Association of Socio-Demographic and Socio-Economic of 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 pregnant mothers is very important in influencing their nutrition as well as that of their babies. Studies carried out so far have lamped the antenatal mothers together and little attempt has been made to delineate 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 labour due to their inadequate knowledge on antenatal nutrition. 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 sociodemographic and socio-economic characteristics, and the knowledge of antenatal nutrition of the mothers. A key informant, a nutritionist at the clinic was also interviewed. Data was analysed using Statistical Package for Social Sciences (SPSS), One-way 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, majority were 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. Other factors such as educational level, socio-economic status of the family of the mothers. 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.

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I. Introduction

Maternal nutrition in Pregnancy is very important as one of the determinants of birth outcome. Many factors affect 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 majority of 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 mothers lack of sufficient and accurate antenatal nutritional knowledge. For these mothers, the main source of knowledge is 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
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 maternaltenatal nutrition knowledge in the Sub Saharan Africa including Kenya is generally very low. 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-economic characteristics. This 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%), \( p \) = the proportion 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, \( nf = 385/1+385/200 = 132 \) with 5% attrition yielding 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 20 and 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 attracted
score of one mark while each wrong answer attracted a score of zero mark; then 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 was obtained by getting the scores against the following 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 diet for 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 B12 [ ]
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 proteins for 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 A for 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 [ ]
5= Legumes e.g. beans, pulses [ ]

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. Cassava [ ]

Q8. Indicate which of the following foods are rich in Vitamin B12 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 [ ]
5= 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. In Kenya, 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>
<thead>
<tr>
<th>Question to the KI</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Years of work in Department</td>
<td>1. Two</td>
</tr>
<tr>
<td>2. Guidelines followed in addressing mothers</td>
<td>2. WHO guidelines</td>
</tr>
<tr>
<td>3. Compliance to the guidelines by mothers</td>
<td>3. Some mothers comply and others do not comply</td>
</tr>
<tr>
<td>4. Reasons for non-compliance</td>
<td>4. Influence from the community</td>
</tr>
<tr>
<td>5. Preferred foods</td>
<td>5. Carbohydrates foods e.g. ugali, proteins foods e.g meat, fruits e.g apples, vegetables e.g managu</td>
</tr>
</tbody>
</table>

**Table 1: Responses by the Key Informant**

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In Kenya, the median age at first birth among women is 25 years. 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 the mothers were married at 77%, while the rest of the mothers were single at 23%. These results are shown in Table 2.

Level of education of mothers
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. In Kenya, 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 are 6-12 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 least have 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). These results are shown in Table 2.

Table 2: Socio-demographic characteristics of the mothers

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

*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 were housewives 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.
The income of the mother’s families 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-economic class (Ksh 10,000-40,000) and higher socio-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 in Table 3.

Table 3: Socio-economic Characteristics of the mothers

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

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

Mother’s age in association with knowledge of balanced diet
There was a significant difference between mothers of age range 36-45 years, and those of age range 15-25 years and 26-35 years, who were not significantly different from each other (p=0.04). This means mothers of higher age category were significantly more knowledgeable in 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 more to attendance of the antenatal clinics and advice given in the clinics than the younger mothers. These results are shown on Table 4.

<table>
<thead>
<tr>
<th>Age(years)</th>
<th>Balanced diet mean score</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-25</td>
<td>3.6a</td>
</tr>
<tr>
<td>26-35</td>
<td>3.9a</td>
</tr>
<tr>
<td>36-45</td>
<td>7.3b</td>
</tr>
</tbody>
</table>

Table 4: Mother’s age

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 included vitamin A, vitamin C, vitamin D, 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 were not 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, Vitamin A, Vitamin C, and...
folic acid, 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 $p=0.001$, folic acid $p=0.025$, 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 knowledge between the levels of education for Vitamin D $p=0.149$, Vitamin B12 $p=0.060$, 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 are more 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.

**Table 5: Distribution of mothers’ level of education by mean knowledge scores of balanced diet, energy, protein and micronutrients**

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

*Means in the same column followed by the same letter are not significantly different from each other ($p\leq0.05$)

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, protein and micronutrients**

Means of knowledge were not significantly different for all the nutrients; balanced diet, energy, proteins, Vitamin A, Vitamin C, Vitamin D, Vitamin B12, folic acid, iron, and calcium except for zinc. Therefore, the level of knowledge of these nutrients was not significantly different among the different occupations which mean 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 and self-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, protein and 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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[12]. https://www.indexmundi.com/kenya/demographics_profile.html