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EFFECTIVENESS OF INFORMATION, EDUCATION AND COMMUNICATION REGARDING IMPACT OF MOBILE PHONE USAGE DURING PREGNANCY ON KNOWLEDGE AMONG ANTENATAL MOTHERS IN SELECTED PRIMARY HEALTH CENTRE AT KANCHIPURAM

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INTRODUCTION

Mobile phones have changed everyone's life, being a portable electronic device primarily used for communication. Public concern about mobile phone-related health risks is increasing due to widespread use. Even minor risks may have major public health consequences[8]. Mobile devices emit electromagnetic field (EMF) radiation in the 100 kHz–300 GHz range. EMF absorption increases with longer usage, multiple devices, prolonged calls, and proximity to the body. Notably, devices still emit radiation in flight mode. If RF radiation levels are high enough, they can raise body temperature, though low-level emissions raise concerns about health effects like headaches and tumors[9].

Research shows widespread mobile phone usage among pregnant women worldwide. In countries like South Africa and Japan, over 90% of pregnant women own mobile phones. In India, mobile phone ownership is linked to improved antenatal care. However, in Tamil Nadu, although access to mobile phones is high, fewer women use them for receiving health information. In districts like Kanchipuram, data is limited, but usage is influenced by education and occupation. Mobile phones have potential for improving maternal health services, but their benefits remain underutilized[10].

According to Takei et al. (2019), EMF radiation absorbed by pregnant women can increase fetal temperature. Ongoing studies aim to clarify the effects of EMF radiation on pregnancy, birth outcomes, and infant development. While adult studies exist, few focus on pregnant women. Some evidence suggests mobile phone radiation can alter sleep patterns, increase brain cell activity, cause fatigue in mothers, and influence fetal behavior[11].

Studies show that mobile phone usage among pregnant women is widespread globally and in India. International research from countries like South Africa and Japan indicates that over 90% of pregnant women own mobile phones, though the level of health-related usage varies[12]. In India, mobile ownership among women is also high and is positively linked to better antenatal care, such as more frequent check-ups and institutional deliveries[13]. In Tamil Nadu, while most pregnant women have access to mobile phones, fewer use them for health information or receive government health messages[14]. In Kanchipuram district, specific data on mobile phone use during pregnancy is not available, but general findings suggest that education and occupation influence how antenatal services are used. Overall, mobile phones are commonly used during pregnancy, but their potential for improving maternal health services is not fully utilized, especially at the local level[15]. This study aims to find effectiveness of Information, Education and Communication regarding impact of mobile phone usage during pregnancy on knowledge among antenatal mothers in selected primary health centre in Kanchipuram.

METHODOLOGY

- INDEPENDENT VARIABLE:

InformationEducation and Communication which was provided by using video on the impact of mobile phone usage during pregnancy was the independent variable in this study.

- DEPENDENT VARIABLE:

In this study, the level of Knowledge among the antenatal mothersregarding impact of mobile phone usage during pregnancy was the dependent variable.

RESEARCH SETTING

The study was conducted in Sevillimeduprimary health centre, Kanchipuram which provides various services such as outpatient consultations, maternal and child health services,health education and awareness campaigns.

POPULATION

Population is the set of antenatal mothers to which the result of a research are to be generalized.

- TARGET POPULATION:

Target population of the study was antenatal mothers.

- ACCESIBLE POPULATION:

Accessible population of the study was antenatal mothers in Sevilimedu primary health centre atKanchipuram.

SAMPLE SIZE

Sample size of the study was 30 antenatal mothers who fulfilled the inclusion criteria.

SAMPLE TECHNIQUE

Sampling is the process of selecting representative segment of the population under study. Convenience (Non-probability) sampling technique was used.

CRITERIA FOR SAMPLE SELECTION

INCLUSION CRITERIA:

The study includes

1) The women who are in the antenatal period.
2) The women who are having mobile phones.
3) The women who are able to speak and understand english and tamil.
4) The women who are willing to participate in the study.

EXCLUSION CRITERIA:

The study excludes

1) The women who are not having smart mobile phones.
2) The women who have mental health problems.
3) The women who are not willing to participate in the study.

DEVELOPMENT OF TOOL

The development of data tool comprised mainly two parts

PART 1 – DEMOGRAPHIC DATA

It consisted of the demographic variables (7) such as age, educational level, gestational age, occupation, type of family, residenceand religion.

PART 2 –STRUCTRED QUESTIONNARIES

It consisted of structured questionnaires (20), which were used to assess the level of knowledge of the antenatal mother on theimpact of mobile phone usage during pregnancy.

