*The Ind. J. Nutr.Dietet., (2004), 41, 17*

# A SURVEY OF NUTRIENT INTAKE AND WORK-LOAD OF PREGNANT WOMEN IN YEWA SOUTH LOCAL GOVERNMENT AREA OF OGUN STATE

**OKAFOR, J.C., OLOYO, R.A. AND ADDO, A.A.**

*(Department of Hotel & Catering Management, Department of Science Laboratory Technology, federal Polytechnic, P.M.B. 50 Ilaro, Ogun State, Nigeria)*

*(Received 15th February, 2002)*

## Introduction

There is ample evidence in support of expectant mother's need to have adequate nutrition before and during pregnancy for the prevention of risks associated with pregnancy and childbirth[1]. More than ever, there is a growing campaign by the state government and international agencies to eradicate malnutrition among women of childbearing age in rural communities of Nigeria. Poor feeding habits characteristic of the women, lack of nutrition education coupled with their participation in a variety of trades or activities that are physical in nature although aimed at uplifting the socio-economic status of their families make them more vulnerable. Evolution of an effective programme for the control and prevention of malnutrition will necessitate the knowledge of the nutritional status of this vulnerable group. The fact that nutritional needs of the individual or a group is influenced by dietary practices, eating habits, economic situations, agricultural practices and food processing conditions[2] widely call for assessment of the nutritional status of the individual or group before adoption and implementation of malnutrition control programme for the group.

This study reports the results of the nutritional status and workload of pregnant women in a community in Yewa South Local Government Area of Ogun State, Nigeria.

## Materials and Methods

### *Experimental Subjects*

Forty pregnant women of ages 17 to 43 years and in the gestational ages ranging from 2 to 9 months constituted the experimental subjects. The volunteers were engaged primarily in occupations such as petty trading, fashion designing (or sewing mistresses), hairdressing, civil servants, housewives and farming characteristic of a rural community. They were all attending antenatal clinic in a Local Government Healthcare Centre in Ilaro, the Headquarters of Yewa South Local Government area of Ogun State. The distribution of the experimental subjects is shown in Table I.

### *Dietary and Workload Studies*

Nutrient intake of the experimental subjects were investigated by means of personal interview in a 24-hour dietary recall procedure. Probing questions were used to help the subjects remember all foods and drinks consumed. Questions were extended to methods of food preparation, portion sizes, as well as to approximate sizes of the meals. Volumes of beverages consumed were also estimated. Nutrient intake was calculated

* Department of Home Science and Management, University of Agriculture, Abeokuta, Ogun State, Nigeria

using a standard food composition table available for use in Africa[3,4]. The subjects were questioned on their daily activity pattern covering both physical and sedentary work, the amount of time spent on each work and their rest periods. Total energy expended daily by the subjects were estimated from values quoted in energy expenditure table[5]. Daily nutrient intake was evaluated against the Recommended Dietary Allowances (RDA) for women of 20 to 50 years adjusted for pregnancy[6].

### *Statistical Analysis*

Data obtained in the study were subjected to regression and correlation analysis and analysis of variance. Scheffe test was used to separate significantly different treatment means. Statistical analysis was performed by the use of Statistical Package for Social Sciences on a COMPAQ personal computer[7].

### Results and Discussion

Results of the 24-hour dietary recall exercise conducted on the experimental subjects indicated that their diets were traditional foods, based on maize, cassava, yam, cocoyam, rice, bread and cowpeas. The highly rich carbohydrate diets were served with okra, 'egusi' (melon) and vegetable soups garnished sparingly with smoked fish or beef. Occasionally, beverages were consumed. The nutrient intake data in Table II indicated that the mean intake of nutrients by all the women were 12.854.10 MJ; protein 50.93 ± 18.84g; 92.59 ± 471.86mg calcium, 25.73 ± 11.15mg iron, 942.38 ± 341.28µRE vitamin A, 1.53 ± 0.51 mg thiamine, 1.27 ± 0.99 mg riboflavin, 25.13±12.18 mg niacin and 48.90 ±65.36 mg ascorbic acid.

Nutrient intake values, when expressed in absolute terms, described the, inadequate dietary status of the women. Indeed, they do not indicate adequacy of the nutrients in meeting the physiological requirements of pregnancy except when expressed relative to RDA[2]. Consequently, evaluation of the nutrient intake values against RDA was used for the assessment of dietary status of the experimental subjects (Table II). Nutrient intake was considered acceptable and adequate if it was up to or more than 66 per cent of the RDA, marginal if they were 50 to 66 per cent of the RDA and, low if they were less than 50 per cent of the RDA[8]. For all the women, the average energy intake was more than 66 per cent RDA (136.18 ± 46.15% RDA) and hence suggestive of adequate energy intake. However, some of the women had marginal (5%) and low (5%) intake. Mean protein intake constituted 84.51 ± 30.89 per cent RDA and thus signified acceptable consumption level, although 5 and 22.5 percent of the women consumed marginal and low levels, respectively. For calcium, the mean intake was 41.04±39.32 per cent RDA and about 80 percent of the women had low intake, whereas 12.5 and 7.5 per cent had adequate and marginal intake, respectively. Although, mean intake of iron was higher than 66 per cent of the RDA value (85.72±37.17%), only 60 percent of the women consumed acceptable amount of iron, while 30 and 10 percent of the women had marginal and low intake, respectively. Intake of vitamin A and ascorbic acid seemed to be either high (≥66% RDA) or low (<50% RDA) although mean intake of both vitamins exceeded the RDA. Over, 92.5 per cent of pregnant women consumed adequate levels as far as each nutrient was concerned while the remaining 7.5 per cent had low intake. The mean intake of vitamins A and C were 157.05 ± 56.88 per cent of RDA and 182.68 ± 83.22 per cent RDA,

**TABLE I**
**Distribution of the Pregnant Women According to Occupation, Stage of Pregnancy (trimester) Age Group and Gravidity**

| | Percentage of women | Maternal age (yr) | |
|---|---|---|---|
| | | Mean | ± SD |
| All pregnant women | 100.0 | 26.23 | ±5.86 |
| Occupation* | | | |
| Trading | 62.5 | 27.00[b] | ±6.44 |
| Hairdressing | 10.0 | 22.80[d] | ±4.03 |
| Fashion designing | 10.0 | 23.50[cd] | ±3.70 |
| Civil servant | 5.0 | 29.00[a] | ±4.24 |
| Housewife | 2.5 | 25.00[bc] | ±0.00 |
| Farming | 10.0 | 26.50[b] | ±6.46 |
| Trimester | | | |
| First | 12.5 | 26.80 | ±3.90 |
| Second | 45.0 | 26.06 | ±6.80 |
| Third | 42.5 | 26.24 | ±5.54 |
| Age group(yr) | | | |
| < 20 | 7.5 | 18.00 | ±1.00 |
| 20 - 35 | 87.5 | 26.06 | ±4.48 |
| > 35 | 5.0 | 41.5 | ±2.12 |
| Gravidity group[1] | | | |
| 0 | 25.0 | 21.80[u] | ±3.16 |
| 1-3 | 42.5 | 24.29[v] | ±3.51 |
| > 3 | 32.5 | 32.15[w] | ±5.29 |

* Mean values denoted by different superscripts (a-d) in a column differ significantly, $P < 0.05$.
[1] Mean values denoted by different superscripts (u-w) in a column differ significantly, $P < 0.05$.

respectively. The thiamine consumption pattern of the pregnant women was such that mean intake was 101.30 ± 33.92 per cent RDA, and 87.5 percent had adequate intake, while 5 and 7.5 per cent consumed at marginal and low levels, respectively. For riboflavin, 47.5 per cent had acceptable intake, while 20 per cent was marginal and 32.5 per cent was considered low and the mean intake was 82.2±63.92 per cent of RDA. Seventy seven and a half per cent met adequate niacin intake level, whereas 15 per cent was only able to meet the marginal level and 7.5 per cent had low intake and the mean intake was 147.85±71.65 per cent of RDA.

