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Original Research Article

Effectiveness of antenatal education on knowledge and practice of maternal nutrition among antenatal women

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ABSTRACT

Background: Nutrition plays a vital role in pregnancy. During pregnancy the need of calorie intake of mother increases from 100k.cal/day during the first trimester to 340-450k.cal/day during the second and third trimester. Pregnant women should have an adequate intake of macronutrients and micronutrients to achieve optimum maternal, fetal and newborn outcomes. Imbalanced nutrition during pregnancy can cause pre-eclampsia, anemia, gestational diabetes mellitus, and infections, obstructed labour, prolonged labour and preterm births in pregnant women. It also affects fetus by causing intra uterine growth retardation, low birth weight, neural tube defects, congenital malformation, mental retardation and fetal macrosomia.
Methods: A quasi-experimental one group pre-test post-test design was used, involving 100 antenatal women attending antenatal OPD at tertiary hospital in Bangalore. Data was collected by using a structured knowledge questionnaire and practice scale on maternal nutrition. Antenatal education on maternal nutrition was administered for 45 minutes by using power point. Post-test on knowledge was assessed after 7 days was assessed after 4 weeks of intervention.
Results: Pre-test findings showed 67% of antenatal women had moderately adequate knowledge and 42% of subjects had adequate practice of maternal nutrition. After the antenatal education, 75% of the subjects had moderately adequate knowledge and 50% had adequate practice of maternal nutrition. The study revealed a significant improvement in knowledge (p=0.01) and practice (p=0.01) of antenatal women. There was a significant association between knowledge and practice and selected socio-demographic profiles.
Conclusion: Antenatal education regarding maternal nutrition was effective in enhancing the knowledge and practice related to maternal nutrition among pregnant women. Therefore, the study also revealed that there is a correlation between knowledge and practice of maternal nutrition among antenatal women.

Keywords: Antenatal women, Antenatal education, Effectiveness, Knowledge, Maternal nutrition, Practice

INTRODUCTION

Pregnancy is a vital event in the life of a woman requiring, special attention from the time of conception to the postnatal period.[1] All human beings need a balanced amount of nutrients for proper functioning of body system. It is well documented that inadequate nutrition during pregnancy results in increased risk of adverse consequences like intra uterine growth retardation, low birth weight (LBW), pre-term birth, prenatal and intranatal mortality.[2] The energy intake during pregnancy reflects the amount of energy needed to support maternal and fetal metabolism and fetal growth and accumulation of energy depots during pregnancy.[3] Institute of medicine, India 2009 recommends that all pregnant women must increase energy intake by 100 k.cal/day during the first trimester and 340-450 k.cal/day during the second and third trimesters. Recommended dietary allowance for pre-

pregnant women is 2200 k.cal/day and 2550 k.cal/day is needed for a pregnant woman.[4,5] Under nutrition or malnutrition is the cellular imbalance between the supply of nutrients and energy and the body's demand for them to ensure growth, maintenance and specific functions.[6] During pregnancy undernourished women may develop pre-eclampsia, anemia, stress, infections, lethargy and weakness. Obstructed labor, preterm labor, and premature rupture of the membrane, prolonged labor and operative delivery at the time of delivery leads to sepsis and postpartum hemorrhage.[7]

Globally, approximately 462 million women (9.1%) are malnourished, while three times as many women 610 million women (32.5%) are overweight and 571 million (47.5%) women are anemic. In South Asia and Southeast Asia 32-35% of women are affected with malnutrition and 30% of women affected with anemia.[8] In developing countries about 12-22% women suffer from chronic energy deficiency and 40% of women are anemic.[9] In India 22.9% women have chronic energy deficiency (BMI less than normal) and 48% are anemic.[10] In Karnataka more than 10% of women are undernourished and more than 40% of women are anemic. And prevalence of fetal malnutrition is 16.7 - 19%.[11]