SCORING INTERPRETATION

The scoring interpretation for the study was each correct answer was awarded 1 mark, while no marks were given for wrong answers. Based on the total score out of 20, level of knowledge was classified as follows:

LEVEL OF KNOWLEDGE	SCORE
Inadequate knowledge	0-10
Moderate knowledge	11-15
Adequate knowledge	16-20

RELIABILITY

The reliability is the extent to which an instrument consistently measures a concept. The reliability value is +0.82 for the knowledge questionnaire.

VALIDITY

The tool was given to three experts in the field of Nursing for content validity. All the comments and suggestions given by the experts were duly considered and corrections are made

DATA COLLECTION

As per the inclusion criteria, samples were selected by using convenient sampling technique for the data collection. As Tuesday of every week was allotted for antenatal services in Sevilimedu primary health centre, the data was collected from 1-4-2025 to 15-4-2025. Consent was obtained from the samples to take part in this study.

The method of data collection used in this study was questioning. Initially, pre-test was conducted for the selected antenatal mothers to assess their level of knowledge regarding impact of mobile phone usage during pregnancy using the structured questionnaires (20 questions) and 15 minutes was provided to complete the questionnaires. Then a video regarding impact of mobile phone usage during pregnancy was showed and explained to the selected antenatal mothers. Post-test was conducted to assess their knowledge level after the intervention and also to know the effectiveness of Information, Education and Communication. After the completion of the data collection, statistical data analysis was started.

PLAN FOR STATISTICAL ANALYSIS

The data collected were analysed using descriptive and inferential statistics

The plan for data analysis as follows:

- Data were collected and organized in master sheet.
- The frequency and percentage for analysis of demographic variable like age, gestational age, education, etc.
- Mean score of the study group.

RESULTS

This section deals with frequency and percentage distribution of demographic variables such as age, education, gestational age, occupation, type of family, residence and religion.

Table 1: Frequency and percentage distribution of antenatal mothers based on demographic variables (n=30)

S.NO	DEMOGRAPHIC VARIABLES	FREQUENCY (f)	PERCENTAGE (%)
1	**Age**		
	a) 18-22 years	9	30
	b) 23-27 years	15	50
	c) 28-32 years	5	16.7
	d) More than 32 years	1	3.3
2	**Education**		
	a) 10^{th} standard	0	0
	b) 12^{th} standard	16	53.3
	c) Degree	14	46.7
	d) Nil	0	0
3	**Gestational age**		
	a) 1-3 months	3	10
	b) 4-6 months	20	66.7
	c) 7-10 months	7	23.3
4	**Occupation**		
	a) Workaholic	13	43.3
	b) No job	17	56.7
5	**Type of family**		
	a) Nuclear family	15	50
	b) Joint family	15	50
6	**Residence**		
	a) Urban	17	56.7
	b) Rural	12	40
	c) Semi-urban	1	3.3
7	**Religion**		
	a) Christianity	3	10
	b) Hinduism	26	86.7
	c) Islam	1	3.3
	d) Others	0	0

Table 1 described the frequency and percentage distribution of antenatal mothers based on the demographic variables. According to their age, 9(30%) were belonged to 18-22 years, 15(50%) were belonged to 23-27 years, 5(16.7%) were belonged to 28-32 years and 1(3.3%) was belonged to more than 32 years. According to their education, nobody were belonged to 10^{th} standard, 16(53.3%) were belonged to 12^{th} standard, 14(46.7%)

were belonged to degree and no one was illiterate. According to their gestational age, 3(10%) were belonged to 1-3 months, 20(66.7%) were belonged to 4-6 months and 7(23.3%) were belonged to 7-10 months. Accordingto their occupation, 13(43.3%) were belonged to workaholic and 17(56.7%) were belonged to no job. According to their type of family, 15(50%) were belonged to joint family and 15(50%) were belonged to nuclear family. According to their residence, 17(56.7%) were belonged to urban, 12(40%) were belonged to rural and 1(3.3%) were belonged to semi-urban. According to their religion, 3(10%) were belonged to Christianity, 26(86.7%) were belonged to Hinduism, 1(3.3%) were belonged to Islam and nobody were belonged to others.

Table 2: Description of pre-test and post-test level of knowledge on impact of mobile phone

S.NO	KNOWLEDGE LEVEL	PRE-TEST		POST-TEST	
		f	%	f	%
1	Inadequate knowledge	16	53.3	6	20
2	Moderate knowledge	12	40	5	16.7
3	Adequate knowledge	2	6.7	19	63.3

Table 2 showed that among 30 antenatal mothers, 16(53.3%) had inadequate knowledge, 12(40%) had moderate knowledge and 2(6.7%) had adequate knowledge regarding impact of mobile phone usage during pregnancy in the pre-test. In the post-test 6(20%) had inadequate knowledge, 5(16.7%) had moderate knowledge and 19(63.3%) had adequate knowledge regarding impact of mobile phone usage during pregnancy.

