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Nutrition Knowledge and Dietary Practices among Pregnant Adolescents in Mandera County, Kenya

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ABSTRACT

Adolescent's pregnancy is on increase and is associated to high morbidity and mortality among the born child and the mothers. The mother's dietary practices during pregnancy is essential for both the mother and the fetus. Dietary intake among pregnant adolescents is a key factor that influences their health and nutrition status and the birth outcome. The nutrition knowledge of the mother has been shown to affect the dietary practices of the children. However, nutrition knowledge is among the ignored aspects of good nutrition. More research has focused on pregnant mothers in general with a little focus on those who are adolescents. In addition, there is inadequate information on dietary practices among pregnant adolescents. Thus, the study aimed to assess nutrition knowledge and dietary practices of pregnant adolescents. A cross-sectional analytical design was used to carry out the study in Mandera East Sub-County, Mandera County which is one of the arid and semi-arid areas in Kenya. A sample size of 258 pregnant adolescents visiting the various health facilities in Mandera East Sub-County was selected using a systematic sampling technique from hospital records. Nutri-survey software was used to analyze dietary data for amount of nutrients consumed. Data was collected, entered and analyzed using SPSS. Pearson's correlation coefficient was used to assess the relationships between non-categorical variables while chi-square was used for categorical variables. Results show that most of the pregnant adolescents (22.1%) were unmarried and with up to primary level education (68.4%). They were mainly casual workers or pastoralists earning an average of 69.34 ± 6.25 USD. The mean nutrition knowledge score of 46.4 ± 6.8 was low leading to majority (47.5%) having moderate nutrition knowledge. The mean number of meals was 2.95 ± 0.6 while energy intake was 1850.5 ± 33.2 kilocalories. Intake of energy and other micronutrients were below the recommended daily allowance except for fat. The mean individual dietary diversity score was 5.64 ± 2.32 food groups. Cereals and oils/fats, flesh meat and milk and milk products were the common foods consumed. Foods rarely consumed were eggs and sea foods. The nutrition knowledge score was shown to have a significant strong positive relationship with dietary diversity score and the number of meals consumed (P= <0.001). This study concludes that the nutrition knowledge of these mothers was low and as such led to poor dietary practices. This study recommends that the Ministry of Health at national level to come up with an enhanced training package and policy for use in counselling pregnant adolescents.

Keywords

Nutrition knowledge, Dietary practices, Pregnant adolescents.

Introduction

A third of women in developing countries deliver below the age of 18 years [1]. About 99% of teenage births are in developing countries [2]. Research show that the rate of adolescent giving birth has been increasing [3]. A study in forty-three developing countries in sub-Saharan Africa, show that childbearing among adolescents is very high [4]. In the majority of these countries, it is due to the fact that girls marry in their teens [5]. In Kenya, based on the Kenya Demographic Health Survey, 18% of young girls aged fifteen to nineteen years have already begun childbearing.

Teenage pregnancy occur due to minimal protection against teenage marriages [6]. Poverty triggers early marriage, where children are regarded as a strategy for income generation. A girl may be given to an older man in marriage as a means of generating income [5]. According to Stewart et al. [7], traditional attitudes lead to family heads making marital choices for girls without

thinking of the implication on their health and welfare [8]. Young girls with low or no education are more than three times likely to have started childbearing by the age of nineteen than those who have acquired secondary and higher education [9].

Many girls drop out of school as a result of pregnancy [10]. Complications related to teenage pregnancies are the leading cause of death among girls in developing countries [9]. About 70,000 adolescents die each year [11]. Poor nutrition during all pregnancy affects fetal growth and may also have far-reaching effects whereby the born child's morbidity and mortality are increased. Though no particular study has been conducted in North Eastern Kenya, high cases of mortality among infants born of adolescent's mothers have been reported in other parts of Kenya [12].

Pregnancy is a critical period in the life cycle [13]. Women's needs for nutrient are high and affect the birth outcome especially if not met as the body uses the reserves. Nutrients deficiencies may lead to newborn death and birth defects [14]. Nutrient supplementations are recommended in addition to diversified diets. Fortified foods should also be provided [4].

Adequate nutrition knowledge of women prior to pregnancy is of importance in improving the dietary practices. Studies have shown that nutrition knowledge relates to the quality of food consumed [15]. In addition, good nutrition practices during pregnancy is important for the pregnancy performance [16]. Pregnant women with high nutrition knowledge had a high dietary diversity [17]. A study in Sudan, associated nutrition knowledge, attitude and dietary practices of adolescents where mothers with higher knowledge depicted better practices in terms of food choices and dietary diversity [15].

