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Determinants of Nutritional Practices Among Pregnant Women Attending Antenatal Clinic at Ngao Sub-County Hospital, Tana River County

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Abstract:
Background*: Dietary practice among pregnant women is an observable action of behavior of dietary habit usually classified as good or bad dietary practices and usually influences both pregnancy and foetal outcome. Pregnancy presents a critical stage of development for both the mother and the developing foetus. The stage is equally nutritionally demanding with caloric intake requirements rising compared to that in pre-gravid state. Poor nutritional practices during this stage had previously shown devastating impact not only to the foetus but also to the mother. Malnutrition during this stage exposes the mother to conditions such as anaemia, diabetes among other dietary related conditions. Women in developing countries find themselves restricted by multiple factors that interfere with their capacity to meet the demands at this stage. Thus, this study sought to assess the determinants of dietary practices among expectant women visiting antenatal clinic in three dimensions that were individual factors, institutional linked factors, and socio-cultural factors The Health Belief model was the theoretical model utilized in this study.*
Materials and Methods*: The study design was descriptive where the variables under investigation were described. The study design was a descriptive. The sampling method was census sampling. Data was collected using self-administered questionnaires. Data analysis was done using SPSS version 24.0 whereby calculations of mean, percentages, and frequencies was done.*
Results*: The results indicated that majority of the respondents were aged between 21 and 25 years (32.6%), with 77.9% married and 31.4% had secondary level of education. On religion, majority were Christians (53.5%). The results showed that age of the mother, highest level of education, employment status of the mother, knowledge on balanced diet were the individual characteristics of the participants that were significant at p values <.05. Religious affiliation did not significantly affect nutritional practices but the cultural beliefs of the mothers were significantly associated with nutritional practices at p value< .05. On facility-linked factors; counselling the mothers on nutrition, using nutritional model to counsel the mothers and giving the mothers micronutrient supplements were all significant at p value<.05.*
Conclusion: *The study indicated that an increase in education level of the pregnant mother determines their understanding of good nutritional practices; higher levels of education were associated with good nutritional practices. Therefore, health workers should endeavor to enlighten pregnant women on nutritional practices especially those with low levels of education or no formal education.*

Key Word*: Nutrition, Pregnancy, practices, pregnant women, Questionnaire, Descriptive statistics.*

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I. Introduction

Antenatal care (ANC) offers a unique period of connecting with the expectant woman while delivering the much-needed services. It promotes safety in pregnancy by providing opportunities for screening and guidance on crucial subjects such as nutrition[1]. A study done by the authors involving 154 pregnant women revealed that only less than a quarter of the respondents went through nutrition counseling during their ANC visits. The healthcare system has proven beyond reasonable doubt especially where large number of clients visit the facilities that giving comprehensive services thus becomes a difficult endeavor. Antenatal care (ANC) often refers to the care offered by registered healthcare workers to expectant women with the sole aim of ensuring healthy outcome of the mother and foetus during pregnancy[2]. The services comprise of the following elements: danger notification, avoidance and management of pregnancy-linked comorbidities, health promotion, and education[3]. Poor nutritional practices and related maternal and child complications continue to persist despite

numerous interventions by various agencies. Due to poor maternal nutritional practices, globally, an estimated 15 million babies are born prematurely and about 20 million are born with low birth weight with more than 95 % occurring in resource-poor countries according to WHO[3]. According to data from UNICEF[4], developing countries are the most hit by the problem with over 200 million expectant mothers presenting with issues around this menace annually. The implications are often far-reaching affecting both the mother and the baby. Kuche[5], highlights that under nutrition in pregnancy is a serious public health issue responsible for multiple maternal and child morbidities and mortalities notably in developing countries. A similar observation is made by WHO[6] indicating that globally, 585,000 mothers die annually secondary to pregnancy and associated complications. A worrying 1,500 mortality cases happen daily in such countries. Ngao Sub- County Hospital mainly attends to population from the Tana Delta Sub County. According to the ANC register at the facility, 400 expectant women were attended to in the first quarter of the year 2019. However, 53 mothers presented with different signs of malnutrition as indicated by the DHIS register. The data points out to a 16% prevalence of malnutrition among the expectant women. The outcomes of the study will serve a great purpose to women especially the expectant ones as it will help identify gaps in nutritional practices and recommend possible solutions to bring remedy to the issue. Health professionals may equally utilize the findings of this study to shape their health education strategies regarding nutrition among expectant mothers. The regulatory body, which is the ministry of health both at national and county levels, can also utilize the outcomes in identifying policies that could benefit the vulnerable groups living in such areas as Tana Delta. It will also help those who may wish to undertake research on the key areas that will be captured in the study as well as contributing to the literature. Moreover, this scholarly piece will enhance future studies and create a platform for reasoning on issues surrounding dietary practices among expectant women.

II. Material And Methods

This cross-sectional descriptive study was carried out on antenatal clients at Ngao Sub- County hospital in Tana River County. A total 88 antenatal clients were for in this study.

Study Design: cross-sectional descriptive study

Study Location: The research was conducted at the Sub- County health facility in Ngao area of Tana Delta, situated in Ngao location and Sub-location, Tarasaa Division, which is in the larger Garsen Constituency in Tana River County.

Study Duration: August 2020 to August 2020.

Sample size: 100 patients.

Sample size calculation: The hospital receives an average of 100 antenatal mothers every month. A representative population was obtained from the group for analysis. According to Yamane's Formula as put by Mugenda and Mugenda (2003), the sample size was realized following the criteria below.

n=N/((1+N(e^2)))

where n= Sample size

N= Population size

e= Level of precision or Sampling error which is ±5%

Therefore;

n=100/((1+100(0.05)^2)))

n= 80

To cater for attrition, additional 10 % non-respondent (8) mothers were included. Thus, the representative sample was therefore 88 pregnant women.

Subjects & selection method: The study respondents were obtained utilizing the following criteria.

The study utilized census sampling. Considering the fact that the sample size is 88 mothers, there is need to maximize every opportunity to achieve the sample population. The technique deemed useful where the sample size is either 200 or less (Mugenda & Mugenda, 2003). Thus, with the use of this method, a good scale of precision was achieved.

Inclusion criteria:

The study took into consideration all expectant mothers attending ANC at Ngao Sub- County Hospital. In addition, only those who gave consent were included in the study and the analysis.

Exclusion criteria:

The study did not take into consideration pregnant mothers who did not give consent or were uncomfortable sharing their information on dietary practices. In addition, partners to the pregnant women were not taken into consideration as not all accompany their spouses to the hospital.

