

ASSESSMENT OF SOCIO-ECONOMIC, DIETARY INTAKE, HYGIENIC PRACTICE AND ANTHROPOMETRIC INDICES IN DETERMINING THE NUTRITIONAL STATUS OF MOTHERS IN AKURE SOUTH LOCAL GOVERNMENT, ONDO STATE

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ABSTRACT

This study was conducted in Akure South Local Government of Ondo State to assess food consumption and nutritional status of mothers. A total of 355 mothers were systematically selected from a sample frame consisting of listed households in the seven wards of Akure South Local Government Area. Data were collected using a pre-tested, semi-structured questionnaire to obtain information on subject socio-economic status, hygiene practices, and clinical observation for signs of malnutrition. Body Mass Index (BMI) and Waist-Hip Ratio (WHR) for mothers were also used as nutritional indicators. Data were analyzed using SPSS version 17. As compared with Recommended Daily Allowance (RDA), most mothers (80%) satisfied their requirement for energy. Only 38% of mothers satisfied their protein requirement. More than half of the mothers (52%) did not satisfy their iron requirement while the folic acid intake of 60% of the mothers was below the RDA. The BMI of 69.7% of the mothers were normal, 19.8% were overweight and 10.5% were underweight. The WHR for 73.6% of mothers was normal while 26.4% had a high value. The correlation analyses done shows that education, age and income level are important factors that influenced or affect the status of the mothers. The mothers age and income ($r=0.726$; $p<0.05$), Educational status of mothers and hygienic practices ($r=0.533$; $p<0.05$), Income and fat consumption ($r=0.442$; $p<0.05$), Income and BMI ($r=0.591$, $p<0.05$) are all positively related. Nutrition education is the most sensitive factor that is needed by all mothers because this will keep them informed about the right food for them at different stages of life and from there better living can be assured that will give the assurance of a better nutritional status for mothers.

Keywords: *Nutritional status, hygienic practice, clinical observation, Nutrition education.*

1. INTRODUCTION

The saga of human nutrition and the improvement of human health has been reflected in the effort of many scientists who have belief that human performances and well being, both physical and mental depends primarily on what is eaten (1).

The nutritional and health status of women is of great concern in the contemporary world, because the multiple roles played by women give rise to serious health and nutritional problems (2, 3). The situation is even worse in countries where societal norms and sex discrimination have forcefully subjected women to satisfy the health and nutritional needs of their families at their own expense.

The major challenges facing third world women today is to overcome the resource constraint that consign them to low levels of productivity and well being. While women's role in the food chain is essential to produce that all important resource, food, it paradoxically does not guarantee women even minimum levels of nutrition. Malnutrition adversely affects women's participation in the economic system and their productivity. To break this vicious downward spiral, it is important to focus simultaneously on women's nutrition related roles and their nutritional status.

Objectives

The general objective is to assess socio-economic, dietary intake, hygienic practice and anthropometric status of mothers in akure south local government, Ondo state.

The specific objectives include:

- To assess the socio economic status of mothers in Akure South LGA.
- To determine the anthropometric indices of mothers.

- To determine the usual dietary intake of the subjects and assess the adequacy.
- To report any clinical signs of malnutrition like Parlor, Goitre and PEM observed in the subjects.

2. MATERIALS AND METHODS

Survey design

Data on Socio demographic status, food and nutrient intakes, anthropometric, hygiene practices and clinical parameters were collected and used to determine the nutritional status of mothers in urban populations in Ondo state.

Sampling procedure

The LGA (Akure South Local Government) was randomly selected among urban local governments in Ondo state. A systematic random sampling was used to ensure spread among respondents, by taking household at regular interval beginning from the oba's house.

Akure South is a Local Government Area in Ondo State, Nigeria. Its headquarters are in the town of Akure. It has an area of 331 km² and a population of 353,211 at the 2006 census (4). It consists of 12 wards. The wards include Apomu, Gbogi/isikan I, Gbogi/isikan II, Ijomu/obanla, Ilisa, Oda, Odopetu, Oke-aro, Irowo, Oshodi/isolo and Owode ward. Simple random sampling was used to choose seven wards that were considered for the study, The wards were Gbogi/isikan I, Gbogi/isikan II, Ilisa, Oda, Oke-aro, Oshodi/isolo and Owode ward.

