Global Research Journal of Public Health and Epidemiology: ISSN-2360-7920: Vol. 8(3): pp, 005-012, March, 2020.

Medical Full Length Article

Influence of Nutrition Knowledge on Dietary Practices and Attitudes of Pregnant Women in Migori, Kenya

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Accepted 8th March, 2020.

Nutrient related deficiency diseases and micronutrient deficiencies which can result to intrauterine growth retardation are manifested. Approximately 200 million women become pregnant each year in developing countries and many of these women suffer from ongoing nutritional deficiencies. In Kenya, malnutrition primarily affects pregnant and lactating women and children under five years of age, and significantly contributes to their morbidity and mortality. Kenya's high rates of under nutrition among WRA are particularly due to insufficient awareness and knowledge on nutritionally adequate diets among other causes. Nutrition education during pregnancy can improve dietary intake. This study sought to determine nutrition knowledge and practices on dietary intake and their associations before and after a psycho-educational nutrition initiative among pregnant women in Migori County. A prospective cohort study design was used and simple random sampling was used to obtain a sample of 150 pregnant women from three sub-county hospitals purposively selected for study. Pregnant women of GA ≤26 weeks were recruited and enrolled into psycho-educational nutrition intervention study. Data was collected by a nutrition knowledge and practices questionnaire. Data was collected at baseline and after intervention for each woman and analyzed by SPSS. Data was summarized by descriptive and relationships between variables was tested by Chi square. Findings showed that the pregnant women Nutrition education had positive significant associations with nutrition knowledge and practices. The study found significant effects of nutrition knowledge from the psycho-educational initiative on dietary intake. The study concludes that nutrition education can be used to improve behaviours and dietary practices of pregnant women. The finding is important to central and county governments, civil society, intergovernmental agencies, research groups, business enterprises and community under study.

Keywords: Nutrition Knowledge, Dietary Practices and Attitudes, Pregnant Women

INTRODUCTION

Nutrient related deficiency diseases and micronutrient deficiencies which can result to intrauterine growth retardation are manifested worldwide (Rao, 2014). Hidden hunger or micronutrient deficiency affects more than one in three of the world's population in both developed and developing countries. In Kenya, malnutrition primarily affects pregnant and lactating women and children under five years of age, and significantly contributes to their morbidity and mortality (MoPHS & SCUK, 2011). Approximately 200 million women become pregnant each year in developing countries and many of these women suffer from ongoing nutritional deficiencies (Ruel; 2013, Merkel, 2016). Kenya's high rates of under nutrition

among WRA are particularly due to sub-optimal feeding practices, heavy physical work and low energy and micronutrient intake (Shrimpton & Sadahha, 2011, Division of Nutrition (GOK), 2012) together with insufficient awareness and knowledge on nutritionally adequate diets (Unicef, 2014).

According to Nutrition International (2017), maternal, infant and child nutrition indicators are still sub-optimal. The High Impact Nutrition Interventions recommended by Lancet have been adopted by MOH Kenya (Unicef, 2014) yet according to the Nutrition Division (GOK) (2012) the coverage of these interventions remains very low due to inadequate resources and low prioritization of nutrition as reflected by low investment. In Kenya good quality maternal health services are not accessible to many expectant women according to Kisika, (2013). Nationally 59 % of pregnant women visit ANC at least four times, 43% deliver at a health facility, 74% receive ARV treatment (AFIDEP, UNFPA & Norad, 2017), 51 % are still anaemic, 41 % do not receive 2 tetanus toxoid vaccines, only 22 % consume iron and folic acid supplements for ≥ 90 days, 14 % are undernourished (SUN, 2016) and only 53 % receive iron folate supplementation (MOH, 2013).

Iron supplementation programmes for pregnant women have had little success in decreasing the high rates of iron deficiency anaemia. Several interventions are provided at the ANC as recommended by WHO (KNBS, 2013). Nutrition Education and counseling has not been brought out strongly in this healthcare package for pregnant women (Unicef, 2014) and its impact cannot be quantified. The Status of monitoring and evaluation for Nutrition in Kenya indicates that there is limited impact from nutrition interventions (Republic of Kenya MOH, 2013).

Creating awareness among pregnant mothers is important. Nutrition education and counseling during pregnancy can reduce the risk of anaemia, increase gestational weight gain and improve birth weight (Giward & Olude, 2012). Positive behaviour adjustments by participants in nutrition education and counseling interventions have been reported by several authors. Nutrition education intervention is therefore an essential consideration to optimise maternal nutrition and pregnancy outcomes.

