Association of Socio-Demographic and Socio-Economicof First Time Mothers (Primigravidae) With Their Nutritional Knowledge of Antenatal Maternal Nutrition: A Case of Kenyatta National Hospital in Nairobi, Kenya.

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Abstract: *Nutrition is a fundamental pillar of human life and its requirement varies with respect to age, gender and physiological conditions such as pregnancy. Nutritional knowledge of pregnantmothers is very important in influencing their nutrition as well as that of their babies. Studies carried out so farhave lamped the antenatalmothers together and little attempt has been made to dilineate them into categories. Little specific information therefore exists on the characteristics of first time (primigravidae) mothers. These mothers are at increased risks of complications in pregnancy and labourdue to their inadequate knowledge on antenatalnutrition. This study therefore, was designed to evaluate the association of socio-demographic and socio-economic characteristics with the nutritional knowledge of first time mothers.A cross-sectional study was carried out on 139 first time mothers attending the Obstetric and Gynaecology clinic at the Kenyatta National Hospital, Nairobi. A previously pretested structured questionnaire was used to collect information on socio-demographic and socio-economic characteristics, and the knowledge of antenatal nutrition of the mothers.A key informant, a nutritionist atthe clinic was also interviewed. Data was analysed using Statistical Package for Social Sciences (SPSS), Oneway ANOVA and t-test. Results showed that on socio-demography of age, almost 96% of mothers were of age 15-35 years; marital status, 77% married; education, secondary to tertiary education 94.2% and age of pregnancy,majority in third trimester; of socio-economic characteristics, majoritywere from the middle socio-economic families (73.4%).Nutritional knowledge was generally low and depended on educational level, age of the mother and socio-economic status of the family. Older mothers scored better than the younger ones, mothers with college education had significantly higher scores than those of lower educational level, and mothers from the middle class families scored significantly higher than those of the lower class.*
The study concluded that the mothers'nutritional knowledge was low and depended mainly on the age, level of education and the socio-economic level of the family of the mothers.
Key words: antenatal, nutrition, first time mothers (primigravidae), maternal nutrition and knowledge.

I. Introduction

Maternal nutrition in Pregnancy isvery important as one of the determinants of birth outcome**.**Many factorsaffect nutrition of mothers; the factors being societal based. Such factors include; food taboos,mother's educational level, socio-economic status and lack of nutritional knowledge.

About 200 million women become pregnant each year globally and majorityof them live in developing countries. Most of these women suffer from ongoing nutritional deficiencies (Mora &Nestel, 2000).In Kenya; maternal mortality remains high at 488 maternal deaths per 100,000 live births (WHO, 2011), despite the many intervention efforts on maternal health by the Government. This is probably due to poverty, and especially for first time motherslack of sufficient and accurate antenatalnutritional knowledge. For these mothers, the main source of knowledge is the older mothers who have had the experience.Other sources of knowledge come from the media and the antenatal clinics. Many of these mothers therefore are found to suffer from a combination of chronic energy deficiency, poor weight gain in pregnancy, anaemia, and other micronutrient deficiencies (WHO, 2011).

The association between maternal nutrition and birth outcome is complex and is influenced by many biologic, socioeconomic, and demographic factors, which vary widely in different populations (Abu-Saad and Fraser, 2010). On one hand, increasing age and education have been associated with a healthy and diverse

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dietary intake in pregnant women.Females that have low education, are non-working and have increased parity are more prone to unhealthy and non-diverse diets (Ali et al., 2014).

Maternal nutrition has direct association with foetal nutrition (Ali et al., 2014).Poor nutrition during pregnancy can cause low birth weight and decreased chances of survival (Suchithra, 2014).For example, in pregnancy a mother needs about 300 extra calories a day, especially later in her pregnancy, when the baby grows quickly, and the mother rapidly gains weight. These calories should come from consumption of nutritious foods (Fouda et al., 2012).In a study conducted in Kenya on dietary habits of Maasai pregnant women, it was found that the birth weight depended on both food avoidance (e.g. no eating of eggs) and induced vomiting, which played a significant role in reduction of mother's and foetus weight (Mammo, 2000). The status of maternalantenatal nutrition knowledge in the Sub Saharan Africa including Kenya isgenerally verylow. However, this status has not been delineated in terms of mother categories. This study therefore was designed to assess the levels of antenatal maternal nutrition knowledge by first time mothers, in association with their socio-demographic and socio-economiccharacteristics. The study was carried out in the Kenyatta National Hospital (KNH), the largest referral hospital in the East and Central, located in Nairobi, capital of Kenya. The study collected information on the socio-demographic and socio-economic characteristics, and the nutritional knowledge of first time mothers attending antenatal clinic at the largest hospital in Nairobi, capital city of Kenya.