It is also found that malnutrition during pregnancy leads to complications of obstructed labour (7.7%), prolonged labour (8.2%), pre-eclampsia (2 to 10%), pre-term births (18%), preterm pre mature rupture of membranes (1-4%), infections and sepsis (12%), and abortions (5%). Maternal malnutrition may lead to hemorrhage which is a leading cause of maternal mortality. Obesity during pregnancy leads to serious health consequences with increase gestational diabetes mellitus, genital & urinary tract infections, cancers and three times more common with infertility problems than normal weight women. It also affects fetus by causing preterm births (54.8%), small for gestational age (84.2%), two fifth of them had IUGR, low birth weight (10.6%), neural tube defects (63.3%), spinal bifida (41.9%) and twice likely to have fetal macrosomia.[12]

Government of India initiated several programmes to improve maternal nutrition such as Applied Nutrition Programme, Special nutrition programme, Ministry of Women and Child Development, Pradhan Mantri Matru Vandana Yojana, National Nutrition Programme and Ministry of Women and Child development. These programmes provide a supplementary nutrition and conditional cash to all pregnant and lactating women to improve their nutritional status.[13-18]

In view of the high prevalence of maternal malnutrition among pregnant women in the Indian population and the maternal and fetal risks associated with inappropriate maternal nutrition, the researcher found that there are very few studies conducted in India to find out the associated socio-demographic factors that influence maternal nutrition which becomes a major reason to conduct this study.

METHODS

Study design

The study design used was a quasi-experimental one group pre-test and post-test design.

Study place

The study was conducted at the antenatal OPD of Ramaiah Medical College and Hospital, Bangalore.

Study duration

The study duration was between February 2024 to April 2024.

A structured tool was prepared after reviewing relevant literature and consultation with the subject experts. The tool consisted of three parts; first part was socio-demographic profile, then structured knowledge questionnaire on maternal nutrition and structured practice scale on maternal nutrition.

Socio-demographic profile which were intended to elicit Socio-demographic information of the antenatal women knowledge and practice questionnaire to assess the level of knowledge and practice of antenatal women on maternal nutrition. The validity and reliability of the tools was established with (α=0.75) for English version and (α=0.78) for Kannada version for knowledge questionnaire and (α=0.76) for English version and (α=0.75) for Kannada version for practice questionnaire.

Ethical approval

Ethical clearance for the study was obtained from the ethical committee of Ramaiah University of Applied Sciences Bangalore.

The study included 100 antenatal women who are in first trimester of pregnancy, attending antenatal OPD of Ramaiah Medical College and Hospital, Bangalore, were selected through a non-probability convenient sampling technique ensuring that they can read and as well as understand English or Kannada. After obtaining a formal permission from the concerned Authority of Ramaiah Medical College and Hospital, the researcher on the first day, a pre-test was administered to assess the knowledge of antenatal women and practice of maternal nutrition. Antenatal education was provided in antenatal OPD to antenatal women one-on-one on maternal nutrition for 45 mins by using power point followed by post-test on knowledge of maternal nutrition was assessed after 7 days and practice of maternal nutrition was assessed after 4 weeks of intervention.

Data were obtained by using a structured knowledge questionnaire and structured practice scale and the level of knowledge and practice was interpreted as inadequate,

moderately adequate and adequate knowledge and practice. Descriptive statistics were used to describe socio-demographic data and the level of knowledge and practice regarding maternal nutrition. A paired t test was used to evaluate the effectiveness of antenatal education to assess the knowledge and practice regarding maternal nutrition and chi-square test were used to find the association between the level of knowledge and selected socio-demographic variables.

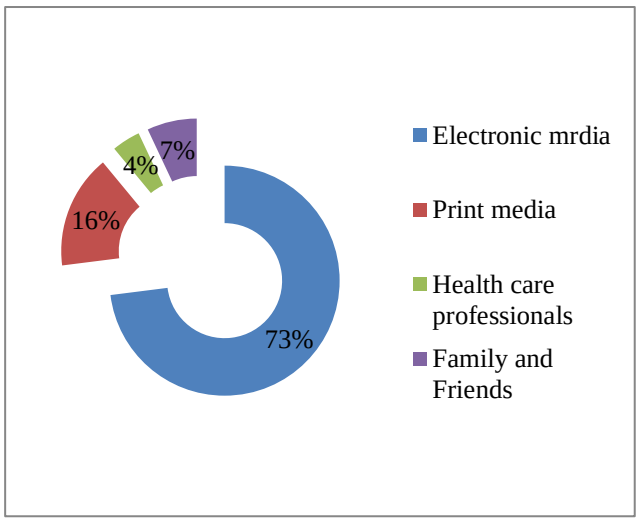

Figure 1: Source of knowledge on maternal nutrition.

