

## Awareness Protocol for Pregnant Women Regarding Safety Measures for Using Electromagnetic Home Devices

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**Abstract:** This study is Quasi experimental design to study effect of using awareness protocol regarding safety measures for using electromagnetic home devices, was conducted at outpatient clinics of Ain Shams University Maternity hospital. A total of 210 pregnant women were included using Simple random sample technique through registered follow up book of antenatal care. Three tools used were Arabic Questionnaire Sheet, Observation Checklist Woman's, Compliance Sheet Regard Electromagnetic home devices used, the main result of the study revealed Marked improvement was detected in knowledge, and practice, after implementing awareness protocol. There was statistically significant improvement in knowledge level post counseling and in follow up after 3 months compared to pre counseling. Conclusion: Awareness protocol regarding safety measures for using electromagnetic home devices is effective, and improves pregnant women knowledge, practice and attitude. Recommendation: Designing a training program for pregnant women about electromagnetic effect to improve pregnant women knowledge, practice, and attitude; replication of the study with inclusion of a control group to examine the effectiveness of educational counseling on knowledge, compliance, in other geographical areas in Egypt.

[Nadia M, Fahmy, Sahar M, Soliman, Ghada H, Hamed. **Awareness protocol about safety measures for using electromagnetic home devices.** *Nat Sci* 2013;11(7):55-62]. (ISSN: 1545-0740). <http://www.sciencepub.net/nature>. 10

**Keywords:** Pregnancy, Safety Measures, Electromagnetic Home Devices

### 1. Introduction:

An electromagnetic field is a physical field composed of two elements, magnetic fields and electric fields. The term generally is used to refer to both magnetic and electric fields because they normally occur together whenever electricity is in use. Magnetic and electric fields occur as invisible lines of force that carry energy. The energy radiates out from any wire or electric device energized with electricity. (Shaw, 2010).

Everyday household electrical devices such as television sets and video, computer and electronic games, wireless telephone and mobile phone networks, lasers, microwaves, and doubled towers, radio and television broadcasting and receiving stations broadcast satellite stations and wireless communications, hairdryers, electrical ovens, fluorescent lights, microwave ovens, stereos emit electrical and magnetic fields of varying intensities. (Skelly, 2009).

Electromagnetic fields suppress the activity of the Pineal Gland" which is a magneto sensitive organ, to electromagnetic fields. Also reduce melatonin production and affect serotonin production. It have a negative impact on health which cause many diseases as severe headache, tumor, brain cancer, sleep interference, allergic reactions, heart disease, infertility and Alzheimer's disease as well as a sense of constant headaches and dizziness and a sense of

stress and fatigue and muscle pain even when its minimal effort. (Ahlbom *et al*, 2009)

Proper use of electromagnetic through daily use of Cellular phone, computer,...etc is very important as protective method from the disease specially for pregnant woman as high risk group so the maternity nurse has a vital role in teaching how use electromagnetic devices daily properly and counseling them because these devices may cause fetal deaths, deformities and miscarriages for better health by creating a positive attitude toward healthy life style. (Lindbohm, 2009)

### Justification of the study:

Nowadays there are presences of growing utilization of electromagnetic devices and new technology for man to live easy life so, the exposure to electromagnetic field (EMF) is very common especially through daily use of home devices and concern about its harmful effects has been raised than the past. Pregnant women and fetus as one of high risk group more susceptible. Electromagnetic radiation on embryonic, will prevent the early cell division, even resulting in cell death, and also prevents the normal development of the placenta. Science shows that combined during fetal development, of the first 3 months of pregnancy risk is much greater than the risk of pregnancy, advanced. Specifically, 1-3 months for the embryonic period, strong electromagnetic radiation can cause abortion, can also cause fetal

defects or malformations of extremities; 4-5 months for the fetal period, electromagnetic radiation may damage the central nervous system, leading to mental retardation in infants; 6-10 months of fetal development, its main consequence is immunosuppression, after the birth of weak Constitution, resistance difference, So the researcher suggested the present study to view real situation in Egypt as one of developing country misuse these electromagnetic devices especially during pregnancy hazards on women and their babies.