Table 3: Effectiveness of IEC regarding impact of mobile phone usage during pregnancy

Descriptive statistics	Level of knowledge (n=30)			t value
	Pre-test	Post-test	Difference (post-pre)	
Mean	9.06	14.56	5.50	t = 13.65
Standard deviation	4.50	5.11	0.61	

Table 3 described the comparison between the pre-test and post-test level of knowledge regarding impact of mobile phone usage during pregnancy among the antenatal mothers in Sevilimedu primary health centre at Kanchipuram. The results depicted that the mean and standard deviation value of pre-test level of knowledge are 9.06 ± 4.50, while the mean and standard deviation of post-test level of knowledge are 14.56 ± 5.11. The mean and standard deviation difference between the post-test and pre-test level of knowledge are 5.50 ± 0.61. The calculated t value was 13.65 which was statistically significant at $p<0.05$ level. The improvement in the level of knowledge among the antenatal mothers after IEC intervention on the mobile phone usage during pregnancy indicated that the program was effective. There was significant difference between the pre-test and post-test level of knowledge. Hence hypothesis H1was accepted.

Table 4: the association of selected demographic variables and their level of knowledge on impact of mobile phone during pregnancy

S. NO	DEMOGRAPHIC VARIABLE	LEVEL OF KNOWLEDGE			CHI SQUARE VALUE X^2	p -VALUE
		INADEQUATE	MODERATE	ADEQUATE		

		f	%	f	%	f	%		
1	**Age** e) 18-22 years f) 23-27 years g) 28-32 years h) More than 32 years	3 2 0 1	10 6.7 0 3.3	2 3 1 0	6.7 10 3.3 0	4 10 4 0	13.3 33.3 13.3 0	$X^2 = 6.962$ df = 6	p = 0.0083 (S)
2	**Education** e) 10th standard f) 12th standard g) Degree h) Nil	0 1 5 0	0 3.3 16.7 0	0 3 3 0	0 10 10 0	0 12 6 0	0 40 20 0	$X^2 = 4.555$ df = 6	p = 0.0328 (S)
3	**Gestational age** d) 1-3 months e) 4-6 months f) 7-10 months	0 4 2	0 13.3 6.7	1 4 1	3.3 13.3 3.3	2 12 4	6.7 40 13.3	$X^2 = 1.27$ df = 4	p = 0.2598 (NS)
4	**Occupation** c) Workaholic d) No job	4 2	13.3 6.7	2 4	6.7 13.3	7 11	23.3 36.6	$X^2 = 1.719$ df = 2	p = 0.1898 (NS)
5	**Type of family** c) Nuclear family d) Joint family	3 4	10 13.3	3 2	10 6.7	9 9	30 30	$X^2 = 0.342$ df = 2	p = 0.5587 (NS)
6	**Residence** d) Urban e) Rural f) Semi-urban	2 3 1	6.7 10 3.3	5 1 0	16.7 3.3 0	10 8 0	33.3 26.7 0	$X^2 = 6.389$ df = 4	p = 0.0115 (S)
7	**Religion** e) Christianity f) Hinduism g) Islam h) Others	0 6 0 0	0 20 0 0	2 3 1 0	6.7 10 3.3 0	1 17 0 0	3.3 56.7 0 0	$X^2 = 9.403$ df = 6	p = 0.0022 (S)

NS – Not Significant **S – Significant**

Table 4 showed that there was significant association between level of knowledge withselected demographic variables at $p<0.05$ level. Among the demographic variables, age, education, residence and religion were significantly associated with the post-test level of knowledge regarding impact of mobile phone usage during pregnancy. The other variables such as gestational age, occupation and family were not significantly associated the post-test level of knowledge; Hence hypothesis H2 was partially accepted.

Discussion: The first objective of the study was to assess the pre-test level of knowledge regarding impact of mobile phone usage during pregnancy among antenatal mothers in Sevilimedu primary health centre.

The pre-test knowledge regarding impact of mobile phone usage during pregnancy among the samples was assessed by using structured questionnaires. The level of knowledge according to the pre-test score obtained by