It is important to give women support for optimal nutrition before and after they become pregnant, in order to promote good nutrition. According to Schultink (2013) to improve local and global health and development, there is need to scale up nutrition. Moreover given the close links between maternal and child nutrition, efforts to improve the nutritional status of women are critical to attaining global nutrition targets of the Sustainable Development Goals (Aguayo & Menon, 2016).

Kenya missed the 2015 Millenium Development Goal (MDG) targets, therefore much is still to be done to improve maternal and child's health. Migori County is one of 15 Counties that account for over 60 % of maternal deaths in Kenya. The high maternal and infant mortality rates are linked to limited access to maternal and child health interventions according to AFIDEP, UNFPA and Norad (2017). UNICEF (2016) states that interventions aimed at preventing foetal growth retardation are urgently needed in many countries.

According to Kenya Reproductive, Maternal, Newborn, Child and Adolescent Health Framework (GOK, 2016) and AFIDEP, UNFPA & Norad (2017) nutrition education is inconspicuous in the healthcare package and in intervention programmes both nationally and in Migori County for pregnant women. In light of the poor maternal nutrition indicators and poor coverage of evidence based interventions, this study aimed at implementation of a nutrition awareness initiative to fill the missing gap and encourage the adoption of optimal nutrition practices by promoting behavioural changes that would improve maternal nutrient intake and pregnancy outcomes in Migori County.

MATERIALS AND METHODS

The study used a prospective cohort study design and purposive sampling was used to select three health facilities as centres for the study. The study aimed to determine nutrition knowledge and its effect on dietary practices and attitudes among pregnant women in Migori County. The study area was Migori County. The County is located in Western Kenya bordering Homabay County on the North, Kisii County on the North East, Narok County on the East and South East, Tanzania on the South and South West and Lake Victoria to the West. The County is made up of an area of 2,597 Km² with a total population of 1,098,343 and 263,602 women of reproductive age of.

The study population was pregnant women who visited selected health care facilities to receive antenatal care. The study included all pregnant women of reproductive age (15 to 49 years) up to 26 weeks gestation, women with a documented medical history or who reported a history of disordered eating, but the diagnosis not listed in the exclusion criteria, those who resided in the county for at least 6 months and those who gave consent to participate in the study.

The sample size was determined by use of Fisher's formula (Fisher, 1991). Simple random sampling was used to obtain the required sample size (50) of pregnant women in each of the selected health facilities. Women were randomly sampled daily as they

arrived at the health facilities by the assistance of health care providers for three to four months until the required sample size was obtained. Those who gave informed consent were recruited into the study. A standard pre-coded questionnaire was used to collect information on nutrition knowledge and practices.

Data Collection Procedure

Six research assistants were trained on data collection techniques. The objectives of the training were to harmonize questionnaire content, to review effective adult teaching techniques, how to carry out the 24 hour recall interview, and to familiarize enumerators with training materials and equipment. After the training, the researcher and assistants proceeded to the various health facilities for sample selection and recruitment. Upon recruitment, baseline data was collected from each subject who was then enrolled into the nutrition awareness initiative study to be followed up until delivery. Data collection was hospital based. A total of 150 pregnant women were selected for study. Each participant was given a code and their names recorded against the codes to ease follow up. After the study the names were discarded and only the codes were used for data entry and analysis.

A standardized nutrition knowledge questionnaire was administered through a face to face interview schedule at the hospital at the first contact to investigate and score for nutrition knowledge and dietary intake. Nutrition knowledge score rated on a scale of 1-10 and nutrition practices and attitudes were investigated again after the intervention. Information that was collected included, nutrition knowledge and practices and nutrition knowledge score, ,

Overall, the intervention was a psycho-education of subjects on adequate diet, reduction of physical activity, the need to gain more weight, hygiene and other best practices during pregnancy meant to change their attitudes to enable positive behaviour change using educational resources issued to them after an initial educational forum with each of the participants which included instruction on the content of the educational resources and how to apply the knowledge contained in them. The information in the brochure, handout and booklet were translated to the local dialect at the initial educational forum for those who didn't understand English. Those who were completely unable to read were instructed to use a family member who was to read and pass the information to them. During each visit to the ANC the women had group counseling sessions with the health workers who used content from the educational chart. During the bimonthly ANC visits the women were reminded to read the brochure, recipe booklet and hand out and apply the knowledge provided in those materials as well as information given during the group counseling sessions. Through contact with the educational resources, women were expected to have acquired knowledge and practised optimal feeding habits, and behaviours that would improve dietary intake.