Sample size determination:

The sample size was calculated using the formula:

$$n = \frac{t^2 \times p(1-p)}{m^2}$$

Where n = The minimum sample size

t = 1.96 Confidence interval

P= 30% of all form of malnutrition in mothers in humid forest AEZ (5)

m = Tolerance error (5%)

$$n = 1.96^2 \times 0.3(1-0.3)$$

$$n = 3.8416 \times 0.21 / 0.5^2$$

$$n = 323$$

The total covered was approximately = 355

METHODS OF DATA ANALYSIS

Appropriate analytical techniques were used depending on the variables or the characteristics being considered. Descriptive and inferential statistical techniques were used for quantitative data including socio-economic and demographic information, anthropometry, food intake to generate frequencies and percentages using statistical package for social sciences (SPSS) Version 17. The body mass index (BMI) was calculated from the weight and height records of the subjects as follows: BMI = Weight (kg)/ Height (m²), the BMI classified using WHO (6) and Gibson classifications (7). Daily intakes of energy, macronutrients, vitamins and minerals was calculated using Food Composition Tables and the results of dietary intake levels of respondents was compared to RDA reference standard. The presence of any clinical sign of malnutrition was noted and frequencies and percentage documented accordingly.

3. RESULTS

Household demographic characteristics

The distribution of mothers' age shows that the age range of 21-30years had the highest (58.6%) percentage and 31-40 years had 34.1% while the lowest percentage (2.5%) came from ages less than 20years.

The family size of the household was shown on Table 1, The breakdown is as follows, household with 1-4 members (59.2%) had the highest percentage while 5-8sized and 9-12sized household had 34.1% and 6.8% respectively.

The mothers educational status shows that, those with secondary education had the highest percentage of 45.1%, followed by those that had post secondary education (34.3%) while those that have only primary education was 17.5% and respondents with no formal education was 3.1%.

Figure 4 shows that the major energy source of most households in Ondo town was from Power Holding Company of Nigerian (PHCN), 96.6% of the household used electricity generated by Power holding company of Nigeria as the primary source of energy while 1.7% use personal generator as the source of electricity and about 1.1% of the respondents did not have electricity in their house and the least is rural electricity which is just 0.6%.

Table 1: Socio demographic characteristics of the respondents n=355

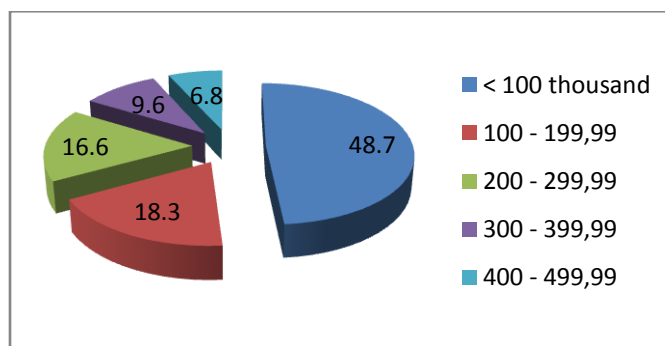
Variable	Frequency	Percentage (%)
<i>Age group (Years)</i>		
Mother		
10 – 20	9	2.5
21 – 30	208	58.6
31 – 40	121	34.1
41 above	17	4.8
Total number of household member		
1 – 4	210	59.2
5 – 8	121	34.1
9 – 12	24	6.7
Total	355	100
Educational status of mothers		
No formal education	11	3.1
Primary education	62	17.5
Secondary education	160	45.1
Tertiary education	122	34.3
Total	355	100
Major energy sources of most households		
PHCN	162	45.6
No electricity	95	26.8
Personal generator	58	16.3
Rural electricity	40	11.3
Total	355	100

Considering the estimated annual income of household depicted on figure 1, of all the respondents, those that their annual income was below 100 thousand naira (1 U.S dollar at the time of the research was 150 naira) had the highest percentage (48.7%) while those that earn between 100 – 199, 99 thousand naira came up with 18.3% followed by 200 – 299, 99 thousand naira with 16.6% and the respondents that earn between 300 – 399, 99 thousand naira annually had percentage of 9.6% and between 400 – 499, 99 thousand naira made up a percentage of 6.8%.