Procedure methodology

The study applied self-administered questionnaires being guided by the research objectives with the help of my supervisors. Since the coverage area is cosmopolitan, research assistants were used to interpret the questions to the mothers in their local dialect where need be. Data regarding the variables under investigation

was obtained via questions targeted to obtain the same from pregnant women who were attending the ANC. Specifically; the questionnaires was split into sections to help obtain data on individual characteristics influencing dietary practices among expectant mothers visiting ANC at Ngao Sub-County Hospital, Tana River County, socio-cultural factors influencing dietary practices among expectant mothers visiting ANC at Ngao Sub-County Hospital, Tana River County, and facility associated factors influencing dietary practices among expectant mothers visiting ANC at Ngao open-ended questions, which helped obtain comprehensive data. Data was collected in a private area that was different from the ANC room. The average time utilized in accomplishing this task was an average of about 10-15 minutes. Nutritional practice was measured using a Likert scale with options of regularly, sometimes, rarely and never. Those who had good nutritional practice always were marked as regular, those who indicated sometimes meant they practiced good nutrition but not always. After obtaining the data, a single variable was computed from the four responses and then categorized as good practice and poor practice.

Statistical analysis

The initial step was evaluating the data obtained through the questionnaires for completeness as assessed by the researcher. This was followed by manually sorting and cleaning the data to assess for comprehensiveness. Nonetheless, to avoid receiving questionnaires that are incomplete, the researcher ensured a follow-up of the participants while providing clarifications of all areas covered to ensure that every question got feedback. Anonymity and confidentiality were ensured by concealing the participant's identity where unique number was allocated to each respondent. However, no private information was obtained from the respondents. When this was done, the completed questionnaires were arranged systematically to facilitate entry into version 24 of the SPSS program. Data analysis was done with the aid of descriptive statistics. The independent variables were assessed using measures of central tendency where calculations of mean and frequencies were done. The dependent variable was analyzed using measures of central dispersion to help establish the relationship. The data analysis was done at 95% confidence interval. The data was presented in frequency tables, pie charts, and bar graphs.

III. Result

The response rate for the study was 98% (n=86) which is acceptable according to Mugenda and Mugenda (2003), with a prevalence rate for good nutritional practices in pregnancy at 30.2% (n=26) of the participants. The level of nutritional practice was measured using a Likert scale with four options; regularly, sometimes, rarely and never practice good nutrition. This dependent factor was then categorized as good nutritional practices and poor nutritional practices. Good nutritional practice was associated with taking balanced diet regularly.

Individual Characteristics of the study participants

The study gathered information on the individual characteristics of the targeted mothers concerning their age, marital status, education level, employment status, and form of employment of the mothers. The study also explored other individual factors like who makes the financial decisions in the family, if the mother had experienced any health problem during the current pregnancy, knowledge on balanced diet and nutritional practice among the 86 mothers in Ngao hospital.

Age of the respondents

The age of the mothers was rounded-up into complete years and categorized as shown in figure 1. The study found that the mothers had varied ages. Majority (32.6%, n=28) had an age of 21-25 years, 24.4% (n=21) had an age of above 31 years, 23.3% (n=20) had an age between 26-30 years and those aged between 15 and 20 years had the least proportion (19.8%, n=17). The age of the pregnant women was summarized in figure 3.

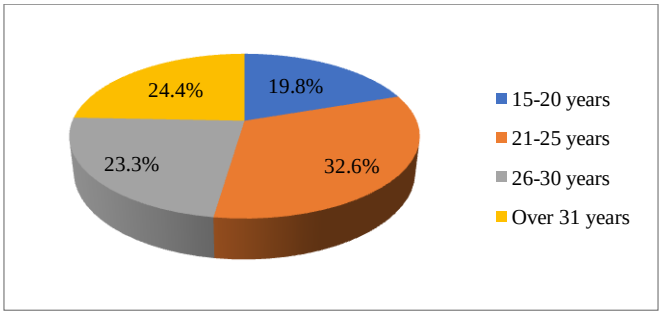

Figure no 1: *Age of the pregnant woman*

On assessing the relationship between age and nutritional practice; out of 17 women who were in the age bracket of 15-20 years, 2 of them were found to have good nutritional practice, 10 of the mothers sometimes practiced good nutrition, 3 rarely practiced good nutrition and 2 of the mothers never practiced good nutrition. In the age group between 21-25 years, out of 28 participants, 5 of them had good nutritional practice, 11 of the mothers sometimes practiced good nutrition, 7 of the mothers rarely practiced good nutrition and 5 mothers never practiced good nutrition at all. In the age bracket of 26-30 years, out of 20, 5 had good nutritional practice, 10 were found to sometimes practice good nutrition, 3 rarely practiced good nutrition and 2 never practiced good nutrition. Among 21 mothers who were of age above 31, 14 of them were having good nutritional practice, 5 mothers sometimes practiced good nutrition, and 2 never practiced good nutrition. Increase in age was strongly associated with increase of the chances of good nutritional practices with Phi of 0.504. These results were found to be significant at χ^2 (9, N=86) = 21.831, p<0.001, Fishers exact test p value<0.001.

Table no 1: *Association between age of the mother and nutritional practice*

Variable	Age in years	Nutritional practice				Total
		Regularly	Sometimes	Rarely	Never	
Age of the mother	**15-20**	2	10	3	2	17
	21-25	5	11	7	5	28
	26-30	5	10	3	2	20
	Above 31	14	5	0	2	21
Total		26	36	13	11	86

χ^2 (9, N=86) = 21.831, Fisher exact p<0.001

A one-way analysis of variance was conducted to evaluate the mean differences between the age brackets in nutritional practices (N=88). The independent variable age of the mother included four groups; 15-20 years (M=2.41, SD=1.121, n=88), 21-25 years (M=2.61, SD=1.315, n=88), 26-30 years (M=2.20, SD=1.152, n=88) and above 31 years (M=1.62, SD=1.253, n=88). The assumption of homogeneity was evaluated using levene test and found tenable, F(3,88)=.566, p=.639. The ANOVA was significant F (3,88) =2.802, p=.045. In Post Hoc test using Bonferroni test to adjust the means, there was a significant difference between the age groups between 21-25 years and above 31 years.