A pilot run was done to test the methodology for three months prior to the actual research. The intervention process similar to the one used during the study was carried out on 10 % of the sample similar to the actual sample that was used in the study but who were not included in the study. The instruments were then pre-tested on the same sample. Procedures to be used in pre-testing were identical to those that were used during the actual data collection. This brought out meaningful observations such as unclear direction, clustered and wrong phrasing of questions. Descriptive statistics were used as appropriate and Chi square test for associations was used to test for relationships between nutrition knowledge scores.

Approval to carry out research was granted by Kenyatta University Ethical Review Committee and Graduate School. A research permit was obtained from National Commission for Science, Technology and Innovation (NACOSTI). Permission to carry out research was sought from the County Commissioner, County Director of Health and County Director of Education. Project administration was sought from the Medical Officers in Charge at all the selected health facilities. Participation in the study was purely voluntary and written informed consent was obtained from the pregnant women who were then recruited into the PNI study. Data confidentiality was also maintained.

RESULTS

Dietary Practices

During the 24 hour recall interview, the women were asked if what they had consumed the previous day was their usual food intake. Most (71 %) of the women had consumed the usual portion. Those women who consumed unusual portions gave reasons for the unusual intakes as not feeling hungry (18.5 %), stressed (17.5 %) and travelling (18.5 %).

Most of the women (22 %) had no pregnancy related complaint affecting food consumption, for those with such complaints, most suffered from poor appetite (16 %) followed by nausea (14 %), oedema of the legs (7 %) and vomiting (6 %) which may have affected the kinds of foods consumed. Others (35 %) had no conditions related to food intake such as fatigue and backache. The pregnant women were asked to rate themselves on a scale of 1 – 10 indicating high, medium and low level of knowledge before and after the psycho-educational nutrition initiative. Before intervention 47 % of the women had low nutrition

knowledge scores, 34 % had medium nutrition knowledge scores and 19 % had high nutrition knowledge scores. At post intervention most women (60.2 %) had acquired high nutrition knowledge, 33.2 % had acquired medium nutrition knowledge and only 6.6 % had low nutrition knowledge (Table 1).

Table 1: Dietary practices of pregnant women

Nutrition and health practices		Frequency (n=136)	Percentage
Prior Day's Food Intake	More than usual	9	5.6
	Less than usual	31	23.4
	Usual	96	71.0
Reasons for less Intake	Travelling	25	18.5
	Not hungry	25	18.5
	Special meal	22	16.2
	Stressed	24	17.5
	Too busy	24	17.5
	Dieting	16	11.8
Health condition influencing diet	Diet related to medical conditions	11	8.1
Special diet pattern	Heartburn	4	2.9
	Digestion complications	9	6.6
	Allergy	10	7.4
	Non	102	75.0
	Normal diet	106	78.0
	Diet related to health	9	6.6
	Unknown	06	4.4
Pregnancy related complaints affecting food intake	Others	48	35
	Non	30	22
	Poor appetite	22	16
	Nausea	19	14.0
	Vegetarian	15	11.0
	Oedema	09	07
	Vomiting	08	06
Nutrition knowledge Score (post intervention)	High (7 – 10)	82	60.2
	Medium (4 – 6)	45	33.2
	Low (1 – 3)	09	6.6
Nutrition knowledge Score (baseline)	High (7 – 10	26	19
	Medium (4 – 6)	46	34
	Low (1 – 3)	64	47

Number of Meals Consumed by Pregnant Women in a Day

At baseline most women consumed three meals a day (42 %) followed by those who consumed four meals a day (27 %) a day, 19 % consumed two meals a day and 4 % consumed only one meal in a day. After the intervention those who consumed four and five meals in a day increased (43 % and 25 % respectively) while those who consumed three meals in a day reduced (32 %). There were no women who consumed one or two meals in a day after the intervention (Figure 1).

