their perceptions on the health implications arising from mobile devices use. Some sources of information on these perceived health hazards include social media, radio, TV, personal experiences, friends and family members. Many reported taking precautions on their use of mobile devices based on their perceived health implications of mobile devices use. Findings also showed that while few respondents refrained from sharing the information on the perceived health hazards, many of the respondents shared this information with others despite this information not being verified. The study recommends government and other stakeholders implementing policy that mandates manufacturers of mobile devices to inform and sensitize users on the potential health hazards involved in their use, thus reducing the level of unsubstantiated information available on the use of mobile devices.**
Keywords: **Health Implications, Perception, Mobile Devices Use, Undergraduate Students, Nigeria**

I. INTRODUCTION

The widespread use of mobile devices has increased over the past decade; they are now an essential part of business, commerce and society. In recent years, mobile telecommunication systems have grown significantly. In the year 2014, nearly 60% of the world's population already owned mobile devices. About 4.77 billion own mobile devices in the world. It is forecasted to increase to 67% by 2019 (Statista, 2016). In June 2016 in Nigeria, there were a total of 217,150,404 connected lines for mobile GSM, CDMA and fixed wired/wireless with 167,371,945 mobile devices (Nigerian Communications Commission, August, 2016). The development of mobile communications has moved rapidly. The youths however, remain the most prominent users of these technologies as ICT has become a central part of their everyday lives (Punamaki *et al.*, 2007). According to Lenhart (2015), the practice of going online to some youths is considered a habit as many teens go online almost constantly and much of this is facilitated by the widespread availability of mobile devices.

However, the increased use of mobile devices has raised concerns about the risks they pose to health and quality of life. Considering the high population of users of mobile phones, Awadalla (2013) noted that even small adverse effects on health could have major public health implications. Several researches have been carried out to show the health implications of the use of mobile devices. A major public-health concern is clearly motor vehicle collisions, a behavioral effect rather than an effect of radio frequency exposure as such (Rothman, 2000; Patrick *et al.*, 2008). Health risks may include increased incidence rate of traffic accidents caused by using telephone during driving (Karger, 2005). Data from Pew Research Center's Internet and American Life Project show that as of 2009 about 48 percent of teens had been in a car when the driver was texting. These statistics are likely to have increased by now since texting by teens has increased since 2009 (Wargo *et al.*, 2012).

Excessive mobile device use can cause or worsen other health problems. Germs are everywhere, and considering the number of times people interact with their mobile devices under different circumstances and places, germs are very likely to transfer from one place to another through them. A research from the London School of Hygiene and Tropical Medicine at Queen Mary in 2011 indicated that one in six cell phones is contaminated with fecal matter harboring E. coli which can result in fever, vomiting, and diarrhea when ingested. Other various health hazards are sleeplessness, distraction, tiredness and poor vision. (Roberts *et al.*, 2014; Upreti and Singh, 2017; Hardell, 2018). According to Reed (2011), the quality of sleep of almost half of 16 year olds may be affected by text messaging on mobile devices and the sleep of one in four 13 year olds could be affected too. Also, a review by Cain and Gradisar (2010) on electronic media use and sleep in school-aged children and adolescents corroborated the fact that delayed bedtime and shorter total sleep time have been found to be most consistently related to media use.

This study investigates the awareness of undergraduate students in Ibadan, Oyo state, Nigeria, on perceived health

hazards posed by the use of mobile devices. The following research questions are addressed.

1. What is the extent and purpose of mobile device use by under graduate students of University of Ibadan?
2. How aware are the students of the perceived health implications in the use of mobile devices?
3. How do the university students get information on the perceived health implications of mobile devices?
4. Do these university students exhibit any fear in the use of the mobile devices?
5. Do the perceived health hazards determine the pattern of use of the mobile devices?
6. What are the students' responses to the perceived health implications of mobile devices use?
7. How do students share knowledge obtained on perceived health implications of mobile devices?