**Aim of the study:**

To study effect of pregnant women using awareness protocol regarding safety measures for electromagnetic home devices through:

1. Assessing pregnant women's level of knowledge toward electromagnetic effect of home devices?
2. Design awareness protocol about safety measures for using electromagnetic home devices
3. Evaluating the effectiveness of using awareness protocol regarding electromagnetic home devices on women health.

**Study question:**

Is using awareness protocol for pregnant women regarding safety measures for electromagnetic home devices are effective?

**2. Subjects and methods:**

**Research design:** Quasi experimental design

**Setting:** The study will be conducted at antenatal outpatient clinic At Ain Shams University Maternity Hospital

**Sample:**

**Size:**

Sensitive analysis will be used to determine sample size from total admission pregnant women attend at antenatal outpatient clinic At Ain Shams University Maternity Hospital (210 case out of 4201 pregnant women attend in year 2010)

**Type:**

Simple random sample technique was used through registered follow up book of antenatal care

**Criteria:**

- 1- Had at least two categories electromagnetic devices
- 2- Can read & write.
- 3-Different age group and socio-economic levels
- 4- Free from any problems or medical complications.
- 5-Had telephone number for contact

**Tools of Data Collection:**

Three types of tools were used for data collection and conduction of the study. These consisted of electromagnetic devices use observation

check list, Woman's Compliance Sheet Regard Electromagnetic devices used. Also supportive material in the form of an educational Arabic protocol about Safety Guideline Regard Electromagnetic home devices.

**1. Woman's level of Knowledge Regard Electromagnetic radiation Structured interviewing Arabic Questionnaire Sheet:**

It was designed by the researchers after reviewing of related literature. The tool which included 29 multiple choices questions, as well as open and close-ended questions. It was divided into three parts: Part I (questions 1-4): It covered the general characteristics of the sample as personal identification, demographic data, e.g., age of woman, place of residence, and occupation, .....etc.

Part II (questions 5-10): This part is concerned with reproductive history and questions about present pregnancy.

Part III (questions 11-29): This part was designated to assess pregnant woman's level of knowledge regarding electromagnetic radiation, electromagnetic devices use.

**Knowledge scoring system:** Scores 3, 2, or 1 were assigned to each answer representing good, average and poor respectively. Total knowledge scores ranged from zero to 30; from 0-9 were evaluated as poor, from 10-20 as average, and from 21-30 as

**2--Observation Checklist:**

Observation checklist will be designed by the researcher to assess pregnant women's accuracy of practicing the safety guideline regarding electromagnetic home devices as reported by them.

**Scoring system:** Scores 3, 2, or 1 were assigned to each answer representing done completely, done incompletely and not done respectively. Total practice scores ranged from zero to 30; from 0-9 were evaluated as not done, from 10-20 as done incompletely, and from 21-30 as done completely.

**3-Supportive Material in form of Arabic booklet:**

Arabic booklet will be constructed by the researcher regarding safety measures and given to all pregnant women after instruction session. It included all aspects related to safety guideline regard devices, it supported with pictures.

**Validity and reliability:**

These tools were reviewed by jury of 3 expertise's in the field of maternity and neonatal nursing to test its contents and face validity. Reliability was done by Cronbach's Alpha coefficient test  $r = 0.81$

**Administrative design and ethical considerations:**

An official approval was obtained from the Maternal & Neonatal Health Nursing department counsels & the Scientific Research Ethical Committee that were approved by the Faculty of Nursing, Ain Shams University Counsel. Also a letter containing the title and aim will be directed to the director of Ain Shams Maternity University Hospital to obtain his approval for data collection

The aim of the study was explained to each woman before applying the tools to gain her confidence and trust. An oral consent was obtained from each woman to participate in the study, after ensuring that data collected will be treated confidentially. The study maneuvers do not entail any harmful effects on participating women or their new born. Women were informed that they have the right to withdraw from the study at any time without giving a reason.

**Operational design:**

The study, to be completed, has passed through different phases: The preparatory phase, then the pilot study, and lastly the fieldwork phase.

**Preparatory phase:**

Review of the current local and international related literature using books, articles and scientific magazines was done by the research team. This helped them to be acquainted with the problem, and guided them in the process of tools' designing. The tools were then presented to experts for review and validation.