Table no 2: *one-way analysis of variance for age*

	Sum of squares	df	Mean square	F	Sig.
Between groups	12.400	3	4.133	2.802	.045
Within groups	120.949	82	1.475		
Total	133.349	85			

In this study, it is evident that as the maternal age increases, the nutritional practice improves. The older mothers' practice of good nutrition may be attributed to the fact that they have experience and less competing interests. Every mother has food preferences; however, the young mothers in most cases prefer foods that do not add nutritional value in their bodies. At Ngao Sub-County hospital, the older mothers were found to have good nutritional practice, this replicates studies done in India and Brazil that revealed that the older a mother is, the more adherent they are to good nutrition during pregnancy (teixeir *et al.*, 2018; Eshriqui *et al.*, 2016.,Gomes *et al.*, 2019). Age of the mother is therefore critical when it comes to nutritional practice, the health care workers need to consider this parameter when counseling the young mothers on nutritional intake.

Marital status of the mother

Majority (77.9%, n=67) of the mothers were married, others were single and a small proportion of the mothers had been divorced (9.3%, n=8).

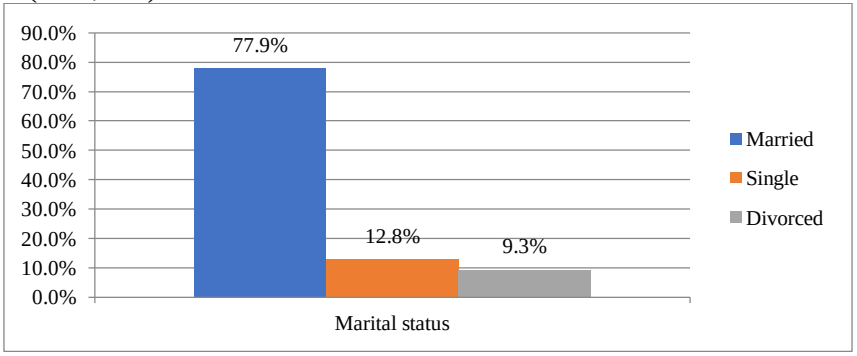

Figure no 2: *Marital status of the participants*

On analysis of how marital status affected nutritional practices among pregnant mothers, out of 67 mother who reported to be married, 20 had good nutritional practice, 25 reported to sometimes practice good nutrition, 11 mothers rarely practiced good nutrition and another group of 11 mothers never practiced good nutrition. Among 11 mothers who were single, 3 had good nutritional practice, 7 mothers reported to sometimes practice good nutrition, one mother rarely practiced good nutrition. Out of 11 mothers who had been divorced by the time of the study 3 had good nutritional practice, 4 sometimes practiced good nutrition, and one mother rarely practiced good nutrition. There was a weak association between marital status and practice of good nutrition with Cramer's V of .177. These results were not statistically significant in determining nutritional practice at χ^2 (6, N=86) = 5.373, p=0.497, Fishers exact test p value=0.258.

Table no 3: *Association between marital status of the mother and nutritional practice*

Variable	Marital status	Nutritional practice				Total
		Regularly	Sometimes	Rarely	Never	
Marital status of the mother	Married	20	25	11	11	67
	Single	3	7	1	0	11
	Divorced	3	4	1	0	8
Total		26	36	13	11	86

χ^2 (6, N=86) = 5.373, Fisher exact test p=0.497

In the current study marital status of the mother did not significantly affect their nutritional practice, this may be due to other confounding factors like maternal financial status. If the mother is financially stable, there is a likelihood of her to practice good nutrition irrespective of their marital status. In cases where the maternal financial status is not stable; the mother depends on the husband for provision of food, then there might be chances of marital status affecting nutritional practices. These results are contrary to the findings of Amega *et al*., (2018) which showed that marital status is a significant determinant of nutritional practices in pregnancy. The contrast might be due to other factors like availability and affordability of the food at the area of study. If the food is available and affordable, then the current research proves that marital status will not affect nutritional practices of the mother.

Level of education of the mother

The study findings revealed that the majority of the mothers had secondary level of education 27 (31.4%). The highest level of education attained among the sampled mothers was university level (2.3%, n=2) and the lowest was no formal education (16.3%, n=14). There were 26 (30.2%) mothers with primary level of education, and 17 (19.8%) mothers had college level of education.

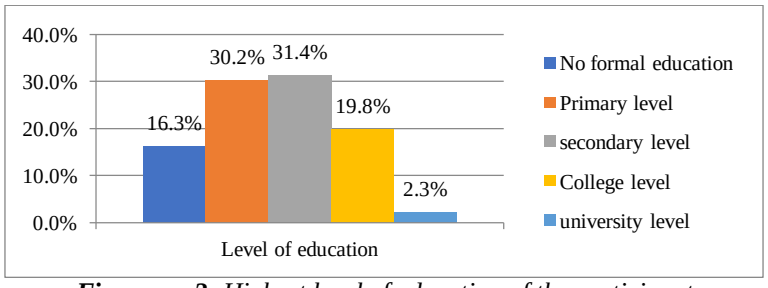

Figure no 3: *Highest level of education of the participant*

As shown in figure 5 above, the level of education was varying among the mothers who participated in the study. Out of 14 mothers who had no formal education, one had good nutritional practice, 4 reported to sometimes practice good nutrition, 2 rarely practiced good nutrition, and 7 mothers never practiced good nutrition. Among the 26 mothers who had primary level of education, one had good practice of nutrition, 14 indicated to sometimes practice good nutrition, eight mothers rarely practiced good nutrition and three never practiced good nutrition. Also, among the 27 mothers who had secondary level of education, 6 mothers were found to practice good nutrition, 17 mothers reported to sometimes practice good nutrition, three mothers rarely practiced good nutrition and one mother was found to have never practiced good nutrition. Among those who indicated to be in college, 16 of the mothers had good nutritional practices, and 1 mother reported to sometimes practice good nutrition, and the two mothers with university level of education had good nutritional practice. These results show that as the level of education increases, the practice of good nutrition increases; this was indicated by a positive correlation between level of education and nutrition practice of Spearman's Rho (r) of

.530 and Phi value of .917. On computation, these results were found to be statistically significant at χ^2 (12, N=86) = 72.387, p<0.001

Table no 4: *Highest level of education*

Variable	Level of education	Nutritional practice				Total
		Regularly	Sometimes	Rarely	Never	
Highest level of education of the mother	**No formal education**	1	4	2	7	14
	Primary level	1	14	8	3	26
	Secondary level	6	17	3	1	27
	College level	16	1	0	0	17
	University level	2	0	0	0	2
Total		26	36	13	11	86

χ^2 (12, N=86) = 72.387, p<0.001

A one-way analysis of variance was conducted to evaluate the mean differences between the levels of education in nutritional practices (N=86). The independent variable level of education of the mother included five groups; no formal education (M=3.57, SD=1.555, n=88), primary level of education (M=2.62, SD=1.023, n=88), secondary level of education (M=2, SD=.832, n=88), college level of education (M=1.06, SD=.243, n=88), and university level of education (M=1, SD=.000, n=88). The assumption of homogeneity was evaluated using levene test and found not tenable, F (4,86) =12.220, p=.000, therefore Welch robust test of equality of means was used instead F (4,86)=11.781, p=.028. The ANOVA was significant F (4,86) =56.825, p=.000.