II. RESEARCH METHODOLOGY

This study adopted the survey research design and used basically the qualitative approach. The location of this research is Ibadan, Oyo state. Ibadan is located in the south-western part of Nigeria and it is the capital of Oyo state. It is the most populous city in the state and the third most populous city in Nigeria after Lagos and Kano. It is the country's largest city by geographical area. There are currently two established universities in Ibadan - Lead City University and University of Ibadan.

Lead City University, Ibadan (LCU) is a private University approved by the Federal Government of Nigeria and established in the year 2005. The school offers various programmes suitable for both the young adolescents and adult working class. The school has four faculties and one Postgraduate school. Programmes are offered by specialized faculties in Social & Management Sciences, Basic Medical & Applied Sciences, Education and Arts and Law. However, University of Ibadan is Federal government owned and was established in 1948. UI as it is fondly referred to, is the first University in Nigeria. It was a College of the University of London in a special relationship scheme until 1962 when it became a full-fledged independent University. The University took off with academic programmes in Arts, Science and Medicine. Presently, it has thirteen faculties and a postgraduate school.

Five faculties common to both institutions were purposively selected for the study. The faculties are Law, Arts, Social & Management Science, Education and Sciences. Convenience sampling was however used in selecting 50 respondents that participated in the study. The consent of respondents was carefully sought. Heads of departments were properly notified and permission obtained.

Data was collected using the interview. The interview guide was structured into two sections. The first section collected data on the demographic characteristic of the respondents. The second section however collected data on the research questions answered in this study. Data was collected in English language and Interview sessions were adequately recorded. The demographic data were analyzed using descriptive statistics while the qualitative data were analyzed using the Nvivo software for qualitative data analysis.

III. RESULTS

A total of forty-eighty respondents participated in the study as recordings from 2 respondents were not usable. Table I shows the breakdown in the demographic characteristics of the respondents.

TABLE I DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

Demographic characteristic	Frequency	Percent (%)
Gender		
Male	36	75.0
Female	12	25.0
Faculty		
Arts	10	20.8
Law	8	16.8
Medical Lab Science	10	20.8
Science	10	20.8
Social Science	10	20.8
Age		
15 – 24 years	32	66.7
25 – 34 years	15	31.2
35 years and above	1	2.1
Years of usage of mobile device		
0 – 4 years	9	18.7
5 – 9 years	25	52.1
10 – 14 years	11	22.9
15 – 19 years	2	4.2
20 years and above	1	2.1

Table I shows that most of the respondents that participated in the study were males (75.0%). As expected, most of the respondents were 15 – 24 years old (66.7%). The estimated number of years spent using mobile devices shows that 18.7% have been using mobile devices for between 0-4 years, 52.1% for between 5-9 years, 22.9% for 10-14 years, 4.2% for between 15-19 years and 2.1% for 20 years and above.

A. Extent and Purpose of Mobile Device Use by Undergraduate Students

As shown in the Nvivo word cloud (Fig.1), most of the respondents used their mobile devices every day. This is shown from themes represented in the cloud which include words like every day, often, 24 hours and always.

Fig. 1 Word cloud representation of frequency of use

Some of the representative responses showing respondents' frequency of mobile device use include the following:
Every day, I can't do without using it. (Male, 25-34years, Social Sciences)
My phone, I make use of it every time and every day. (Female, 15-24years, Social Sciences)

Respondents were also asked the purposes for which they use their mobile devices. Table II and Fig. 2 shows that many of the students reported using their mobile devices for Research followed by communication. The word frequency count shows 'research' appearing 24 times while 'communication' appears 21 times. Hence, generally, their use of these devices can be grouped into academic and non-academic uses. The most prominent academic use of their mobile devices is for research. Other academic uses include preparing school assignments, while non-academic uses include making social calls, chatting on whatsapp, listening to music and watching movies.

