



Compromising Health by Excessive Use of Smart Phones

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Abstract—Technology has totally change the world especially the role of smart phones in our routine life have proved to be very dominating and with release of technology gadgets and new apps have totally changed the use of our mobile phones, gone are the day when mobile phones were considered as luxury and they were supposed to use for telephone calls only or maximum for send and receiving of text messages, but now a days situation has been changed and our smart phones are more than just a phone because Mobile apps are facilitating us in almost every field which is resulting in extensive use of mobile phones. One side these apps are considered as blessing while on the other side excessive use of mobile phone is creating some serious health issues. This paper is presenting a study about effect of mobile phone on human's life.

Keywords— Mobile apps, Smart Application, Smart Services, GNOME, 3G, 4G, Edge, Frequency

I. INTRODUCTION

It's an Era of Technology and almost in every walk of life technology has been used to support the business and day to day routine life. At present no one can imagine his/her life without a mobile phone in his pocket but the fact is that almost seventy years back it was not everyone's cup of tea. In early 1930's it was not a small multipurpose multitasking piece of technology in your pocket rather a 25 pound (a device of the weight of a sugar bag) portable device which was making you able to communicate with others just within few miles of distance or range. These devices were mainly used by the infantry battalion and company intercommunications.



Figure 1: From Huge bulky structure to smarter ones

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Figure 2: The Evaluation of Mobile Phones[1]

Early mobile phones were just two way radios which relied on some powerful base stations covering an area within a wide range rather than two separate cells transmitting signals in between them. Instead of cell phone towers the whole system was embedded in a building with receivers and operators[2]. At that time the expenses of this service were estimated to an approximate cost of \$170 per month. Initially the system contained just one channel and allowing only one among the two communicating parties to talk while they were in communication. In addition to the cost they were heavy in weight and slow in communication. In 1965 mobile phones with more channels and an embedded number pad for manual dialing came into existence, taking the history of mobile phones a step ahead[3].

Later in 1980's the two way radio communication was replaced by the concept of analog transmission of voice signals within cells (geographically divided portions of land). These phones were not of the design to be carried out anywhere rather they needed to be installed permanently[4]. At that time the term car phones was famous because these phones were usually installed in cars and attached to the car battery for charging. In late 1980's the cost of mobile phone services and mobile devices was reduced to some extent but after implementing advanced mobile phone services in many areas it was realized that the voice modulation of analog signals is lagging behind in terms of encryption which raised security issues. Also analog signals are easily interfered which decreases the call quality[5].

The analog transmission in mobile networking was followed by the digital transmission which resulted in quick signal transmission, reduced the size, improved the call quality and bought the weight of the device from kilograms to just 100 to 200 grams and changed the concept of car phones to small portable mobile phone devices. After introduction of digital transmission there was a rapid growth in mobile technology.

Mobile phones with flip-flap were introduced and text messages via mobile phones was made possible. Digital transmission in mobile phones encouraged and paved a way for associating multiple functionalities to mobile phones and making mobile phone a small multipurpose piece of technology in one's pocket. In Early 1990's the first camera phone was introduced which fixed our big camera inside our small camera phone. Technology gave us the freedom of accessing internet on our phones. Anywhere anytime we were able to check emails, read the newspaper, make a search on google. Between the years 2000 and 2005 technology tried to embed the features of different mobile phones and introduced a camera phone with an mp3 player which later resulted as the wonder which got labeled as SMART PHONE. Black Berry was the first smart phone with an embedded key pad, internet, mp3 player, and camera. Now you just need one smart phone for texting your friends, listening music, surfing internet, taking pictures and lot more[6].

After the invention of Black Berry Apple company in late 2000's introduced iPhones and embedded all the functions of an IPAD in your mobile phone with touch screen. After some time mobile technology embedded Bluetooth in your mobile phones so that you could transfer music, pictures with your friends. Ear piece was invented to help you drive safely while you are talking on your phone[7].

A. SERVICES OFFERED BY MOBILE PHONES

For human beings in their day to day life a person feels handicapped without having a mobile phone or we can say that human beings have become dependent on mobile phones and that is because of innumerable services provided by the mobile phones. Mobile phones are equipped with such high-end features and specifications that we really feel great in having them with us all the time.

The basic function of any mobile phone is "calling" thus it is the basic and foremost service provided by mobile phone to its users. A person having a mobile phone can get in immediate contact with any person whenever and where ever needed and in case of emergencies they can be of great help to get in contact with the rescue team. Since mobile phones are Wireless devices, so they are much portable and easy to use and handle as compared to other traditional means of wired communication[8][9].

