

## THE IMPACT OF SMARTPHONES DEVICES AND MOBILE NETWORKS TOWERS ON YOUNGSTERS MENTAL ABILITIES: DEDUCTIVE RESEARCH IN BABIL PROVINCE, IRAQ

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### ABSTRACT

Feeling headache, anxiety, boredom, confusion, nervous behavior, poor performance of most students, were observed during the classroom time. A research was done via designing a quantitative questionnaire to detect the key reasons of the mentioned symptoms, and followed by a survey to acquire population insights who are living at or near mobile towers about the topic in Babil province-Iraq. It was mentioned that long screen time for communication or surfing internet as a main reason by 63% the respondents, and various diseases were discovered among population living close to the mobile networks towers after setting up them. It was concluded by this research that a risky relationship (direct or indirect) between the addiction on smartphone; the radiation of mobile network towers and the human health, particularly the youngsters' mental abilities. The necessity for further studies about the risks at human health caused by the electromagnetic fields emitted by smartphones and their broadcasting stations was recommended by this research.

**KEY WORDS :** Screen time, Smartphone, Cellphone, Electromagnetic fields

### INTRODUCTION

Pollution by electromagnetic fields EMFs is still a dialectical problem, particularly the EMF of cellphone, smartphone and their broadcasting towers. Researchers point to the existence of some risks on the human health, especially the youngsters performance due to the electromagnetic radiation of these wireless technologies (Hareb, 2006) as well as some of them from different countries highlight that these devices "ties us" and the usage of them becomes an addiction (Shoukat, 2019). On the other hand, few researchers believe that there is no solid proof between human health status and cellphone radiation and "smartphone usage and gender are not significantly associated (Nishad and Rana, 2016; Cha and Seo, 2018). In other words 'Cellphonization revealed proponents and opponents. Cellphones' proponents state that devises enhance safety, deliver education, improve transparency and root out corruption, strength democracy and provide access to market, while

opponents see various health risks and pollution" (Miakotko, 2017). In spite of the huge advantages of mobile phones and smartphone, but the different insights about the impact of cellphones or any handheld devices on human health status need more and more investigations for fact-finding.

Wireless technology which makes our lives easier, is one of the important invention occurring a big technical revolution worldwide in the modern era. Basically the wireless equipment, especially the telecommunication technologies are dependent on electromagnetic waves as signals and carriers in their function, like the broadcasting stations, mobile network stations, cell phone & smartphone devices, etc., In present it finds EMFs anywhere surrounding people, because of the world-wide popularization of cellphones, smartphones and other wireless equipments.

Scientists classify the electromagnetic waves depending on the of their frequency and energy EMF into two classifications relying on their impact the on the tissues of organisms: Ionizing radiation

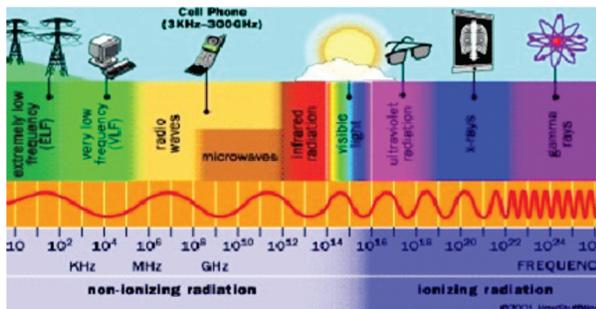


Fig. 1. The Ionizing and Non-Ionizing Electromagnetic waves (Hareb, 2006)

and non-Ionizing radiation as shown in Fig 1 (Hareb, 2006).

