

CHAPTER – 1

INTRODUCTION

1.1 Introduction

The effect of Electromagnetic Radiations from mobile towers, on human health has been a subject of debate and study worldwide, as a result of the enormous increase in mobile phone usage throughout the world.

Telecommunications in general and mobile communications in particular, which were once considered to be a luxury, have now become a necessity in our lives. Up to February 2016, there were about 7.7 Billion mobile subscribers¹ worldwide, which is more than the population and is continuously growing at a faster pace (some people have more than two/ dual sim mobiles, so 4.7 Billion unique mobile users gives better picture).

India with the second largest population in world has been the front runner in this growth of mobile phones and also has the second largest telecom network. Tele-density in India has grown from 2.86% in March 2000² to 79.38% in March 2015³. The main contributor to this exponential growth has been the rise in number of wireless subscribers, which has grown from 1.88 Million in March 2000 to 969.89 Million in March 2015, with a net addition of 9.31 Million in the month of March 2015. As per the Telecom Regulatory Authority of India (TRAI), out of the tele-density of 79.38% in March 2015, wireless contributed for 77.27% & wire line

¹ <https://gsmintelligence.com> (accessed 29 February 2016)

² Government of India, Ministry of Communications & IT, Department of Telecommunications, *Annual Report 2006-2007*

³ Telecom Regulatory Authority of India, *Press Release No. 34/2015*

for 2.12% and state-wise, Delhi is at the top with tele-density of 237.94% in March 2015 followed by Tamil Nadu with a tele-density of 117.52% and at the lowest level is Bihar with tele-density of 51.57%. The fact that so many people use wireless connection for communication attests to its perceived importance.

This large increase in number of mobile subscribers has led to the increase in telecom revenues and is also said to have contributed for the increase in GDP & employment. It is often said that a new revolution is being brought about by mobile broadband. It is considered that 10% increase in mobile broadband leads to more than 1% increase in GDP of the country. The reason being, more mobile users, leads to more Value Added Services, mobile applications, m-commerce, mobile handsets, business for small shops for recharge, mobile accessories, etc. and more work at the backend for telecom operators & their vendors for providing good services. Thus mobile communication is being viewed by many entrepreneurs as a field with high returns.

1.2 Statement of the problem

As is known, mobile connections work by communicating through the mobile towers, using Electromagnetic waves and so these towers serve as the essential backbone for mobile communication. For the mobile connections to grow at this rate, it is required that the mobile towers should also grow at a corresponding rate. This has led to installation of large number of mobile towers, especially in the dense urban areas. As per TRAI, urban wireless tele-density was 143.08% and rural wireless tele-density was 47.78% in March 2015. This boom in the

number of mobile connections and towers has been accompanied by public debate about their possible effects on human health. The concerns relate to the emission of Electromagnetic Radiations (EMRs) from the mobile towers i.e. the base stations that receive and transmit the signals. In view of the importance of this issue, the dissertation will try to understand and analyze various standards set, the concerns raised in Indian society and their implementation in our country.

1.3 Objectives of the study

The study has been carried out within the available theoretical framework of various studies, researches, reports given by various international & national groups, their recommendations, standards set and action taken for their implementation. The purpose of this study is,

- To understand the effects of Electromagnetic Radiations from various sources and specifically analyze the existing research based evidences related to mobile towers and their impact on society.

1.4 Rationale

As per the Department of Telecommunications⁴, "There is a public concern over possible health effects from Electromagnetic Field Radiation (EMR) exposure from diverse EMR sources especially Mobile Base Transmitter Station (BTS) antennae and mobile. In this regard, several studies have been conducted in different countries, under the aegis of World Health Organization (WHO). WHO

⁴ <http://dot.gov.in/access-services/journey-emf> (accessed 3 March 2016)

has referred to approximately 25,000 articles published around the world over past 30 years and based on an in-depth review of scientific literature, has concluded: *'current evidence does not conform the existence of any health consequences from exposure to EMF radiation'*. Since the effects on human beings are to be studied over a long period of time, further studies are going on around the world." Additionally, WHO has recommended that the National authorities should adopt international standards, namely International Commission for Non Ionizing Radiation Protection (ICNIRP)/ Institute of Electrical and Electronics Engineers (IEEE). Department of Telecommunications (DoT), Government of India has taken necessary steps and adopted stricter norms for safety from EMF radiations from mobile towers and mobile handsets.

In spite of this, there have been concerns raised at various levels related to this issue. Hence it is required to understand the concerns that are still being raised and examine if there is some gap in government implementation.

Rightfully this may be a valid concern but on the flip side this concern in the society has also created a non-enabling environment for continuing with the high pace mobile growth as witnessed till now. It may further hamper growth which may in turn have its effect on the economic progress of the country.

