Chapter VI

RECOMMENDATION AND FUTURE SCOPE

The investigation reported in the thesis is mainly based on the youngsters who are the most common user of mobile phones. They should be informed regarding the ill effects of radiation emitted by mobile phones especially related with health aspects. People should be aware about EMR and preventive measures to minimize the radiation exposure. In this regard, more surveys are needed to be conducted among all age groups in urban as well as in rural area, among the literate and illiterate and in various zone of the country with proper instructions creating awareness regarding pollution caused by electromagnetic radiation.

It is suggested that exposure of radiation can be reduced practically by using mobile phones in emergency only, curtailing the talk time and communicating by text whenever possible. To evade jeopardy due to EMR, simple steps can be used to reduce the exposure. These steps are listed follow:

1. Talk time on the phone should be minimized. Discussion on cellular phone for a period greater than 20 minutes increases temperature of ear lobe and brain.
2. It is suggested to avoid long conversations and frequent use.
3. If conversion for longer period is needed, mobile phone should be kept at more distance from body especially the head. Because exposure level of radiation decreases with increase in distance of mobile phone from body. Hence a handset should be placed at least 15-18 cm away from the body.
4. It is recommended not to keep the cell phone in close proximity to the body such as in a shirt pocket or on a belt clip.
5. It is preferable to avoid use of cordless phones in a house.
6. It is suggested to use mobile phone only when a usual telephone is unavailable. Ordinary landline phone should be used as it emits lesser radiation.
7. Cell phone should be used with lowest output power. The speaker phone should be used whenever possible.

8. The signal intensity should be always ensured. Call should be avoided when signal is feeble because cell phone irradiate maximum at this stage.

9. It is recommended not to speak on a cell phone while in a bus, on a railway train, airplane. Confined areas catch radiation and as a result radiation exposure becomes higher in these enclosed metal surroundings.

10. Mobile phone should be used in open spaces as often as possible.

11. Use of mobile phone while driving should be strictly avoided.

12. User has to remain out of Wi-Fi fields. Longtime stay in Wi-Fi zones should be avoided as its radiation is continuous.

13. The wired internet connections should be preferred and used in the schools, colleges and educational institutes.

14. It is recommended that children under 16 years of age be discouraged from using mobile phone and playing games with it. They are more susceptible for RF radiation than adult.

15. Pregnant woman should avoid use of mobile phone as developing child is more susceptible for RF radiation.

16. Cell phone should be switched off when not in use. During sleep, mobile phone should not be on or placed under pillow. It releases signals in stand-by mode also.

17. It should be mandatory for cell phone manufactures to exhibit radiation level on the product. The related comparable data about the SAR values should be available for customers.

18. It has been observed that ferrite bead attached to headset decreases RF interference. Ferrite is a semi-magnetic substance created from iron oxide (rust) alloyed with other materials. It is commonly used on computer cables, to reduce or eliminate the radio frequency.

19. For pace maker users, the necessary precautions should be taken not to keep the mobile near pacemaker circuit.
Scope for future work

The importance of health hazards due to mobile phone and mobile towers has not been still understood by common man. Mobile companies and mobile operators are claiming that there are no ill effects of using it. Therefore, for installing the mobile/cell tower followings rules and regulations should be strictly pursued. Violations of the rules should be punished irrespective of income received from company for allowing erection of mobile tower in the residential zone.

Several studies reported in past are mainly sponsored by industries or companies related with mobile phones and only 30% studies are independent and without any sponsorship. It is believed that there is an urgent need to give emphasis on unbiased and individual investigations in connection with mobile use and radiation emitted. The cause for continuation of investigation is not just for technology sake. The basis is that our scientific proof is inadequate to support the ideas that there will be no health effects and that the protection standards are sufficient to defend all customers. The present circumstances of scientific doubt warn for equally preventive measures and for additional investigations in this direction.

For the installation of mobile towers following norms are suggested.

