

**INTERNATIONAL JOURNAL OF CURRENT RESEARCH IN  
CHEMISTRY AND PHARMACEUTICAL SCIENCES**

(p-ISSN: 2348-5213; e-ISSN: 2348-5221)

[www.ijrcrcps.com](http://www.ijrcrcps.com)

DOI:10.22192/ijrcrcps

Coden: IJCROO(USA)

Volume 4, Issue 6 - 2017

Research Article



DOI: <http://dx.doi.org/10.22192/ijrcrcps.2017.04.06.004>

**Public awareness of the health effect of radiation emitted  
from telecommunication masts.**

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**Abstract**

This research work shows the level of awareness of the health effect of radiation emitting from telecommunication mast in Nnewi community. This was a prospective non-experimental study to determine the level of awareness of the health effect of radiation emitting from telecommunication masts among people living in Nnewi community. This study was carried out among adults from 18 years of age and above, living in Nnewi north and south areas of Anambra state. The data was collected by the use of questionnaire. Two hundred and four questionnaires were distributed to assess the level of awareness of health effect of radiation emitting from telecommunication masts among people living in Nnewi North and South. The data collected was analyzed using software, statistical package for social sciences, (SPSS), 16.0, (Chicago Illinois). The age bracket of 18-25 years were the highest respondents (48%, n=98) while the least respondents in terms of age were the age bracket, 41-45 years (1.5%, n=3). It was also noted from the analysis that most of the respondents were female (55.2%, n=112). The male respondents comprised 44.8 % (n=91). Also, from the analysis, it can be inferred that most of the respondents were all single (74.8%, n=151). The married individual comprised 25.2% (n=51) of the whole respondents. When the respondent was posed the question of whether they had any knowledge about the concept of radiation, 54.2% (n=110), indicated 'yes', that they had some knowledge about radiation while 34.5% (n=70), indicated 'not sure', which means that they are not sure whether they had such knowledge. 11.3% (n=23), indicated that they do not have any form of knowledge on radiation. Only few (4.9%, n=10) could not identify a telecommunication mast when they see one. 77.1% (n=155), concurred that these mast emit radiation while 16.4% (n=33) disagreed. 70.2% (n=139) concurred that it can pose health risk while 6.6% (n=13) said it does not have any effect. Majority of the respondents is aware of the health effects of radiation emitting from telecommunication masts.

**Keywords:** Public awareness, Health effect, Radiation, Telecommunication masts.

**Introduction**

Telecommunication masts or towers are tall structures designed to support antennas or aeriels. They are also among the tallest man-made structures. These masts or towers make use of electromagnetic radiation in transmission of this signal. The erection of these masts has created lots of problem between families and friends, tenants and landlords due to the huge amount of money accrued to leasing or selling of land to telecommunication companies for the purpose of installation of the mast at the detriment of their health and needed luxury of space for the proper

ventilation due to them. It has been mentioned that we are now living within a microwave oven (Ugwu., 2014). From epidemiological research, persons living in places where telecommunication masts are erected are vulnerable to disorders like cancer, lung diseases, sleep disturbances and even physical disabilities (Osaretin *et al.*, 2011).

Prof. Kundi from the environmental hygiene institute in the University of Vienna has proven that a higher incidence of circulatory illnesses, hypertension, heart

attacks, and strokes occurs in the proximity of mobile phone base stations (Ugwu, 2014).

With the increase use of mobile phones which will also increase the demand for mobile phone masts or towers, the sitting or location which often generates a lot of local interest and concern to the general society. This will help to create more awareness of the dangers of living close to a telecommunication mast and also to be aware of the type of radiation being emitted from the mast. This work will also help to know the radiation protection that will be taken in other to prevent the hazardous effect of radiation emitting from telecommunication masts.

### Aim

To assess the level of awareness of the health effects of radiation emitting from the telecommunication masts among people living in Nnewi community.

### Specific objectives

To create awareness of the dangers associated with living close to a telecommunication mast.

It will also help to know the radiation protection measures that should be taken in other to prevent the hazardous effect of radiation emitting from a telecommunication mast.

### Research methodology

#### Research design

This was a prospective non-experimental study to determine the level of awareness of the health effect of radiation emitting from telecommunication masts among people living in Nnewi community.

#### Target population

This study was carried out among adults from 18 years of age and above, living in Nnewi north and south areas of Anambra state.