Primary source of water of the household as shown on Figure 2, indicated that larger percentage of respondents in Ondo town used deepwell (51.3%) while borehole was next to deepwell with 31.3% and 17.2% used pipe borne water while the spring/river has the lowest percentage of 0.3%.

Method of refuse disposal of the household as shown on Figure 3 indicates that majority of the respondents used city service (80%) as their primary method of refuse disposal while 15.5% of the respondents used refuse dump and the remaining 4.5% used bush as a means of disposing their waste.

Result obtained from main type of toilet available to the respondents on Figure 4, indicated that about 67.9% used water system type of toilet while 26.2% used pit latrines and 3.7% used bush and lastly 2.3% used VIP latrines.

**Figure 1: Estimated annual income of the households (In naira)**

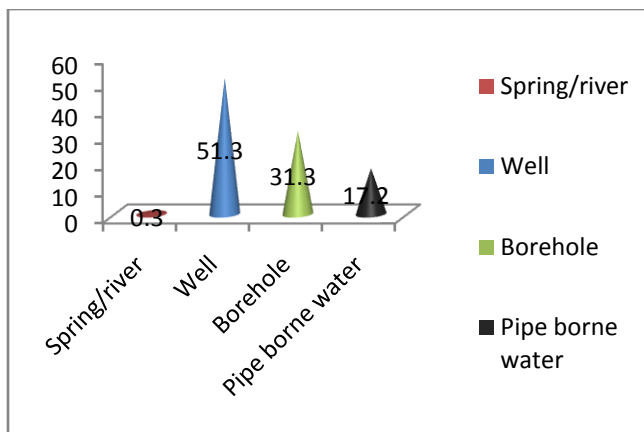


Figure 2: Primary source of water of the household

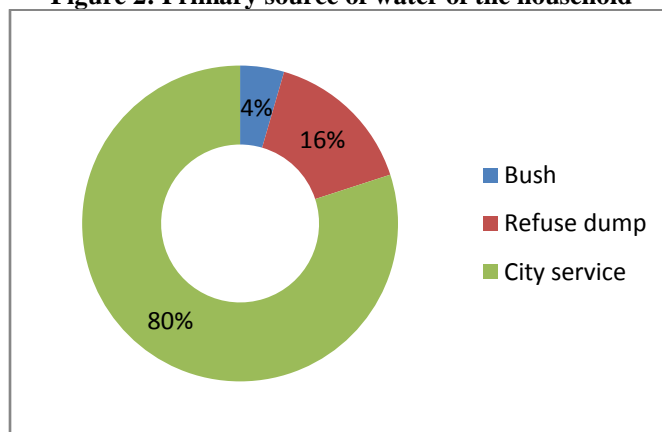


Figure 3: Method of refuse disposal of the household

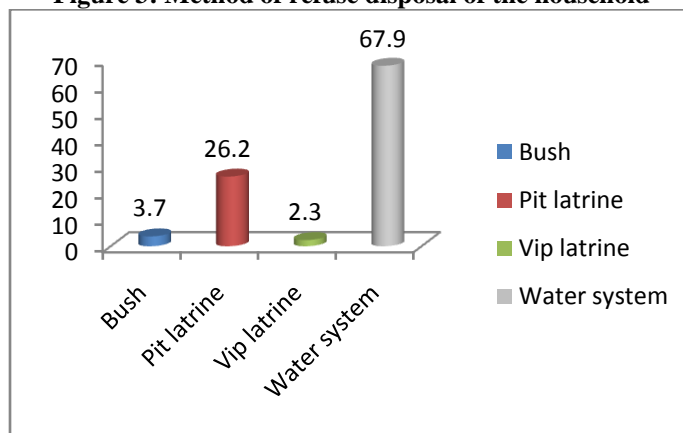


Figure 4: Main type of toilet available to the respondents

Dietary assessment section

Fifty mothers were selected randomly from the wards considered in this study. Their intake within a day was recorded and later converted to nutrient equivalent. The mean intakes of all the mothers were calculated and the range of mothers’ intake was also calculated.