Mandera County is one of the counties in Arid and Semi-arid Lands (ASAL) areas of Kenya which are characterized by low rainfall and famine with pastoralism being the main livelihood. Poverty has been documented to be low in this region [18]. The areas are also characterized by food insecurity. Early marriage seems more prevalent in the Northern part of Kenya than the other parts due to the effect of Muslim religion [19]. This is where girls have been found to marry at an age of 15-19 years. This is risky especially in a region which has >15% of under nutrition among adolescents [20].

Pregnant adolescents are more vulnerable to malnutrition and infection because of their physiological requirements. As such, malnutrition is passed from one generation to the next leading to vicious cycle. To break this viscous cycle, information specific to pregnant adolescents is needed. Most studies shows information about all pregnant mothers with minimal information on pregnant adolescents. Most of these studies have been conducted in developed countries with only a few in developing countries. In addition, information on prevalence of under nutrition has not been associated with the causative factors like nutrition knowledge.

Studies focusing on pregnant adolescents have been scarce in Kenya. Thus, minimal information exists on how to design programs to intervene on this vulnerable group. This is more so in Mandera County which is an ASAL area. The population in this county is vulnerable due to food insecurity [21]. This study thus assessed nutrition knowledge and dietary practices among pregnant adolescents in Mandera East Constituency, Mandera County. The objectives to this study was to ssess the nutrition knowledge level and dietary practices of pregnant adolescents

Materials and Methods

Study design

The study used a cross-sectional analytical design. Mandera East Sub-County is a sub-counties in the larger Mandera County with a population of 119,420. The major livelihood activity is pastoralism. The sub-county experiences fragile food security most of the time which affect nutrition and dietary intake of the households in the area [22]. Mandera County is selected as one of the ASAL areas in Kenya.

The study targeted all pregnant adolescents (<18 years) attending Antenatal Clinics at all the six health facilities in Mandera East Sub-county, Mandera County, Kenya. The health facilities are; Mandera referral hospital, Khadija dispensary, Shasshasey dispensary, Khalalio dispensary, Neboi and Kamor dispensary.

Sample size was calculated using Cochran formula to get a sample of 258. Mandera County and Mandera East Sub-County are randomly selected. The selection is based on being ASAL area with high number of pregnant adolescents. All the six health facilities in sub-county were identified. From the hospital records, all the pregnant adolescents were identified. The calculated sample size was divided among these facilities using proportionate to size sampling as per the health records. From each health facility, systematic random sampling was adopted to randomly select the desired sample per health facility from a list of pregnant adolescents in the hospital records visiting the facility. Table of random numbers was used to determine the first number. Then every nth number was taken.

Research instruments

A research-administered questionnaire was used for data collection on socio-demographic characteristics information and dietary practices. A 24-hour recall and a food frequency questionnaire was used to collect dietary practices related information.

The level of nutrition knowledge was determined by use of a recommended and modified nutrition knowledge tool with 10 questions regarding dietary practices and healthy eating during pregnancy [15]. The respondents were allowed to choose correct answers by indicating whether a given statement was true or false. The responses were then scored and computed for the nutrition knowledge variables. Nutrition knowledge score was calculated and categorized as low (<40), moderate (41-69) and high (>70) [15].

The tools were pre-tested on length, content and language. A sample of 27 respondents, which is 10% of the sample size, attending Ante-Natal Care at Mandera Sub-county Hospital in the

Sub-County was used.

Data collection procedure

The research assistants were first to explain the study objectives to the respondents. After the informed consent was signed or a thumb print put, questionnaires was administered. Dietary practices were assessed by using 24-hour recall and food frequency questionnaire (FFQ). The 24-hour recall was used for determination of amount of energy and other nutrients consumed in a day. The foods consumed in the previous day from waking up to sleeping time was assessed. The various types of foods consumed, the ingredients, the amount of ingredients used in dish preparation, volume cooked and consumed was established. The quantity of food consumed was determined by measuring the actual food consumed using a kitchen scale. The 24-hour recall was conducted for two days in a week and the average calculated.