TABLE II WORD FREQUENCY QUERY RESULT

Word	Length	Count	Weighted Percentage (%)	Similar Words
Use	3	30	7.96	Use
Research	8	24	6.37	research, researches
Communication	13	21	5.57	communicate, communicating, communication

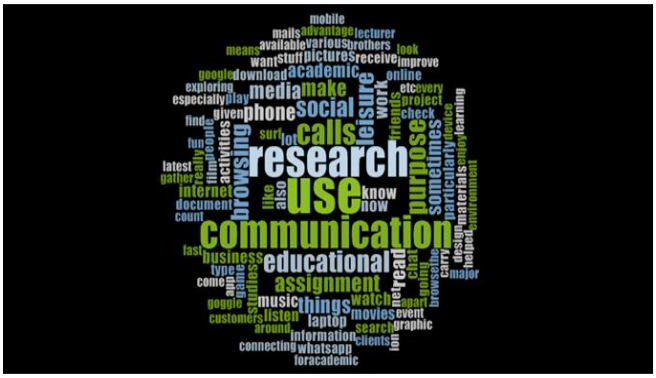

Fig. 2 Word cloud representation of purpose for mobile device use

Below are some of the responses showing the purpose of mobile devices use by the undergraduate students:
I use them for research purpose; I use them as a means of communicating with friends. (Male, 25-34years, Social Sciences)

A lot of things. When you talk of research I like doing research especially when assignments are given. I use it to communicate with my friends, brothers and sisters. You can also say I use phones for fun. (Male, 15-24years, Arts)

B. Awareness on Perceived Health Implications in the Use of Mobile Devices

Findings showed that many of the respondents were able to talk about some health issues they perceived are due to use of mobile devices, while some of them even claimed to have been affected by some of these health issues.Some perceived that mobile devices can cause cancer as a result of the radiation, affect the ear when used regularly too close to the ear or when used to listen to loud music. They also expressed their perception that mobile devices can affect sleep when used too late into the night, and can explode and cause damage to the body especially when placed directly on the body when it is hot. Many of the respondents expressed a good level of awareness of the perceived health implications in the use of mobile devices. The following are some responses by the students.

For mobile phones I know that there is electromagnetic wave which is not very healthy. At the same time when we are asleep these electromagnetic waves have more effect on the brain and the body so therefore during the night I try to keep it a little distance away, not close by. I have seen cases where the battery exploded and the phone was burning like coal. So you can imagine if the person had put it in the pocket what it could have caused. (Male, 25-34years, Social Science)

Yes I do. The ones that I basically know about myself is charging phone and using it. So it happened to me twice that I was charging and wanted to receive a call and the phone shocked me on my ear so I had to unplug it to receive the call. Another hazard is for people who drive cars. Sometimes you have a call that you want to pick or sometimes you have to chat on social media and you don't see a car coming in front of you and you just swerve into it. That may cause an accident. (Male, 25-34years, Med. Lab. Science)

When you stay too close to the phone frequently I think there are some hazards that might come from it. The one I perceive exist; like eyes, it affects the eyes, the brightness of the phone when you use it too frequently. (Female, 15-24years, Science)

Some respondents however reported that even though they have heard about these hazards they do not believe they actually happen.

I heard that when charging it and you are receiving calls it will damage your ear or it can lead to explosion. But I don't think so. I have never come across it. (Male, 15-24years, Social Science)

On the other hand, others reported not being aware of any health implication in the use of mobile devices.

Is there any implication for our health in using the phones? Not really. I don't think so. (Male, 15-24years, Arts)

C. Sources of Information on Perceived Health Implication of Mobile Devices

The word frequency counts in Table III shows the result of where the respondents get their information on the perceived health implications of mobile devices.

TABLE III WORD FREQUENCY QUERY RESULT

Word	Length	Count	Weighted Percentage (%)	Similar Words
Online	6	13	4.92	Online
Internet	8	9	3.41	Internet
Media	5	9	3.41	Media
Social	6	9	3.41	Social
People	6	8	3.03	People
News	4	6	2.27	News
Friends	7	4	1.52	friend, friends
Information	11	4	1.52	Information
Parents	7	4	1.52	Parents
Research	8	4	1.52	Research
Broadcast	9	3	1.14	broadcast, broadcasts
Doctors	7	3	1.14	doctor, doctors
Radio	5	3	1.14	Radio

From Table III, 'online' has the most occurrences (13 times), followed by internet and media each appearing 9 times. Many of them reported getting their information from the internet and social media such as whatsapp, Facebook, Instagram. Other sources include people, friends, parents, experts, co-workers, research works, personal experiences, family members, doctors, newspapers, radio and TV. Below are some responses from the undergraduate students.