II. Methodology

The study was cross sectional descriptive in design and carried out in the outpatient clinic for Obstetrics and Gynecology at the Kenyatta National Hospital (KNH).KNH is the largest hospital complex in the country. KNH is located in Nairobi, the capital city of Kenya and serves as a teaching and referral hospital. It is a referral hospital mainly for the country but also for Eastern Africa countries.

The required minimum sample size was calculated based on modified Fischer formula(Fischer et al., 2003),

$$N=Z^2pq/d^2$$

Where:

N=desired sample size, Z= standard normal deviate at the required confidence level (95%),

p= theproportion in the target population estimated to have the characteristic

being measured, then when not known its 50%, q= 1-p,d=the level of statistical   significance.

The formula yielded a sample of 385 mothers. For population less than 10,000, sample size is calculated as follows;

$$nf=N/1+N/p$$

Where:

nf=desire sample, N=sample size by Fischer formula, P=population of first time mothers attending clinic per month (200).

Therefore, nf=385/+385/200=**132**with5% attritionyieldinga total sample =**139.**

Sampling Procedure

Sampling of the 139 mothers was serialogical until enough mothers who satisfied the inclusion criterion of being a first time mother and who consented to participate were picked as they came to the clinic. One nutritionist was also interviewed as a key informant.

Data Collection

A previously pretested structured questionnaire was used to collect information from the mothers on socio-demographic and socio-economic characteristics, while the knowledge test was used to collect information on the nutritional knowledge. A checklist was used to collect information from the Key informant (KI).

Data Analysis

Data was analyzed using Statistical Package for Social Sciences (SPSS) software version 20and generated descriptive statistics.Cross tabulations, one way Anova and independent t-test were applied to test the significance of differences between two or more groups at a selected probability level of 0.05.For the knowledge test,the mean knowledge score of each category was calculated by subjecting the composite score to a statistical test; ANOVA or a T-test. Comparison of the resultant mean knowledge scores for the different categories in relation to different variables was determined.

Development of a knowledge Test

Knowledge was tested based on a test developed by the researchers, to test for knowledge on balanced diet, and the rich sources of energy,protein,vitamins A,C,D,B12,and folate;and iron,calcium and zinc. For each mother's responses, all the correct answers for each question were added up. Each correct answer attracteda

score of one mark while each wrong answer attracted a score of   zero markthen; the mothers were grouped according to the different socio-demographic and socio-economic characteristics. A composite score for each nutrient was calculated in each of the categories. The maximum score for each mother was 43.The nutritional knowledge wasobtained by getting the scores against thefollowing questions:

Q1. Do you know what a balanced diet for an antenatal mother is? 1= Yes [   ]   2=No [   ]

Q2. **If Yes to question 1**, which of the foods indicated are the components of a balanced dietfor an antenatal mother? (***Indicate with a tick in the box***)

    1=Energy foods [   ]   2= Proteins [   ]   3= Vitamin A [   ]   4= Vitamin C [   ]
    5= Vitamin D [   ]   6= Vitamin B_{12}[   ]   7= Folate [   ]   8= Iron [   ]
    9= Calcium [   ]   10= Zinc [   ]

Q3. Among the foods below, which ones do you consider are rich in energy for both the mother and the baby?