#### Source of data

The data was collected by the use of questionnaire and will be both open and close ended questionnaire.

#### Sample size

The sample size determination using Yaro Yamine's formula.

$$S = \frac{N}{1 + N(e)^2}$$

Where:

S = Sample size

e = Margin of error assumed (0.05)

1 = Theoretical constant.

N = No. of population

No. of population is 420.

$$S = \frac{N}{1 + N(e)^2}$$

$$S = \frac{420}{1 + 420(0.05)^2}$$

$$S = \frac{420}{1 + 420(0.0025)}$$

$$S = \frac{420}{2.05}$$

$$S = 204.87.$$

Therefore, two hundred and four questionnaires were distributed to assess the level of awareness of health effect of radiation emitting from telecommunication masts among people living in Nnewi North and South.

#### Sample technique

A random sample technique was used for this study.

#### Inclusion criteria

Only adults from the 18 years of age and above participated in this study.

#### Exclusion criteria

Those below the age of 18 years did not take part in this research study, because they are under aged.

#### Statistical analysis

The data collected was analyzed using software, statistical package for social sciences, (SPSS), 16.0, (Chicago Illinois). The result of the data analyzed would be represented using frequency tables, charts and percentages.

#### Results

#### Presentation of data

A total of 204 questionnaires were distributed to respondents that are willing to participate in the study. Two hundred and four questionnaires were returned, giving a return rate of 100%.

**Table 1: Age distribution of respondents.**

AGE(YRS)	MEAN	PERCENTAGE (%)
18-25	98	48
26-30	61	29.9
31-35	25	12.3
36-40	7	3.4
41-45	3	1.5
46& above	10	4.9
<b>TOTAL</b>	<b>204</b>	<b>100</b>

Table 1: shows the age distribution of the respondents. It can be seen that the age range chosen was from 18 years and above. It can be seen from table 4.1 that the age bracket of 18-25 years were the

highest respondents (48%, n=98) while the least respondents in terms of age were the age bracket, 41-45 years (1.5%, n=3).

**Table 2: Sex distributions of the respondents.**

SEX	FREQUENCY	PERCENTAGE (%)
MALE	91	44.8
FEMALE	112	55.2
<b>TOTAL</b>	<b>203</b>	<b>100</b>

Table 2: It was also noted from the analysis that most of the respondents were female (55.2%, n=112). The male respondents comprised 44.8 % (n=91).

Also, from the analysis, it can be inferred that most of the respondents were all single (74.8%, n=151). The married individual comprised 25.2% (n=51) of the whole respondents.