the samples include 16(53.3%) had inadequate knowledge, 12(40%) had moderate knowledge and 2(6.7%) had adequate knowledge. It implies that the samples had inadequate knowledge regarding impact of mobile phone usage during pregnancy. The mean and standard deviation value of pre-test level of knowledge are 9.06 ± 4.50.
The finding of this study was supported withGelarehBiazar et al., (2021), the study was done to find the association between cell phone radiofrequency electromagnetic fields (RF-EMF) and the developing fetus complications. The researcher interviewed eligible pregnant women admitted to Al Zahra Hospital, to fill questionnaires intended to assess maternal demographic data and their attitude towards cell phone use during pregnancy in 2020. A total of 322 pregnant women with the mean age of 30.12 ± 6.81 years enrolled in the survey, in which 3.1% of them were non-cell phone users, and 6.052% of all did not use a cell phone during the first trimester. The mean years of cell phone use and the daily hours were 8.26 ± 4.1 and 2.66 ± 2.02, respectively. Also, 64.3% believed that cell phone use poses risks to the fetus, while 26.7% had no idea. A positive association was also found concerning maternal awareness from cell phones harmfulness to the fetus and maternal education, residency, and employment ($P < 0.0001$). The study concluded that the majority of pregnant women believed that cell phone use during pregnancy could be harmful to the fetus28.
The second objective of the study was to assess the effectiveness of Information, Education and Communication regarding impact of mobile phone usage during pregnancy among antenatal mothers in Sevilimedu primary health centre.
The post-test knowledge regarding impact of mobile phone usage during pregnancy among the samples was assessed by using structured questionnaires. The level of knowledge according to the post-test score obtained by the samples include 6(20%) had inadequate knowledge, 5(16.7%) had moderate knowledge and 19(63.3%) had adequate knowledge regarding impact of mobile phone usage during pregnancy. The mean and standard deviation of post-test level of knowledge are 14.56 and 5.11. The level of knowledge among the antenatal mothers is increased to some extent which shows that the information education communication regarding impact of mobile phone usage during pregnancy which is conducted is effective.

On comparison between the pre-test and post-test level of knowledge regarding impact of mobile phone usage during pregnancy among antenatal mothers in Sevilimedu primary health centre, the results depicted that the mean and standard deviation value of pre-test level of knowledge are 9.06 ± 4.50, while the mean and standard deviation of post-test level of knowledge are 14.56 ± 5.11. The calculated t value was 13.65 which was statistically high significant at $p<0.05$ level. The overall mean and standard deviation of the post-test level of knowledge is comparatively higher than the pre-test knowledge which confirms that there is improvement in the level of knowledge on the impact of mobile phone usage during pregnancy. It showed that IEC is effective. Hence research hypothesis H1 was accepted.
The finding of this study was supported withSumangala. B. R and Anitha. C. Rao (2016), A Pre- experimental study was conducted among 50 antenatal women who were selected by non-probability convenient sampling technique. The study was conducted in hospitals, to determine the knowledge regarding impact of usage of mobile phone during pregnancy. Data was collected through a structured questionnaire using demographic proforma of antenatal women and knowledge questionnaire. The data collected was analysed and interpreted based on descriptive and inferential statistics. The mean post-test knowledge score (18.88 ± 3.12) was higher than the mean pre-test knowledge score (10.96 ± 3.36) which showed that there was highly significant difference in the scores. The concluded that structured teaching programwas effective in improving the knowledge regarding impact of usage of mobile phone during pregnancy among antenatal women17.
The third objective of the study was to associate the selected demographic variable and the level of knowledge regarding impact of mobile phone usage during pregnancy among the antenatal mothers in Sevilimedu primary health centre.
The present study revealed that there was significant association between the selected demographic variables and post-test level of knowledge of antenatal mothers regarding impact of mobile phone usage during pregnancy at p level. Among the selected demographic variables such as age, education, residence and religion were significantly associated. But the remaining variables such as gestational age, occupation and type of family were notshown significant association with the post-test level of knowledge. Hence research hypothesis H2 was partially accepted.
The findings of this study was supported withAmbli.V.,(2024),. A quantitative evaluative research approach with pre-experimental one group pre-test and post-test research design was done. The simple random sampling technique was employed to select the 30 samples of antenatal mothers. Self-administered structured knowledge questionnaire was used to collect the information from the study samples. The study was conducted in selected community area, Bengaluru. The data was analyzed by descriptive and inferential statistics. Findings of the study revealed that the overall post -test mean score was 36.33 (121.1%) with standard deviation 2.52 and the respondent's knowledge were significantly higher than the overall mean pre-test knowledge scores 28.33(94.43 %) with standard deviation 1.96 and computed paired 't' value 37.4 is higher than table 2.02 at $p< 0.05$ level. Hence the Structured Teaching Program on knowledge regarding impacts of mobile phone usage among ante-natal mothers was effective statistically significant. The study reveals that there was significant association

between selected demographic variables. The study concluded that the structured teaching program was an effective method in providing **moderate to adequate level of knowledge regarding impacts of mobile phone19.**

CONCLUSION

The study findings concluded that,the Information, Education and Communicationregarding impact of mobile phone usage during pregnancy among the antenatal mothers was effective in improving the level of knowledge.

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