To assess the frequency of food intake, FFQ was used. This was to collect data on the frequency of intake of selected foods. The FFQ consisted of a list of the commonly consumed foods. The pregnant adolescent stated the foods and the number of days she took them food in the previous seven days. The individual dietary diversity score (IDDS) was based on the 16 food groups as recommended [23]. The respondents indicated the number of food groups that they consumed from the possible 16. A score of ≤3 was considered as low dietary diversity, 4-6 was considered as moderate while a score of >6 was considered as high dietary diversity [23].

The nutrition knowledge of the pregnant adolescents was established to determine whether the adolescents have adequate nutrition knowledge. The level of nutrition knowledge was determined by use of a recommended and modified nutrition knowledge tool with 10 questions regarding dietary practices and healthy eating during pregnancy [15]. The tool comprised of a nutrition test given to the mothers. Scores were awarded depending on how they answered the questions. The respondents were allowed to choose correct answers by indicating whether a given statement was yes or no. The responses were then scored and computed for the nutrition knowledge variables. Nutrition knowledge score was calculated and categorized as low (<40), moderate (41-69) and high (>70) [15].

Data analyses

Completed questionnaires were checked, edited and coded before data entry. Data entry and analysis was done using SPSS version 22. Data from 24 hour recall were entered into Nutri-survey software and the amount of energy and nutrients consumed were derived. This was then compared with the recommended daily requirements by FAO and WHO to determine the adequacy of energy intake [24]. The IDDS was calculated from the 146 food groups. A score of ≤3 was considered as low dietary diversity, 4-6 was considered as moderate while a score of >6 was considered as high dietary diversity [23]. Food frequency was considered regular if taken more than 4 times a week [25].

Pearson correlation was used to assess relationships between the non-categorical variables. Chi-square tests was done to establish relationships between the categorical variables.

Results and Discussion

Demographic characteristics of households with pregnant adolescents

Demographic characteristics: Out of the 258 targeted, 244 questionnaires were completed. The age and marital status of the pregnant adolescents was assessed. Results show that the proportion of ages of the adolescents increased with age with majority (36.1%) being in the age of 17 years. There was no significant difference (p>0.05) in the pregnant adolescents various ages.

Majority (63.5%) of the mothers were married, though there were some who were unmarried (22.1%) (Table 1). Majority of the married pregnant adolescents were from polygamous families, with majority (48.8%) being a second wife. All the respondents were Muslims.

		N	%	P value
Age (n=244)	15	75	30.7	0.625
	16	81	33.2	
	17	88	36.1	
Marital status (n=244)	Married	155	63.5*	0.0031
	Single mother	54	22.1	
	Divorced/Separated	19	7.8	
	Widowed	16	6.6	
Level in marriage (n=155)	Only wife	25	16.4	0.011
	Second wife	76	48.8	
	Third wife	34	22.1	
	Fourth wife	20	12.7	

Table 1: Demographic characteristics among pregnant adolescents.

Socio-economic characteristics of households with pregnant adolescents

The socio-economic characteristics among pregnant adolescents is shown in Table 2. The study notes that majority of the respondents (68.4%) had education up to primary level. About 19.7% completed secondary school while 11.9% had no formal education. There was a significant difference (p=0.016) in the pregnant adolescents in the various levels of education. Most of these mothers either were herding animals or were casual workers as represented by 34.0% and 29.9%, respectively. There was no significant difference (p=0.231) in the pregnant adolescents in respect to occupation.

		N (244)	%	P value
Education	No formal education	29	11.9	0.016
	Primary	167	68.4	
	Secondary	48	19.7	
Occupation	Herding animals	83	34.0	0.231
	Casual worker	73	29.9	
	Business	54	22.1	
	Housewife	34	13.9	

Source of income	Business	75	30.7	0.004
	Wage	71	29.1	
	Sale of milk	57	23.4	
	Sale of livestock	41	16.8	

Table 2: Socio-economic characteristics among pregnant adolescent.

Findings from household income indicates that majority of households earns less that 6,001-8000 KES with 11.5% earning <2000 and only 14.3% earned more than 10,000 (Figure 1). This income was mainly from business (30.7%), wages (29.1%) and sale of milk (23.4%) (Table 2). There was a significant difference (p=0.004) in the households pregnant adolescents as pertains to source of income.