**Figure 1: Respondents occupation.**

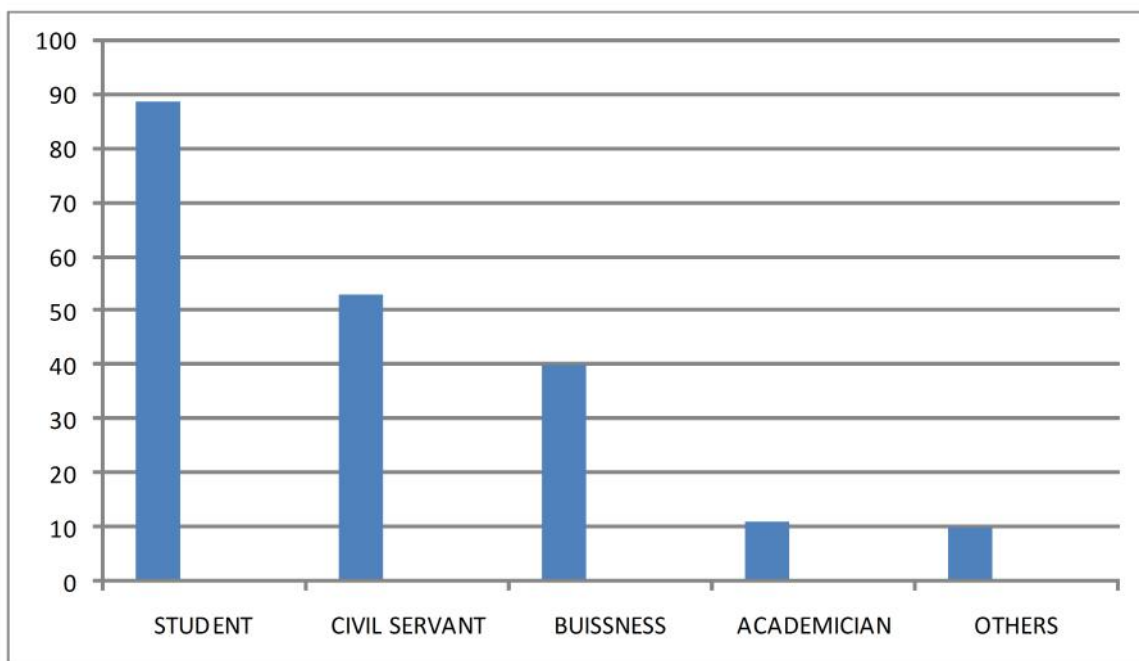


Figure1: shows the occupation distribution of the respondents. It can be inferred that most of the respondents were students (43.8%, n=89), while the people that did other things like business, academicians etc were the least respondent (4.9%, n=10).

Also, most of the respondents that participated in the study were from Nnewi North (71.8%, n=127). Those from Nnewi South comprised 28.2% (n=49).

The level of awareness of the health effect of radiation was assessed using various questions designed to

ascertain the public awareness of radiation effect on health.

When the respondent was posed the question of whether they had any knowledge about the concept of radiation, 54.2% (n=110), indicated 'yes', that they had some knowledge about radiation while 34.5% (n=70), indicated 'not sure', which means that they are not sure whether they had such knowledge. 11.3% (n=23), indicated that they do not have any form of knowledge on radiation.

**Table 3: Knowledge about radiation**

	FREQUENCY	PERCENTAGE (%)
YES	110	54.2
NOT SURE	70	34.5
NO	23	11.3
TOTAL	203	100

The level of awareness of the health effect of radiation was assessed using various questions designed to ascertain the public awareness of radiation effect on health.

Table 3: When the respondent was posed the question of whether they had any knowledge about the concept

of radiation, 54.2% (n=110), indicated 'yes', that they had some knowledge about radiation while 34.5% (n=70), indicated 'not sure', which means that they are not sure whether they had such knowledge. 11.3% (n=23), indicated that they do not have any form of knowledge on radiation.

**Table 4: Identifies a telecommunication mast**

	FREQUENCY	PERCENTAGE (%)
YES	166	81.4
NOT SURE	28	13.7
NO	10	4.9
TOTAL	204	100

Table 4: Shows the result on whether they could identify a telecommunication mast when they see one, most of the respondents indicated yes (81.4%,

n=166). Only few (4.9%, n=10) could not identify a telecommunication mast when they see one.

**Table 5: Telecommunication mast emits radiation**

	FREQUENCY	PERCENTAGE (%)
YES	155	77.1
NOT REALLY	13	6.5
NO	33	16.4
TOTAL	201	100

Table 5: Shows the respondents knowledge on whether telecommunication mast emit radiation,

77.1% (n=155), concurred that these mast emit radiation while 16.4% (n=33) disagreed (table 5).

**Table 6: Does radiation emitted from a telecommunication mast have health hazard?**

	FREQUENCY	PERCENTAGE (%)
YES	159	79.9
NOT SURE	28	14.1
NO	12	6.0
TOTAL	199	100

Table 6: Shows For those that agreed that telecommunication mast emit radiation; the next question was extended and directed to them. They were then asked whether these radiation emitted by

these telecommunication mast cause any harm to human health, it was observed that 79.9% (n=159) indicated yes while 6% (n =12) said no while the rest were not sure whether it causes harm.

**Table 7: Does living/working close to telecommunication mast pose any health risks?**

	FREQUENCY	PERCENTAGE (%)
YES	139	70.2
NOT SURE	46	23.2
NO	13	6.6
TOTAL	198	100

Table 7: Shows when the respondents were asked whether living close or working close to telecommunication mast have any effect on health, 70.2% (n=139) concurred that it can pose health risk while 6.6% (n=13) said it does not have any effect.

The other respondents were not sure whether it poses any risk to health. There is a significant difference between the population of people who are aware that living close to telecommunication mast is harmful to health and those who are unaware that living close to a telecommunication mast is harmful to health (P 0.005).