1. Consent from the local self government is essential with some license fees and consent of the people staying near it.
2. Consent from the Department of Telecommunication is obligatory with observations and visits of experts.
3. Rules and regulations created by the TRAI have to be observed and sustained. TRAI should guarantee that quality service being provided to the customer/user.
4. In addition, TRAI should examine and carry out the survey about the quality of service. TRAI should provide directives to improve the services and quality of the services.
5. Number of towers to be erected should be on the basis of requirement and number of the consumers.
6. Towers to be erected should be away from highly populated areas, schools and hospitals.

7. Instead of a single huge tower emitting larger radiation, erection of number of small towers should be encouraged.

The HV powerlines are the sources of pollution to the environment through its direct damage to the landscape, land use in the city or agricultural land. Following are some suggestions and recommendations, which can be carried on to reduce the effect of EMR from high voltage powerlines on student's health.

1. Schools, Colleges and houses must be far away from high voltage transformers at least 200 m.

2. Trees should be planted around the educational institute, hospitals and residential zones to reduce the EMR pollution inside it.

3. Sitting under the pillars of high voltage transformers or powerlines in the street should be avoided, because of risks.

4. People should be informed about the EMR risks on health.

5. Officials should advice about construction of buildings by using a plaster cement form as pre-manufactured tiles, to shield these building effectively from outside electromagnetic interference.

6. Use one of the materials in addition to cement for good absorption, such as polystyrene or electrolytic manganese dioxide and manganese zinc ferrite should be promoted.

7. Besides high voltage powerlines, there are many appliances and sources that produce EMR such as high voltage transformer, copy machine, wireless from laptops, and imaging machines in libraries, microwave oven, and televisions that need to be studied.

8. It is proposed to use diverse sources of renewable energy to avoid the centralized production and promote the proximity between production sites and places of energy consumption.
Use of solar energy can be best option for powerline voltage as it abundant, easily available, free from pollution, without transmission cost and free. While other non-renewable energy sources are going to be exhausted we have to think about alternative renewable energy sources to save our lives and our earth.

On the basis of geopathic zone stress studies conducted and reported in the thesis following suggestions are recommended.

1. Awareness about low level EMR and its health hazards should be created among the people residing in the geopathic zone.
2. Geopathic zone factor should be taken into consideration while constructing houses.
3. Probability of accidents in geopathic zone is more as compared with normal road as soil structure differs in GS zone. Hence site of geopathic stress area should be considered as important factor while creating new roads.
4. Furniture kept in the geopathic zone area should be rearranged to avoid low frequency radiation effects.
5. The rearrangement includes repositioning of beds and cradles used for child.
6. For the peoples suffering from chronic problems like migraine, anxiety, asthma, rheumatic pains, arthritis, substitute medical solution should be made available.
7. Hospitals, Schools should not be constructed in the areas showing geopathic stress.

There is an urgent need to control pollution of EMR just like air pollution, water pollution, and noise pollution. The government has to take actions to control this pollution. If government does not take action then the day will come when every third Indian will be sick due to this pollution.

The study reported in this thesis is an important addition to other studies of health hazards due to exposure of EMR created due to mobile phone and low frequency sources like powerlines and geopathic stress zone. It is concluded from study that electromagnetic fields are harmful and can have unfavorable effect on human body functioning.
It had been observed that size of sample in all the study reported in thesis was limited, 200 for survey of effects of mobile phone, 105 for mobile use study, 20 for electric powerline voltage study and 40 for geopathic stress study. The investigator feels that more studies should be carried out for more samples before reaching any firm conclusion. Non availability of female study for geopathic study is also one limitation as methodology adopted was not suitable and acceptable by girl’s students.

Measurement of radiation power emitted from mobile tower can be done using instrumentation and these observations can be correlated with the study reported in the thesis. Investigation presented in the thesis forms a basis for the new researchers willing to work in this area.