Average nutrient intake of pregnant women according to the stage of pregnancy indicated that the intake of energy, calcium, iron, vitamin A, riboflavin and niacin varied significantly ($P < 0.05$) with trimester of pregnancy whereas no significant difference was observed in the intake values for protein, thiamine and ascorbic acid ($P > 0.05$). (Table III). While energy, calcium, iron and niacin increased steadily as pregnancy progressed, the reverse was the case for riboflavin. Vitamin A intake declined in the second trimester only to pick up in the third trimester. Correlation coefficients and trends of the relationships between each of the nutrient expressed as percent of RDA and the

Figure 1-1 Energy (%RDA)

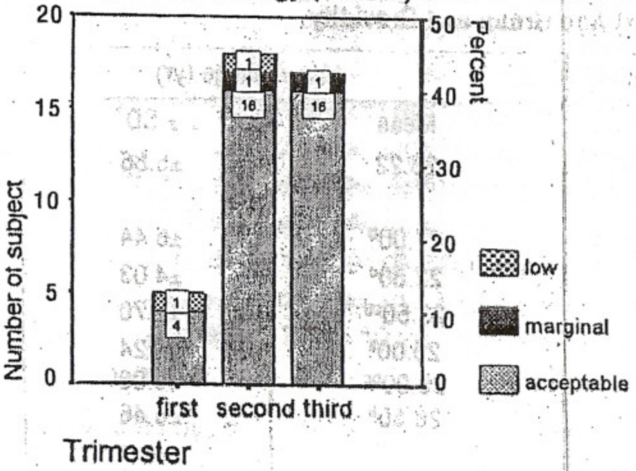



Figure 1-2 Protein (%RDA)

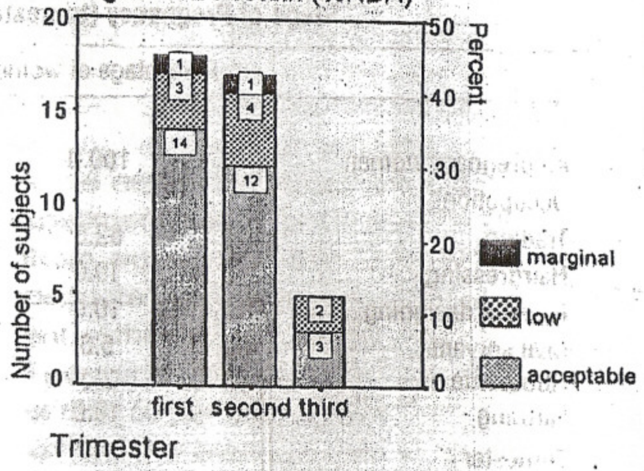



Figure 1-3 Calcium (%RDA)

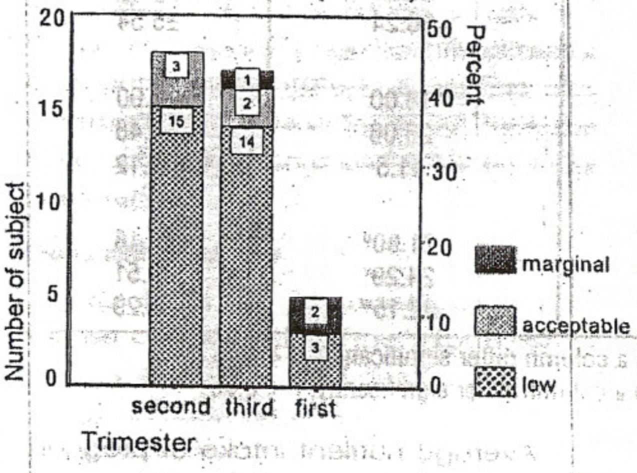



Figure 1-4 Iron (%RDA)

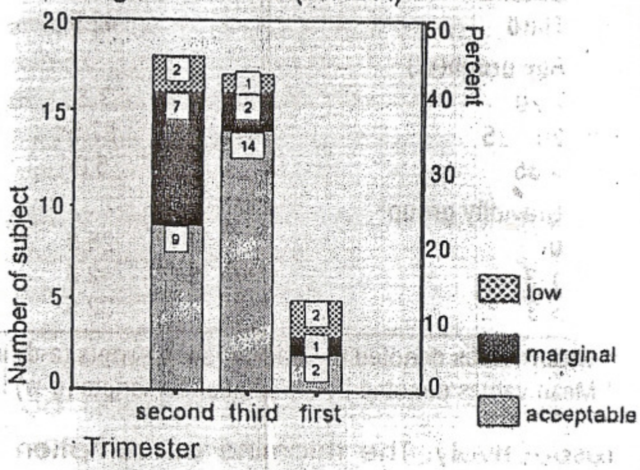



Figure 1-5 Vitamin A (%RDA)

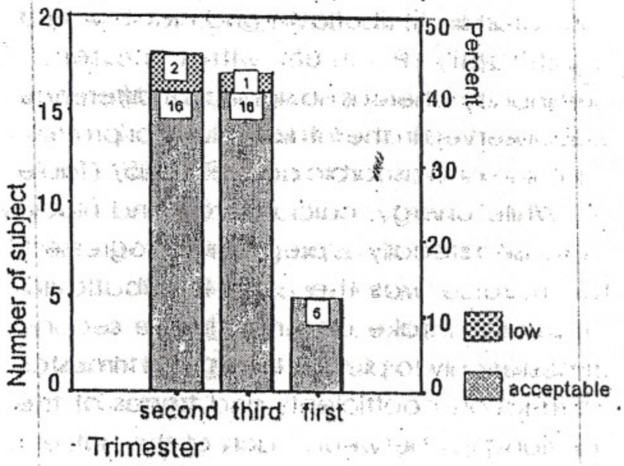



Figure 1-6 Thiamine (%RDA)