**Table 8: Can one get cancer while living close to a mast?**

	FREQUENCY	PERCENTAGE (%)
YES	99	49.7
NOT SURE	72	36.2
NO	28	14.1
TOTAL	199	100

Table 8: Shows when the question of whether one can get cancer while living close to a telecommunication mast/tower, it was observed that 49.7% (n=99) agreed

to the question, 14.1% (n=28) said no, while the rest (36.2%, n=72) were not sure whether it causes cancer or not.

**Fig 2: Type of radiation emitted from telecommunication masts**

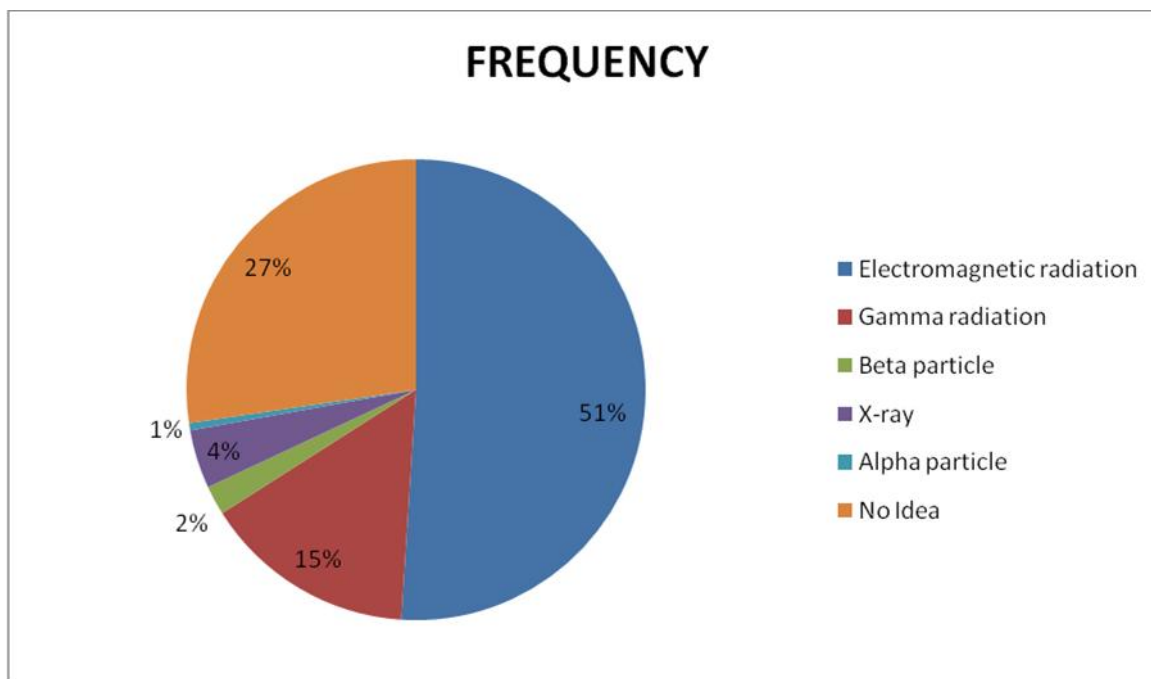


Figure 2: shows the responses of the respondents to the question, “what is the type of radiation emitted from telecommunication mast?” It can be seen that 51% (n=99) believe that the radiation emitted is an electromagnetic radiation. Those that had no idea of

the kind of radiation emitted from the telecommunication mast comprised 27.3% (n=53) of the respondents. Others indicated gamma radiation, beta particle, x-rays and alpha particle.

**Table 9: precautionary measures to prevent the health effect of radiation from telecommunication mast.**

TEST CRITERIA	MEAN	SD (±)
Radiation norms should be strictly followed, yet practical enough to be cost effective without causing too much inconvenience to the user.	1.78	0.76
The maximum cumulative power allowed should be reduced with immediate effect to 0.1w/m <sup>2</sup> , which should be reduced subsequently to 0.01m/w <sup>2</sup> within a year so that network planning can be carried out.	1.85	0.72
All operators must be strictly instructed that power inside residential or office buildings, schools and hospitals must be Within the guideline.	1.74	0.73
That regular and proper awareness should be carried out on the health effects of radiation emitting from telecommunication mast.	1.62	0.69
Government should take strict measures by not allowing any communication company to build or erect masts/tower on residential areas, offices or frequently visited places.	1.65	0.71
That people should avoid living close to or building residential houses, churches, offices and schools near a telecommunication mast.	1.72	0.74
There should be more number of towers with lesser transmitted power.	2.02	0.85

Table 9: On the final section of the questionnaire, a descriptive analysis was conducted to show the proper measures or precautions answers that should be taken to prevent the health effect of radiation coming out from a telecommunication mast. Different questions were asked of which the respondents gave varying. Table 9, shows the responses of the participants of the survey.