Table no 5: *One-way analysis of variance between education levels of the participants*

	Sum of squares	df	Mean square	F	Sig.
Between groups	56.825	4	14.206	15.037	.000
Within groups	76.524	81	.945		
Total	133.349	85			

The actual differences were evaluated using Post Hoc test using Turkey HSD test to adjust the means, there was a significant difference between the no formal education level and university level of education, primary level of education, secondary level of education, college level of education and university level of education. There was also difference between means of primary level of education and college level of education but no significant difference between primary level of education and that of secondary and university levels of education and finally the findings indicated a significant difference between secondary level of education and college level of education. However, there was no significant difference between college level of education and university level of education.

It is evident that the current study points out that as the level of education increases, it increases the level of awareness of the mother about foods needed in pregnancy. The increase in knowledge compounded by knowledge on balanced diet increases the chances of good nutritional practices. These findings concur with the previous studies done in Brazil, China and Ghana, which showed that mothers with higher level of education have good nutritional practices (Amega *et al*., 2018; Oh, Kang, Cho, Ju, & Faye 2019; Lee *et al*., 2016).

Table no 6: *Mean differences for various levels of education of the participants*

	N	Mean	Std. Deviation	Std. error	95% Confidence interval for mean		Minimum	Maximum
					Lower bound	Upper Bound		
No formal education	14	3.57	1.555	.416	2.67	4.47	1	5
Primary level	26	2.62	1.023	.201	2.20	3.03	1	5
Secondary level	27	2.00	.832	.160	1.67	2.33	1	5
College level	17	1.06	.243	.059	.93	1.18	1	2
University level	2	1.00	.000	.000	1.00	1.00	1	1
Total	86	2.23	1.253	.135	1.96	2.50	1	5

Employment status of the participant

Majority of the participants (68.6%, n=59) reported to be unemployed with only 31.4% (n=27) mothers reporting to be employed by the time of the study. When the employment status of the participant was cross tabulated with nutritional practice, out of the 27 mothers who reported to be employed, 19 of them had good nutritional practice while 15 mothers had poor nutritional practice. Among the 59 mothers who were unemployed, only seven mothers were found to have good nutritional practice. There was a moderate correlation between employment status and good nutritional practice with Cramer's v of .452. The mothers who were

employed were 0.510 times more likely to practice good nutrition than the unemployed mothers (AOR=0.510, CI [0.344-0.755]). These results were statistically significant at χ^2 (1, N=86) = 26.8877, p<0.001. These results indicate that availability of funds or money for the purchase of food is critical in nutritional practices among pregnant mothers. Previous studies in Brazil also agree with these findings that financial stability is important in determining nutritional practices. The current study used employment; both formal and self-employment as an indicator for financial stability. The mothers who do not have a source of income are likely to depend on either their husbands or other family members for support. In such case, they do not have the power to decide what to eat and when. This can be very detrimental to the fetus and the baby after birth in terms of either prematurity or low birth weight or sometimes miscarriage.

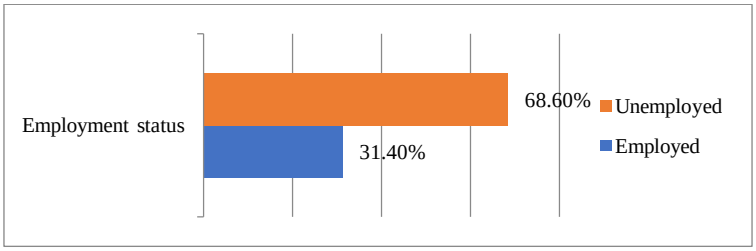

Figure no 4: *Employment status of the participant*

Among those who were employed, 12 (44.4%) were formally employed in public service, 12 (44.4%) more mothers reported to be self-employed, and 3 (11.2%) mothers were casual workers in companies.

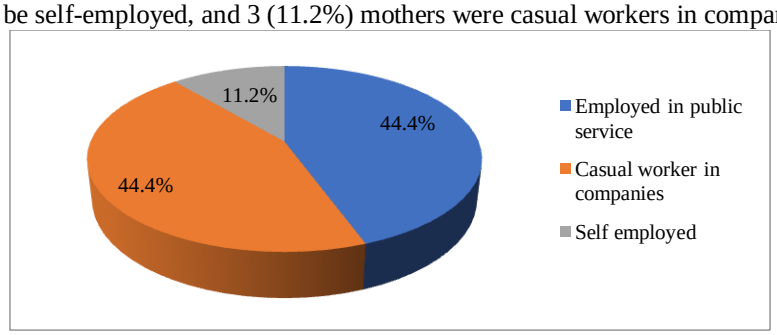

Figure no 5: *Form of employment of the employed participants*

Variable	Employment status	Nutritional practice		Total
		Good	Poor	
Employment status of the mothers	**Employed**	19	10	29
	Unemployed	7	50	57
Total		26	60	86

χ^2 (1, N=86) = 26.8877, p<0.001

Financial decision maker in the family

Majority of the participants (47.4%, n=41) reported that it is the role of the husband to allocate the finances in the family including the purchase of food in their houses. The remaining participants, 30.2% (n=26) reported that they discuss with the husband and come up with a budget while 22.1% (n=19) reported to decide on their own about the family finances.