    1=Cereals [   ]   2=Root crops e.g. potatoes [   ]   3= Fats and oils [   ]
    4= Fruits [   ]   5= Vegetables [   ]

Q4. Indicate which of the following foods are rich in proteinsfor both the mother and the baby? 1=Meat [   ]
    2= Milk and milk products [   ]   3= Eggs [   ]   4= Cereals and cereal products [   ]
    5= Legumes e.g. beans, pulses [   ]   6= Root crops e.g. cassava, sweet potatoes [   ]
    7= Fruits [   ]

Q5. Indicate which of the following foods are rich in Vitamin Afor both the mother and the baby? 1=fruits [   ]
    2= leafy vegetables [   ]   3= liver [   ]   4=eggs [   ]   5=oils and fats [   ]
    6= legumes e.g. beans, peas [   ]

Q6. Indicate which of the following foods are rich in Vitamin C for both the mother and the baby? 1=Fruits [   ]
    2= Vegetables [   ]   3= Meat [   ]   4= Cereals [   ]

Q7. Indicate which of the following foods are rich in Vitamin D for both the mother and the baby?
    1=Eggs [   ]   2= Milk and milk products [   ]   3= Fortified cereals []
    4= Cod liver oil [   ]   5= margarine [   ]   6= leafy vegetables [   ]
    7= root crops e.g. Sweet potatoes, cassava [   ]

Q8. Indicate which of the following foods are rich in Vitamin B_{12} for both the mother and the baby?
    1=Animal foods (meat, milk, eggs) [   ]   2= Fermented foods [   ]
    3= Vegetables [   ]

Q9. Indicate which of the following foods are rich in folic acid-vitamin (see IFAS) for both the mother and the baby?
    1=Green leafy vegetables [   ]   2= Legumes [   ]   3= Nuts [   ]
    4= Liver [   ]   5=Cereals [   ]

Q10. Indicate which of the following foods are rich in iron for both the mother and the baby?
    1=Green leafy vegetables [   ]   2= Liver [   ]   3= Meat [   ]   4= Fish [   ]
    6= Beans and legumes [   ]

Q11. Indicate which of the following foods are rich in calcium for both the mother and the baby?
    1=Milk and milk products [   ]   2= Green leafy vegetables [   ]   3= Fruits [   ]
    4= Beans and legumes [   ]

Q12. Indicate which of the following foods are rich in zinc for both the mother and the baby? 1=Meat [   ]
    2= Poultry [   ]   3= Whole fish [   ]   4= Root crops [   ]
    5= Beans and peas [   ]

III. Results And Discussions

Key Informant interview

These results of KI interview based on the nine questions asked are presented in Table 1.The most glaring information from the key informant was that not all mothers complied with the nutrition guidelines and the reason given for non-compliant was the influence by the community. InKenya, many communities practice indigenous knowledge on child feeding. This knowledge has been passed on from generation to generation and it is still very well entrenched. If this knowledge conflicts with the modern knowledge, then the indigenous knowledge predominates.

Table 1: Responses by the Key Informant

Question to the KI		Response	
1.	Years of work in Department	1.	Two
2.	Guidelines followed in addressing mothers	2.	WHO guidelines
3.	Compliance to the guidelines by mothers	3.	Some mothers comply and others do not comply
4.	Reasons for non-compliance	4.	Influence from the community
5.	Preferred foods	5.	Carbohydrates foods e.gugali., proteins foods e.g meat, fruits e.g.apples, vegetables e.g.managu

6.	Reasons for preference	6.	The foods give energy, boost blood volume
7.	Nutritional challenges by mothers	7.	Poor appetite, foods not available
8.	How they are helped to cope with the challenges	8.	Encouraged to eat balanced diet, eat small frequent feeds
9.	Other comments by the KI	9.	Mothers need more nutrition education

IV. Socio-Demographic Characteristics Of Mothers

Age of the mothers

The age of the mothers ranged between 15-45 years.Majority of the mothers were between 26-35 years at 52.5% followed by 15-25 years at 43.2%. The findings of the study are similar with findings from a study in Accra, Ghana; which established that the mothers aged 25-35 years were more than those younger than 25 years (Alice et al.,2012).In Kenya, the median age at first birth among women is 25-29 (Kenya Demographic Profile,2018).These results are shown in Table 2.

Marital status of the mothers

Results showed that majority of mothers were married at 77%, while the rest of the mothers were single at 23%.Theseresults are shown in Table 2.