The average taken from the response of the respondents show that the respondents strongly agreed that radiation norms should be strictly followed, yet practical enough to be cost effective without causing too much inconveniences to the user. Also the mean value gotten from the responses of the respondents also shows that they strongly agree that the maximum cumulative power allowed should be reduced with immediate effect to  $0.1\text{w/m}^2$ , which should be reduced subsequently to  $0.01\text{m/w}^2$  within a year so that network planning can be carried out. They also strongly agreed that all operators must be strictly instructed that power inside residential or office buildings, schools and hospitals must be within the guideline.

The respondents also strongly agreed that regular and proper awareness should be carried out on the health effects of radiation emitting from telecommunication mast. They also strongly agreed that government should take strict measures by not allowing any communication company to build or erect masts/tower on residential areas, offices or frequently visited places. The respondents also strongly agreed that people should avoid living close to or building residential houses, churches, offices and schools near a telecommunication mast.

Finally, the respondents agreed that there should be more number of towers with lesser transmitted power. The views of the respondents solely imply that all these factors that will reduce the radiation risks to the health of an individual should be implemented.

## Discussion

Telecommunication masts are among the tallest man-made structures. It emits a form of radiofrequency energy (or radio wave) a form of electromagnetic radiation, which is known to produce heat. Every day they are being erected around schools, residential houses and offices and this affects the health and well being of every one living close to them.

The presence of electromagnetic field in the environment has always been associated with controversy on the adverse health effects. The effects of electromagnetic field on humans generally depend on their strength and frequency (Poljak *et al.*, 2014).

This study was aimed at assessing the level of awareness of health effects of radiation emitting from telecommunication masts among people living in Nnewi community.

From the content analysis of this study, it has shown that majority of respondents which are 139 (70.2% ) were aware of the harmful effect of living or working close to a telecommunication mast while 13 (6.6%) were unaware of the harmful effects to human health, this shows that there is a significant difference between the mean population of those who are aware of living close to a telecommunication mast is harmful to health and those who are unaware that of living close to a telecommunication mast is harmful to health ( $P < 0.005$ ). This is in contrast with the study by Ugwu (2014) who reported that there is no significant difference between the mean population of those are aware that living close to a telecommunication mast is harmful to health and mean population of those who are unaware that living close to a telecommunication mast is harmful to health ( $P > 0.05$ ).

From this research study, it has shown that 159 (79.9%) of the respondents were aware of the harmful effect of radiation emitting from a telecommunication mast to human health and 12 (6%) are unaware of the harmful effect to human health. This is in line with the findings of the epidemiologic research, that persons living in places where telecommunication masts are erected are vulnerable to cancer and even physical disabilities.

This study has shown that majority of the respondents 166 (81.4%) can identify a telecommunication mast when they see it and 10 (4.9%) cannot, in this work also 99 (49.7%) said yes that the radiation emitted from the telecommunication mast can cause cancer while 28 (14.1%) said no and 72 (36.1%) said that they are not sure, People should be informed about the harmful effects and avoid living close to a telecommunication mast (Kumar *et al.*, 2010).

This research study also shows that the respondents solely imply that all these factors that will reduce the radiation risks to the health of an individual should be implemented. The government should take corrective measures in implementing these guidelines (Kumar *et al.*, 2010).

## Conclusion

This research work shows the level of awareness of the health effect of radiation emitting from telecommunication mast in Nnewi community Majority of the respondents is aware of the health effects of radiation emitting from telecommunication masts. This will help policy makers, legislators and government officials who have to deal with demands for public health safety and need to make difficult decision



based on reliable information on health aspect of radiofrequency field.

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### How to cite this article:

Ugwuanyi, Daniel, Chiegwu,H.U., Eleje,G.U. and Ibekwe, N.C. (2017). Public awareness of the health effect of radiation emitted from telecommunication masts. Int. J. Curr. Res. Chem. Pharm. Sci. 4(6): 20-27.

DOI: <http://dx.doi.org/10.22192/ijcrops.2017.04.06.004>