Access to mobile phones has become a common choice involved in our everyday social interactions. It is often used in our informal and formal social settings. Thus its impact is vociferous and needs further investigation, as to see its significance. Mobile phones are deployed to describe not only the technology involved in it but also as an impetus to facilitate the social course of interaction.

Indeed, the increasing number of mobile phones to our social life has made us believe more of a virtual world than that of the real world where neighbor may be distant and the far-off becomes a close counterpart. Its indelible influences shape our cultural matrix in such a way that we tend to define, refine and articulate ourselves. This decoupling driven trend intends to create a dichotomy between agency and structure, soul and body, matter and spirituality and so on. This chasm affects the cognitive domain of its attendants where attitude becomes a crucial concern for the further interpretation.

1.5 Research Questions

- 1.5.1 What are the effects of Electromagnetic Radiations from various sources on the ecosystem?
- 1.5.2 What is the contribution of mobile towers as a part of those effects?
- 1.5.3 Are the mobile towers really the problem or mobile phones have a higher effect?

1.6 Methodology

"If I have seen farther than others, it is because

I have stood on the shoulders of giants."

– Sir Isaac Newton

The research is centrally based on secondary literature. Secondary research literature refers to the works that have already been published on various issues not necessarily focused on the issues under our investigation. The current

literature and various studies done in past all over the world on usage of mobile and its impact on the society as a whole, especially in reference to the EMRs from mobile towers make the basis for this work. Some of the studies done previously irrespective of qualitative, quantitative methods, mixed or descriptive methodology, etc. were reviewed. The relevant articles, columns, papers, study reports, researches, periodicals were selected based on the keywords: radiations, mobile phones, mobile towers, tower radiations, harmful effects, etc.

This particular methodology was preferred over primary methodology mainly due to the time constraint, in addition to the reason that, large, diverse and assorted collection of studies could be readily made use of, without spending time on collection of primary information. This particular approach also helped doing longitudinal analysis and the results can be generalized as large variety of material was available. Additionally, as the articles, columns, papers, study reports are written by researchers and reviewed by experts, they were more valuable than responses that could have been had. This method also helped in saving time and going through more literature than probably could have had gone through. The inbuilt limitations of the secondary sources were considered like reliability, bias, incompleteness i.e. non availability of full background data but the advantages outnumbered and this particular methodology was adopted.

Mainly data was collected from online sites and those texts which could be translated in Indian reality were selected. Exclusion criteria was applied to those papers that considered effects of only mobile phones, their biological, medical, social & psychological impacts and also on driving. Once data was collected, the

principles of systematic review were applied for analysis keeping in mind the theoretical framework. The review included how the scholars/ researchers/ study groups have arrived at their findings, methodology, themes and conclusions. Finally, findings are organized in themes address.

As the field is highly technical, other than the study on Electromagnetic Radiations, it also involves understanding of human health i.e. medical and biological sciences. A lot of research is already being conducted in this direction all over the world. Hence a review of some of the reports and literature by international bodies/ groups, WHO, ICNIRP, IEEE, International Telecommunication Union (ITU), American Cancer Society has been used for analysis of information.

Also, Department of Telecommunication in India has already taken steps in this direction. Therefore, it was required to understand them and then try to find out the gaps that remain, due to which the various concerns are still being raised.

Some of the primary sources used were discussions with officers in Department of Telecommunications, Telecom Engineering Center, Telecom Enforcement Resource and Monitoring (TERM) cells, BSNL, private telecom vendors, Department of Science & Technology, professors of engineering colleges and the general public.

1.7 Limitations

The study is limited as it is based on secondary analysis of reports of various researches already conducted around the globe and the literature obtained from

such secondary sources, depending upon their accessibility and availability. This has also been constrained by time as the researches of this type are required to be conducted by observing the effects over a long period of time and as this issue is not very old, hence some of the researches may still be ongoing and may not be concluded as yet, so getting their final results was not possible.

Practically it is not possible to monitor the prolonged effects of Electromagnetic Radiations from a single source on one particular living being hence no such primary research has been carried out till now.

1.8 Chapterisation Scheme

The dissertation starts with introduction chapter consisting of statement of problem, followed by objectives, rationale, research questions, methodology and limitations. As the topic is related to Electromagnetic Radiations hence chapter 2 discusses about them, their sources and effects. Chapter 3 contains the literature review in the form of some researches/ studies/ papers, their review and media reports. Chapter 4 includes the action taken by various international bodies like WHO, International Agency for Research on Cancer (IARC) & ICNIRP and Indian government to answer the rising concerns in society. The dissertation ends with concluding remarks in Chapter 5.