Quest Journals
Journal of Electronics and Communication Engineering Research
Volume 8 ~ Issue 6 (2022) pp: 18-21
ISSN(Online) : 2321-5941
www.questjournals.org

Research Paper

Mobile Tower Radiation and Its Impacts on Child Health - A study conducted in a highly populated state - Kerala

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ABSTRACT: *In this paper, the effect of mobile tower radiation on child health is studied in a highly populated state of India Kerala. Out of ten diseases were examined in which eight of them are found to be closely related to the cell tower exposure. The observation location includes different districts of Kerala. An attempt has been made to discover whether any relation exists between the RF exposure and the health of children under 15 years old. In the region under study, exposure levels were well below the ICNIRP recommendations and the current Indian standards. However, still it is inadequate to safeguard children.*
KEYWORDS: *Cell tower radiation, Child health ,Power density, Radiation level ,RF exposure*

R*eceived 5 June, 2022;* ***R****evised 18 June, 2022;* ***A****ccepted 20 June, 2022 © The author(s) 2022.*
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I. INTRODUCTION

The radiation effects can be classified into two; thermal and non-thermal effects[2]. Thermal effects are due to the heat absorption by body liquids just like in a microwave oven. Non thermal effects are due to the coupling effects of electric and magnetic fields by the electromagnetic radiation. The exposed fields produce eddy currents and electric fields inside the body which will affect the electric dipole balance of the body. This will affect transportation through cell and brain membranes and leads to permeant damages[3]-[10]. The induced electricity will affect the nerve communication also[11],[12]. The coupling from the mobile tower and mobile phone is comparatively large because of the compatibility of wave length with length of human organs. Children are found to be more affected by the RF exposure. This is because of their smaller head, thinner bones, tender skin, elastic ears, more reproducing cells etc. So the radiation penetrates more than the adults.[13]-[17]

The aim is to analyse the above facts which will enable us to get a clear picture about the mobile tower radiation exposure and the health troubles of the children. The observation location includes different districts of Kerala. More than 1 lack mobile towers are already installed in the Kerala state[1]. The effect of mobile tower radiation on child health in this area is studied. An attempt has been made to discover whether any relation exists between the RF exposure and the health of children under 15 years old. At some point of path of this work, ten common diseases were considered. From the analysis, it has been discovered that eight of them are very much related to RF exposure.. In the region under study, exposure levels were well below the ICNIRP recommendations and the current Indian standards. However, still it is inadequate to safeguard children.

II. METHEDOLOGY

We divided the examination area into two; Highly Exposed Zone (HEZ), which is the area within a radius of 300 metres of any cell tower and Radiation Free Zone (RFZ) at a distance more than 300 metres from any cell tower. Power density, electric field intensity and magnetic field intensities were measured and a survey was conducted. Statistical tests have been conducted to conclude the assessments. The device used for measuring the exposure parameters was MECO's 9720 three axes radiation metre.
Statistical analysis was done using the software SPSS. The tests conducted were T- test, independent sample test, Levene's test for equality of variance and ANOVA.
The diseases examined were

1) Autism, Down syndrome etc. in children
2) Ophthalmic problems at younger ages
4) Joint pain, Rheumatic pain, Bone weakness

5) Cancers and Tumours
6) Sleep disorder
7) Memory loss
8) Headaches and related digestive issues (Migraine, IBS etc.)
9) Heart Diseases, Hipper Blood pressure etc.
10) Ear and hearing problems.

III. SAMPLE SIZE

In this study, the population size is 1.48 crores, and a confidence level of 95% and the margin of error assigned is 2.5. Z score value for the above confidence level is 1.94. Assign a standard deviation value of 5, the sample size calculated is 1245. So we took a higher value of 1250 for our study.

IV. RESEARCH AND DISCUSSION

Ten diseases were examined which are relevant from our previous studies. Out of which eight are found to be caused by mobile tower radiation exposure.

1. Autism, Down syndrome and other such disabilities found in children

About 5.21 % of the surveyed children are affected by these diseases. Among which 87.5 % are from CZ and only 12.5 % are from RFZ. The 75 % hike shows that the cell tower plays a major role. The mean radiation power density value of the victims' residence is 325.05 mW/m2 with a standard deviation of 277.88 from the normal.

2. Ophthalmic problems at younger ages

We studied the ophthalmic problems of the younger ones. It is found that 12.13 % of the children under 15 years are affected of which 72% are from the highly exposed zones.