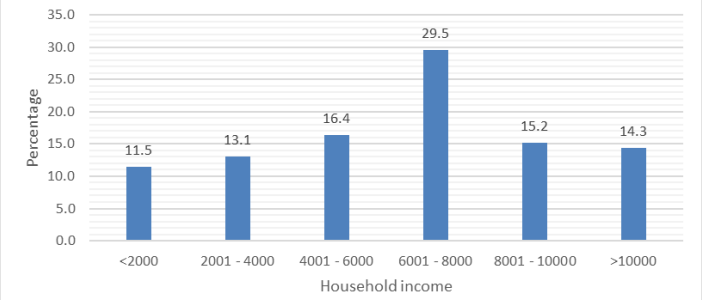

Figure 1: Monthly household income among pregnant adolescents.

Proportion of pregnant adolescent in the various trimesters

The proportion of pregnant adolescent in the various trimesters was assessed. It was noted that 51.2% were in the third trimester while 40.2% were in the second trimester (Figure 2).

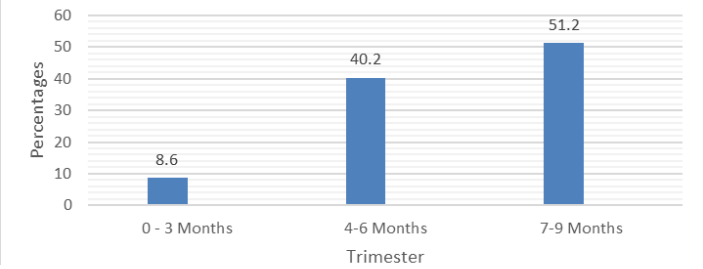

Figure 2: Proportion of pregnant adolescent in the various trimesters.

Nutrition knowledge level of pregnant adolescents

Nutrition knowledge on various aspects of feeding practices: Respondents were asked several questions related to nutrition during pregnancy (Table 3). Results are shown in Table 3. Most of the respondents (73.8%) understood what comprised a balanced diet while 65.6% understood the food groups that best protects the body against illnesses. However, only a few (36.1% and 36.1%) knew the importance of increasing amount of energy and other nutrients during pregnancy, respectively. Only 33.6% knew the effect of poor dietary practices on birth weight of the child.

Nutrition knowledge score: Nutrition knowledge score was calculated and categorized as low (<40), moderate (41-69) and high (>70). The mean knowledge score was 46.4 ± 6.8. Slightly less than half of the mothers (47.5%) had moderate nutrition knowledge (Figure 3). Only 13.5% had a high knowledge. About 38.9% of women had low nutrition knowledge. These findings are similar to other studies that indicate low nutrition knowledge among young pregnant adolescents [15]. Low nutrition knowledge is also noted in studies by Kinyua [26] and Rahmiwati [27].

	N (244)	%
Aware of what a balanced diet is	180	73.8
Aware of food groups that provide body with energy	121	49.6
Aware of food groups that are useful for body building	98	40.2
Aware of food groups that best protects the body against illnesses	160	65.6
Understands the importance of increasing energy during pregnancy	91	37.3
Understands the importance of increasing nutrients during pregnancy	88	36.1
Aware of various deficiency problems that arise due to inadequate intake of nutrients	87	35.7
Understand the effect of low energy intake	96	39.3
Understand the effect of poor dietary practices on birth outcome		
Understand the effect of poor dietary practices on birth weight of the child	82	33.6
Understand the effect of poor dietary practices on their health	76	31.1

Table 3: Nutrition knowledge on various aspects of nutrition during pregnancy.

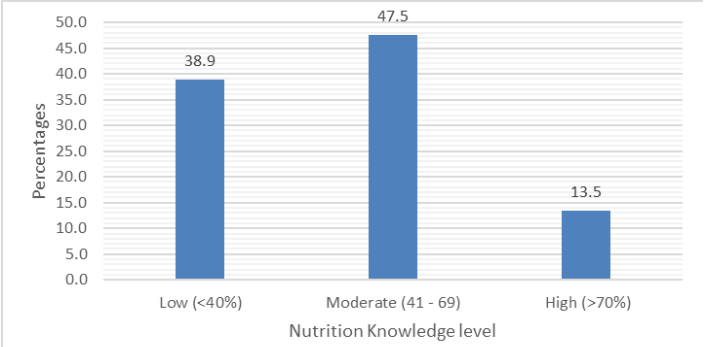

Figure 3: Nutrition knowledge score.

Dietary practices of pregnant adolescent

Number of meals consumed: The number of meals (both main meals and snacks) consumed by pregnant adolescents was determined (Table 4). Results show majority (47.1%) took 3 meals per day. This was lower than the recommended 4-5 meals per day. The mean number of meals consumed per day was 2.95 ± 0.6. Frequent meals ensures adequate consumption as well as improving the diversity.