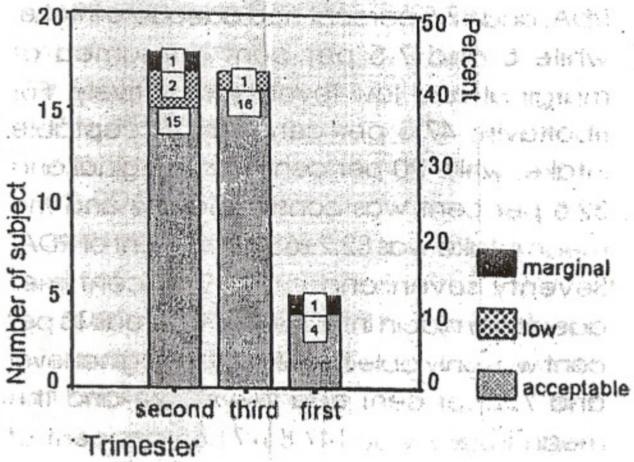


**TABLE II**

**Nutrient Intake of Pregnant Women According to Their Occupation**

| Nutrient | All pregnant women | | Trading | | Occupation | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Hairdressing | | Fashion designing | | Civil servant | | Housewife | | Farming | |
| | Mean | ± SD | Mean | ± SD | Mean | ± SD | Mean | ± SD | Mean | ± SD | Mean | ± SD | Mean | ± SD |
| Energy (MJ) | 12.85 | ±4.10 | 13.07$^{ab*}$ | ±4.51 | 13.95$^{a}$ | ±3.73 | 11.63$^{b}$ | ±2.64 | 8.86$^{c}$ | ±2.36 | 10.27$^{bc}$ | ±0.00 | 14.24$^{a}$ | ±3.61 |
| Energy (%RDA) | 136.18 | ±46.15 | 140.50 | ±48.53 | 149.19 | ±38.69 | 123.39 | ±25.91 | 60.86 | ±23.27 | 110.43 | ±0.00 | 153.09 | ±38.85 |
| Protein (g) | 50.93 | ±18.84 | 52.29$^{b}$ | ±18.62 | 58.38$^{a}$ | ±14.63 | 59.54$^{a}$ | ±7.94 | 48.36$^{b}$ | ±21.73 | 29.52$^{c}$ | ±0.00 | 33.02$^{c}$ | ±25.12 |
| Protein % (RDA) | 84.51 | ±30.89 | 86.55 | ±30.24 | 97.30 | ±24.38 | 99.23 | ±13.24 | 80.59 | ±36.22 | 49.20 | ±0.00 | 55.02 | ±41.86 |
| Calcium (mg) | 492.59 | ±471.86 | 552.58$^{b}$ | ±569.28 | 345.26$^{c}$ | ±131.25 | 256.85$^{d}$ | ±83.97 | 340.20$^{c}$ | ±137.74 | 645.20$^{a}$ | ±0.00 | 538.79$^{b}$ | ±334.79 |
| Calcium (%RDA) | 41.04 | ±39.32 | 46.04 | ±47.44 | 28.77 | ±10.94 | 21.40 | ±7.00 | 28.35 | ±11.48 | 53.76 | ±0.00 | 44.89 | ±27.90 |
| Iron (mg) | 25.73 | ±11.15 | 27.81$^{a}$ | ±12.60 | 24.58$^{b}$ | ±8.10 | 22.46$^{b}$ | ±6.06 | 11.53$^{d}$ | ±4.58 | 15.62$^{c}$ | ±0.00 | 26.79$^{a}$ | ±3.57 |
| iron (%RDA) | 85.72 | ±37.17 | 92.62 | ±42.06 | 81.93 | ±27.00 | 74.85 | ±20.20 | 38.42 | ±15.25 | 52.06 | ±0.00 | 89.30 | ±11.91 |
| Vitamin A (µRE) | 942.38 | ±341.28 | 982.19$^{b}$ | ±305.14 | 865.01$^{c}$ | ±518.33 | 963.47$^{b}$ | ±295.11 | 884.99$^{c}$ | ±368.88 | 1218.00$^{a}$ | ±0.00 | 709.68$^{d}$ | ±496.63 |
| Vitamin A (%RDA) | 157.05 | ±56.88 | 163.683 | ±50.85 | 144.18 | ±86.39 | 160.58 | ±49.19 | 147.50 | ±61.48 | 203.02 | ±0.00 | 118.28 | ±82.77 |
| Vitamin $B_1$ (mg) | 1.53 | ±0.51 | 1.54 | ±0.50 | 1.80 | ±0.40 | 1.65 | ±0.50 | 1.25 | ±0.52 | 1.30 | ±0.00 | 1.26 | ±0.78 |
| Vitamin $B_1$ (%RDA) | 101.83 | ±33.92 | 102.50 | ±33.14 | 120.17 | ±26.55 | 110.17 | ±33.21 | 83.33 | ±34.89 | 86.66 | ±0.00 | 84.00 | ±51.85 |
| Vitamin $B_2$ (mg) | 1.27 | ±0.99 | 1.39 | ±1.15 | 0.92 | ±0.41 | 1.07 | ±0.32 | 1.46 | ±1.51 | 1.16 | ±0.00 | 1.02 | ±0.78 |
| Vitamin $B_2$ (%RDA) | 82.20 | ±63.92 | 89.56 | ±74.63 | 61.67 | ±27.29 | 69.03 | ±20.34 | 94.19 | ±97.62 | 74.83 | ±0.00 | 65.80 | ±50.08 |
| Vitamin $B_3$ (mg) | 25.13 | ±12.18 | 26.39$^{b}$ | ±11.99 | 32.32$^{a}$ | ±13.00 | 32.25$^{a}$ | ±6.21 | 11.22$^{c}$ | ±7.08 | 13.68$^{c}$ | ±0.00 | 12.78$^{c}$ | ±5.28 |
| Vitamin $B_3$ (%RDA) | 147.85 | ±71.65 | 155.26 | ±70.54 | 190.13 | ±76.50 | 189.70 | ±36.51 | 66.01 | ±41.49 | 80.47 | ±0.00 | 75.14 | ±31.08 |
| Vitamin C (mg) | 148.90 | ±65.36 | 154.77$^{c}$ | ±64.04 | 122.95$^{d}$ | ±77.65 | 156.20$^{c}$ | ±45.67 | 171.58$^{b}$ | ±110.91 | 210.00$^{a}$ | ±0.00 | 104.23$^{d}$ | ±70.72 |
| Vitamin C (%RDA) | 182.68 | ±83.22 | 189.93 | ±82.05 | 153.69 | ±97.06 | 195.25 | ±57.08 | 214.84 | ±139.17 | 262.50 | ±0.00 | 117.78 | ±82.73 |

* Mean values denoted by different superscripts in a row differ significantly, P( < 0.05)

Figure 1-7 Riboflavin (%RDA)

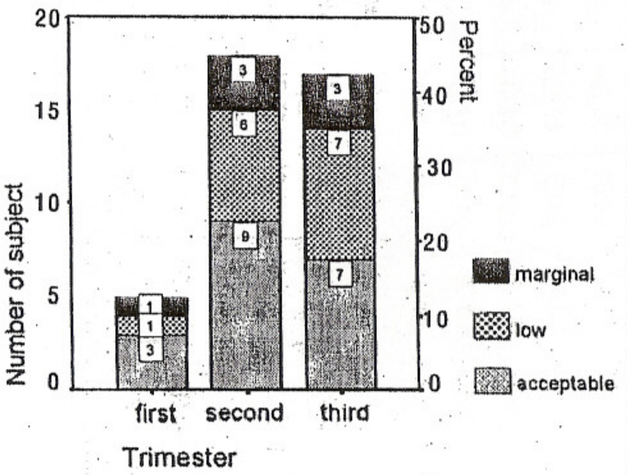



Figure 1-8 Niacin (%RDA)