3. Joint pain, /Rheumatic pain/Arthritis / Bone weakness

About 2.33 % of the children under study are affected. Among this 72.67 % are from CZ and 27.33% are from RFZ. 45.34 % increase is definitely due to mobile tower exposure.

4. Tumors and cancers

3.37 % of the children are suffering. Among them, 81.48 % are from CZ and 18.52 % are from RFZ. 62.96 % increase is due to cell tower exposure. The victims' exposure level is 459.57 mW/m2 with a standard deviation of 277.57 from the normal.

5. Sleep Disorder

About 12.98 % of the children are suffering from sleep disorder. Among them, 89.42 % are from Core Zone and only 10.58 % are from Outer radiation-free zone. 78.84 % increase points to the role of mobile tower radiation exposure The average radiation exposure of the victims is 470.38 mW/m2 with a standard deviation of 277.22.

6. Memory Loss

About 10.99 % of the surveyed are suffering. Among them, 75 % are from CZ and only 25 % are from RFZ. The 50 % increase is definitely due to cell tower radiation. The mean power density ofthem is 399.93 mW/m2 with a standard deviation of 297.80.

7. Headaches/Digestive problems

About 25.34% of the children are suffering from the above diseases. Among them 63.05% from CZ and 36.95% from RFZ. The mean exposure level is 314.61 mW/m2 with a standard deviation of 291.69 from the normal. The radiation plays a major role.

8. Ear/ Hearing problems

About 15.61% of the surveyed are affected by ear related problems.70.40% are from CZ and 29.60% are from RFZ. The mean radiation exposure level is 487.34 mW/m2 with a standard deviation of 315.46.

No	Disease	Social Average %	HEZ %	RFZ %
1	Brain Disorders	5.21	87.5	12.5
2	Ophthalmic problems	12.31	72	28
3	Joint Pain etc.	2.33	72.67	27.33
4	Tumours/Cancers	3.37	81.48	18.52
5	Sleep Disorders	12.98	89.42	10.58
6	Memory Loss	10.99	75	25
7	Headaches/Digestive problems	25.34	63.05	36.95
8	Ear Problems	15.61	70.40	29.60

Table 1. Diseases, Zone wise comparison

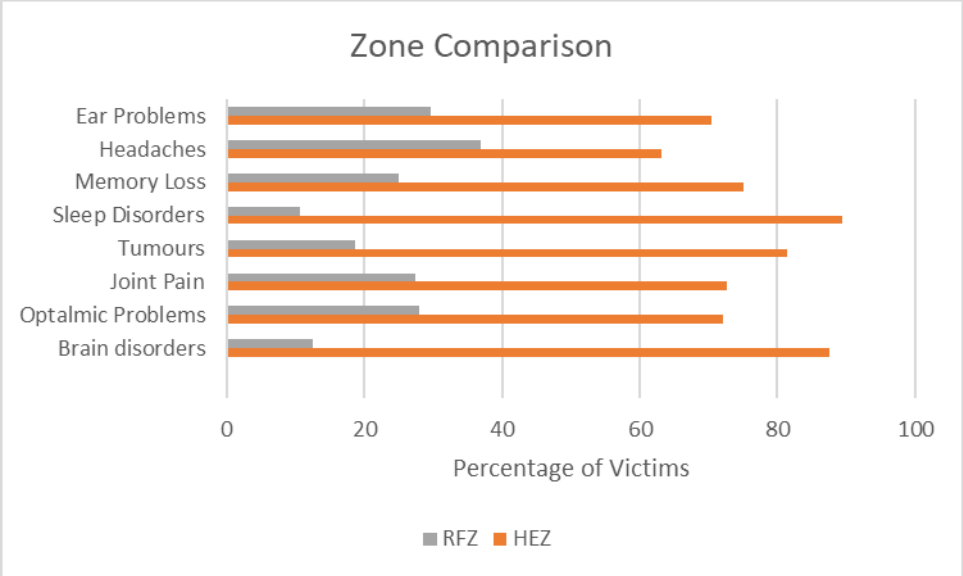

Figure 1: Zone Comparison

V. CONCLUSION

Cell tower radiation levels in different areas of the state of Kerala have been measured. Out of the ten diseases examined, eight are found to be strongly related to cell tower exposure.

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