The carrier waves used in the different telecommunication activities, are radio frequencies (RFs) within the range of 900MHz – 2.4GHz (earthpulse, 2019) until 3GHz. Selecting the frequency rang depends on the generation broadcasting technology that employed by each mobile network such as G2, G3, G4 or G5(under test). Despite of placing the RF waves in the domain of non-Ionizing radiation, but some studies point to existence of a relationship (direct or indirect) between the high RFs and the human health that affects negatively. Most of the people who addict the usage of the smartphones, especially the youngsters unaware to what risks will occur to their health status, particularly the brain due to the longtime of exposition to the RF waves emitted from their devices (Miakotko, 2017). Some negative symptoms appear on a large number of students, like nervous behavior, anxiety, boredom, feeling headache, confusion and poor performance compared to the disciplined behavior, significant skills and positive mental abilities of students during 1990s and before in Iraq. That observation triggered the author to investigate the problem statistically and seek for the key reasons of the mentioned negative symptoms. For sure it is not an easy task and still needs more efforts from other researchers to continue studying in various scientific domains to identify if truly, there is any side effect on the human health status will occur due to the excessive usage of cellphone, smartphone and the radiation of mobile network towers.

## METHODOLOGY

### Research Design and location

A quantitative and deductive strategy was adopted in this research to acquire different insights via

doing a closed-ended, self-reporting questionnaire was participated randomly by 300 undergraduate students. Then was followed by a Likert Scale model survey and responded by 110 samples of people of ages (1-85 years old) and the average age of them was been (29.6) years. The selection of survey audience was dependent on the distance between their homes and the closer mobile network tower station as; 0 meter; 40 meters; 80 meters. The participants' gender was considered and classified them to three groups relying on their age; 21 samples (1-16 years old); 56 samples (17-40 years old); 33 samples (41-85 years old). For the purpose of giving the respondents more freedom in answering and capturing their argumentations, each statement in the survey was furnished with a textbox to be an open-ended question. The research was done in Hilla city/ Babil Province - Iraq Republic.

### Gathering Data

The willingness to participate as volunteers was agreed by all the participants. Ethical consideration was referenced by allowing all respondents not to mention their names and consent of the top management at our faculty to seek data was obtained.

## FINDINGS AND DISCUSSION

One of the main objectives of this research was to discover the key reasons that affect the youngsters mental abilities. The 1<sup>st</sup> questionnaire resulted that 63% of the respondents argued that the usage of their cellphone, smartphone long time for messaging friends, playing games, internet surfing continuously, especially during night time. That means that the long screen time was the key reason for why feeling headache, anxiety, boredom, confusion, nervous behavior. Whilst 21% of the participants argued that the noise pollution coming from various sources was the problem, their arguments are shown in Table 1. Responses of the questionnaire participants showed convergent insights to the reviewed literature as well. That gave sign to go on investigation to validate the above results by doing survey to seek for what impact on the people health status was caused due to cumulative exposition on the smartphone devices or living near the mobile network towers.

The survey findings resulted four relationships as below:

