

The Challenges and Effect of Telecommunication Mast Station To Human Health

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Abstract

Human needs may be difficult to attain when there are no means of communication among them. Languages, therefore, have been age long means of communicating among human beings. They are used to easily send messages to persons who are physically present and understand these languages. Where a person to whom a message is to be passed is not physically present, the message is sent through another person who takes the message and delivers the same to him physically. The delay and inefficiency associated with primordial ways of communicating with a person at a distance necessitated the need to devise a means by which the person in the distant place can be instantly communicated with as if he is present. One of such newly devised ways is known as Telecommunication (Telecom). Telecom makes use of radiofrequencies and microwaves to enable people at different places communicate easily. To ensure clearer reception of signal from one end to another, mast stations are installed and put in place. This equipment causes some health and environmental challenge; this paper therefore recommends some steps to avoid these challenges.

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I. Introduction

The World Health Organization (WHO) warns that a telecommunication (telecom) mast should be located at least 10-metre radius away from residential quarters. Yet, many Nigerian landlords let out their pieces of land for erection of telecom masts near residential and educational facilities without thinking of the health hazards that may arise. On their part, telecom firms callously capitalize on the people's naivety to send them to their early graves (All Africa, 2012).

According to medical reports, some ailments are caused by radiation or emission of electromagnetic impulses from a telecom mast erected close to residential premises. These killer-masts transmit poisonous gases that impair the immune system and human neurological functions. Frequent and close contacts with these radioactive substances could hamper memory and sleep patterns, causing brain tumors, cancers and Alzheimer's disease (loss of memory and ability to speak clearly in older people). The radiation impacts on fertility and metabolism and can cause depression and fatigue. Other diseases, like leukemia, cancer, depression, lymphoma, neutropenia, lymphocytosis and platelet, result from hoisting telecom masts within 10 meters radius to human habitation. Children suffer memory loss, dizziness and bleeding from the nose. Consequently, domestic animals have been wiped out and families are at the verge of extinction in some cases. This growing wrong practice is further compounded by environmental risks associated with cracks of the walls of houses located close to the masts due to vibration from the generating plants that power the system (All Africa, 2012).

Sharing the dangers of electromagnetic fields (EMFs) and the key steps to reducing exposure and improving health, Riggs (2009) submits that EMFs are the cause of cancer, insomnia and fatigue in adults and concurs that EMFs can cause symptoms of illness in infants, children and adults, particularly those who already experience low immunity. People sensitive to EMFs may experience nervous system abnormal (like fatigue, stress and sleep disturbances), skin symptoms (such as facial prickling, burning sensations and rashes), body symptoms (like pains and aches in muscles), eye symptoms (such as burning sensations), foggy thinking and depression, a variety of less common symptoms (like ear, nose, and throat symptoms and digestive disorders), infertility, and leukemia in children. Breast cancer or cancer clusters have been linked to high exposure to EMFs, Riggs. (2012).

However, radiation dramatically and rapidly decreases as distances increase from the mast. Thus, at 10 meters away, the dose is 0.1% that of 1-metre distance, and at 20 meters away, the dose is 0.0125% that of 1-metre distance. There are claims that the Nigerian Communications Commission (NCC) certifies a 5-metre distance and other requirements, while the National Environmental Standard Regulatory Agency (NESREA)

insists on a minimum of 10 meters, as stipulated by its 2007 establishing Act. Consequently, NESREA has shut down a number of base stations that contravened its position.

Otitololu, Obe, Adewale, Otubanjo and Osunkalu (2009) reported that exposure of male mice to radiofrequency radiations from mobile phone (GSM) base stations at a workplace complex and residential quarters caused 39.78% and 46.03% respectively in sperm head abnormalities compared to 2.13% in control group. Statistical analysis of sperm head abnormality score showed that there was a significant ($p < 0.05$) difference in occurrence of sperm head abnormalities in test animals. The major abnormalities observed were knobbed hook, pin-head and banana-shaped sperm head. The occurrence of the sperm head abnormalities was also found to be dose-dependent.

Nonetheless, it is opined that there is no conclusive evidence that emissions from telecom masts antennae caused leukemia and other diseases. Other reports show that it is the antenna that actually emits radio waves, not the structure that supports it; to get a dose of radiation considered dangerous from the antenna requires almost touching it, and the antenna does not beam signals directly down, nor 'blow' radiation directly down to people below.

There have been reports that telecom masts erected close to residential compounds are the cause of a myriad of health challenges, there is a growing fear of radiations from the mast (All Africa, 2012). Amidst the controversy, precaution is needed, especially as some people are more susceptible and/or gullible than others. More research is needed to get the facts, expose the truth and harmonize opinions on the effects of emissions from telecom masts antennae. Therefore, this study was aimed at investigating the environmental pollution health effects of the radiation from the antennae of telecom masts located near residential and basic school premises. The health crises suffered by children and adults using residences and/or basic school facilities harboring telecom masts nearby were compared with those using residences and/or basic school facilities far away from telecom masts.