Table 2: The mean intake of the Mothers within the last 24hours

Food consumed/day	Mean (g/day)
Cereals, grain and products (eaten)	
1. Pap	38.55
2. Eko	31.75
3. Spaghetti	16.0
4. Custard	5.2
5. Semolina	10.1
6. Indomie	16.1
7. Rice	16.9
8. Boiled corn	13.44
9. Biscuit	6.4
Starchy roots, Tubers and products	
1. Cassava flour (lafun)	4.1
2. Plantain	6.3
3. Amala	52.44
4. Eba	87.16
5. Fufu	7.7
6. Garri	10.48
7. Porridge	4.1
8. Boiled Cassava	4.08
9. Boiled yam	88.30
10. Bread	18.7
11. Doughnut	7.0
Legumes and Legume Products	
1. Bean cake	26.37
2. Beans	62.66
Nuts and Seeds	
1. Walnuts	3.2
2. Coconut	3.8
3. Groundnut	2.83
4. Mellon	10.33
5. Ogbono	2.7
Vegetable and vegetable Products	
1. Amaranthus(Cooked)	25.77
2. Okro	11.45
3. Pumpkin(cooked)	15.32
4. Jews mallow(Ewedu)	7.56
Fruits	
1. Garden egg	3.2
2. Orange	2.5
Milk, Milk Products and Beverages	
1. Peak milk	1.6
2. Cowbell milk	5.6
3. Viju milk	2.4
4. Bourmvita	4.6
5. Milo	6.1
6. Nice vita	2.2
Meats, Fish and Eggs and products	
1. Beef	19.2
2. Egg	3.4
3. Fish	33.2
4. Fish roll	3.0
5. Crayfish	2.3
Meals	
1. Rice + Stew	21.04
2. Jollof rice	16.10
3. Pounded Yam + Vegetable + Meat	28.34
4. Stew	28.55
Oils and Fats	
1. Butter	0.98
2. Margarine	2.44

Table 3: Mean Intake of Macro-Nutrients of Mothers

Age cohort (yrs)	Calorie(g)	Protein(g)	Fat(g)	Carbohydrate(g)
<19	1025±187	39±21	45±23	116±58
19-29	1885±217	57±19	56±18	288±89
30-39	2040±478	59±11	68±25	298±99
40-49	1624±344	68±22	72±33	176±78

Table 4: Mean intake of minerals and vitamins of the Mothers

Age cohort(yrs)	Calcium(mg)	Iron(mg)	Vit C(ug)	Folic(ug)	Vit B6(mg)	Vit A(ug)
<19	457±285	41±7	22±19	19±14	0.6±0.4	19±5
19-29	483±348	47±3	20±15	18±12	0.3±0.2	17±4
30-39	484±375	51±6	37±11	13±9	0.3±0.1	29±8
40-49	569±152	48±6	18±12	14±10	1.0±0.3	15±7

The ranges of mothers' nutrient intake

The mothers nutrient intake were categorized into three sections (below, within and above the recommended allowance) using the recommended dietary allowance by National academy of sciences (8) as a reference standard.

The result of intake of protein by mothers are shown on Table 5, Over two thirds(62%) of the mothers consumed less than the recommended intake allowance for protein while 13mothers consumed between 50-65g which fall within the recommended intake, and the remaining 6mothers (12.0%) consumed more than 60g of protein.