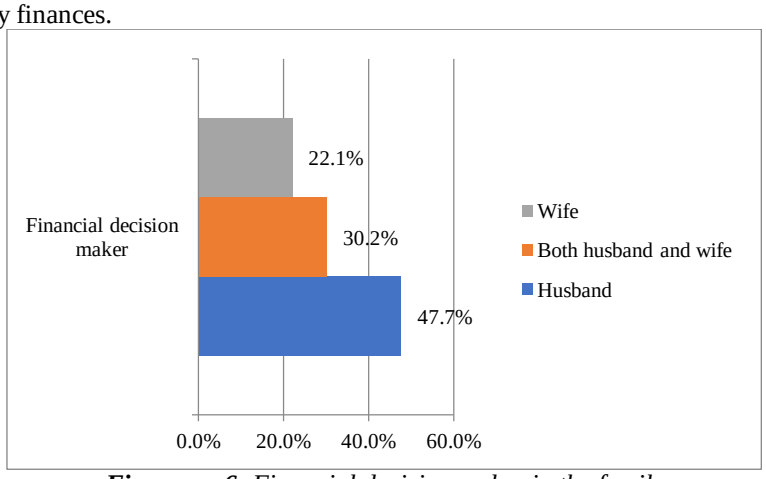

Figure no 6: *Financial decision maker in the family*

There was a strong association between the person who decides on finances and good nutritional practice with Cramer's v value of .579. Out of 27 mothers who reported to be making financial decisions on their own 22 of them had poor nutritional practice. Out of the 31 mothers whose husbands made financial decisions, 17 had good nutritional practices and among the 30 who share and discussed about their finances as a husband and a wife, only 4 had good nutritional practice. These results were found to be statistically significant at χ^2 (2, N=86) = 28.873, p<0.001

Variable	Category	Nutritional practice		Total
		Good	Poor	
Financial decision maker in the family	**Wife**	5	22	27
	Husband	17	12	29
	Both husband and wife	4	26	30
Total		26	60	86

χ^2 (2, N=86) = 28.873, p<0.001

Experience of health problem that led to food restriction

The study findings indicated that majority of the participants (82.6%, n=71) had not experienced any health problem that restricted their food intake. However, 17.4% (n=15) had experienced health problems that restricted their food intake.

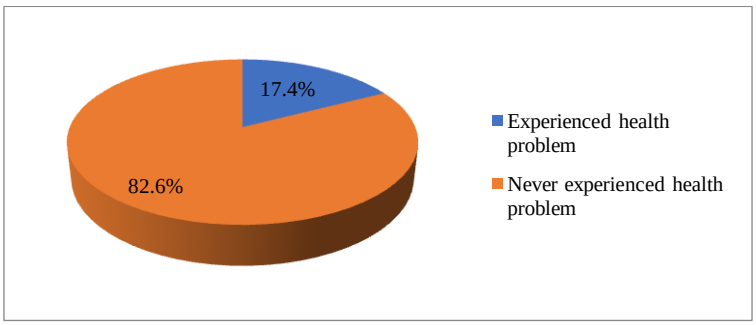

Figure no 7: *Experience of health problem that restricted the participants' food intake*

Among the study participants who experienced health problem that led to restriction of their food intake, they reported to be restricted in taking; vegetables and acidic foods (3.5%, n=3), fatty foods (1.2%, n=1), sukuma wiki (2.3%, n=2), eggs (1.2%, n=1), beans (4.7%, n=4), legumes (2.3%, n=2), salty junky foods (1.2%, n=1), and carbohydrates (1.2%, n=1). The results indicated a moderate association between having a health problem that restricts dietary intake at Cramer's v value of 0.275. However, the experience of a health problem that led to restriction of the diet of the participant was not significantly associated with practice of good nutrition at χ^2 (3, N=86) = 0.382, p=0.944.

Knowledge on balanced diet.

The study findings showed that majority of the participants (84.9%, n=73) were aware of what balanced diet entails.

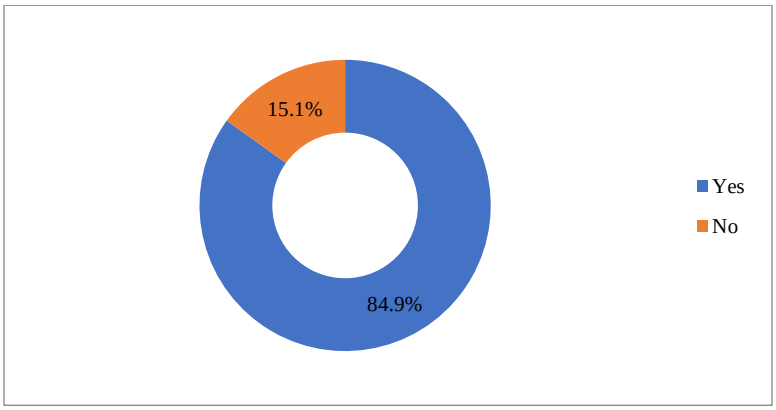

Figure no 8: *Participant knowledgeable on balanced diet*

Among the participants who were aware what balanced diet entailed, 25 of the participants regularly practiced good nutrition, 36 of the mothers reported to sometimes practice good nutrition, and 12 mothers rarely practiced good nutrition. Among those who were not aware of what a balanced diet entailed, one mother was

found to regularly practice good nutrition, another one mother rarely practiced good nutrition and 11 mothers never practiced good nutrition. The results showed that there is a strong association between knowing what a balanced diet entails and practice of good nutrition
at Cramer's v of 0.911 and a positive correlation of Spearmans' (r) of 0.898. Therefore, the results had statistically significant effect on nutritional practice among pregnant mothers at χ^2 (3, N=86) = 71.312, Fisher exact test p<0.001. Having knowledge on balanced diet increase the chances of preparing a balanced diet, these results concur with those of Lee *et al*., (2016). Knowledge on balanced diet was positively correlated with education level of the mother and had high colinearity; therefore, highest level of education may be a confounding factor to knowledge on balanced diet.

Variable	Aware of what a balanced diet entail	Nutritional practice				Total
		Regularly	Sometimes	Rarely	Never	
Knowledgeable on balanced diet	**Yes**	25	36	12	0	73
	No	1	0	1	11	13
Total		26	36	13	11	86

χ^2 (3, N=86) = 71.312, Fisher exact test p<0.001

Practice of good nutrition

The practice of good nutrition was measured using a Likert scale which had four categories based on taking a balanced diet, the categories were; regularly, sometimes, rarely and never. The study findings revealed that 26 (30.2%) mothers regularly took a balanced diet, 36 (41.9%) mothers reported to be taking a balanced diet occasionally or sometimes, 13 mothers (15.1%) rarely took a balanced diet and 11 mothers (12.8%) never took a balanced diet. The nutritional practice then categorized into good practice and poor practice based on taking a balanced diet regularly and this revealed that only 26 mothers had good nutritional practice while 60 mothers were found to have poor nutritional practice.

Table no 7: *Nutritional practice*

Variable	Category	Frequency	Percentage
Nutritional practice	**Good**	26	30.2
	Poor	60	69.8
Total		86	100

Socio-cultural factors affecting nutritional practice among pregnant mothers

Effects of religion on nutritional practice

Majority of the participants in the study (53.5%, n=46) were Christians while 46.5% (n=40) participants were Muslims by religion. However, the religion of the participants never affected their nutritional practices.

