

Emission of Electromagnetic Rays from Mobile Phones Cause Dysfunction of Thyroid Gland

Dr. Humera Ayesha¹, Shaikh Mahmood²

¹Department of Physiology, Deccan College of Medical Sciences, Owaisi Hospital & Research Centre, DMRL X Road, Kanchan Bagh, Hyderabad 500058 Telangana State, India

²Department of Physiology, Deccan College of Medical Sciences, Owaisi Hospital & Research Centre, DMRL X Road, Kanchan Bagh, Hyderabad 500058 Telangana State, India (Corresponding Author)

Abstract: During the past decade, there is a dramatic increase in wireless communication system particularly the mobile phones (cell phones) which are low power single channel two ways radios that emit signals through electromagnetic waves. As most of the physiological functions in our body is regulated by electric currents and the electromagnetic fields (EMF) emitted from the mobile phones may affect the physiological processes and associated health effects like sleep disorders, headaches, etc. When we discuss about the endocrine system the most exposed vital endocrine glands when compared to pineal, pituitary, adrenal which can get affected by the electromagnetic fields is thyroid gland, An important endocrine glands that control our body metabolism which is located in front of the neck and release hormones into the bloodstream. It secretes Thyroxine(T4)¹, Triiodothyronine(T3) Calcitonin, to synthesize thyroid hormones Thyroid gland needs Iodine, too little or too much iodine can affect the level of hormones and its release. Role of thyroid hormones is to control Metabolism, Body Temperature, Breathing, Heart rate, Brain development, Mental activity, Digestion, Fertility etc. This study shows a higher TSH level (Hypothyroid) with low T4 in mobile phone users. It may be concluded that there can be deleterious effects of mobile phones through electromagnetic rays on Hypothalamo-Pituitary-Thyroid axis (HPT)

Keywords: Mobile phones, Electromagnetic Rays, Hypothalamo - Pituitary- Thyroid axis (HPT) Axis, Hypothyroidism

1. Introduction

In the recent years there is a huge increase in mobile phones usage throughout the world. The Electromagnetic Rays (EMR) induced by the Global system of Communication from mobile phones can have detrimental effects on Human health. This EMR'S are non-ionising in nature and cannot ionise molecules in our body these can affect thyroid gland metabolism as a part of its non thermal effects. Generally mobile phones are low power single channel two ways radios that emit signals through electromagnetic rays. As most of the physiological functions in our body is regulated by electric currents and the electromagnetic rays (EMR) emitted from the mobile phones may affect the physiological processes and associated health effects like sleep disorders, headaches, etc. When we discuss about the endocrine system the most exposed vital endocrine gland when compared to other endocrine glands such as pineal, pituitary, adrenal which can get affected by the electromagnetic rays is thyroid glands, An important endocrine glands that control body metabolism which is located in front of the neck and releases hormones into the bloodstream. They secrete thyroxine¹ (T4), Triiodothyronine (T3), Calcitonin, to synthesize thyroid hormones, thyroid glands need Iodine too little or too can affect the level of hormones. Role of thyroid hormones is to control Body Metabolism, Temperature, Breathing, Heart Rate, Brain Development, Mental activity, Digestion, Fertility etc.

2. Materials and Methods

The present study shows alteration in TSH and thyroid hormones. The people who use mobile phones have elevated TSH, and decreased T4 and T3. This Study concluded that possible deleterious effects of mobile microwaves on

Hypothalamo-Pituitary-Thyroid axis (HPT)² affects the level of these hormones.

A study was done on the effect of electromagnetic radiation due to mobile phones use on thyroid function in medical students studying in medical college in south India⁴. They explored for the association between radiation exposure and thyroid dysfunction among mobile phone users. Students who actively have mobile phones usage was considered under inclusion criteria. The students who have preexisting thyroid disease was excluded from the study. Statistical analysis has shown that 53% of students spent 0.5 hour on phone, 28% of students spent 1-2 hours on phone, 10% for 3-4 hours. Around 20-22% of students of the above came with significant results of thyroid disease either a thyroid swelling or a thyroid dysfunction. study concluded that there is a significant correlation between total radiation exposure and increased TSH among students. But there was no consideration of family history of thyroid diseases under this study.

A study was done at diagnostics radiology department on mobile phone usage and risk of thyroid gland lesions detected by ultrasonography⁵. There were 180 participants with 110 females and 70 males of age 15 - 65 years, USG examination of thyroid gland was done 5-9 MHz linear probe in B- mode and colour Doppler mode and analysed for size, echogenicity, vascularity of thyroid gland and any presence of any focal lesion, calcifications or abnormal lymph nodes was checked. Demographic analysis of study group showed 141 with mobile phone uses and 39 non users. when compared to males, female uses were found more. 36.7% use mobile phone for >5 hours daily and had noticed that 46.7% has abnormal thyroid gland functioning and 53% were normal.