From Table 5, mothers that their fat intake is more than 30g were 25 (50%) while the mothers that their intake is between 20-30g were 17 (34.0%) and those consumed less than 20g were eight (16.0%). Out of the fifty mothers, those that consumed more than 150g of carbohydrate were 32mothers (64.0%) while the mothers that their intake is between 100-150g were 12mothers (24.0%) and less than 100g were 6mothers (12.0%). As shown on Table 5, 28 mothers (56.0%) consumed less than 800mg of calcium which is lower than the recommended intake while 16mothers (32.0%) consumed between 800-1200mg of calcium and remaining 6mothers intake was more than 1200mg(12.0%). The **iron** intake was shown on Table 5, 26mothers (52.0%) intake was between 0-8mg (lesser than the recommended intake) while 21 (42.0%) mothers intake was 9-18mg and the remaining 3mothers intake was above 18mg (6.0%). The number of respondents that consumed less than 65ug of vitamin C were 28mothers followed by those that consumed between 65-85ug and they were 20mothers and only 2mothers consumed above 65-85ug of Vitamin C. (Table 8)

As indicated on Table 5, 30mothers (60.0%) consumed less than 350ug of folic acid while 13mothers (26.0%) consumed between 350-450ug of folic acid which falls within the recommended intake for folic and 7mothers (14.0%) intake was more than 450ug of folic acid. More mothers (32) consumed less than 1.0mg of vitamin B6 while 15mothers consumed about 1-1.5g and 3mothers consumed more than1.5g of Vitamin B6. 27mothers (54.0%) intake was less than 500ug while 19mothers (38.0%) consumed between 500-800ug of Vitamin A and about 4mothers (8.0%) intake was above 800ug of Vitamin A.

Table 5: The range of nutrient intake of mothers using the standard RDA

Range	Frequency	percentage
Protein (g)		
<50	31	62
50-65	13	26
>65	6	12
Fat (g)		
<20	8	16
20-30	17	34
>30	25	50
Carbohydrate (g)		
<100	6	12
100-150	12	24
>150	32	64
Calcium (mg)		
<800	28	56
800-1200	16	32
>1200	6	12
Iron (mg)		
0-8	26	52
9-18	21	42
Above 18	3	6
Vitamin C (ug)		
<65	28	56
65-85	20	40
>85	2	4
Folic acid (ug)		
<350	30	60
350-450	13	26
>450	7	14
Vitamin B6 (mg)		
<1.0	32	64
1-1.5	15	30
>1.5	3	6.0
Vitamin A (ug)		
<500	27	54
500-800	19	38
>800	4	8.0

Anthropometric status of mothers**Mothers Body mass index (kg/m²)**

The percentage of the mothers within 18.5-24.9 was 77.7%, followed by the mother that falls within 25-29.9 (13.5%) and the mothers within 30-34.9 had percentage of 4.2% while those with body mass index less than 18.5 were 1.7% and over 40 made a percentage of 1.1%, and the percentage of mothers within 35-39.9 was 0.8%.

Waist/Hip ratio for mothers

This is an indicator of the pattern of subcutaneous adipose tissue distribution among the subjects and when the ratio is more than 0.85 in women, it means a risk of chronic diseases or obesity (7).

Low risk - < 0.80

Medium risk - 0.81 – 0.85

High risk - > 0.85

The result on table 7 shows that, Majority of the mother (42.8%) was within the range of low risk while 30.1% of the mothers were within the medium risk and 27% was at the high risk level.

Table 6: Anthropometric Indices of Mothers

Variable	Frequency	Percentage (%)
Mothers BMI (kg/m²)		
<18	6	2.5
18-24.9	276	77.7
25-29.9	48	13.5
30-34.9	15	4.2
35-39.9	3	0.8
Over 40	4	1.1
Mothers waist/hip ratio (cm)		
Low risk	152	42.8
Medium risk	107	30.1
High risk	96	27

Hygiene practices of the households

To know where the member of the household wash their hands, Table 10 shows that 183 (51.5%) of the respondents household had in house wash hand basin where they cleaned their hands. The number of respondents where the family member washed their hands outside/yard or their compound when need arises was 100 (28.2%) while 68respondents (19.2%) did not have any particular place but can do the washing anywhere.

To know the percentage of those that have water/tap, basin, soap/cleaning agent and towel/napkin/toilet paper which can aid in the proper cleaning. For tap, 202 respondents (56.9%) household had tap water while 153respondents (43.1%) did not. As for the use of basin, 202respondent (56.9%) had basin for washing while 153respondents (43.1%) did not and 89% of the respondents used soap or other cleaning agents in washing their hands after every activity. Another 78.9% of the respondents used towel/napkin or tissue paper after washing their hands while the remaining 21.1% did not.