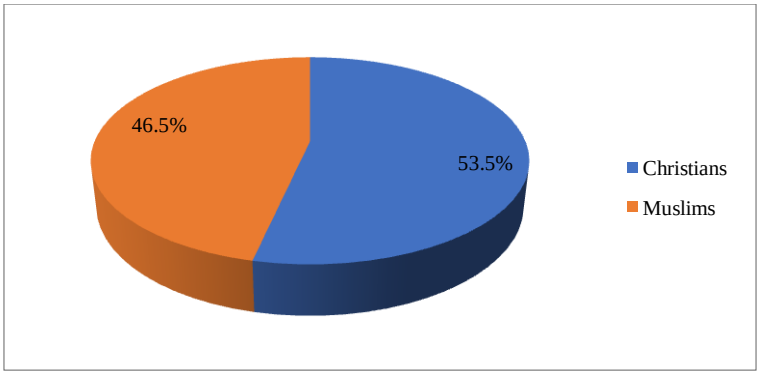

Figure no 9: *Religion of participants*

Despite the fact neither of the religious affiliation affected or restricted dietary intake, it was evident from the results that majority of the Christians had good nutritional practice compared to Muslims. These results were significant at χ^2 (1, N=86) = 13.501, Fisher exact test p<0.001. A positive correlation was found between Christianity and good nutritional practices. The Christians were 4.564 times more likely to practice good nutrition than Muslims (AOR=4.564, CI [1.718-12.125]). There was also a positive correlation between Christianity and good nutritional practice at Spearmans' (r) of 0.396.

Table no 8: *Association between religious affiliation of the participant and nutritional practice*

Variable	Religious affiliation	Nutritional practice		Total
		Good	Poor	
Religious affiliation of the participant	**Christian**	22	25	47
	Muslim	4	35	39
Total		26	60	86

χ^2 (1, N=86) = 13.501, Fisher exact test p<0.001

These results show that some religious beliefs restrict specific food intake. This can be during pregnancy or the normal life. Other religions emphasize that the life of a person is under Gods' control and therefore taking food or not does not matter a lot. In pregnancy, there is extra demand for nutrients which need to be available for health growth of the fetus, therefore, if the mother does not take enough of the nutrients, the fetus suffers. It is therefore important to understand the specific religious beliefs that restrict specific foods needed in pregnancy so that advice can be given to the mothers accordingly. The current study did not investigate on the specific beliefs. In comparison with other studies previously done, it is important to note that in Ghana, Graham *et al*., (2015) also found that religious beliefs affected nutritional intake among pregnant mothers. In some cases, there exists food taboos, that if you eat certain foods when pregnant you are likely to bear a child with abnormalities or get miscarriage as it has been reported in Ethiopia (Mohammed *et al*., 2019; Swihart *et al*., 2019).

Effects of culture on nutritional practices

It was found from the study results that some mothers were restricted from taking some foods according to their culture. In the study, majority of the mothers (87.2%, n=75) had no food or dietary restrictions according to their culture. However, a few mothers (12.8%, n=11) had been restricted not to take specific foods taught to have consequences in their pregnancy according to their culture.

Table no 9: *Culture restricts food intake in pregnancy*

Variable	Category	Frequency	Percentage
Your culture restricts any type of food intake during pregnancy	**Yes**	11	12.8
	No	75	87.2
Total		86	100

The mothers who reported to be restricted in taking some foods in pregnancy were probed more on specific foods that are prohibited. It was indicated from the results that the foods restricted during pregnancy included; wild meat (10.5%, n=9), porcupine meat (1.2%, n=1), eggs (1.2%, n=1), rolled vegetables like cabbage (1.2%, n=1), avocado (1.2%, n=1) and the larger proportion of the mothers (84.9%, n=73) reported not to belief in those restrictions.

According to the belief of the respondents, those who adhered to the cultural beliefs reported that in case a pregnant woman took the prohibited food during pregnancy, she was likely to experience some consequences. Some of the consequences highlighted included; difficult labor (10.5%, n=9), rude baby (2.3%, n=2), big baby (1.2%, n=1) and majority of the mothers (86%, n=74) were not aware of any consequence that can befall a mother if she took the prohibited food during pregnancy.

Among the participants who reported to be restricted by their culture on which food to take, 9 mothers regularly took their balanced diet hence practicing good nutrition, and two mothers reported to sometimes practice good nutrition. It was also noted that among those who were not restricted by their culture on dietary intake during pregnancy, 17 mothers had good nutritional practice, 34 mothers sometimes practiced good nutrition, 13 mothers rarely practiced good nutrition, and 11 of the mothers never practiced good nutrition. These results showed a moderate association between culture and nutritional practice at Spearmans (r) of 0.436 and were statistically significant at χ^2 (3, N=86) = 16.312, Fisher exact test p<0.001.

Table no 10: *Effects of culture on nutritional practice in pregnancy*

Variable	Culture restricts food intake during pregnancy	Nutritional practice				Total
		Regularly	Sometimes	Rarely	Never	
Effects of culture on nutritional practice	**Yes**	9	2	0	0	11
	No	17	34	13	11	75
Total		26	36	13	11	86

χ^2 (3, N=86) = 16.312, Fisher exact test p<0.001

The current study depicts that cultural beliefs affect nutritional practices, however, the study did not explore the specific cultural beliefs that prohibit pregnant mothers from taking specific foods in pregnancy. The

beliefs that if you eat eggs during pregnancy you will experience difficult labor or get big baby still lingers in the mind of many mothers in Tana River County. It was reported in the study that some mothers fear and other do not eat eggs because of such belief. Other foods like rolled vegetables (Cabbage) and wild meat are also prohibited. Restricting pregnant mothers from taking proteins is exposing the same mothers to anemic conditions known to be detrimental to the life of the fetus. These results are in agreement with previous studies done in China (Marquis & Jensen, 2015) which showed that eating a lot of proteins is prohibited in pregnancy especially eggs.

Facility-linked factors affecting nutritional practice

Health education on nutrition during pregnancy

The mothers reported that during ANC they were taught about nutrition during pregnancy. This was indicated by the majority (81.4%, n=70) while a few (18.6%, n=16) reported not to have been counseled on nutrition during pregnancy.