Level of education ofmothers

The study showed that all the mothers had education at least to primary level. Over 94% had secondary or tertiary education. A higher number of mothers had acquired college education 63.3%.It is possible that these were career women who are in employment. InKenya, on average 38.5 % of the Kenyan adult population is illiterate .Women have 58.9 %literacy rate and 61.4 % numeracy rate. These results are shown in Table 2.

Age of pregnancy of the mothers

The age of pregnancy ranged between six weeks and forty weeks. The age ranges correspond to the different trimesters;these are6-12 weeks (first trimester), 13-24 weeks (second trimester) and 25-40 weeks (third trimester),majority of the mothers (66.2%) were in the third trimester of pregnancy. Based on the high level of education, it is possible that most of the mothers would at leasthave started attending the antenatal clinic at eight weeks of pregnancy as recommended by World Health Organization and enforced by the Ministry of Health of Kenya (WHO, 2018).Theseresults are shown in Table 2.

Table 2: Socio-demographic characteristics of the mothers

Socio-demography	Frequency	Percent
Age of mothers (years) (N=139)		
15-25	60	43.2
26-35	73	52.5
36-45	6	4.3
Level of Education (N=139)		
Primary Education	7	5.0
Secondary Education	43	30.9
College Education	88	63.3
Others	1	0.7
Marital Status (N=139)		
Married	107	77.0
Single	32	23.0
Age of pregnancy (N=139)		
Below 6 weeks	2	1.4
6-12 weeks	17	12.2
13-24 weeks	28	20.1
25-40 weeks	92	66.2

The age ranges of the pregnancy represent the pregnancy trimesters

V. Socio-Economic Characteristics Of Mothers

Occupation of mothers

The results show a large percentage of the mothers werehousewives at 38.1%. When women are housewives they lack good access to information about nutrition due to the confinement and lack of interaction as required, also by Dabaet al., (2013). The remaining proportion of mothers had some form of gainful employment with 33.1% of the mothers having regular salaried jobs. The earnings from casual labour are very unpredictable.These results are shown in the Table 3.

Socio-economic Class ofthe Mother's Families

The income of the mother'sfamilies placed them in three levels of socio-economy in categories based on income per month as follows: Lower socio-economic class (Ksh 10,000 and below), middle socio-economicclass (Ksh 10,000-40,000) and highersocio-economic class (above Ksh 40,000) (Institute of Economic Affairs, 2015).Mothers from middle socio-economic families were the majority at 73.4%.The proportion of middle class population in Kenya today is about 45%.It is not surprising that majority of the mothers were middle class because Nairobi city being the main centre for both Government and Private sector, then it is possible that majority of the mothers were employed which in most cases places them in the class. Lower class mothers attend antenatal clinics in the satellite health centres located within reach in the estates within which they live. The Government of the County of Nairobi has made such clinics more affordable than the clinic in the KNH and Private hospitals.These results are shown inTable 3.

Table 3: Socio-economic Characteristics of the mothers

Socio-Economy	Frequency	Percent
Occupation of the mothers (N=139)		
Housewives	53	38.1
Casual labour	7	5.0
Salaried Employment	46	33.1
Self-Employment	33	23.7
Socio-Economic class of the mothers (N=139)		
Lower socio-economy	25	18.0
Middle socio-economy	102	73.4
Higher socio-economy	12	8.6

VI. Association Between Antenatal Maternal Nutritional Knowledge And Socio-Demographic Characteristics

Mother's agein association with knowledge of balanced diet
There was a significant difference between mothers of age range 36-45 years, and those of age range 15-25years and 26-35years, who were not significantly different from each other **(p=0.04).**This means mothers of higher age category were significantly more knowledgeablein maternal nutrition than the mothers of lower age categories. Probably this is because the older mothers are more exposed to nutrition information than the younger mothers. It is also possible that the older mothers comply moreto attendance of clinic and the clinics than mothers. These shown on Table 4: Mother's age

the antenatal advice given in the younger results are 4.