The general cleanliness of the environment (using parameters such as clean gutter, adequate refuse disposal, clean environment) as observed by the interviewer shows that 181respondents (51%) did well in any one of the criteria stated while 138respondents (38.9%) satisfied two of the criteria and 24respondents (6.8%) did not satisfied any of the criteria and only 12respondents (3.4%) satisfied all the criteria. Of all the respondents,204 of the respondents (57.5%) used cupboard in keeping the food that is not to be consumed immediately while 119respondents (33.5%) stored their food in the refrigerator, 20respondents (5.6%) kept their food warm while 7respondents covered their food in the open and the remaining 5respondents (1.4%) leave their food uncovered in open places.

Table 7: Observed Hygiene practices of the household

Character	Frequency	Percentage (%)
Where members of household wash hands		
Nowhere	4	1.1
In house wash hand basin	183	51.5
Outside/Yard/Compound	100	28.2
How often the environment is cleaned		
Daily	353	99.4
Weekly	2	0.6
Methods of preserving food		
Not covered in the open	5	1.4
Covered in the open	7	2.0
In cupboard	204	57.5
Kept warm	20	5.6
In the refrigerator	119	33.5
General cleanliness of the environment as observed by interviewer		
Clean gutter, adequate refuse disposal, Clean environment	12	3.4
When any of the two above is adequate	138	38.9
When any of the above is adequate	181	51.0
None adequate	24	6.8

Clinical signs of malnutrition observed among mothers

Protein energy malnutrition was absent in all the mothers observed in the study but for obesity 55 respondents (15.5%) were overweight while the remaining 300 respondents (84.5%) were not. Goiter was noticed in only two mothers (0.6%) while the remaining 352 respondents (99.4%) were free from goiter. As for pallor, it was noticed in two mothers (0.6%) while others were free of pallor.

Table 8: Clinical observation of the mother

Variable	Frequency	Percentage
Mother's overweight/obesity		
Yes	55	15.5
No	300	84.5
Total	355	100.0
Pallor in mothers		
Yes	2	0.6
No	353	99.4
Total	355	100

Table 9: Correlation among BMI, nutrient intake, income, and selected variables

Variable	Age	education	Income	Nutrition knowledge
BMI	0.311	0.145	0.591*	-0.041
Energy	0.237	0.243*	0.321*	0.256
Fat	0.359*	0.128	0.442*	-0.312*
Calcium	0.345*	0.276	0.345*	-0.134
Iron	0.325*	0.133	0.420*	-0.172
Vit A	0.108	0.120	0.342*	-0.055
Vit B6	0.634*	0.239	-0.325*	-0.027
Income	0.726*	0.654*	-0.054	0.621*
Hygienic practice	0.312*	0.533*	0.123	0.031*

Significant correlation-coefficients (p<0.05)

Level of education correlated positively with all the nutritional variables but was significant (p<0.05) for energy (r=0.243), income (r=0.854) and hygienic practice (r=0.533). There was a significant (p<0.05) positive association between income and all the nutritional variables, except for vitamin B6 intake (r=-0.325, p<0.05). Income was also

Strongly correlated to age (r=0.726; p<0.05), level of education (r=0.654; p<0.05), and nutrition knowledge (r=0.621, p<0.05). However, it had a non-significant (p<0.05) association with hygienic practice (r=-0.078). The association between nutrition education and most of the nutritional variables was negative, except for energy intake. However, nutrition education significantly (p<0.05) correlated with fat intake (r=-0.346).

4. DISCUSSION

The socio economic characteristics of the household revealed that the majority (40.6%) of the head of the household was civil servants and 48.7% of them earn less than 100,000 naira annually (1U.S Dollar equivalents 150 naira at the time of the research). Such a relatively low income will most likely affect the nutritional status of subjects in such homes considering the cost of living in Akure town.