GSM BASE STATIONS AND HEALTH HAZARDS

Man as a social being must interact and this is achieved by exploring every avenue that provides a cheap mean among alternatives. Cell phones serve as tool for social connection and managing social relationships among people (Banjo, Hu and Sundar, 2008). However, there is currently considerable confusion over the health and safety issues relating to non- ionizing radiation emitted by GSM telephony base stations and handsets. There is obviously conflicting information from the various scientific sources and environmental groups with respect to health hazards associated with GSM telephony (Yusuf, 2009).

A growing number of studies have linked electromagnetic field associated with the operation of mobile telephony with health hazards ranging from changes in cognitive performance and sleep disturbances to serious illness and disablement, with even higher cancer rates (Abdel-Rassoul, Abou El-Fateh, Abou Salem, Michael, Farahat, El- Batanouny, and Salem (2006).; Bortkiewicz et al., 2004; Cherry, 2000; Eger, Hagen, Lucas, Vogel and Voit, (2004).; Hutter et al., 2006; Navarro, Segura, Portolés, Gómez-Perretta, 2003; Santini, Santini, Danze, Le Ruz, Seigne, 2002.; Wolf and Wolf, 2004). Hamblin and Wood (2002) claimed that exposures to electromagnetic radiation can affect the natural rhythms of the brain's electrical activity, as measured by Electroencephalogram. Fernie and Reynolds (2005) iterated that studies of the effects of exposure to electromagnetic fields on populations of wild birds can provide further insights into the potential impacts on animal and human health. According to Cherry (2000), cell sites are risk factors for cancer, specifically brain tumors and leukemia; heart attack and heart disease, particularly arrhythmia; neurological effects including sleep disturbance, learning difficulties, depression and suicide; reproductive effects, especially miscarriage and congenital malformation; viral and infectious diseases because of reduced immune system competency associated with reduced melatonin and altered calcium ion homeostasis.

Contrariwise, some research works opposed the assertion that erection of GSM mast within residential neighborhoods has negative effect on people's health. For instance, Chagnaud et al. (1999) and Heikkinen et al. (2001), looked at the short time effects of pulse microwave radiation on rodents and the result produced negative evidence of the effect of mast on these animals. This further alleviated the fears of people who live in close proximity to these masts. In September 1999, the Health Council of the Netherlands received a request from the Minister of Housing, Spatial Planning and the Environment; Minister of Health, Welfare and Sport; the State Secretary of Social Affairs and Employment and the State Secretary of Transport, Public Works and Water Management to advise on whether exposure to electromagnetic fields used for the data transfer between mobile telephones and base stations may result in negative health consequences. The Committee based its report on several reviewed articles and reports which have been published in recent years. Both thermal and non-thermal effects of GSM base stations on health were examined. It could not be established if exposure to electromagnetic field could cause changes to the functioning of the cell membrane. Damage to the DNA, the genetic material, which can form a step in the development of cancer, could not also be established. The effects on brain function were investigated and on the basis of the available data, the Committee concluded that the

occurrence of health problems at exposure levels associated with the use of mobile phones is unlikely. It is considered virtually impossible that the low field strengths in the vicinity of base stations give rise to changes in cognitive functions (Health Council of Netherland, 2000).

Norwegian Institute of Public Health was commissioned by the Ministry of Health and Care Services and the Ministry of Transport and Communication in 2009 to summarize the knowledge regarding exposure to weak high- frequency fields and present a report of the current management practices in Norway and in comparable countries. The purpose is to investigate the management and regulations concerning electromagnetic radiation, including the placement of mobile masts, base stations and wireless networks. The Expert Committee reviewed previous scientific reports from independent expert panels worldwide, as well as recently published studies on the possible effects on health following exposure to weak RF fields and presented specific report on the link between use of mobile phones and base stations and cancer, reproductive health, heart, blood pressure and circulation, the immune system, hormonal effects, effects on the nervous system, changes in gene expression, and electromagnetic hypersensitivity. A large number of scientific studies agree that it is probable that the physical characteristics of electromagnetic fields are not the direct or contributory cause of health problems attributed to electromagnetic fields (electromagnetic hypersensitivity). The Committee believes that there is no need to revise radiation protection legislation for individuals who attribute their health problems to electromagnetic field exposure (Norwegian Institute of Public Health, 2012). It is scientifically improbable that the reduction of exposure to electromagnetic fields is significant for health problems attributed to electromagnetic fields. The Committee therefore believes that there is no basis to recommend measures aiming to reduce exposure to electromagnetic fields for individuals with health problems attributed to electromagnetic fields. The health service and other parties should instead encourage the reduction of avoidance behavior and discourage implementation of measures for which there is no scientific basis. However, it recommended that it is always important to respect individuals and their choices.

GSM BASE STATION AND PROPERTY VALUES

Understanding the effects of cell phone base stations on property values is important to telecommunications companies in planning the siting and handling likely opposition from property owners. Similarly, property values need to understand the evaluation implications of this when valuing properties which are in close proximity to cell phone base stations (Bond et al 2003). Considerable growth in the use of mobile phones has led to increasing demand for land to site telecommunication base stations and associated infrastructures (Biebuma and Esekhaigbe, 2011). The literature on the impact of GSM base station on property values is still very scanty especially in developing countries. Bello (2010) examined the variation in the satisfaction of people living around GSM base stations with samples drawn from Akure, Nigeria. Using Crosstabs' nominal-by-nominal measures, the study found that residents' satisfaction increases with distance away from the base station. When the effect of fear of health problems exhibited by the residents was introduced, the study found that the variation in the satisfaction level with distance was due to those who harbored fear of health problems. However, the result of the study did not show how property values respond to base station situation whether it increases or reduces rent passing on these properties.