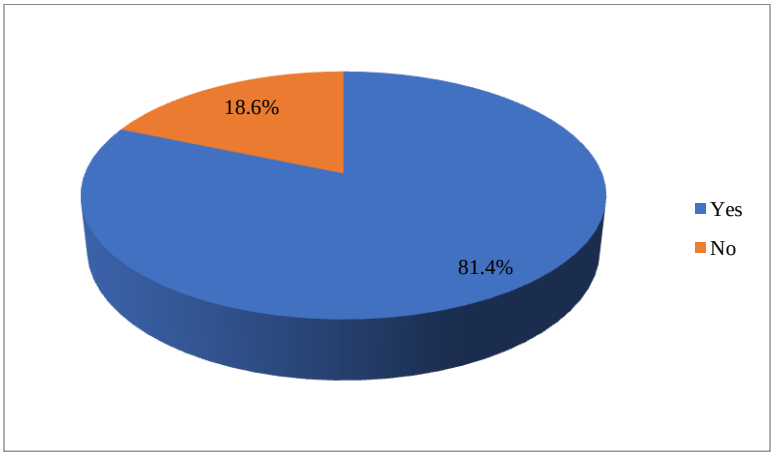

Figure no 10: *The participant was offered nutritional counseling during pregnancy*

Among those who received nutritional counseling during pregnancy, 25 mothers were found to practice good nutrition, 31 others reported to sometimes practice good nutrition,10 mothers rarely practiced good nutrition and four mothers never practiced good nutrition. On assessing the mothers who reported not to have been counseled on nutrition during pregnancy, one mother was found to have good nutritional practice, five mothers reported to sometimes practice good nutrition, three mothers rarely practiced good nutrition and seven mothers reported to never have been practicing good nutrition during pregnancy. These results showed a moderate association between nutritional counseling during pregnancy and good nutritional practice at Cramer's v value of 0.472 and were statistically significant at χ^2 (3, N=86) = 19.170, Fisher exact test p<0.001. Nutritional counseling is critical especially in pregnancy, Murage-Kimani (2019) revealed that the mothers counseled on their nutritional intake regardless of their education level, had good nutritional practices. This is in agreement with the findings of the current study.

Table no 11: *Association between nutritional counseling and good nutritional practice*

Variable	Counsel on nutrition during pregnancy	Nutritional practice				Total
		Regularly	Sometimes	Rarely	Never	
Effects of nutritional counselling during pregnancy on nutritional practice	**Yes**	25	31	10	4	70
	No	1	5	3	7	16
Total		26	36	13	11	86

χ^2 (3, N=86) = 19.170, Fisher exact test p<0.001

Use of nutritional models during nutritional counseling

The participants indicated that the nutritional counseling was done using nutritional models to enhance understanding. This was reported by majority of the mothers (68.6%, n=59) that use of nutritional pyramid helped them understand on the proportions of each food type.

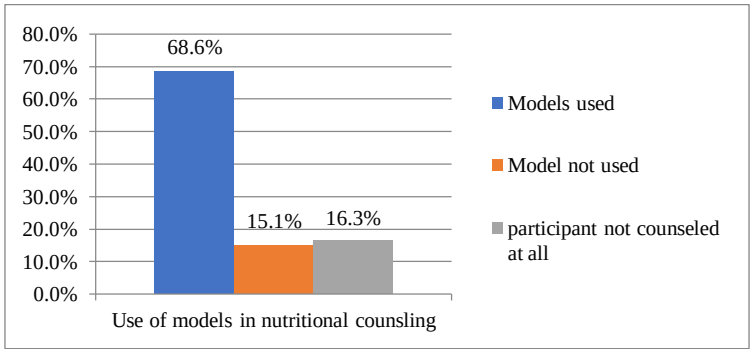

Figure no 11: *Use of nutritional models in nutritional counseling to enhance understanding*

Among those who were counseled using nutritional models, 23 mothers were practicing good nutrition, 25 mothers sometimes practiced good nutrition, 9 mothers rarely practiced good nutrition and two mothers never practiced good nutrition. Also, among those who were counseled but not using nutritional models, two mothers had good nutritional practices, six sometimes practiced good nutrition, one mother rarely practiced good nutrition and four other mothers reported never to have practiced good nutrition during pregnancy. It was also noted that among those who were never counseled either using the model or not, one mother had good nutritional practice, five mothers sometimes practiced good nutrition, three mothers rarely practiced good nutrition and four more mothers reported never to have practiced good nutrition during pregnancy. There was a strong positive correlation between being counseled using nutritional model and good nutritional practice at Spearmans' (r) of 0.471 and these results were statistically significant at χ^2 (6, N=86) = 19.056, Fisher exact test p<0.001

Table no 12**:** *Association between use of nutritional model during nutritional counseling and good nutritional practice*

Variable	**Response**	**Nutritional practice**				**Total**
		Regularly	**Sometimes**	**Rarely**	**Never**	
Use of nutritional model during nutritional counselling to enhance understanding	**Model used**	23	25	9	2	59
	Model not used	2	6	1	4	13
	Never counselled at all	1	5	3	5	14
Total		26	36	13	11	86

χ^2 (6, N=86) = 19.056, Fisher exact test p<0.001

Previous studies concentrated on nutritional counseling and gave minimal attention on modalities of doing the counseling. The current study explored the use of nutritional models (pyramids) as teaching aid to foster understanding of dietary intake. The study revealed significant results, that use of the models enhances understanding of the counseling given.

Use of nutritional supplements

The participants reported to have been give nutritional supplements during ANC clinics. However, majority of the mothers (60.5%, n=52) never got the micronutrient supplements at the facility.

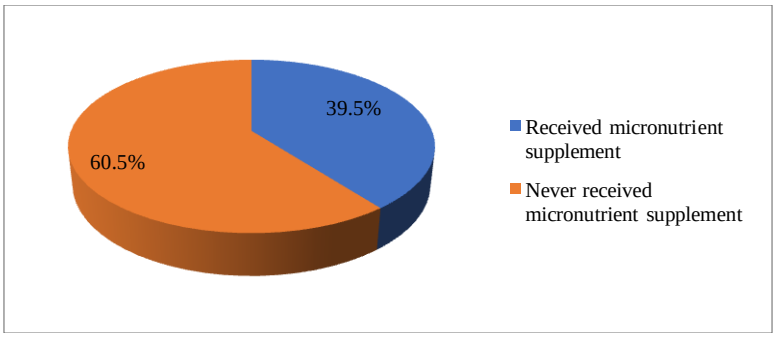

Figure no 12*: Reception of micronutrient supplement during ANC visits*

Among those who received the supplement, 15 mothers had good nutritional practice, ten mothers reported to sometimes practice good nutrition, six mothers rarely practiced good nutrition and three mothers

never practiced good nutrition. Also, among those who never received the supplements, 11 mothers had good nutritional practice, 26 mothers sometimes practiced good nutrition, seven mothers rarely practiced good nutrition, and eight mothers never practiced good nutrition. There was a moderate association between reception of micronutrient supplement and good nutritional practice at Cramer's V value of 0.304 and these results were statistically significant at χ^2 (3, N=86) = 7.968, Fisher exact test p=0.047. Previous studies had also shown similar findings that the mothers advised and given supplements had good nutritional practices (Sunuwar *et al.*, 2019). Also, in Ethiopia, Winter *et al*., (2019) found out that giving of iron and folic supplements to the mothers replenished the nutrient stores.