The income of the household therefore, appears to be a major factor in determining the nutritional status of mothers. The result from the food consumption of mothers as compared with the recommended dietary allowance shows that majority of the mothers satisfied more than 50.0% of the energy needed but 62.0% of the mothers were below 50.0% of their needed protein. Majority of the mothers did not satisfy the recommended allowance for iron and 56.0% of the mothers did not satisfy the requirement of calcium. Similar result was obtained from National Micronutrient Survey and the study on the nutritional status of women of child bearing age by Ibeanu (9). The result also shows that 64.0% of the mothers did not satisfy the requirement of Vitamin B6 while only 26% satisfy the recommended allowance for folic acid. The recommended allowance for vitamin c was satisfied by 40% of the mothers but 54% of the mothers did not satisfy the recommended allowance for vitamin A. The finding of Nigerian food consumption and nutrition survey (5) also reported 13.1%, 24.3% of mothers for vitamin A and iron deficiencies respectively.

The result of the nutritional status of the mothers using Body mass index shows that 2.5% were underweight while 13.5% and 6.1% were overweight and obese respectively. The waist/hip ratio measurements also show low, medium and high risk in 42.8%, 30.1% and 27% of mothers respectively. Nigeria food consumption and nutrition survey (5) reported similar trend with majority of the subjects within the normal range of body mass index.

The observed hygiene practices of the household shows that 48.5% did not have an in-house wash hand basin and 10% of the household neither keep their food in cupboard nor preserved in the refrigerator but left the food in an open place. The primary source of water to majority of household was deep well which may not be too clean for consumption. Infections due to contaminated foods and feeding utensils may be attributed to inadequate facilities in the household and the poor hygiene practices in the preparation of foods (10). This combine with inadequate dietary intake would result in vicious malnutrition cycle. With low access to safe water, poor sanitary and hygienic practices by most mothers that participated in this study, the prevalence of mal nutrition among the subjects is not a surprise.

5. CONCLUSION

The levels of malnutrition in the present study underline the great need for nutritional intervention because the result showed some of the subjects were overweight. The BMI for mothers shows that 2.5% were malnourished while 29.6% overweight and the waist hip ratio also confirm it because 27.0% of the mothers were at high risk(>0.85cm) and it may be as a result of the level of fat and carbohydrate consumption of the mothers which is high in calorific.

The nutrient intake of mothers compared with RDA, Shows that the protein intake of mothers were low but carbohydrate intake was high and most mothers exceeded the dietary goal for fat. The micronutrient (Vitamin & Mineral) intake was found to be low; which may be due to method of cooking that may affect the nutrient content and also the low consumption of fruit and vegetables.

Also, hygiene practice is another factor that can greatly affects the status of the mothers, it was gathered from the study that many of the mothers with little nutrition education did not always care about the safety of their food whereby it may be an avenue for different organism causing disease to grow which will at the end affects their health status.

The correlation analyses done shows that education, age and income level are important factors that influenced or affect the status of the mothers. The mothers age and income ($r=0.726$; $p<0.05$), Educational status of mothers and hygienic practices($r=0.533$; $p<0.05$), Income and fat consumption ($r=0.442$; $p<0.05$), Income and BMI ($r=0.591$, $p<0.05$) are all positively related. Nutrition education is the most sensitive factor that is needed by all mothers because this will keep them informed about the right food for them at different stages of life and from there better living can be assured that will give the assurance of a better nutritional status for mothers.

Recommendations

The results of this study suggest that the following recommendations be made in order to improve the food consumption and the nutritional status of mothers.

- There is need for more nutrition education. An educated mother is most likely to provide better health care interm of good nutrition and better hygiene which will in turn improve the status of the subjects.
- There is need for more attention on feeding and hygienic practices, easy access to portable water, so that the problem of malnutrition can be reduced to the minimum in Akure South LG.
- Mothers should be more enlightened on the benefits of consuming fruits and vegetables, so that their daily consumption can be improved and their micronutrient status will also be better.
- The hospitals and health centre should have nutrition officers that will be counseling mothers on what is good (food) for them at different stages.
- Survey of this nature should be conducted at intervals of at most five years, so that it will assist government in knowing the nutritional status of those they governs and how to plan for improvement.

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