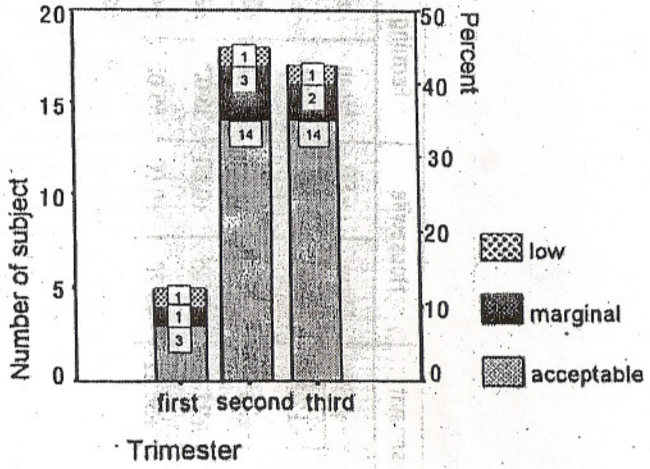



Figure 1-9 Vitamin C (%RDA)

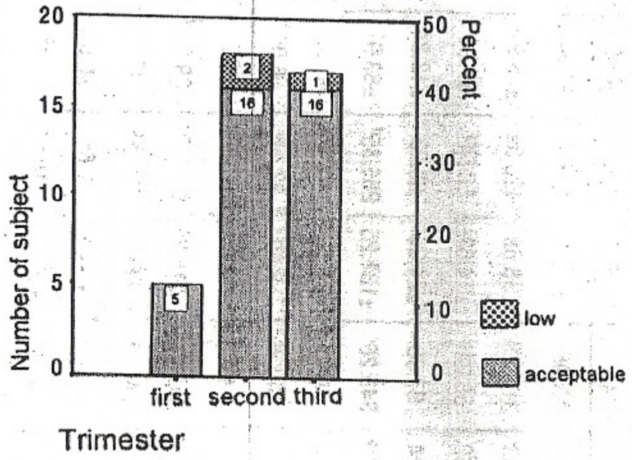



Figure 2-1 Energy (%RDA)

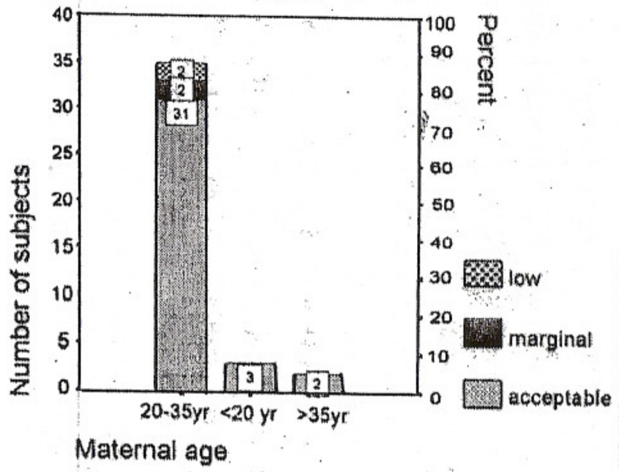



Figure 2-2 Protein (%RDA)

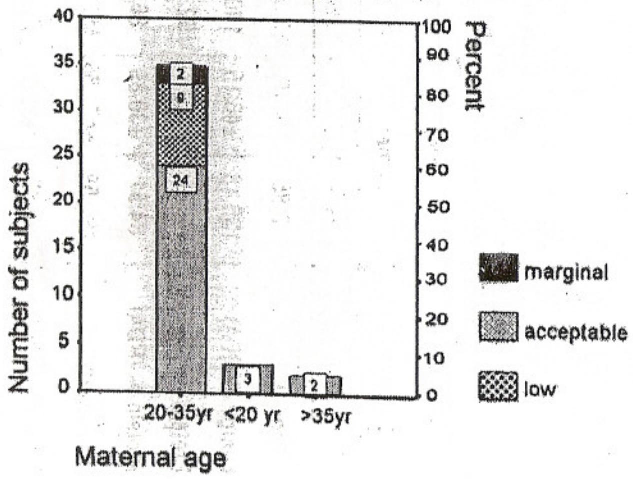


**TABLE III**
**Nutrient Intake of Pregnant Women According to Trimester of Pregnancy**

| Nutrient | Trimester of pregnancy | | | | | |
|---|---|---|---|---|---|---|
| | First | | Second | | Third | |
| | Mean | ± SD | Mean | ± SD | Mean | ± SD |
| Energy (MJ) | 9.68[b*] | ±5.83 | 12.10[ab] | ±3.27 | 14.57[a] | ±3.76 |
| Energy (% RDA) | 104.08 | ±62.63 | 125.95 | ±40.22 | 156.46 | ±40.18 |
| Protein (g) | 52.44 | ±32.50 | 51.85 | ±17.07 | 49.52 | ±16.96 |
| Protein (%RDA) | 87.39 | ±54.17 | 85.57 | ±27.18 | 82.53 | ±28.27 |
| Calcium (mg) | 409.09[c] | ±216.50 | 449.18[b] | ±437.86 | 563.12[a] | ±563.66 |
| Calcium (%RDA) | 34.08 | ±18.04 | 37.43 | ±36.47 | 46.92 | ±46.97 |
| Iron (mg) | 21.25[c] | ±14.84 | 24.60[b] | ±10.87 | 28.25[a] | ±10.38 |
| Iron (%RDA) | 70.82 | ±49.45 | 81.98 | ±36.24 | 94.05 | ±34.69 |
| Vitamin A (μRE) | 949.11[b] | ±188.55 | 887.53[c] | ±382.49 | 998.48[a] | ±335.90 |
| Vitamin A (%RDA) | 158.12 | ±31.36 | 147.92 | ±63.75 | 166.41 | ±55.99 |
| Vitamin $B_1$ (mg) | 1.32 | ±0.34 | 1.48 | ±0.55 | 1.64 | ±0.50 |
| Vitamin $B_1$ (%RDA) | 87.86 | ±22.61 | 98.33 | ±36.93 | 109.64 | ±32.99 |
| Vitamin $B_2$ (mg) | 2.11[a] | ±1.28 | 1.32[b] | ±1.17 | 0.98[c] | ±0.462 |
| Vitamin $B_2$ (%RDA) | 133.86 | ±85.45 | 84.94 | ±75.48 | 64.11 | ±29.87 |
| Vitamin $B_3$ (mg) | 15.68[b] | ±8.76 | 27.11[a] | ±12.43 | 25.82[a] | ±12.07 |
| Vitamin $B_3$ (%RDA) | 92.21 | ±51.52 | 159.51 | ±73.09 | 151.87 | ±70.96 |
| Vitamin C (mg) | 153.48 | ±66.67 | 145.92 | ±76.88 | 150.70 | ±54.78 |
| Vitamin C (%RDA) | 191.75 | ±83.49 | 182.56 | ±96.21 | 180.14 | ±72.60 |

* Mean values denoted by different superscripts in a row differ significantly, $P < 0.05$.

gestational period are given in Table IV. While as percent of RDA, energy, calcium, iron, thiamine and niacin were positively correlated with gestational age, protein, vitamin A, riboflavin and ascorbic acid were negatively correlated with gestational age. Assessments of the adequacies of the nutrient intake of the women at the three trimesters of pregnancy against RDA are depicted in Figures 1-1 to 1-9. The most limiting nutrient was calcium and its intake was low in all the three trimesters. Riboflavin, iron, protein and niacin intake ranked next to calcium, although the former nutrients were found low or marginal in the three trimesters.