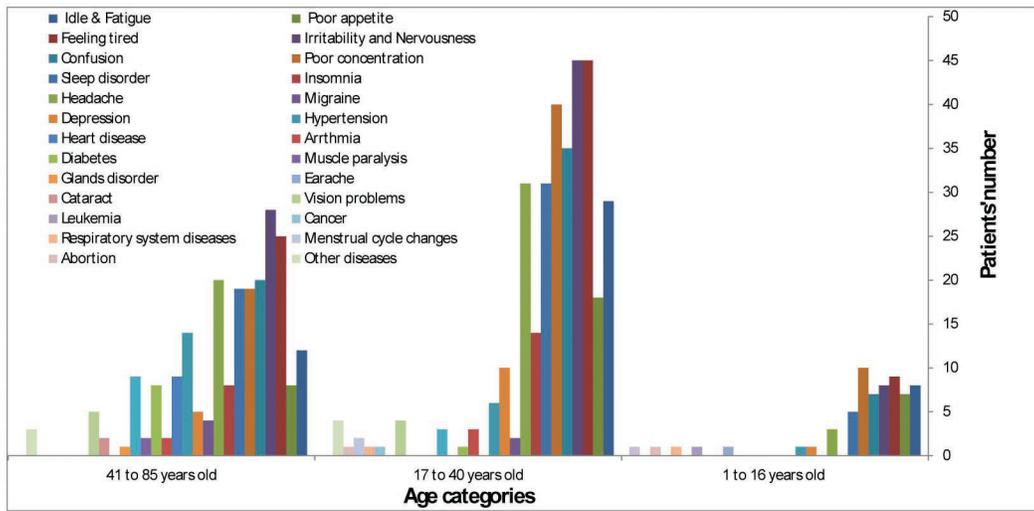


Fig 2. The relationship between Age categories & Patients' number

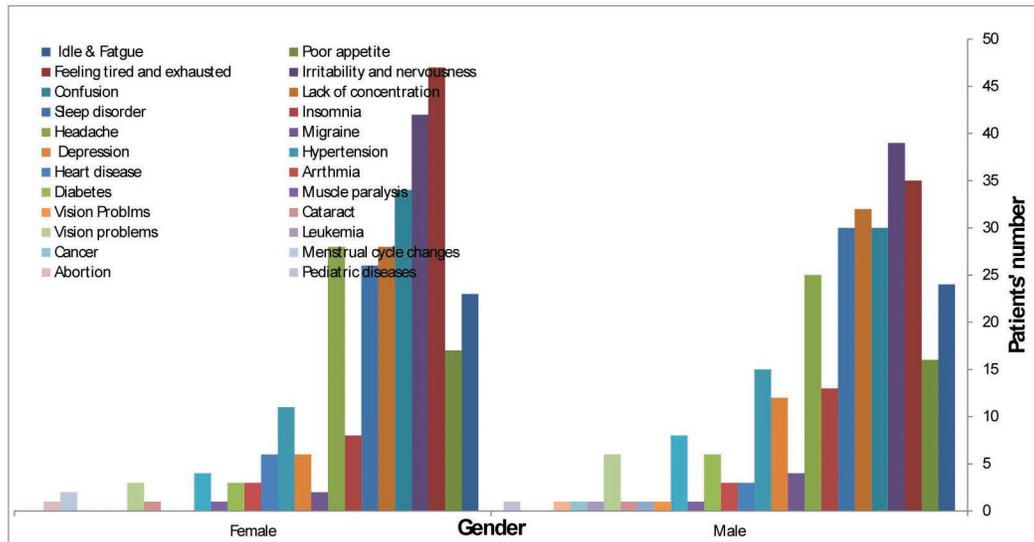


Fig 3. The relationship between Gender & Patients' number

1. It seems from Fig 2 that the largest patients' number were at the participants' category of age (17 to 40 years old), and most of them were youngsters. They suffered from various diseases like Feeling tired, Irritability & Nervousness, Poor Concentration, Confusion, Sleep disorder, Headache, Idle & Fatigue, Insomnia, Depression, etc. All of these diseases affected their brains, and then decreased their mental abilities.
2. The Graph in Fig 3 highlighted that females were strongly affected by the electromagnetic fields more than males and this conclusion underpinned some articles in the literature reviewed.
3. When doing location was variable, the findings showed that the most risky distance was forty meters away from the mobile network tower station. (Fig. 4) showed that the respondents who lived at 40 meters far away from the mobile tower suffered from large number of different diseases that influenced their health status, particularly their brains. At last, the research found that the number of pathological cases among the participants who lived at ground floors of buildings ( away 40 meters from tower location) more than that at the 1<sup>st</sup> & 2<sup>nd</sup> floors as in Fig 5. That means the maximum electromagnetic pollution at the ground level down the antenna of mobile network tower.