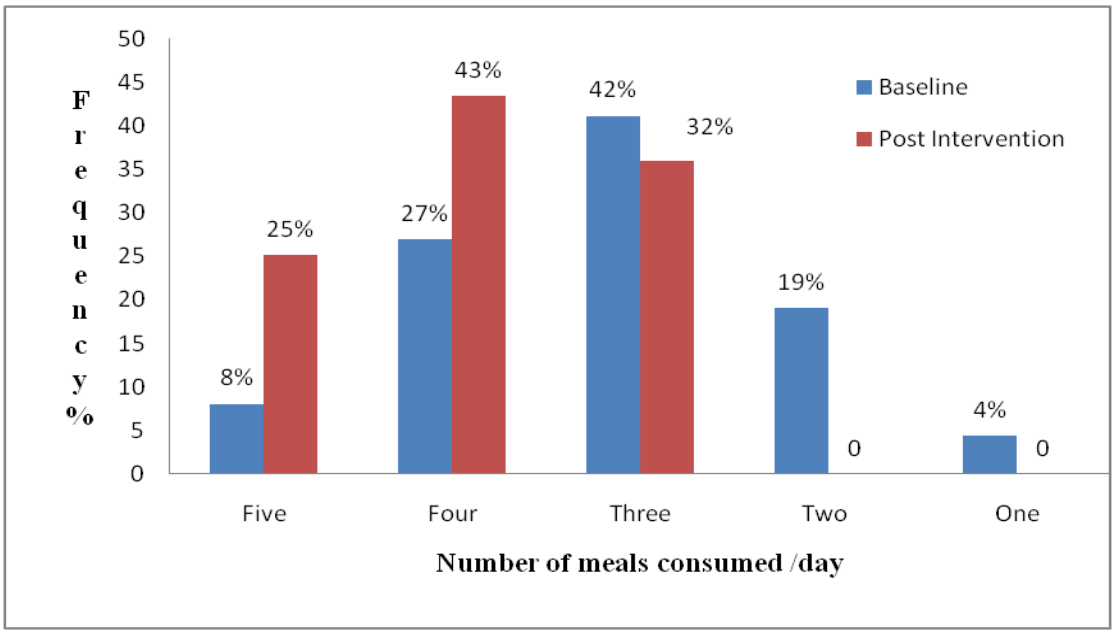

Figure 1: Number of meals consumed in a day by the pregnant women

At the baseline level most (61.4 %) of the women felt that a pregnant woman needed to increase their food intake but 38.6 % felt that a pregnant woman need not increase their food intake. More of the women (58.8 %) felt a pregnant woman also needed to rest more during pregnancy but a considerable proportion although less than half of pregnant women (41.2 %) also felt that a pregnant woman should not decrease their workload during pregnancy.

More women (77.4 %) reported to have increased rest during their pregnancy after the intervention. All the women reported to have applied the knowledge that they had obtained from the psycho-educational nutrition initiative. Almost all the women (96.5 %) observed food hygiene handling practices as well as washing their hands (88 %) before eating after the intervention. Chi square test for associations found all the factors tested under nutrition knowledge and practices to have significant associations at baseline and after intervention except presence of problem preventing eating, food craving and washing hands that had no significant associations (0.415, 0.902, and 1.83 at $p \leq 0.05$ respectively) (Table 2).

Table 2: Relationship between nutrition knowledge and practices of pregnant Women at baseline and post intervention

Practices and Attitudes	Baseline (n=136)	Post Intervention (n=115)	P* (χ^2)
Positive attitude on increased Food intake in pregnancy	58(43%)	71(61.4%)	0.014
Increased rest during the pregnancy	71(52%)	89(77.4%)	0.026
Hygiene observed during handling food	82(60%)	110(96.5%)	0.003
Presence of problem preventing eating	82(60%)	68(58.8%)	0 .415
Washing hands before eating	103(76%)	101(88%)	0.180
Positive attitude on More rest in pregnancy	46(34%)	68(58.8%)	0.047
Food Craving	67(49%)	61(53%)	0.902
Took all medicine given at ANC**		110(95.7%	
Incidence of sickness requiring treatment during the pregnancy**		30(26.1%)	
Applied knowledge obtained during the pregnancy**		115(100)	

P* values from chi-square test of association between nutrition knowledge score and dietary attitudes and practices, $p \leq 0.05$

** Test not done.

DISCUSSION

Pregnant Women's Nutrition Knowledge and Practices

More women reported to have increased rest during their pregnancy implying that those who had earlier felt that a pregnant woman should not rest more may have changed their attitude and behaviour after the encounter with the psycho-educational nutrition initiative. Most of the pregnant women had some dietary knowledge acquired during the intervention as shown by the high proportion of women who applied the nutrition knowledge obtained. From the nutrition knowledge scores more than half of the pregnant women had acquired high nutrition knowledge after the intervention and almost all the women had acquired acceptable nutrition knowledge levels.

Nutrition knowledge and practices that were tested before and after the intervention (having a positive attitude on increased food intake in pregnancy, positive attitude on more rest during pregnancy, having increased rest during the pregnancy and having observed hygiene practices during the given pregnancy) showed significant improvements after intervention. Presence of problem preventing eating, hand washing before meals and food craving had no significant associations at baseline and after intervention. A study on nutrition knowledge of caregivers and dietary practices of children in Kajiado, Kenya found caregivers to have minimal knowledge on nutritional issues with more than half of the caregivers having very low nutritional knowledge scores.