The dietary constitution of the pregnant women was such that they depended on diets based largely on high-carbohydrate containing vegetable food ingredients such as cereals and tubers and less on protein-rich food items of both vegetable (cowpeas and melon) and animal sources (fish and beef). This explains why majority of the women had adequate energy intake, but inadequate protein intake. Foods that are rich sources of calcium, particularly fish and milk were either included sparingly or not at all. Dietary requirement for thiamine, riboflavin and niacin has been related to the quantity of dietary energy intake[9]. Indeed, the three vitamins are active parts of co-enzymes (i.e. thiamine pyrophosphate, TPP; flavin adenine dinucleotide, FAD; and nicotinamide adenine dinucleotide, NAD) which play essential parts in the metabolism of dietary energy in the animal cells[10]. The implication is that utilisation of the dietary

Figure 2-3 Calcium (%RDA)

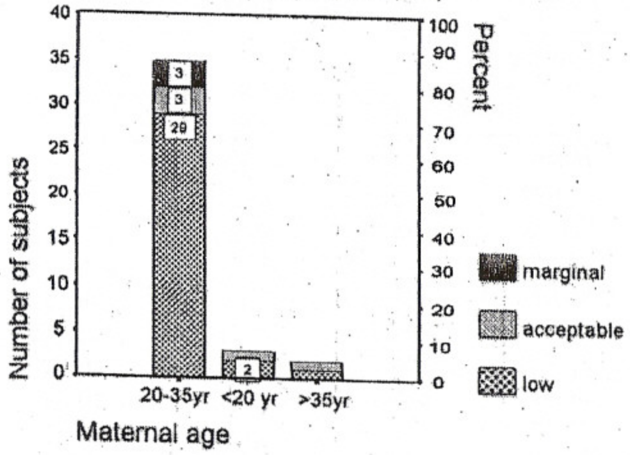



Figure 2-4 Iron (%RDA)

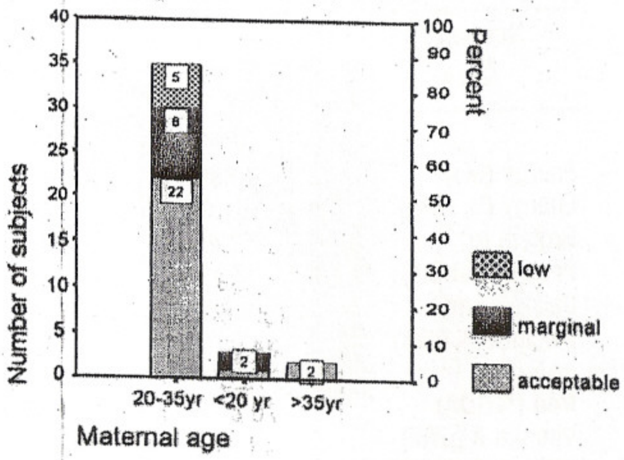



Figure 2-5 Vitamin A (%RDA)

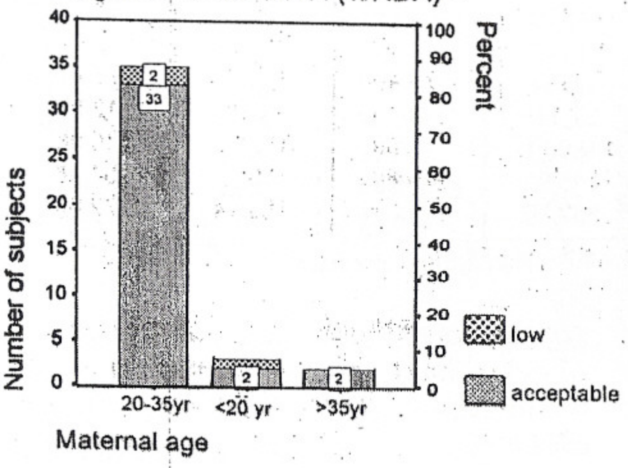



Figure 2-6 Thiamine (%RDA)

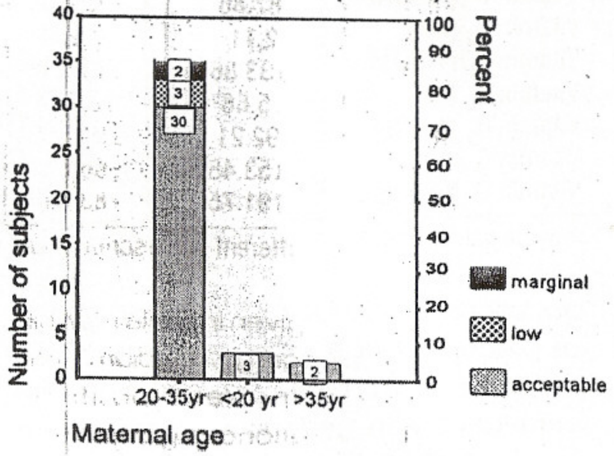



Figure 2-7 Riboflavine (%RDA)

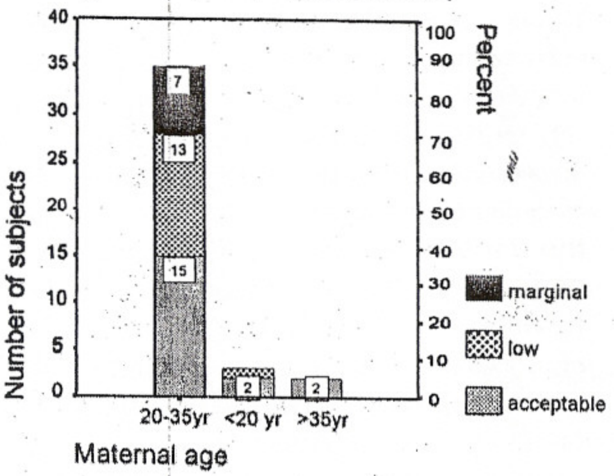



Figure 2-8 Niacin (%RDA)

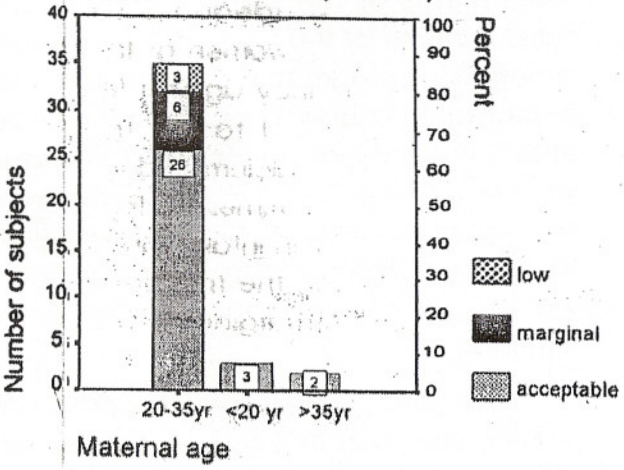
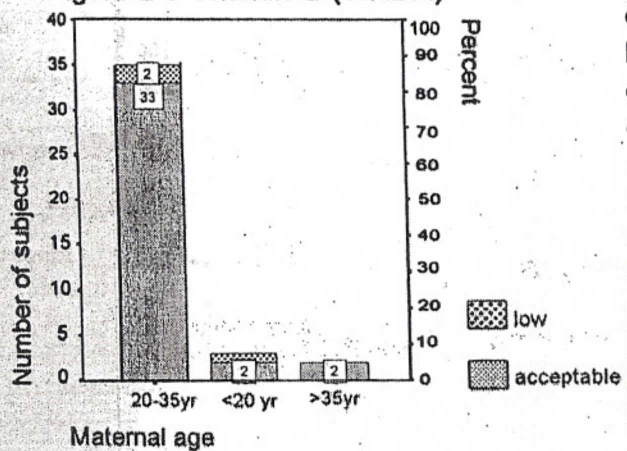


Figure 2-9 Vitamin C (%RDA)




energy that hitherto considered to be consumed at the adequate level when compared against the RDA will be limited in women who had inadequate and marginal intake of riboflavin (52.5%) and niacin (22.5%). Similarly, energy utilisation in the animal cell is affected by iron because the latter plays a vital role in the oxidative transport chain where the reduced forms of NAD and FAD are oxidised and adenosine triphosphate (ATP), the energy currency of the cell is produced[10].