Table 13: Association between reception of micronutrient supplement at the facility during ANC visits and good nutritional practices.

Variable	Response	Nutritional practice				Total
		Regularly	Sometimes	Rarely	Never	
Reception of micronutrient during ANC visits	Yes	15	10	6	3	34
	No	11	26	7	8	52
Total		26	36	13	11	86

χ^2 (3, N=86) = 7.968, Fisher exact test p=0.047

Regression analysis of significant factors that affect nutritional practices during pregnancy

After adjusting for all confounding factors and checking for model fit, all the significant factors were entered into binary logistic regression using dependent variable as nutritional practices which had two categories; good nutritional practice and poor nutritional practice. After computing forward stepwise regression at an entry point of 0.05 and removal point of 0. 1 and 95% confidence interval, the researcher developed one model that was found fit for the factors determining nutritional practices.

Variables in the equation

	B	S.E	Wald	df	Sig.	Exp (B)
Step 0 constant	-0.836	0.235	12.685	1	.000	.433

Omnibus tests of model Coefficients

		Chi-square	df	Sig.
Step 1	Step	48.030	3	.000
	Block	48.030	3	.000
	Model	48.030	3	.000

Model Summary

Step	-2 log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	35.653	.556	.787

Variables in the equation

		B	S.E	Wald	df	Sig.	Exp (B)	95% C.I for EXP(B)	
								Lower	Upper
Step1	What is your highest level of education?	2.819	.811	12.098	1	.001	16.768	3.424	82.125
	Are you in any form of employment?	-2.226	.960	5.373	1	.020	.108	.016	.709
	Does your culture restrict any type of food intake?	-3.178	1.331	5.698	1	.017	.042	.003	.566
	Were you given micronutrient supplements at the facility during your visits?	-3.338	1.221	7.467	1	.006	.036	.003	.389
	Constant	5.172	3.167	2.667	1	.102	176.338		

The results after adjusting for confounding factors indicated that the main determinants of good nutritional practice among mothers attending their ANC visits at Ngao Sub-County hospital were; having education level of secondary level and higher, having a source of income especially being in employment, cultural food restrictions negatively affected nutritional practices, and the mother who were given micronutrient supplements at the facility during ANC visits were found to have good nutritional practices.

IV. Discussion

Individual factors affecting nutritional practice

The response rate for the study was 98%. The majority of the mothers (32.6%%, n=28) were having their ages range between 21-25 years. When age was associated with nutritional practice, the relationship was significant at p value <.05. The older mothers were more likely to practice good nutrition than the young mothers were. Marital status ranged from single mothers (12.8%,n=11), Divorced mother (9.3%, n=8) to married mothers (77.9%, n=67). However, marital status did not have significant results on determining nutritional practices in pregnancy.

The highest level of education was found to be influencing nutritional practices significantly. The higher the level of education the higher the probability of good nutritional practices. The mothers with above primary level had higher prevalence of good nutritional practices compared to those with no formal education. The mothers reported to be employed (31.4%, n=27) and others not (68.9%, n=59). Those who were employed were either in public service (14%, n=12) or self-employment sector (14%, n=12). Irrespective of the form of employment, the findings revealed that employment was critical in determining nutritional practices in pregnancy.

The study also assessed who made financial decisions in the family of the participant. Some reported to be making the decisions by self (22.1%, n=19), others discussed with the husband (30.2%, n=26) and others the husband made the decision (47.7%, n=41).

Experience of health problem restricting certain food intake was taught to influence nutritional practices. The study findings indicated that having a health problem that restricted a mother from taking certain foods did not significantly affect their nutritional practices. The foods the mothers were restricted from included; sukuma wiki, acidic foods and legumes. On knowledge on balanced diet, the mothers were knowledgeable (84.9%, n=73). Having the knowledge on balanced diet significantly determined nutritional practices but was found to be confounded by mothers' level of education.

Socio-cultural factors determining nutritional practices

The study assessed the religious affiliations of the participants and if the religion restricted them from taking certain foods in pregnancy. The study findings indicated that the participants were either Christians (53.5%, n=46) or Muslims (46.5%, n=n=40). The Christians were more likely to practice good nutrition compared to Muslims. However, the study showed that the participants were no restricted from taking any of the foods during pregnancy by their religion.

Cultural beliefs of the participants was found to be significantly determining nutritional practices of the mothers involved in the study. The culture of the mothers restricted them from taking certain foods especially proteins and this predisposed them to anemia. Some of the foods prohibited were proteins and these are major source of amino acids needed for fetal growth. However, the study did not explore the specific cultural beliefs prohibiting dietary intake. Some mother feared eating the prohibited foods for fear of unknown consequences. It was evident from the respondents that they belief if the prohibited food is eaten, the mother will bear a baby with abnormalities.

Facility-linked factors determining nutritional practices

Three factors were assessed among the mothers. First, the mothers were assessed if they received nutritional counseling. Majority (81.4%, n=70) reported that they had received nutritional counseling during ANC visits. Among those counseled, nutritional practices were good. Secondly, use of nutritional models in counseling was assessed and results showed 68.6% (n=59) mothers had been counseled using nutritional models; these results too were significantly determining nutritional practices. Thirdly, the mothers reported to have been given micronutrient supplement during ANC visits, however, not all mothers had been given the supplements. Among those who were given the supplements (39.5%, n=34), they were found to have higher probability of practicing good nutrition.

V. Conclusion

The study makes the following conclusions

1. The age of the pregnant mother should be considered when offering nutritional counseling since young mother are poor observers of good nutritional practices
2. Education level of the pregnant mother determines their understanding of good nutritional practices; higher levels of education were associated with good nutritional practices. Therefore, health workers should endeavor to enlighten pregnant mothers on nutritional practices especially those with low levels of education or no formal education
3. Employment status of the mothers was significantly associated with nutritional practices. This indirectly showed the capability of the mothers to decide on which food to take as per their income. Therefore, the mothers should be advised on how to practice good nutrition with the available foods and not necessarily the foods to be bought.
4. Culture of the mother also affected their nutritional practices. The mothers believed that babies born with abnormalities are as a result of taking prohibited foods, health care providers should shed light on such misconceptions.

References

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