**Pilot study:**

A pilot study was carried out on 10% of pregnant women those were excluded in the main study sample. Its aim was to evaluate the simplicity, clarity, validity and reliability of the tools. It also helped in the estimation of the time needed to fill in the forms. According to the results of the pilot study, simple modifications were done.

**Fieldwork:**

Official permission was obtained to perform the study. Data were collected 3 day/ week starting from 10 am to 1 pm. All attended women fulfilling study criteria were included. All participants were informed about purpose of the study, the booklet and the compliance sheet will be give to woman by the end of the session. Women will keep on touch through telephone contacts and out patients follow up visits (at least two follow up session). Woman compliance and accuracy of practicing it were evaluated after one and three months following counseling session.

Anatomical models were used for woman's practical training on performing during the session as well as for assessing woman's accuracy of practicing during the follow up visits supported by checklist and finally likert scale was used to assess pregnant women's attitude change.

**3. Result**

**Table (1):** show the number and percent distribution of study sample pregnant woman regard their demographic characteristics concerning women's age 47.6% ranged between 25-33 years. As regards their place of residence 66.7% of them were from urban area. While 52.4% of them had higher school education, also 52.4% house wife and their average income is 675±100

**Table (2):** show number and percent distribution of study sample pregnant woman regard their living conditions. Concerning numbers of family members 66.7 % of pregnant women living with her husband. Concerning house area 52.4% of the their house area ranged from 80-100 m, and had 3 rooms. As regards house ventilation the majority of them (76.2%) had ventilated house. Also 57% of them don't know if there tower network or not.

**Table (3):** show number and percent distribution of study sample pregnant woman regard their different types of devices present at pregnant women's home. The majority of them 90.4% had one TV and receiver, 76% had radio, 19% had video, 85.7% had computer, 90.4% had no play station nor hair dryer, 81% had one mobile 95.3 had no microwave and all of them had more than 2 lamps in their house

**Table (4):** shows that there were highly significance difference observed between pre and 1 month following counseling, in knowledge between pre and 3 months following counseling, and in knowledge between 1 and 3 months following counseling

**Table (5):** shows that there were highly significance difference observed between pre and 1 month following counseling, in practice between pre and 2 months following counseling, and in practice between 1 and 2 months following counseling

**Table (6):** shows that there were highly significance difference observed between pre and 1 month following counseling, in attitude between pre and 2 months following counseling, and in attitude between 1 and 2 months following counseling.

**Table (1):** Number and percent distribution of study sample pregnant woman regard their demographic characteristics:

Items	n = 210	
	No.	%
<b>Age</b>		
• 18<25	80	38.1
• 25-33	100	47.6
• >33	30	14.3
<b>Mean±SD</b>	27.19±4.03	
<b>Place of Residence</b>		
• Rural	70	33.3
• urban	140	66.7
<b>Education level</b>		
• read and write	30	14.3
• Secondary education	70	33.3
• Higher education	110	52.4
<b>Occupation</b>		
• Work	100	47.6
• House wives	110	52.4
<b>Income average</b>		
• -500-800	50	76.2
• >800	160	23.8
<b>Mean±SD</b>	675±100	

**Table (2):** Number and percent distribution of study sample pregnant woman regard their living conditions:

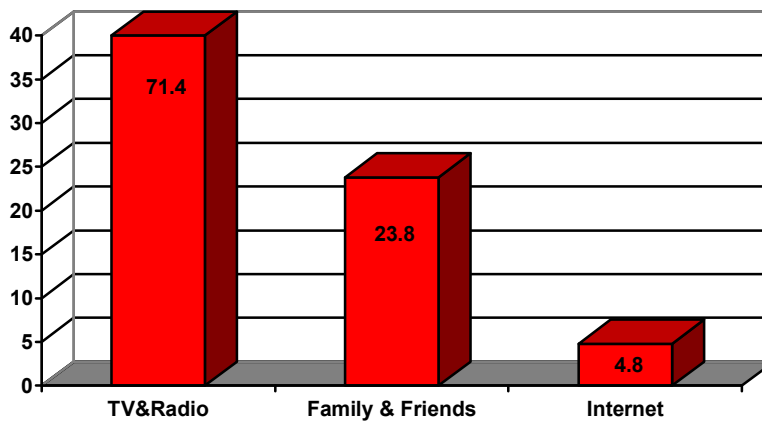
Items	n = 210	
	No.	%
<b>Number of family members</b>		
• <3	140	66.7
• 3-6	30	14.3
• >6	40	19
<b>House area</b>		
• 70- < 80	20	9.5
• 80-100	110	52.4
• >100	80	38.1
<b>Rome numbers</b>		
• 2	20	9.5
• 3	110	52.4
• >4	80	38.1
<b>house ventilation</b>		
• Yes	160	76.2
• No	50	23.8
<b>Place of tower network</b>		
• near	40	19
• far	50	24
• don't know	120	57