Number of meals per day	N (244)	%	P value
2	79	32.4	<0.001
3	115	47.1	
4	37	15.2	
5	9	3.7	
6	4	1.6	

Table 4: Number of meals consumed per day by pregnant adolescents.

Amount of energy and selected nutrient intake: Energy intake as well as intake of protein, fat, vitamin B1, B2, B6, folic acid, iron

and calcium were analyzed (Table 5). Results show that the mean energy intake was 1850.5 ± 33. The mean intake of the nutrients by the mothers was all below RDAs for pregnant mothers apart from fat. Results show that majority did not meet their nutrients requirements for all the nutrients assessed (Table 5). It was notable that of the pregnant adolescents interviewed all did not meet their RDA for vitamin B6 and calcium.

Pregnant women require more energy to prevent the use of the body reserves [28]. The low energy intake noted in this study is in agreement with a study by Aaltonen et al. [13] that indicated low energy intake. Other studies that show low dietary intake as a result of poor dietary diversification among pregnant women are by Abebe et al. [29] and Kamau-Mbuthia [30]. A similar study in china indicated poor dietary intake of both energy and other micronutrients among pregnant women [31].

	RDA	Mean	SD	Proportion meeting RDA
Energy (Kcal)	1850.5	638.94	33	30.3
Protein (g)	45.5	18.11	41	37.6
Fat (g)	73.5	28.52	46	42.2
Vitamin. A (µg)	264.8	315.16	12	11.0
Vitamin. B1 (Mg)	0.76	0.42	16	14.7
Vitamin. B2 (Mg)	0.78	0.43	9.3	8.5
Vitamin. B6 (Mg)	0.79	0.44	10.6	9.7
Calcium (Mg)	447.4	253.71	6.5	6.0
Iron (Mg)	28.9	46.85	24.5	22.5

Table 5: Energy and nutrient intake. RDA as per WHO guidelines (FAO/WHO, 2001).

Individual dietary diversity score: The number of food groups consumed are shown in (Table 6). This indicates the individual dietary score. The mean IDDS was 5.64 ± 2.32 food groups (Range; 3-11). Four (4) food groups were consumed by the largest proportion of respondents (30.3%).

This is an indication that the diet lacked diversification. As highlighted by FGD. Diversified diets are necessary for pregnant mother to ensure availability of all the required nutrients to support the fetal growth. Pregnant adolescents have been shown to have poor dietary practices due to numerous challenges that affect their lives. A study by Kopi [18] also came up with such findings. Dietary diversity was also shown to be low among adolescents' mothers in Ahvaz study by Vakili et al. [32]. A similar study conducted in rural Bangladesh reports low dietary diversification among adolescent pregnant girls [10]. A study in Australia also associates first time pregnant mothers with poor dietary practices especially the number of meals consumed per day [33].

Number of food groups consumed	n	%
3	7	2.9
4	74	30.3
5	56	22.9
6	42	17.2
7	39	16.0
8	21	8.6
≥ 9	5	2.0
Total	244	100

Table 6: Individual dietary diversity score.

Frequency of food consumption: This study assessed the frequency of food consumption (Table 7). The most consumed food groups were cereals and oils/fats which were consumed by all mothers. Other common foods consumed by most mothers were sweets (94.7%) and other vegetables (91.4%). Eggs and sea foods were rarely consumed (<2%).

Food group	N=244	%
Cereals	243	99.6
White roots and tubers	81	33.2
Vitamin A rich vegetables and tubers	74	30.3
Dark green leafy vegetables	169	69.3
Other vegetables	223	91.4
Vitamin A rich fruit	151	61.9
Other fruits	11	4.5
Organ meat	33	13.5
Flesh meat	188	77.0
Eggs	4	1.6
Fish and seafood	3	1.2
Legumes and nuts	101	41.4
Milk and milk product	181	74.2
Oils and fats	244	100
Sweets	231	94.7
Spices condiments, beverages	3	1.2

Table 7: Food frequency consumption by food groups.

Relationships between nutrition knowledge level and dietary practices of pregnant adolescents

The relationships between the study variables is as shown in Table 8. This was by use of person correlation for non-categorical variables and chi-square for categorical variables.