Apart from the function of "calling" mobile phones can be used for texting. We can send and receive the text messages by the use of mobile phones.

Now-a-days computers and other mostly internet providing devices are also replaced by mobile phones. We can access internet on our mobile phones and thus we can send and receive e-mails, IM's, chats, online banking, download apps etc. We can also get information about weather forecast, notifications and alerts about natural disasters like earthquakes as many of the countries like Japan is sending quick alerts and notification to its mobile phone users in case of natural disasters.

Besides mobile phones can be used for audio and video recording, health and medical information, play games and most important is capturing our precious moments.

The Pew Internet and American Life Project has done a survey according to which; after phone calls, the highest activity of mobile phones at 82% was taking photos which was slightly higher compared to survey carried out in 2010 that showed that activity at 76%.

II. MOBILE PHONES MANUFACTURING PROCESS AND QUALITY CHECK

Once the manufacturing process is over then manufacturers have to go through the following quality checks.

- a) IQC = incoming Quality checking
In IQC they check the material is good or not i.e. plastic material as a cover, B cover, C cover, D cover and also high model boxer and lock function, scratch, color fastness each model they have the different check point
- b) OQC = outgoing Quality checking
In OQC they check the DD (delivery documents), IMES (international Manufacturing Equipment System) and also software is also checking trace the Quality checking count the how many sample check? How it's used to check? , wrongly identification i.e. top to bottom or bottom to top and also the sequence check and also the check IMEI (international Mobile equipment identifier) and finally model no or color code, country code
- c) PQC = product Quality checking
When new product is running in production line then there is Visuals check is going on this is called the visual Quality document there is two type of checking
 - i. Material wise i.e. called MOSS Mobiran Object specific Standard Under this A cover B cover LCD, Printing, BOX Checking etc
 - ii. Part wise i.e. Visual Quality Document Under this DOT, Dent, Color and also checking is Rubber part wise, Plastic part wise Printing part Wise, Fabric part wise
- d) PQC = Process Quality control
In process Quality Control we check the class 1, class2, class3 i.e. inner defect, SIM lock, memory lock and all outer will checking i.e. language country code customer specification which depend upon customer that is English and Hindi and also check the BOM (bill of material) and fix the process is going on top to bottom or bottom to top and checking the sequence of operation and also add new feature and identify the defect and maintain the PPQM (process production and Quality management) with the CE (certification of Europe)
- e) RQC = Re Quality checking

The main purpose of RQC checking is to check the working condition and the performance stability, its breakness and specific part rotations of several times to show the stability and overall part stability include the physical checking of Finishing Product i.e. particular Heating Capacity etc. Other aspect is the main checking about the particular weight and all function is properly working or not. [11].

After evaluation, the next step is to find out any defect and then refer to DD department i.e. diagnostic team and Process Rejection and Supply Rejection which further scrutinize and sort out the problem before sending to customers. The main purpose of this step is to recover area failure engine come before the Quality test and also check the ATO (assembly to Order).

In this process defect component part are removing that process is called Rever with two types

- i. Chip Rever: – in this process only defective chip is removing
- ii. CSP Rever: - different IC will recovery

III. FREQUENCY RANGES AND RADIATION OMITTING PATTERNS

Radiation omitting process of mobile phones and mobile towers with different intensity depending open distance and battery level. The type of radiation emitted from mobile phones is electromagnetic radiation[12]. The main reason is about using radio frequency (RF) because it has been used to make and receive phone calls. Mobile phone radiation are known as a small kind of radiation because the emissions are low power (short range). However, other modes could be applied to decrease exposure to these waves instead doing extensive research on the subject, research also proves there is no consensus that using a mobile phone causes long term side effects in humans. No doubt, an extensive research has been done on mobile phone technology as users are increasing but the focus is not phenomenal on its emissions. Therefore, much more research is needed (considering this fact) before we can know for certain the effects they have on human health. One of the main controversial issues that cause leukemia and other diseases are radio antennas and mobile phone antennas. [13]. The mobile phones tower are another source of radiation and emissions.

Due to the increase of Mobile users, still no consensus one way or the other, but came up with few facts that it could be divided into different level and one way to check the initial level is to almost touch a mobile phone transmission antenna, and other facts are about:

- The antennas don't radiate signals instantly down, so they don't 'boast' emissions straight onto us below
- The mobile towers that backing the antennas don't pass off radiation

- Radiation impressively and quickly decreases as you move away from the mast - 10 meters away, the dose is 0.1% of what it was at 1 meter away; 0.0125% at 20 meters away and so on[14].