In view of the variation in maternal ages of the experimental subjects, adequacy of nutrient intake was considered for three age groups i.e. < 20 yrs, 20 - 35 yrs and > 35 yrs. Graphical presentations in Figures 2-1 to 2-9 indicated that women above 35 years of age consumed acceptable levels of all the nutrients except calcium. A half of the women in the category were observed to consume inadequate amount of the mineral element. All the teenagers had adequate amount of energy, protein, thiamine and niacin but only two-thirds of them had acceptable levels of vitamin A, riboflavin and ascorbic acid and marginal intake of iron. Furthermore, only one-third of the teenagers had adequate calcium intake. For the women who were in the 20-35 yrs group, about four-fifth of them met acceptable intake levels for energy, vitamin A, thiamine and ascorbic acid; about two-thirds had adequate intake of protein, iron and niacin; about two-fifth met acceptable level of riboflavin intake; while less than one-tenth had adequate calcium intake.

All the nutrients assessed in this survey excepting thiamine and riboflavin varied significantly with the women in occupational subgroups ($P < 0.05$). While the farmers had the highest energy intake (14.24 MH/day), the civil servants consumed the least (8.86

**TABLE IV**
**Estimated Regression Equations of Relationships Between Gestational Age and Daily Nutrient Intake Exressed as percentage of RDA**

| Nutrient (% RDA) | Trend line* | $R^2$ | r |
|---|---|---|---|
| Energy | $y = -0.4567x^2 + 13.339x + 74.425$ | 0.830 | 0.905 |
| Protein | $y = -0.4524x^3 + 5.2925x^2 - 16.754x + 103.7$ | 0.647 | -0.507 |
| Calcium | $y = -0.9207x^2 + 11.469x + 7.6574$ | 0.215 | 0.273 |
| Iron | $y = 0.5037x^2 + 0.372x + 66.993$ | 0.727 | 0.840 |
| Vitamin A | $y = -0.9763x^3 + 11.671x^2 - 33.982x + 180.14$ | 0.777 | -0.281 |
| Thiamine | $y = -0.9264x^2 + 12.331x + 62.658$ | 0.298 | 0.413 |
| Riboflavin | $y = -1.4236x^2 + 14.1031x + 124.5$ | 0.431 | -0.637 |
| Niacin | $y = -9.2484x^2 + 103.58x - 104.86$ | 0.657 | 0.081 |
| Ascorbic acid | $y = 1.356x^3 - 28.482x^2 172.79x-96.436$ | 0.498 | -0.245 |

+ y, nutrient (% RDA); x, gestational age (months)

Figure 3-1 Energy (%RDA)

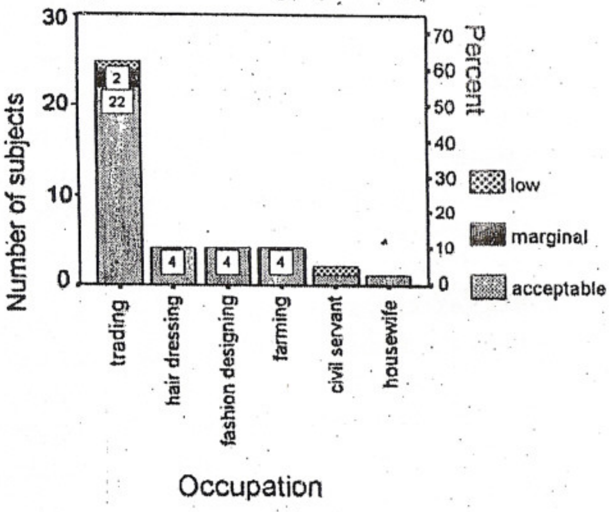



Figure 3-2 Protein (%RDA)

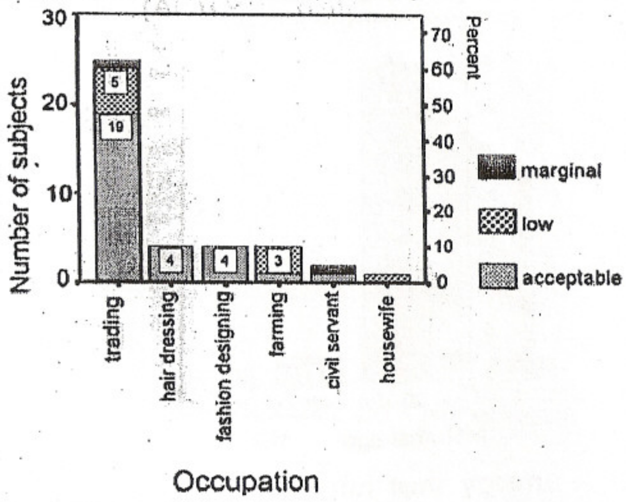



Figure 3-3 Calcium (%RDA)

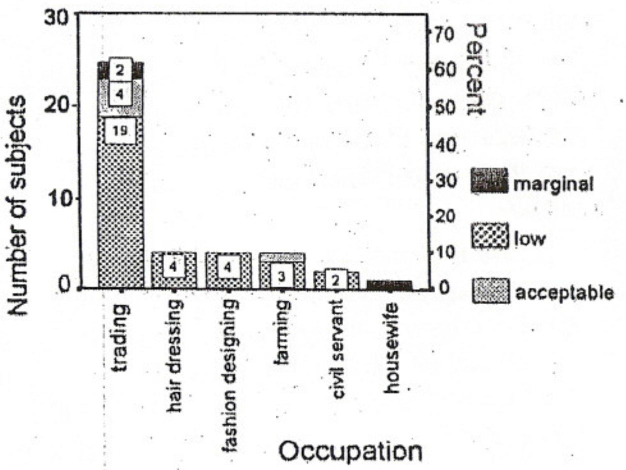



Figure 3-4 Iron (%RDA)

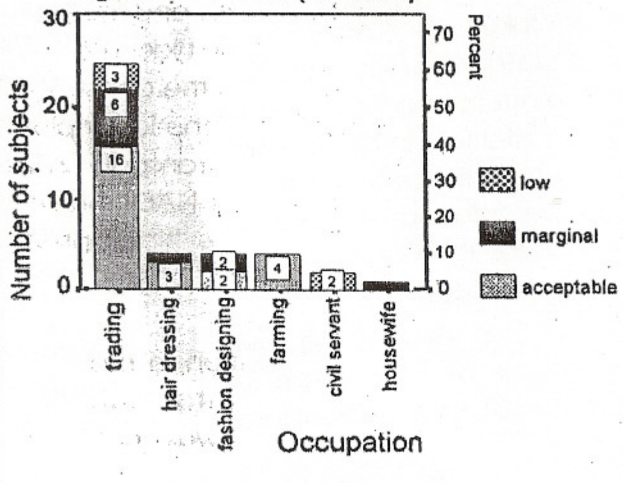



Figure 3-5 Vitamin A (%RDA)