Bond et al (2003), studied residents' perceptions toward living near Cell Phone Base Stations (CPBS) and how they evaluate the impacts of these structures. Two case study areas in the city of Auckland, New Zealand were selected in order to understand how residents' perceptions impact on property values. The study revealed mixed responses from residents ranging from being prepared to pay the same to being prepared to pay more than twenty percent less for a property located near a CPBS. Bond and Beamish (2005) assessed the perceived impact of cellular phone towers on residents and property values in Christchurch, New Zealand. The study revealed that people who live close to a CPBS perceive the sites less negatively than those who live further away. However, overall, respondents would pay from 10- 19% less to over 20% less for a property if it were in close proximity to a CPBS.

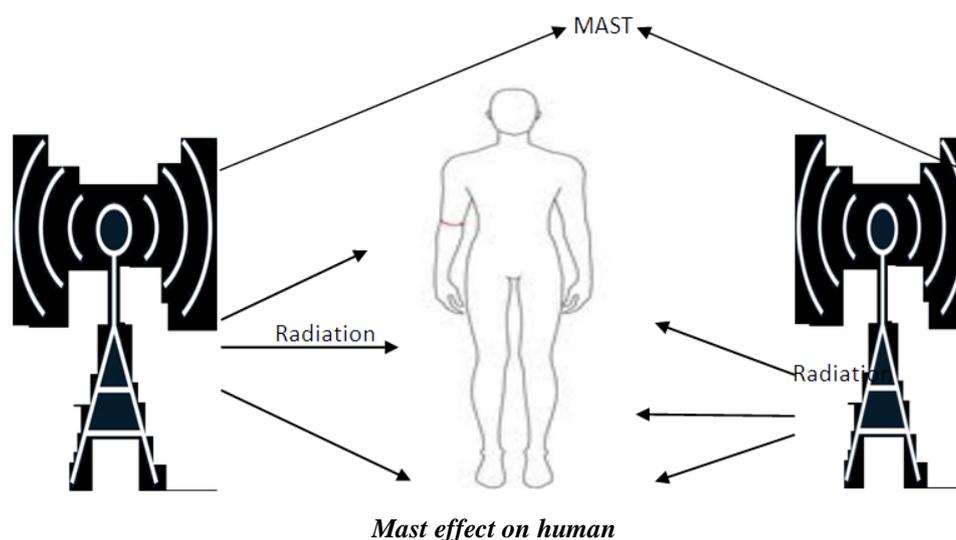
Brandt and Maennig (2012) examined the impact of cell phone base stations on prices of condominiums in Hamburg, Germany. The study distinguished between individual masts and groups of masts and it was found that only immediate proximity to groups of antenna masts is perceived as harmful by residents of nearby condominiums. For individual masts no effect on residential property prices in the surrounding areas was observed. It was recommended that cell phone service providers should prevent installation of groups of masts in a single location.

II. Conclusion

The telecom mast station is believed to cause serious human and environmental challenges, through the emission of electromagnetic field. There is no doubt that this issue is one of the most controversial areas in the telecommunication industries. This is due to the claims and counter-claims from experts that the emission of electromagnetic fields constitute health challenges and dangers.

The Mobile Site (MS) communicates with the Base Station through radiofrequency signal. On the other hand, a base station communicates with another base station through microwave link. The handset has inbuilt antennas which sends signal transmission, or voice and data traffic to the radio frequency (RF) antenna mounted on the tower in a Base Station. The signal sent by the handset is a process by the Base Transceiver Station (BTS) which is usually housed in a prefabricated shelter located in the base station; and the processed signal is sent to another Base Station via a microwave antenna also mounted on the tower.

In the process of this signal transmission, radiation is emitted in the electromagnetic field. Radiation is the energy that comes from a source and travels through space and may penetrate various **materials**.



These radiations are in two forms

- Ionizing radiation
- Non-ionizing radiation

Ionizing radiation is a high frequency radiation generally considered to have harmful potentiality to human health when continuously exposed to for a very long time without adequate protection and or precaution.

While a non-ionizing radiation on the other hand is an extremely low frequency radiation which arguably, is considered to pose no significant harm to human health.

The telecommunication industries made us believe the radiation from its equipment is the non-ionizing radiation and not harmful to human.

This we believe to wrong considering the following:

- Proximity to residential area.
- Continuous accumulation will affect those close to the station
- Making a phone call for a straight one hour without termination has health effects
- Why is it that at 150 meters from the station you do not need a thunder arrestor?

If this is true, we therefore recommend the following:

- Mast stations should be sited outside residential areas
- Government should provide a hub for mast station; where all telecom companies will mount there equipment. This will greatly reduce both service and transmission cost.

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