Distribution of with mean

Age(years)	Balanced diet mean score
15-25	3.6a
26-35	3.9a
36-45	7.3b
P value	**0.04**

knowledge scores of balanced diet

Mother's age in association with knowledge of balanced diet, energy, protein and micronutrients
The micronutrients considered includedvitamin A, vitamin C, vitaminD, vitamin B12, folate, iron, calcium and zinc.Means of knowledge for all the nutrients were not significantly different between the age categories. Therefore, age did not influence knowledge of the foods rich in these nutrients.
Marital Status in association with knowledge of balanced diet,energy, protein and micronutrients
The means of the two groups, married and single werenot significantly different. Therefore, marital status of the mothers did not influence the knowledge of the foods rich in different nutrients.
Level of education in association with knowledge of balanced diet, energy, protein and micronutrients
There was significant difference between balanced diet, energy, protein, VitaminA, Vitamin C,

folate,iron and calcium knowledge means scores of mothers with college education as compared to mothers with primary education as shown by the anova values of: balanced diet **p=0.001**, energy foods **p=0.000**, protein foods **p= 0.003**, Vitamin A p=**0.042**, Vitamin C p=**0.001**, folate**p= 0.025**, iron**p=0.000**and calcium **p=0.001**.Mothers with higher education were significantly more knowledgeable about the foods rich in the nutrients than mothers with primary education.There was no significant difference of knowledgebetween the levels of education for Vitamin D **p=0.149,** Vitamin B 12 **p=0.060**and zinc **p=0.064**respectively**.** However, mothers with college education were more knowledgeable than those with primary and secondary education who were not significantly different from each other. It is generally expected that when mothers attain college education they aremore knowledgeable than those with secondary and primary education, because the former join the working class and therefore have more interaction. A study in Malaysia demonstrated that individuals with higher education had significantly higher nutritional knowledge levels and better nutritional attitudes (Daba et al., 2013).These results are shown on Table 5.

Table5: Distribution of mothers' level of education by mean knowledge scores of balanced diet, energy, protein and micronutrients*

Level of Education	Balanced diet	Energy foods	Protein foods	Vit A	Vit C	Vit D	Vit B12	Folate	Iron	Calcium	Zinc
Primary	1.8a	1.9a	2.3a	0.3a	0.3a	0.0a	0.1a	0.4a	0.8a	0.8ab	0.0a
Secondary	2.7ab	1.7a	3.0b	0.8ab	0.1ab	0.5b	0.3a	0.8a	1.1a	0.7a	0.2a
College	4.7b	2.6b	3.4b	1.1b	1.0b	0.6b	0.5a	1.2b	1.8b	1.1b	0.4b
P-value	**0.001**	**0.000**	**0.003**	**0.416**	**0.001**	**0.149**	**0.060**	**0.025**	**0.000**	**0.001**	**0.064**

*Means in the same column followed by the same letter are not significantly different from each other(p≤0.05)

The highest knowledge mean score for each group was for mothers who had attained college education. When mothers attain more education, they interact more and have more exposure as compared to mothers with secondary and primary education.

Occupation of mothers in association with knowledge of balanced diet, energy, proteinand micronutrients

Means of knowledge were not significantly different for all the nutrients; balanced diet, energy, proteins, Vitamin A, Vitamin C, Vitamin D, Vitamin B12,folate, Iron, and calcium except for zinc. Therefore, thelevel of knowledge of these nutrients was not significantly different among the different occupationswhichmean the occupation of the mothers did not influence their level of knowledge on these nutrients. Knowledge of zinc was significantly different between the different occupations**(P=0.010).**Mothers who had formal employment andself-employment had more knowledge than mothers who were housewives and those on part-time employment. This was so probably because mothers on formal employment have a regular salary as well as those on self-employment who have small businesses which give them some income and this enables them to access nutrition information.

Socio-economic class of mothers in association with knowledge of balanced diet, energy, proteinand micronutrients

Mothers of middle and higher socio-economic classes had significantly higher knowledge scores than those of lower socio-economic class.In a study in Ethiopia it was found that, monthly income was one of the important predictors of knowledge of women on nutrition during pregnancy. The other important predictors were level of education and access to nutritional education (Daba et al., 2013).

VII.   Conclusions

The study shows that first time antenatal mothers (primigravidae) had poor knowledge on maternal nutrition which depended mainly on age, occupation and level of education. Older mothers, salaried mothers and those educated to college level had the highest mean knowledge in the categories of age, occupation and education respectively. Finally, mothers of middle and higher socio-economic status had significantly higher knowledge scores than those of lower socio-economic status.

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