RESULTS

Socio demographic variables of antenatal women

Among 100 antenatal women, majority of the subjects 40% of participants were aged between 20-24 years and 60% of the subjects were Hindus. 70% of participants had educational qualification of degree and above educational qualification of 80% of the participants' husbands was degree and above. Occupation wise 60% of participants were homemakers and 70% of participant's husbands were private employees with most of the subject's family monthly income of Rs 30000 & above. The pregnancy of 70% of the subjects were planned and the gestational age of 80% of participants was in between 9-10 weeks and majority of participants (70%) were primigravida. 80% of participants had no previous source of knowledge on maternal nutrition (Figure 1).

The study shows that the mean post-test knowledge score is 11.35 which is higher than pre-test 9.11. The obtained t value is 7.005 (Table 4). The study shows that the mean post-test value of practice is 49.8 which is higher than pre-test value 45.9. The obtained t value is 15.937 (Table 5). The study shows that there is a weak positive correlation exist between knowledge and practice of antenatal women regarding maternal nutrition with r=+0.225 at p<0.005 (Table 6).

Table 1: Socio-demographic variables of antenatal women.

S. no.	Socio demographic variables	Frequency (f)	Percentage (%)
1.	**Age (in years)**		
	20-25	27	27
	26-30	40	40
	31-35	20	20
	36-40	13	13
2.	**Religion**		
	Hindu	60	60
	Christian	22	22
	Muslim	18	18
	Others	0	0
3.	**Educational status of husband**		
	Primary education	3	3
	Secondary education	17	17
	PUC	21	21
	Degree and above	59	59
4.	**Educational status of antenatal women**		
	Secondary education	30	30
	PUC	3	3
	Degree and above	63	63
5.	**Occupation of antenatal women**		
	Private employee	30	30
	Self-employed	3	3
	Homemaker	63	63
	Others	4	4

Continued.

S. no.	Socio demographic variables	Frequency (f)	Percentage (%)
6.	**Occupation of husband**		
	Govt. employee	28	28
	Private employee	36	36
	Self- employed	0	0
	Not employed	8	8
	Others	28	28
7.	**Monthly income in rupees**		
	≤10000	0	0
	10001-20000	7	7
	20001-30000	37	37
	30000 and above	56	56
8.	**Is it planned pregnancy**		
	yes	69	69
	No	31	31
9.	**Period of gestation**		
	6-8wks	27	27
	9-10wks	42	42
	10-12wks	31	31
10.	**Previous knowledge regarding maternal nutrition**		
	Electronic media	73	73
	Print media	16	16
	Health care professionals	4	4
	Family and Friends	7	7

Table: 2 knowledge of antenatal women on maternal nutrition.

Level of knowledge	Pre-test		Post-test	
	Frequency (f)	(%)	Frequency (f)	(%)
Adequate knowledge	2	2	5	5
Moderately adequate knowledge	67	67	75	75
Inadequate knowledge	31	31	20	20

Table 3: Practice of antenatal women on maternal nutrition.

Level of practice	Pre-test		Post-test	
	Frequency (f)	(%)	Frequency (f)	(%)
Poor practice	54	54	40	40
Adequate practice	42	42	50	50
Good practice	4	4	10	10

Table 4: Effectiveness of antenatal education on knowledge and practice of maternal nutrition among antenatal women.

S. no.	Variables	Mean	SD	t-value	P value
1.	**Pre-test score of knowledge regarding maternal nutrition**	9.11	1.96	7.005 df=99	0.001
2.	**Post-test score of knowledge regarding maternal nutrition**	11.35	2.93		

Table 5: Mean and standard deviation of practice scores of antenatal women.

S. no.	Variables	Mean	SD	t-value	P value
1.	**Pre-test scores of nutrition practice**	45.9	2.89	15.937 df=99	0.001 S*
2.	**Post-test scores of nutrition practice**	49.8	2.11		

S= significant.

Table 6: Correlation between knowledge and practice regarding maternal nutrition.