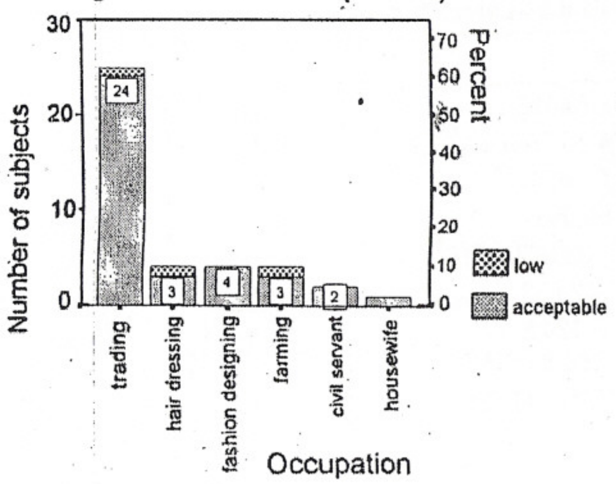



Figure 3-6 Thiamine (%RDA)

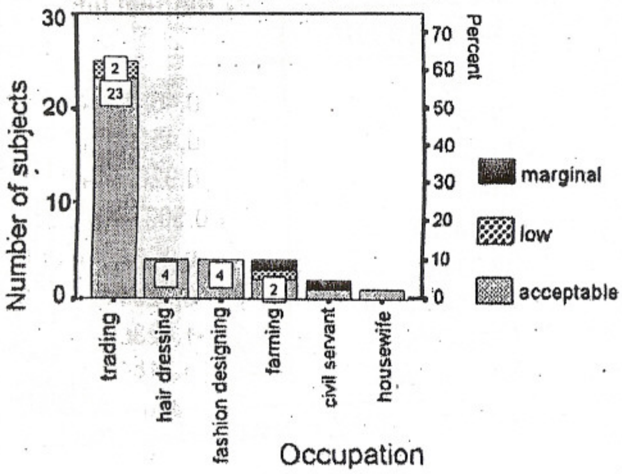


**TABLE V**
**Energy Balance of Pregnant Women According to Occupation, Trimester of Pregnancy and Maternal Age**

| | Workload (MJ day$^{-1}$) | | Net energy+ (MJ day$^{-1}$) | |
|---|---|---|---|---|
| | Mean | ± SD | Mean | ± SD |
| Total for all pregnant women | 7.52 | ±2.59 | 5.33 | ±3.45 |
| Occupation* | | | | |
| Trading | 7.78$^{a}$ | ±2.68 | 5.91$^{a}$ | ±4.20 |
| Hairdressing | 8.55$^{a}$ | ±2.42 | 5.40$^{a}$ | ±1.74 |
| Fashion designing | 5.74$^{b}$ | ±1.81 | 5.89$^{a}$ | ±0.95 |
| Civil servant | 4.66$^{b}$ | ±1.70 | 4.19$^{b}$ | ±4.05 |
| Housewife | 5.17$^{b}$ | ±0.00 | 5.10$^{a}$ | ±0.00 |
| Farming | 8.64$^{a}$ | ±2.17 | 5.59$^{a}$ | ±1.69 |
| Trimester ‡ | | | | |
| First | 8.88$^{s}$ | ±2.88 | 0.80$^{r}$ | ±6.11 |
| Second | 6.58$^{r}$ | ±2.31 | 5.22$^{s}$ | ±2.30 |
| Third | 8.11$^{s}$ | ±2.59 | 6.77$^{t}$ | ±2.33 |
| Age group(yr)† | | | | |
| < 20 | 6.74$^{x}$ | 2.76 | 6.06 | ±1.78 |
| 20 - 35 | 7.50$^{y}$ | 2.65 | 5.28 | ±3.31 |
| > 35 | 9.02$^{z}$ | 1.52 | 5.08 | ±1.85 |

\+ Net energy is calculated as the difference between daily energy intake and daily energy expended (workload).
* Mean valeus within the occupational subgroups denoted by different superscripts (a-b) differ significant at P>0.05.
‡ Mean values within the trimester subgroups denoted by differet superscripts (r-t) differ significantly at P > 0.05.
† Mean values within the age subgroups denoted by different superscripts (x-z) differ significantly at P > 0.05.

MJ/day). Protein intake ranged from 29.52 g/day for housewives to 59.54g/day for fashion designers. Housewives took the highest amount of calcium (645.2 mg/day) whereas fashion designer had the lowest (256.85 mg/day). For iron, the traders had the highest (27.81 mg/day) and the civil servants had the lowest (11.53mg/day). Highest intake of vitamin A was recorded for the housewives (1218.0 μRE/day) and the farmers had the lowest (709.68 μRE/day). Niacin intake ranged from 11.22 mg/day for civil servant to 32.32 mg/day for hairdressers. Ascorbic acid intake was highest for housewives (210.0 mg/day) and was least in the case of farmers (104.23 mg/day).

Data on evaluation of the adequacy of the nutrient intake of the various occupational subgroups against RDA (Table II) and as illustrated in Figures 3-1 to 3-9 indicated that the housewives faired well in their consumption of energy and all the vitamins assessed, but consumed marginal level of calcium and iron and had inadequate level of protein. The farmer subgroup had acceptable intake levels of energy and iron. While three-quarters of them faired well in vitamin A and ascorbic acid, only half had adequate thiamine and niacin. In addition, one-third of the former subgroup consumed acceptable levels of protein, calcium and riboflavin. In case of fashion designers, all of them had adequate intake of all the nutrients excepting calcium, iron and riboflavin that were consumed at marginal or inadequate levels. While all of them had inadequate calcium intake, only half of them met acceptable intake levels

Figure 3-7 Riboflavin (%RDA)

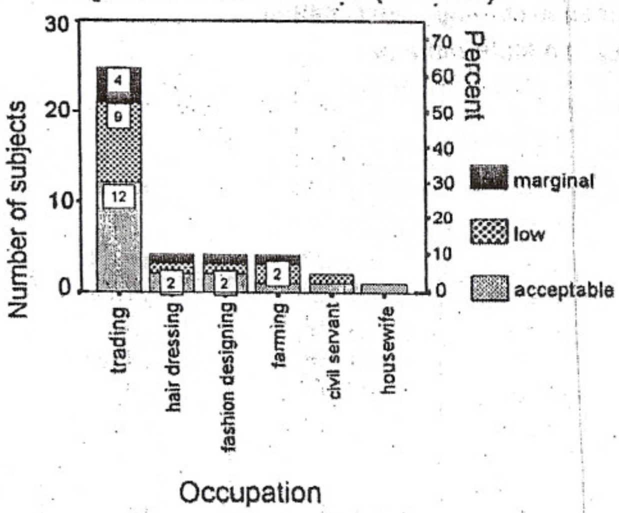



Figure 3-8 Niacin (%RDA)