	Variable	Statistics
Relationship between knowledge score and other variables	Age	r = 0.153; p= 0.081
	Level of education	χ^2 =121 df= 6, P= <0.001
	Household income	r = 0.524; p= 0.004
	Dietary diversity score	r = 0.643; p= 0.014
	Number of meals	r = 0.485; p= 0.023
	Marital status	χ^2 =121 df= 6, P= <0.001

Table 8: Relationship between study variables.

There were significant relationships (P<0.05) between the nutrition knowledge and dietary practices (dietary diversity score, number of meals,). Other studies have found the same association. Low nutrition knowledge was found to lead to poor dietary practices

[15]. Pregnant women with high nutrition knowledge had a high dietary diversity [17]. A study by Perumal et al. [34] found a significant relationship between nutrition knowledge level and dietary practices. A study in China highlights a relationship between nutrition knowledge and dietary practices among pregnant women [35]. The results also are similar to a study by Byerly et al. [36] on nutrition knowledge of pregnant adolescents which found out that knowledge related food intake. A study by Vijayeta [37] found a significant relationship between dietary practices and nutrition knowledge of pregnant adolescents. In a study among pregnant women in South Sumatera noted that nutrition knowledge affected dietary practices. A study by Kamau-Mbuthia and Elmadfa [30] in Nakuru Kenya found a strong relationship between nutrition knowledge and dietary practices of pregnant mothers. Other studies that noted a significant relationship between nutrition knowledge level and dietary practices of pregnant adolescents [38-40].

In addition, the education level, income and marital status significantly ($p<0.05$) related with the nutrition knowledge. Age in this study was not an important predictor of nutrition knowledge. A study by Arkkola et al. [41] in Finland found that education occupation and income affected the dietary intake. A study by Ongosi et al. [42] elaborates on how marital status affect dietary practices of pregnant mothers. A study by Daba et al. [38] found a significant relationship between nutrition knowledge and marital status of pregnant adolescents.

Summary

Most of the pregnant adolescents (63.5%) were married and with up to primary level education (68.4%). In terms of occupation, most of these mother either are casual workers or pastoralists. Majority earned less that 10,000 KES with only 19.7% earning more than 10,000. This income sources were from business (30.7%) and wages (29.1%). The mean nutrition knowledge score was 46.4 ± 6.8 was low with majority (47.5%) having moderate nutrition knowledge. Most of the respondents (73.8%) understood what comprised a balanced diet, 65.6% understood the food groups that best protects the body against illnesses. The mothers were found not to understand the importance of increasing amount of nutrients consumed during pregnancy.

The mean number of meals was 2.95 ± 0.6. The mean energy intake was 1850.5 ±33. Intake of energy and other micronutrients were below the recommended daily allowance apart from fat. The mean IDDS was 5.64 ± 2.32 food groups (3-11). Four (4) food groups were consumed by the largest proportion of respondents (30.3%). Cereals and oils/fats, flesh meat and milk and milk products were the common foods consumed by most mothers. Foods were rarely consumed were eggs and sea foods. The dietary practices, education level, income and marital status significantly ($p<0.05$) related with the nutrition knowledge.

Conclusion

This study noted that the education level of the pregnant adolescents was poor. This is because most of them dropped out of school due to pregnancy. As such some of them were not married. This consequently led to adoption of low profile careers like casual labour and herding of animals. This consequently resulted to low income which was barely enough to procure food. The nutrition knowledge of these mothers was low. This is evidenced by the fact that they failed to understand even the basic aspect of nutrition during pregnancy. The low knowledge was attributed to low education level and poor health seeking behavior. The low nutrition knowledge translated to poor decision making in dietary practices.

This study reports poor dietary practices among the pregnant adolescents. This is in terms of few number of meals consumed per day, low dietary diversity and infrequent intake of key nutrients responsible for good nutrition during pregnancy. This is contributed by poor nutrition knowledge and resulted to the high case of underweight. The determinants of nutrition knowledge among adolescents' mothers are dietary practices, education level, income and marital status.

Recommendations

- To improve the nutrition knowledge level among the mothers, the Ministry of Health at national level should come up with a counselling package and policy for use in counselling these mothers.
- Need for continued training to health workers so as to help the mothers improve their care practices
- The study recommends continued provision of both adult education and nutrition education by community health workers. This would enable the mothers make appropriate decisions in dietary practices and health seeking behavior. This would also help to utilize the available income to buy nutritious foods.

Acknowledgement

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Ethical Statement

The study was approved and registered by Kenyatta university ethical review committee (PKU/666/1744-17)

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