The study on thyroid cancer, Genetic variation Mutations and Point Mutations are found positive for regular usage of cell phones⁶, 900 people was examined and provided evidence that genetic susceptibility with certain SNP (single nucleotide polymorphism) in 4 genes found. It has a role in prolonged usage of cell phones, developing thyroid cancer. .

3. Discussion

An important endocrine glands that control body metabolism which is located in front of the neck and releases hormones into the bloodstream. They secretes thyroxine¹ (T4), Triiodothyronine (T3), Calcitonin, to synthesize thyroid hormones, thyroid glands need Iodine. Too little or too much iodine can affect the level of hormones. Role of thyroid hormones are to control body Metabolism, Temperature, Breathing, Heart Rate, Brain Development, Mental activity, Digestion, Fertility. Etc. It may be possible to have deleterious effect of mobile microwaves on Hypothalamic-Pituitary-Thyroid axis affect the level of these hormones.

4. Conclusion

As Mobile phones have become a daily necessity for every person. There are certain disadvantages of getting constant exposures of electromagnetic radiations. The emitted rays through mobile phones are very harmful to the whole body to absorb non ionising radiations. The most crucial and superficial endocrine gland that is thyroid gland get much of its effected by disturbing its normal functions as it controls Metabolism, Heart rate, Breathing, Brain development, Mental activity, Fertility. etc. The present study concluded there is a strong connection between mobile phones usage and thyroid dysfunction.

References

- [1] Markovà E, Hillert L, Malmgren L, Persson BR, Belyaev IY. Microwaves from GSM mobile telephones affect 53BP1 and gamma-H2AX foci in human lymphocytes from hypersensitive and healthy persons. *Environ Health Perspect* 2005. Sep;113(9):1172-1177 10.1289/ehp.7561
- [2] Takahashi S, Inaguma S, Cho YM, Imaida K, Wang J, Fujiwara O, et al. Lack of mutation induction with exposure to 1.5 GHz electromagnetic near fields used for cellular phones in brains of Big Blue mice. *Cancer Res* 2002. Apr;62(7):1956-1960
- [3] Myerson SG, Mitchell AR. Mobile phones in hospitals. *BMJ* 2003. Mar;326(7387):460-461 10.1136/bmj.326.7387.460
- [4] Frumkin H, Jacobson A, Gansler T, Thun MJ. Cellular phones and risk of brain tumors. *CA Cancer J Clin* 2001. Mar-Apr;51(2):137-141 10.3322/canjclin.51.2.137
- [5] Karinen A, Heinävaara S, Nylund R, Leszczynski D. Mobile phone radiation might alter protein expression in human skin. *BMC Genomics* 2008;9:1-5 . 10.1186/1471-2164-9-77
- [6] Seitz H, Stinner D, Eikmann T, Herr C, Röösl M. Electromagnetic hypersensitivity (EHS) and subjective health complaints associated with electromagnetic fields of mobile phone communication—a literature review published between 2000 and 2004. *Sci Total Environ* 2005. Oct;349(1-3):45-55 10.1016/j.scitotenv.2005.05.009
- [7] Mortazavi SM, Ahmadi J, Shariati M. Prevalence of subjective poor health symptoms associated with exposure to electromagnetic fields among university students. *Bioelectromagnetics* 2007. May;28(4):326-330 10.1002/bem.20305
- [8] Mortazavi SM, Daiee E, Yazdi A, Khiabani K, Kavousi A, Vazirinejad R, et al. Mercury release from dental amalgam restorations after magnetic resonance imaging and following mobile phone use. *Pak J Biol Sci* 2008. Apr;11(8):1142-1146 10.3923/pjbs.2008.1142.
- [9] Stevens RG. Electric power use and breast cancer: a hypothesis. *Am J Epidemiol* 1987. Apr;125(4):556-561
- [10] Löscher W, Mevissen M. Animal studies on the role of 50/60-Hertz magnetic fields in carcinogenesis. *Life Sci* 1994;54(21):1531-1543 10.1016/0024-3205(94)90024-8 [
- [11] Brainard GC, Kavet R, Kheifets LI. The relationship between electromagnetic field and light exposures to melatonin and breast cancer risk: a review of the relevant literature. *J Pineal Res* 1999. Mar;26(2):65-100 10.1111/j.1600-079X.1999.tb00568.x
- [12] Graham C, Cook MR, Gerkovich MM, Sastre A. Examination of the melatonin hypothesis in women exposed at night to EMF or bright light. *Environ Health Perspect* 2001. May;109(5):501-507 10.1289/ehp.01109501
- [13] Ossenkopp KP, Koltek WT, Persinger MA. Prenatal exposure to an extremely low frequency-low intensity rotating magnetic field and increases in thyroid and testicle weight in rats. *Dev Psychobiol* 1972;5(3):275-285 10.1002/dev.420050312 [
- [14] Zagorskaya EA. Endocrine responses to low frequency electromagnetic fields of continuous and intermittent generation. *Kosm Biol Aviakosm Med* 1989;23:4-14
- [15] Picazo ML, Miguel MP, Leyton V, Franco P, Varela L, Paniagua R, et al. Long-term effects of ELF magnetic fields on the mouse testis and serum testosterone levels. *Electro-Magnetobiol* 1995;14:127-134 [
- [16] Zagorskaya EA, Klimovitsky VY, Melnichenko VP, Rodina GP, Semyonov SN. The effect of low frequency electromagnetic fields on physiological systems: a review. *Kosm Biol Avinakosm Med* 1990;24:3-11
- [17] Forgács Z, Thuróczy G, Paksy K, Szabó LD. Effect of sinusoidal 50 Hz magnetic field on the testosterone production of mouse primary Leydig cell culture. *Bioelectromagnetics* 1998;19(7):429-431 10.1002/(SICI)1521-186X(1998)19:7<429::AID-BEM4>3.0.CO;2-3
- [18] Burchard JF, Nguyen DH, Block E. Progesterone concentrations during estrous cycle of dairy cows exposed to electric and magnetic fields. *Bioelectromagnetics* 1998;19(7):438-443 10.1002/(SICI)1521-186X(1998)19:7<438::AID-BEM6>3.0.CO;2-