The study found significant relationships between knowledge score and dietary practices (Chege & Kuria, 2017). These findings compare well with that obtained from this study. Proportion of women who wash their hands before eating was however lower than the Migori County figure of 96.9 % (KIRA, 2015). The variation may be due to the nature of the data collection in this study where the women were required to give information on hand washing at all instances of eating even if only a light snack was taken while the Migori figures may have been obtained from questionnaires requiring women to indicate hand washing only during the major meals. An Algerian study (Taleb, Kaibi & Deghboud, 2011) observed that pregnant women's nutrition knowledge was not quite perfect and recommended for nutrition counseling of the pregnant women.

A study conducted in Nepal on knowledge on dietary patterns among pregnant women attending ANC checkups in Narayani hospital found that more than half of the women (59.3 %) had moderate knowledge on nutrition and concluded that although all had some sort of knowledge on nutrition, there was lack of sufficient knowledge on dietary patterns and some had wrong perceptions about food intake during pregnancy just like in this study and recommended awareness programs and health education to develop positive attitudes (Shah et al, 2017). Another study in Dindigul (Usharani & Hepsiba, 2017) on effectiveness of structured teaching programme on diet in terms of knowledge, attitudes and practices observed that there was a significant improvement in knowledge, attitude and practices among mothers after the teaching programme.

A nutrition education conducted at community level hospitals and area health centres contributed to positive health behaviour modifications (Dunneram & Jeevon, 2015). The nutrition focused maternal nutrition counseling program in Bangladesh significantly increased the proportion of pregnant women who received information on eating five food groups during pregnancy (Nguyen, et al, 2017). These observations confirm the important role that nutrition education is able to play in improving the nutritional health of a pregnant woman. The Linkages Project (2001) indicates that improving maternal nutrition partly depends on changing maternal behaviour patterns which can only be achieved through nutritional counseling. Nutrition knowledge and practices improved after the intervention in this study group indicating that nutrition education can be used to successfully improve dietary intake.

Number of Meals Consumed by Pregnant Women in a Day

From the report on number of meals consumed in a day collected during the 24 hour recall, the women had increased the number of meals they ate after the intervention propelled by the knowledge they had acquired from the psycho-educational nutrition initiative. At baseline the women consumed an average of three meals in a day but after the intervention this increased to four meals a day. Pregnant women are required to increase the number of meals eaten in a day by at least one meal and this seems to have been followed by the women after the intervention. Before the intervention, most women did not increase the number of meals they ate in a day meaning that they ate three meals in a day, suggesting that the women did not have knowledge on pattern of feeding required for an expectant mother.

In a Malawian study, majority of pregnant women increased the number of meals they consumed in a day after nutrition education programme (Hjertholm et al, 2017). A study on the effect of behavioural counseling on patients' consumption of fruits and vegetables in adults from a low income setting found that at post intervention fruit and

vegetable intake increased by 1.5 and 0.9 portions per day in the behavioural and nutrition groups. An increase in the number of participants eating 5 or more portions a day was reported in both groups (42 % and 27 %) (Steptoe, Perkins, Mckay, et al, 2003).

Nutrition focused maternal nutrition counseling programme in Bangladesh significantly increased the proportion of pregnant women who received information on eating five food groups during pregnancy. Women in the intervention group consumed 1.6 more food groups, had higher increases in the proportion consuming high nutritional value foods such as pulses and consumed greater quantities of food than women in the comparison group (Nguyen, et al, 2017). These findings are consistent with the findings from this study where participants increased the number of meals consumed in a day as well as intake of fruits and vegetables.

After being exposed to the psycho-educational nutrition initiative, about half of the participants in this study increased the number of meals they consumed in a day to four and five. The finding at baseline of most women consuming three meals a day is consistent with a Migori County Fact Sheet that reports meals consumed by WRA to be two to three meals a day (KIRA, 2015). This also implies that the pregnant women did not increase their frequency of food consumption much before interaction with the psycho-educational nutrition initiative. However, after the intervention food intake frequency increased to four for most women and even five for others. This suggests that nutrition education can be used to increase frequency of food intake by pregnant women in Migori County.

CONCLUSION

There were significant improvements in the pregnant women's nutrition knowledge and practices and dietary behaviour. The Ministry of Health needs to strengthen nutrition education programme within the primary health care system to help pregnant women acquire nutrition knowledge and attitudes that will create optimal feeding practices.

ACKNOWLEDGEMENT

This study thanks the National Research Fund (NRF) and Rongo University for financial support.

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