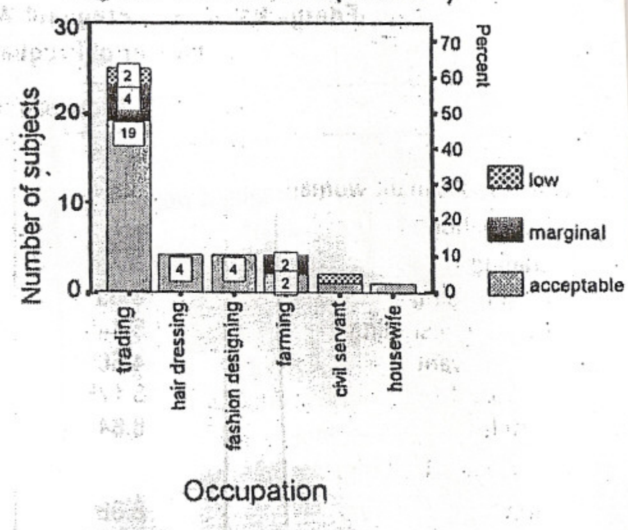
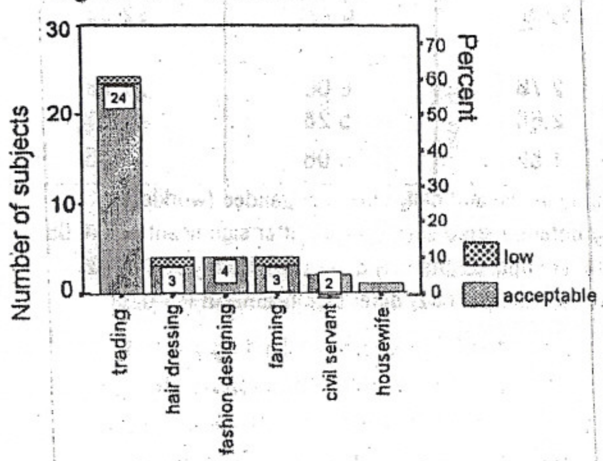



Figure 3-9 Vitamin C (%RDA)




of iron and riboflavin. All the civil servants consumed adequately vitamin A and ascorbic acid, whereas only half of them met acceptable intake levels for thiamine, riboflavin, niacin, protein and energy. They all consumed calcium and iron at low levels. All the hairdressers had adequate intake of all the energy, protein, thiamine and niacin, whereas the reverse was the case for calcium intake. Three-quarters of the hairdressers faired well in their intake of iron, vitamin A and ascorbic acid, while only a half of the group met acceptable intake level for riboflavin. While about two-thirds of the traders met the acceptable energy, vitamin A, thiamine and ascorbic acid intake levels, about half of the women in the subgroup met adequate intake levels of protein and niacin, one-third met riboflavin intake level, one-tenth met adequate intake of calcium and about two-fifth met acceptable iron intake level.

Table V shows the daily energy balance of the pregnant women. Although, the mean energy expended daily on physical activities by all the pregnant women was 7.52±2.59 MJ. workload varied remarkably ($P>0.05$) due to occupational groups, trimester of pregnancy and maternal age. The civil servant expended the least energy on physical activities (4.66±1.70MJ day$^{-1}$), while the farmers recorded the highest (8.64±2.17 MJ day$^{-1}$). There was no significant ($P < 0.05$) difference among the civil servants, housewives and fashion designers and among the farmers, traders and hairdressers. Women in the first trimeter expended the largest amount of energy (8.88 ±2.8 MJ day$^{-1}$), while the least amount was used in the second trimester (6.58±2.31 MJ day$^{-1}$). The teenagers expended the least quantity of energy (6.74±2.76 MJ day$^{-1}$) whereas women above 35 years old expended the largest quantity of energy (9.02 ±1.52 MJ day$^{-1}$).

The mean energy expended by all the women was less than the mean energy consumed as evident by a positive net energy value (5.33 ± 3.45 MJ day$^{-1}$). However, the net energy is less than half of the mean energy intake of all the women. Nevertheless, both the workload and the net energy of the women were significantly ($P > 0.05$) affected by occupation, trimester of pregnancy and the maternal age. The net energy was lowest for civil servants (4.19 ±4.05 MJ day$^{-1}$), and it was significantly ($P>0.05$) less than those observed for the rest of the occupational subgroups. It was least among women in the first trimester (0.80±6.11 MJ day$^{-1}$), and highest in the third trimester (6.77 ±2.33 MJ day$^{-1}$). The teenagers had the highest net energy (6.06 ±1.78 MJ day$^{-1}$), while those above 35 years old had the lowest (5.08±1.85 MJ day$^{-1}$). However, there was no significant ($P < 0.05$) difference among the net energy values of women in the three different age groups.

## Summary and Conclusion

A study on the assessment of the adequacy of diets and workload was conducted among 40 pregnant women who were primarily petty traders, fashion designers (sewing mistresses), hairdressers, civil servants, housewives and farmers; and were attending antenatal clinic in the rural community of Ilaro. The subjects had average maternal age, gestational age and gravidity of 26.2±5.86 yrs, 5.9 ± 1.98 months and 2.8 ±2.47, respectively. Average daily nutrient intake were energy (2.85±4.10 MJ); protein (50.93±18.84g); calcium (492.59± 471.86mg); iron (25.73±11.15mg); vitamin A (942.38 ±341.28 μRE); thiamine (1.53 ±0.51mg); riboflavin (1.27±0.99mg); niacin (25.13 ±12.18mg); and ascorbic acid (148.90 ± 65.36mg). Mean daily energy expenditure (workload) was 7.52±2.59MJ). Assessment of the adequacy of the nutrient intake against the RDA indicated that calcium was the most limiting, its intake was low throughout the pregnancy period and the teenagers, hairdressers, fashion designers and the civil servants suffered the deficiency of the mineral most. Protein, riboflavin, niacin and iron ranked next to calcium. It was concluded that while mean energy intake of all the women was higher than acceptable level, its utilisation might be limited in majority of the women who had either marginal or inadequate intake of riboflavin, niacin and iron.

## REFERENCES

1. United Nations. *Micronutrient Deficiency - The Global Situation*. ACC./SCN. 2nd Report on World Nutrition Situation. 1993, **9**.
2. Passmore, R and eastwood, M.A. *Human Nutrition and Dietetics* 8 Ed. English Language Book Society / Churchill Livingstone. U.K. 1986.
3. Okafor, J.C., Oloyo, R.A. and Addo, A.A. study of iron status of pregnant women in Yewa South Local Government Area of Ogun State. *Ind. J. Nutr. Dietet.* 2001, **38**, 394-402.
4. Wu Leung, W.T., Busson, R and Jardin, C. *Food Composition Table for Use in Africa*. U.S. Department of Health, Education and Welfare, bethesda, Maryland, U.S.A. / Food and Agriculture Organisation of the United Nations, Rome, Italy. 1968.
5. FAO/WHO/UNU. *Energy and Protein Requirements ; Report of a joint FAO/WHO expert consultation*. Food and Agriculture Organization, World Health Organisation, United Nation. Technical Report Series. 1985, No. 724.
6. NRC. *Recommended Dietary Allowances*. 8th Ed. National Research Council. National Academy of Sciences. Washington, D.C. 1974.
7. SPSS Inc. SPSS 9.0 for Windows. Standard Version. 1998.
8. Bowering, J., Lowenberg, R.L. and Morrison, M.A. Nutritional studies of pregnant women in East Harlem. *Am. J. Clin. Nutr.* 1980, **33**, 1987-1996.
9. Fisher, P. and bender, A. *The Value of Food*. 2nd ed. Oxford University Press. London. 1975.
10. Stryer, L. Biochemistry. 2nd Ed. W.H. Freeman and Co. San Francisco, USA. 1981.