Through internet, through people, through broadcasts that people do, online, whatsapp and Face book. (Female, 15-24years, Social Science)

Through random information, reading online or people just telling me. (Male, 15-24years, Law)

From experience and from the news. (Female, 15-24years, Med. Lab. Science)

D. Exhibition of Fear in the Use of Mobile Devices

This question seeks to find out if the students exhibit any fear in the use of the mobile devices as a result of their perception of the health hazards associated with their use. The word frequency result in Table IV showing the most relevant word count indicates that the word 'yes' appears 20 times, followed by 'never' which appears 19 times and 'not really' which appears 6 times.

TABLE IV WORD FREQUENCY QUERY RESULT

Word	Length	Count	Weighted Percentage (%)	Similar Words
Yes	3	20	3.60	Yes
Never	5	19	3.42	Never
Not really	9	6	1.08	Not really

Hence, the result shows that more students did not exhibit any fear in the use of mobile devices due to their perception on the health implications of these devices. According to the respondents, such awareness simply helps them to use mobile devices with caution. Some representative responses include the following.

It doesn't as long as I know the implications of the possible hazards, I just try to maintain the way I use it. I know my proximity to it, I know I don't charge my phone while calling at the same time. My phone should be a little distance away from me and I only put my phone in the pocket on a few occasions, I prefer to hold it. If the temperature is rising I know. (Male, 25-34years, Social Science)

Not really because we are in an era of technological development and I believe that there is nothing good that does not have has its own effect. They will continue to improve on it. All these things automatically create progress in the life of man, that is why I don't entertain much fear. (Male, 45-above years, Arts)

Many other respondents however reported exhibiting some fear. They expressed fear of the hazards involved in the use of mobile devices, hence they are very conscious of how they use them.

Yes. It does o. Like in my house if we want to take our phone to the kitchen my mum will just shout. We can't even take our phone. Since my mum has put that fear in me, I don't take my phone when I want to go and cook or near my stove or put on the generator. I don't just take my phone anywhere again. (Female, 15-24years, Law)

Yes it does. Like when I was using a Samsung phone, I don't plug it and receive calls, I usually remove it, am always conscious of removing it before receiving calls and never to charge and leave it on my chest because of the heat from the phone. (Male, 25-24years, Social Science)

E. Influence of Perceived Health Implications on the Pattern of Mobile Devices' Usage

Many of the respondents believed that knowledge of the perceived health hazards associated with the use of mobile devices influences the way they use their devices. Some of the cautions they reported taking included not using while charging, reducing the brightness of the device, not using when the battery is low and restricting usage in certain places such as petrol stations and kitchens.

Yes. It does most times. I don't use my phone at night without another light and I don't use my phone light in the kitchen. (Female, 15-24years, Med. Lab. Science)

Yes. Like most times when I want to sleep at night I don't put my phone beside me and I don't make use of it every time so as not to affect my eyes.(Female, 15-24years, Law)

Of course. When am driving I don't use my phone. When I am charging I don't use it and am not addicted to it. I don't allow it to disturb me from other things that am supposed to do. I have time for it and can do without it. (Male, 25-34years, Med. Lab. Science)

Some of the respondents also are not bothered about the health hazards, they use it without restrictions. The knowledge of the perceived health hazards does not determine their pattern of use. This is shown with the responses below:

Not really I don't see them as too much of a threat, because the only thing I feel they can cause is cancer and most things nowadays cause cancer I can't let in to the pressure of using mobile device. (Male, 15-24years, Law)

Not really because most often I do put my phone in my front pocket but I know it's not good. I don't have a choice. (Male, 25-34years, Science)

F. Response by Students to Perceived Health Implications in the Use of Mobile Devices

Findings show that many of the respondents reported taking precautions in their use of the devices. Some of the reported precautions include using the devices according to manufacturers' instructions, being choosy in the type or brand of mobile devices and informing others about these perceived hazards.