IV. HEALTH EFFECTS

There are certain known health issues due to use of mobile phones. Studies have shown that exposure to the RF waves emitted from mobiles can cause:

- Slightly raised blood pressure at the time of use, pressure returning to normal when use is stopped (to put this into perspective, our blood pressure changes regularly throughout the day and is even affected by tasks such as speaking)
- Direct brain warming after prolonged use, which disperses as soon as you stop using your phone and causes no harm[15]
- Mild fatigue after prolonged use
- A recent study in Sweden suggested that acoustic neuromas (benign tumors of the acoustic nerve) are twice as common in mobile phone users as in those who do not use mobiles.
- Finger cramping and sore muscles is effect of long time texting scrolling and gaming on your smartphone.
- A professor at Indiana University Dr. Michelle Drouin found that 89% of her students are experiencing phantom vibrations during their study. Phantom vibration is a condition in which your brain is unconsciously bothers as if there is real vibration of your smartphone[16].

The health risk is considered to be very, very small, although some individuals may be more susceptible to radiation than others. Whilst it's true that excessive exposure to RF waves causes heat to be generated, the spoof claims you may have heard about being able to cook an egg using a mobile phone are entirely false.



Figure 2: Blue Light Effects on Brain and Body [13]

Nevertheless, mobiles do emit low doses of radiation so common sense dictates that precaution should be taken when using them.

V. RELATED WORK

Good work has been done by researchers in the field of smartphone usage, its benefits, draw back and effect on health. The excessive use of smartphone can cause many health problems like Neck pain, Backbone pain, Nerve damage, Stress, Disrupted sleep, Eyesight problems and many indirect injuries. The radiation of smartphone can cause many severe disease like; Blood–brain barrier, Cancer and damage of hearing. Excessive use of smartphone defiantly disturb you social life.

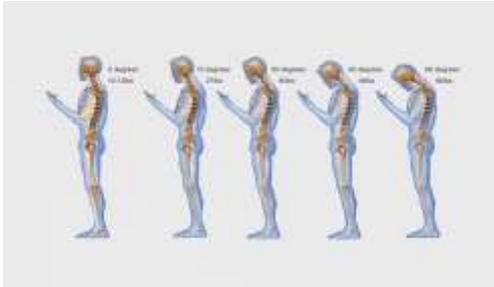


Figure 4: Texting with your head at an angle [19]

Here are few article of related work done by other researcher in the field of side effect of smart phone.

- **Back Problem:** If you are constantly using your phone, you could be putting your back under pressure.[19]
- The [British Chiropractic Association](#) study prove that in last few years the back problem is dramatically increase due to use of smartphone. 45% of the people at the age of 16 to 24 are suffering from the back pain.[20]
- **Sleep Disruption:** the survey of 2013 by “THE HUFFINGTON POST” shows that the 63% of the people from age 18 to 29 and 30% of people from age 30 to 64 use to sleep with their smartphone in their bed. This act causes disruption in their sleep.
- **Changes in the Thickness of Median Nerves Due to Excessive Use of Smartphones:** It was studied that, excessive use of smart phones in daily life would cause to increase pressure on the median nerve and also raise the probability of occurrence of CTS. Therefore, the compaction of carpal tunnel and median nerve is caused by elongated use once using time excessively rather than total using duration of smartphone. The need of using the smartphone for individuals is more often. Therefore, the study should be progressed. [17].
- **Impact of Smartphone’s on Society:** It is confessedly that Smartphone has a deep impact on people lives and other aspects of life such as in surveillance systems. It is also proved that smartphone technology demonstrates the volume of this impact on the society. Consumers are in process in switching their conventional cell phone to the Smartphone’s that represent norm of the society. Distributors, manufacturers and markets are the main

source of expanding smartphones but there is no doubt that Smartphone’s are brining great characteristics and capabilities to consumers. The key role is android technology that enables to be always-connected, get addiction among the people, disrespectful demeanor, concealment issues, affect on culture, distraction at work, etc. have negative impact on people life but on other hand it has changed the people life such as its app for educational purpose, entertainment, social contacts, expand of business and many more provide us both positive and negative sides of the Smartphone’s [18].

CONCLUSION

With all of its advantages and useful features that are essential part of our routine life now a days and which are helping us to move with the fast pace of technology but if it is effecting our health it is not wise to keep on using mobile phones with the same pace. There is no doubt for productivity and positivity of all these technology gadgets Best way to deal is moderate use of mobile phone and don’t take it to level when it became addiction and start effecting our health.

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