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Determinants of Health and Nutritional Status of Rural Nigerian Women

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ABSTRACT

This study was undertaken to determine the effects of socioeconomic and cultural factors on the health and nutritional status of 300 women of childbearing age in two rural farming communities in Enugu State, Nigeria. The women were engaged in farming, trading, and teaching. A cross-sectional survey was conducted using both qualitative and quantitative data-collection methods. The study involved focus-group discussions (FGDs), interviews using a questionnaire, measurement of food/nutrient intake, assessment of activity patterns, anthropometry, and observations of clinical signs of malnutrition. The better-educated women had higher incomes than those with little or no education. Poor education was mainly attributed to lack of monetary support by parents (34%), marriage while in school (27%), and sex discrimination (21%). The teachers had significantly ($p<0.05$) better health status, health and nutrition knowledge, food habits, nutrient intake, and self–concept, and adhered less to detrimental cultural practices. However, none of the women met their iron, riboflavin and niacin requirements. More cases of chronic energy deficiency were observed among the farmers (16%) and traders (13%) than among the teachers (5%). Generally, the women worked long hours with reported working hours (6-7 hours) being lower than the observed working hours (11 hours) for the traders and teachers. Income had a significant ($p<0.05$) positive correlation with all nutritional variables, except vitamin C, age-at-marriage ($r=0.719$), and nutrition knowledge ($r=0.601$). Age-at-marriage had a positive correlation with body mass index (BMI) and all nutritional variables but was significant ($p<0.05$) for protein ($r=0.362$), calcium ($r=0.358$), iron ($r=0.362$), riboflavin ($r=0.364$), and vitamin C ($r=0.476$). Workload was negatively correlated with protein intake ($r=0.346$; $p<0.05$). Meal frequencies for more than 70% of the farmers and petty traders and 42% of the teachers were dependent on the availability of food in the household. Food taboos had no effect on their nutrient intake, since only 5-11% of women adhered to taboos. Although most women gave their children and husbands preference in food distribution, not much difference was found in the amount of food consumed by these women. The ratio of wife's portion to husband's was 1:1.4 for the farmers, 1:1.3 for the traders, and 1:1.2 for the teachers. FGDs revealed that sex discrimination in education prevailed where resources were limited. The results of the study suggest that the basic determinants of health and nutritional status of women are socioeconomic and cultural, education having a mediating or modifying influence on cultural practices.

***Key words**:* Health status; Nutritional status; Women's health; Maternal nutrition; Rural health; Nigeria

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INTRODUCTION

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 (1,2). 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. Women are, thus, vulnerable to malnutrition for social and biological reasons.

Recently, efforts have been made to improve women's economic independence in Nigeria by introducing Better Life for Rural Women and Family Support Programmes (FSP) to ensure a more equitable role for women in the community. As in other regions, African women are an indispensable part of human resources for development. Their quality of life is very important for their effective participation in development. This study, therefore, aims at identifying the underlying factors affecting the health and nutrition of rural Nigerian women. The information gathered is expected to help plan and implement a comprehensive package for improving their health and nutritional status.

MATERIALS AND METHODS

Study area

Two rural farming communities—Eha-Amufu and Adani—in Enugu State, Nigeria, were selected because the economic activities of women in these two communities are similar. Familiarity of the researchers with the language and cultural practices of the local people was another determining factor. The predominant economic activities of women in the two communities include farming, trading, and teaching. The agricultural system varies from rotational fallow in the low-density area to semi-permanent cultivation in the high-density area. The farmers still use primitive tools, such as hoe and machete.

The major crops grown include root-crops, such as yam *(Dioscorea alata)* and cassava *(Manihot esculenta),* and rice *(Oryza sativa)*. Livestock, such as goats, pigs and sheep, and poultry, such as ducks and fowls, are raised for cash and also serve as sources of animal protein and manure.

Population and sample-size determination

The study was carried out to determine the effects of socioeconomic and cultural factors on the health and nutritional status of women. Of adult women in sub-Saharan Africa, 10-40% have mild-to-moderate chronic energy deficiency (3). Based on this, we estimated that 10% of the teachers and 30% of both farmers and traders suffer from malnutrition. The sample size was calculated using the formula:

$$n = \frac{2p(1 - p)F}{D^2}$$

Where, n=total number of women in each occupational group, p=estimated proportion of malnourished women, F=level of precision, and D=difference between the estimated proportions of malnourished women. A sample size of 67 was required for each occupational group. However, the researchers increased the sample size to 100 to make up for drop-outs. An equal number of women (50) from each occupational group in the two communities was studied bringing the total number of women in the study to 300.