S. No	Variables	Spearman's correlation	'r' value
1.	Knowledge on maternal nutrition	r = + 0.225	S P <0.005
2.	Practice on maternal nutrition		

S= Significant

Table 7: Association between the level of knowledge with age in years and period of gestation.

S. no.	Socio demographic variables	Knowledge		Chi-square value (χ2)	P value
		Above median	Below median		
1.	**Age (in years)**			34.95 Df=3	0.010 S
	20-25	4	24		
	26-30	8	32		
	31-35	3	17		
	36-40	4	8		
2.	**Period of gestation**			4.034 Df=2	0.012 S
	6-8	9	18		
	9-10	7	36		
	10-12	5	26		
3.	**Educational status of antenatal women**			16.977 df=2	0.049 S
	Secondary education	9	12		
	PUC	4	26		
	Degree and above	7	42		
4.	**Educational status of husband**			16.961 df=3	0.049 S
	Primary education	1	1		
	Secondary education	3	16		
	PUC	6	13		
	Degree and above	10	50		

S*= significant, NS=not significant, at p < 0.05, df=degree of freedom.

Table 8: Association between level of practice with age in years, period of gestation and number of pregnancies.

S. no.	Socio-demographic variables	Practice		Chi-square value (χ2)	P value
		Above median	Below median		
1.	**Educational status of antenatal women**			4.955 df=2	0.037 S
	Secondary education	16	5		
	PUC	22	8		
	Degree and above	39	10		
2.	**Occupation of husband**			1.214 df=3	0.048 S
	Govt. employee	23	5		
	Private employee	28	8		
	Not employed	6	2		
	Other	20	8		
3.	**Previous knowledge**			6.676 df=3	0.017 S
	Electronic media	58	15		
	Print media	3	2		
	Health care professional	2	5		
	Family and friends	13	2		

DISCUSSION

The findings revealed that out of 100 subjects 67% of the subjects had moderately adequate knowledge and 42% had adequate practice of maternal nutrition before antenatal education. And 75% had moderately adequate knowledge and 50% had adequate practice of maternal nutrition after the antenatal education and showed that there was significant effectiveness in antenatal education (p=0.001). The study finding was supported by a quasi-experimental study conducted in Indonesia in the year 2021 among 226

pregnant women. Results showed that there is a significant increase on the mean scores of their knowledge from 29.01/47 (SE=0.35) pre-intervention to 42.73/47 (SE=0.24) immediate post-intervention. The study findings shows that there was a positive correlation between knowledge and practice of maternal nutrition among antenatal women (r=0.225, p<0.05). The study was supported by descriptive cross-sectional study conducted in south Africa in 2018 among 120 antenatal women about good knowledge and practices, and positive attitudes regarding maternal nutrition, 88.3%, 99.2% and 62.5%, respectively. There was a significant relationship between knowledge, attitude and practice, with a correlation coefficient of r=0.296, and p=0.001.[19] The findings of the study shows that maternal nutrition was found associated with age in years (p=0.001), period of gestation (p=0.012), educational status of women (p=0.049) and educational status of husband (p=0.049) are significantly associated with knowledge and educational status of antenatal women (p=0.037), occupation of husband (p=0.048), and source of previous knowledge of maternal nutrition (p=0.017) are significantly associated with practice. The study was supported by a cross-sectional study conducted in China in 2023 among 310 pregnant women. The results showed that lower the educational background of pregnant females (P=0.003) and their husbands (P=0.003), the more likely they are to become lower in knowledge, attitude and practice.[20] There was a significant improvement in the knowledge (p=0.01) and practice (p=0.01) of maternal nutrition among antenatal women after the antenatal education. And the study was aimed in improving awareness about healthy diet during pregnancy to improve the overall outcome of pregnancy.

The study is limited to the antenatal women who are in first trimester of pregnancy and attending antenatal OPD of Ramaiah Medical College, Hospital.

CONCLUSION

A healthy and balanced diet is very important during pregnancy, to promote adequate weight gain. Nutrition education is very important to improve the nutritional status of women during pregnancy and important factor in health promotion. Pregnant women should be given adequate and nutritious food throughout pregnancy to provide the energy and nutrients needed for fetal growth, and breast milk production. A health care provider can advise pregnant women to attend regular antenatal checkups to identify and reduce the risks to mother and fetus during pregnancy.

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Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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