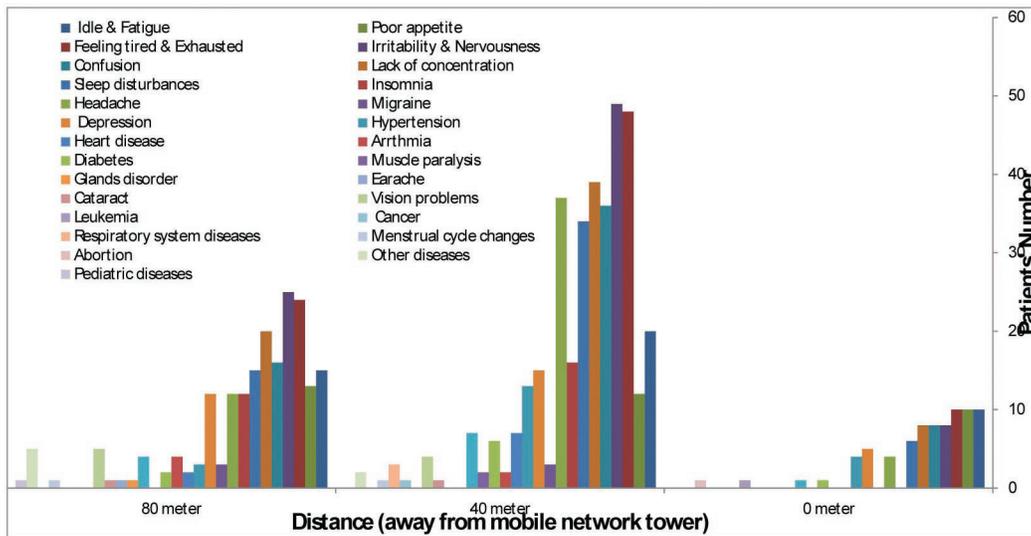


Fig. 4. The relationship between Distance (a way from Mobile Tower) & Patients' number

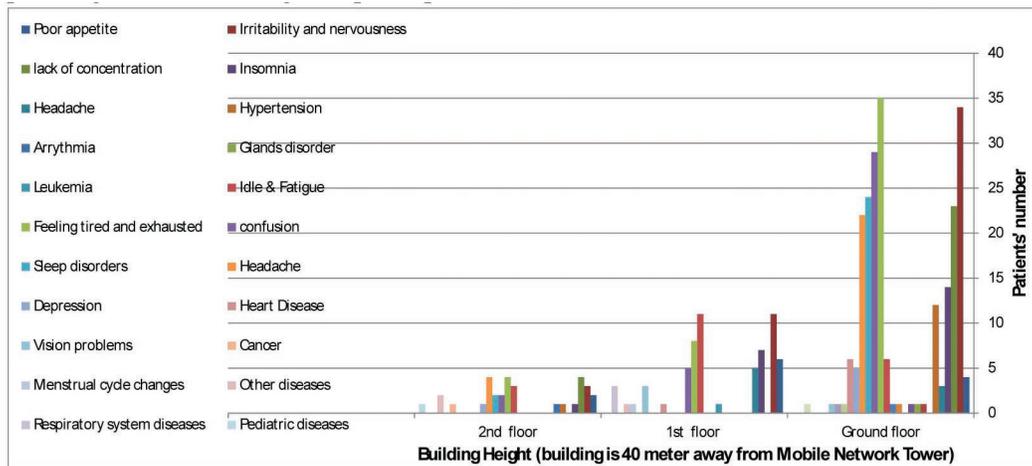


Fig. 5. The relationship between Building Height & Patients' number At Building is 40m away from Mobile Network Tower

Table 1. Questionnaire Findings

Participants 'responses	Respondents' Percentage
Long screen time for different reasons (messaging friends, playing video games, internet surfing)	63% (189 from 300)
Noise pollution by trucks & cars Horns, Noise pollution due to private electric generators, machines, ...	21% (63 from 300)
Social reasons, family problems, poverty	12% (36 from 300)
Other reasons, alcohol, smoking, hookah (al narjila)	4% (12 from 300)

**CONCLUSIONS**

This research tried to highlight the reasons of some negative symptoms that part of students suffered from. It supported the former researchers' insights that the prolonged usage of cellphones, smartphones and handheld devices bring harm to people health. In spite of the large advantages of the

smart technologies, but this research gave an evidence that the accumulative use of them affect the mental abilities of youngsters who participated in the survey. It also concluded that it should take in consideration by specialists the relationship between the risk volume due to the electromagnetic fields pollution on human health and each of the

age, gender, distance away from mobile tower, height of antenna. The research recommended the need for more studies and tests to discover the influence of smart phone on human health; shorten the period of mobile usage as much as possible; chose mobile device of Specific Absorption Ratio SAR doesn't exceed 1.6-2 watt/kg. It should keep away mobile network stations' towers outside living sectors, schools and hospitals.

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