**Table (3):** Number and percent distribution of study sample pregnant woman regard their different types of devices present at pregnant women's home:

Device type	Number of devices		
	0	1	2
	%	%	%
• TV	0	90.4	9.5
• Radio	24	76	0
• Video	81	19	0
• Receiver and dish	0	90.4	9.5
• Computer	14.3	85.7	0
• Play station	90.4	9.5	0
• Wirless phone	100	0	0
• Mobile	0	81	19
• Hair dryer	90.4	9.5	0
• Microwave	95.3	4.7	0
• Oven	4.7	95.3	0
• Fluorescent lamp	0	0	100

**Table (4):** Pregnant women's total knowledge regards electromagnetic

Items	Pre	Post 1month	Post 3monthes
	%	%	
Good	2	81.4	78.6
Average	18	7.6	14.3
Poor	80	11	7.1
Difference in knowledge between pre and 1 month following counseling	X = 365.749 P = 0.000		
Difference in knowledge between pre and 2 months following counseling	X = 294.918 P = 0.000		
Difference in knowledge between 1 and 2 months following counseling	X = 16.244 P = 0.000		



**Figure (1):** Study sample's sources of Knowledge regard Electromagnetic

**Table (5):** Pregnant women's total practice regards electromagnetic devices:

Items	Pre	Post 1 month	Post 3 month
	%	%	%
Complete correct	0	85.7	57.1
Incomplete	47.6	9.5	23.8
Incorrect	52.4	4.8	19.1
Difference in knowledge between pre and 1 month following counseling	X = 356.935 P = 0.000		
Difference in knowledge between pre and 2 months following counseling	X = 201.587 P = 0.000		
Difference in knowledge between 1 and 2 months following counseling	X = 61.875 P = 0.000		

**Table (6):** Pregnant woman total attitude regards electromagnetic devices

Items	Pre	Post 1 month	Post 3 month
Positive	5	69	47.1
Uncertain	35	18.5	20
Negative	60	12.5	32.9
Difference in attitude between pre and 1 month following counseling	X = 352.605 P = 0.000		
Difference in attitude between pre and 2 months following counseling	X = 289.191 P = 0.000		
Difference in attitude between 1 and 2 months following counseling	X = 27.159 P = 0.001		

#### 4. Discussion:

Radiation comes from many sources and is constantly present in modern environments. Most of its effect on body is damaging. Damage from various types of radiation can affect sex cells, developing embryos and growing children, and it also plays a role in many diseases because of the damage caused to cellular DNA. This renders the body unable to repair its 'injuries', causing mutations that can then be passed along to the next generation of cells.

This is Quasi experimental study to study effect of using awareness protocol regarding safety measures for using electromagnetic home devices. The sample of the study was homogenous, the sociodemographic characteristics of the studied women revealed that majority of them were between 25 to 33 years old, half of them living in urban area, more than half had higher education and they were not working., most of them had regular antenatal care, and all of them had pregnancy associated problems

The current study pointed out that, about 47.6% ranged between 25-33 years, with mean age 27.19±4.03. This finding in same line with EDHS (2008) which found that women age of marriage was between 25-30 years.

Concerning living condition of the studied women, the current study showed that, more than third of pregnant women had 2-3 family member lived in the house, about half of the studied sample had 3 rooms in house, while the majority of studied pregnant women had ventilated house.