I just consider the kind of phones to use, how to use them, then follow the precautions that have to do with a particular brand of phone. (Male, 24-35years, Social Science)

One thing is that I take precautions since I am aware of the hazards and implications too. I am careful while using it and at the same time when I see people around me using it in a way that can cause any hazard to them I enlighten them or educate them based on what I know. (Male, 25-34years, Med. Lab. Science)

Dissemination of the health hazards involved, dissemination of the information as in the effect it poses to people. I try as much as possible to just share with people. (Male, 15-24years, Social Science)

G. Knowledge Sharing on Perceived Health Implications in the Use of Mobile Devices

As shown in Fig.3 and Table V, many of the students reported sharing the information they have on the perceived health implication of mobile device use. The words 'tell' and 'yes', appear 33 and 31 times respectively. This shows that the students actively engage in sharing their knowledge on the perceived health implications of mobile devices. Some of the ways they share this information include verbally by telling people, friends and families, sending messages through social media or forwarding related messages as they are received.

Fig. 3 Word cloud representation of knowledge sharing

TABLE V WORD FREQUENCY QUERY RESULT

Word	Length	Count	Weighted Percentage (%)	Similar Words
Tell	4	33	5.64	tell, telling
Yes	3	31	5.30	Yes
Use	3	22	3.76	use, used, using
See	3	18	3.08	See
Share	5	17	2.91	share, sharing
Phone	5	15	2.56	phone, phones
Friends	7	13	2.22	friend, friends
People	6	12	2.05	People

Below are some representative responses from the students on the different ways they share their knowledge on the perceived health implications of mobile devices use.

Definitely yes. Sometimes when I see posts on Instagram, Facebook, or Whatsapp that are related to the hazards it has, after reading it I also share. (Male, 25-34years, Med. Lab. Science)

Yes if I see them using it or when some people use earphone and I can hear what they are listening to I tell them that it is not good for their health. (Male, 15-24 years, Law)

Yes I do because when they send me broadcasts I resend them because I know my generation and friends are very careless about our hand held devices because we can receive it anywhere we use it basically all the time. So we are not very conscious of the pattern of usage, we use it anyhow. I think because of that I have been knowledgeable to send broadcasts and educate people. (Female, 15-24years, Law)

A few of the respondents reported not sharing the information at all. Some of them believe that such information are mere propaganda and cannot be relied upon.

Not at all since I don't believe in them so I don't share. (Male, 15-24years, Science)

Not really, I don't think so. I don't see it as valuable information. I see it as all propaganda. (Male, 15-24years, Med. Lab. Science)

IV. DISCUSSIONS AND CONCLUSION

This study investigated the perceptions of undergraduate students on the health implications of mobile devices usage. Many of the students reported being aware of some health precautions associated with mobile phone usage which includes not picking calls while charging phones or driving and avoiding eye strain from excessive phone use. Previous study from Akande and Ajao (2006) also reported that respondents were aware of the various hazards of the mobile device. However, it should be noted that responses from these students in the current study area were based on their perceptions, as many of these were information obtained from different sources other than manufacturers of the mobile devices or health professionals.

Some of the sources identified by these students include the internet, social media sites, friends and even family members. The study noted that these respondents in turn share these information through similar channels. Few of the respondents however reported not sharing the information since they were not verifiable. Awadalla (2013) reported that evidence on the potential effect of exposure to mobile devices in childhood and adolescence are confusing. Hence, there is a need for government and other stakeholders to implement policies that mandate manufacturers of mobile devices to inform and sensitize users on the health implications of mobile devices use. This will reduce the different unsubstantiated perceptions as expressed by the respondents.

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