- [19] Feria-Velasco A, Castillo-Medina S, Verdugo-Díaz L, Castellanos E, Orozco-Suárez S, Sánchez-Gómez C, et al. Neuronal differentiation of chromaffin cells in vitro, induced by extremely low frequency magnetic fields or nerve growth factor: a histological and ultrastructural comparative study. *J Neurosci Res* 1998. Sep;53(5):569-582 10.1002/(SICI)1097-4547(19980901)53:5<569::AID-JNR7>3.0.CO;2-7 [
- [20] Uscebrka G, Zikic D, Matavulj M, Rajkovic V, Gledic D. Electromagnetic field effects on the morphometrical characteristics of rat adrenal glands. In: Bersani, F. (Ed.), *Electricity and Magnetism in Biology and Medicine*. Kluwer Academic/Plenum Publishers, New York, pp. 485–488, 1999.
- [21] Matavulj M, Rajkovic V, Uscebrka G, Lukac T, Stevanovic D, Lazetic B. Studies on the possible endocrinological effects of an 50 Hz electromagnetic field. *Centr. Europ. J. Occup. Environ. Med* 2000;6:183-188
- [22] Sinha RK. Chronic non-thermal exposure of modulated 2450 MHz microwave radiation alters thyroid hormones and behavior of male rats. *Int J Radiat Biol* 2008. Jun;84(6):505-513 10.1080/09553000802085441
- [23] Bauer M, Goetz T, Glenn T, Whybrow PC. The thyroid-brain interaction in thyroid disorders and mood disorders. *J Neuroendocrinol* 2008. Oct;20(10):1101-1114 10.1111/j.1365-2826.2008.01774
- [24] Bernal J. Thyroid hormone receptors in brain development and function. *Nat Clin Pract Endocrinol Metab* 2007. Mar;3(3):249-259 10.1038/ncpendmet0424
- [25] Koyu A, Cesur G, Ozguner F, Akdogan M, Mollaoglu H, Ozen S. Effects of 900 MHz electromagnetic field on TSH and thyroid hormones in rats. *Toxicol Lett* 2005. Jul;157(3):257-262 10.1016/j.toxlet.2005.03.006
- [26] Larsen RP, Davies TF, Schlumberger MJ, Hay ID. Thyroid physiology and diagnostic evaluation of patient with thyroid disorders. In: *Williams textbook of endocrinology*. 11th edition. Saunders, pp: 319-320, 2008.
- [27] Burchard JF, Nguyen DH, Rodriguez M. Plasma concentrations of thyroxine in dairy cows exposed to 60 Hz electric and magnetic fields. *Bioelectromagnetics* 2006. Oct;27(7):553-559 10.1002/bem.20253
- [28] Rajkovic V, Matavulj M, Gledic D, Lazetic B. Evaluation of rat thyroid gland morphophysiological status after three months exposure to 50 Hz electromagnetic field. *Tissue Cell* 2003. Jun;35(3):223-231 10.1016/S0040-8166(03)00029-6