In the present study, a large proportion of sample was having poor knowledge regarding to electromagnetic. This means that there were poor knowledge and/or misunderstanding of electromagnetic. This could be due to insufficient information provided to the public about this topic.

These findings are supported by **Abdelfatah, 2011** in Egypt, who found that a considerable proportion of women lack of knowledge about electromagnetic. This concerning the lack of knowledge related to electromagnetic in Egypt shows that, health teaching was almost universally deficient in developing countries

Governmental Egyptian study on 74 women from computer users were compared with sixty people are involved in office does not include the use of the computer. The results of the study confirmed that high proportion of the complaint fatigue for users of the computer with the complaint of increase in the degree of myopia and the inability to identify colors in some

cases. It is also found that there are cases suffer from a lack of proportion in a flash of the eye. The study showed that 13.5 percent of computer users have symptoms of dry eye grows, as noted also increase the pain in the neck, shoulders, back, hand and wrist. The study also pointed out that 33.8 percent of computer users suffer drier skin and itching and burning sensation. For pregnant women exposed to computer screens and found three cases suffered from abortion and also found a rise in the incidence of respiratory disease.

It is important to know what proportion of the population is concerned about contracting a disease since those who are concerned would be expected to take more precautions. In a telephone-assisted survey of 2,081 adults above the age of 16 years, the New South Wales Department of Health found that only 48.3% of those interviewed were willing to comply with precautionary measures (*Myers & Goodwin, 2011*).

The previous finding was in the same line with current study finding that revealed 34.3% of pregnant women incompletely practice preventive measures. Only, 3.6% of pregnant women completely practice preventive measures regarding electromagnetic. This could be explained by overloaded of women with multi role reversely comply to preventive measures.

The present study results demonstrated marked improvement in practice to after the educational session.. 52.4% of them had incorrect practice pre counseling and 85.7 had complete correct practice post counseling with one month and 57.1% had complete correct practice after counseling with 3 month. These mean that, total compliance to all improved. This could be due to that the educational book is based on women's needs.

As regards practice regarding to electromagnetic, the present study indicated that, women practice has improved significantly from approximately 0% percent pre counseling to almost eighty-six percent post program and poor compliance dropped from around thirteen percent to one percent.

The current study findings come in accordance with *Roca et al. (2003)* study, as the majority of the study sample had unsatisfactory practice score before implementing the program. This could be due to lack of continuous teaching to patients and/or improper communication between patients and health care providers. This approach is also supported by *Cuspidi et al. (2001)*, who reported that patient education plays a fundamental role in successful management, the failure to establish an effective communication with patients is associated with unsatisfactory practice

Some scattered studies denied the effectiveness of being knowledgeable on practice to life style modifications. In this respect, *Tetttersell (2003)* found

that patient's knowledge about disease and prescribed treatment regimen appears to have little effect on their compliance to lifestyle modifications. This may be due to effectiveness of counseling and fear of women on her health and her fetus.

The study presented that majority of sample had incorrect practice pre counseling and 85.7 had complete correct practice post counseling with one month and 77.1% had complete correct practice after counseling with 3 months. Moreover, the result of the current study showed that there was statistical significance between number of people living in the house and mean pregnant women practices score regarding electromagnetic devices measures. This could be explained by women responsibilities to meet family needs.

Electromagnetic fields are almost unavoidable. They easily penetrate walls and our bodies. Hence the importance of avoiding and changing all the things have control over, because for each aspect of life can negatively affect fertility, unaware about and/or can do nothing to change. So for the sake of health and fertility, in home the body is relax and In this vulnerable state, research indicates that 100-150 times more open to damage from EMFs than are awake in outdoor so we can say the prevention is better than cure.

#### Conclusion:

Using awareness protocol for pregnant women regarding safety measures for electromagnetic home devices are effective.

#### Recommendations:

- Designing a training program for women about electromagnetic effect to improve pregnant women knowledge, practice and attitudes
- Integrate electromagnetic concept and its effect on women health in maternity nursing curriculum
- Replication of the study with inclusion of a control group to examine the effectiveness of educational counseling on knowledge, compliance, in other geographical areas in Egypt.

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5/5/2013