Sampling: Three hundred respondents were included in the cross-sectional survey. A stratified sampling technique was employed. Three different strata, farmers, traders/market women, and teachers, were considered. The method of selecting respondents in each stratum differed due to their special characteristics. In the villages where the study was conducted, there were no streets. Families clustered in different locations. For farmers, the researchers randomly picked one in every four households in each cluster for the survey. The farmers were usually visited in the morning hours as the research was conducted during the pre-planting season. The traders/market women were located at the market places. The main market in each community was selected. One in every two market-stalls was randomly selected, and the traders were interviewed there. All the female teachers, identified in the two communities, were included in the study to make up the number of respondents required. After permission had been granted by the school principal, teachers were visited in their schools, and a questionnaire was distributed during the break periods.

Preliminary visits: Preliminary visits enabled the researchers to become acquainted with the village setting, village heads, and community leaders, and to identify contact persons. The purpose of research was also made known to the community leaders and contact persons. These, in turn, persuaded people to cooperate and participate in the study. The women willingly participated in the cross-sectional survey. However, because of the rural nature of the communities, only volunteer households were observed.

Study design: The study combined both qualitative and quantitative data-collection methods. The study involved focus-group discussions (FGDs), cross–sectional survey, measurement of food/nutrient intake, anthropometry, assessment of activity patterns, and clinical examinations for overt signs of malnutrition.

Data collection: Five FGD sessions were conducted to obtain information on cultural beliefs about women. The contact persons, using traditional communication channels, passed the information about the meetings to their community members. Participants were divided into the following five groups: (a) married men (aged 25-35 years), (b) married men (40-55 years), (c) married women (18-25 years), (d) married women (30-45 years), and (e) elderly women (50 years and above). Each group comprised 8-12 persons, and each meeting lasted for 45-60 minutes. A focus-group guide was constructed for the discussion. The researchers took notes on the discussions, which were also tape-recorded. One researcher served as a moderator.

Questionnaire: A questionnaire was used for the cross–sectional survey. The questionnaire was developed and validated by the Department of Home Science and Nutrition at the University of Nigeria, Nsukka. The pretested questionnaire was distributed to the teachers in the two communities. The teachers themselves completed the questionnaire under close supervision of the researchers. The researchers collected data from the farmers and traders by interviewing them, since they themselves could not complete the questionnaire.

***Measurement of food intake and assessment of activity patterns*:** Thirty randomly-selected women—10 from each occupational group—were considered for household observation. Those who refused were dropped, and others were selected until the required numbers were obtained. Food intake by each woman was weighed for 3 consecutive days. The researchers visited them early in the morning and stayed with them until after supper. Sundays and holidays were excluded, because the activities and eating patterns of women on these days are not representative of a typical day for rural women. All raw ingredients and empty pots used for food preparation were weighed before cooking. The total weight of food was determined after cooking. The mother's portion of food and that of other family members were weighed, and the wastes remaining on the plate after consumption were noted. The quantity of ingredients in the mother's portion of food was calculated according to the method of Olusanya (4). The nutrient content of foods consumed was calculated using food-composition tables (5,6). Food eaten while away from home, if any, was estimated using household measure (spoon, cups, etc.) or weights measured by food-sellers' balance or other tools, and the nutrient content was calculated as explained above. Chemical analyses of local recipes for which no values were available in the food-composition tables were done where necessary.

The activity patterns of the women who participated in the 3-day food intake weighing exercise were also recorded by the researchers using the diary method, in which detailed information was obtained on how the 24 hours of a day are spent (7). Time spent on economic activities, house work, childcare, and food chain activities (work and work-related activities), time spent on all forms of social and religious activities (voluntary activities), and time spent on all forms of relaxation, such as sleep and rest (subsistence activities) as classified by FAO/WHO/UNU (8), were recorded.

Anthropometry: Anthropometric measurements for height and weight of the study women were taken following the standard procedures outlined by Lohman *et al.* (9). The body mass index (BMI) was calculated using the formula:

$$\text{BMI}\,\frac{\text{wt(kg)}}{\text{ht}^2(m)}$$

where wt=weight in kg, ht=height in metres (8).

Clinical examination: The women were examined for overt signs of malnutrition, such as muscle wasting, angular stomatitis, bleeding gum, dermatitis, paleness, pallor, etc. Women who were grossly emaciated were regarded as wasted.

Data analyses: Tape-recorded FGDs were transcribed and compared with the summary notes taken, and a comprehensive account of all the discussions was compiled. Information gathered from the questionnaires was coded and entered into the computer. The data were analyzed using descriptive statistics, such as frequencies, percentages, means, and standard deviations, for each category of women. Chi-square test for proportion, analysis of variance (ANOVA), and Pearson's correlation were done where applicable. The mean energy and nutrient intake of these women was compared with the recommended intake (8, 10-13). The BMI was also compared with standards (8).

RESULTS

Characteristics of women

Most (88.5%) women in the study were aged 25-45 years. There were significantly ($p<0.05$) more younger women (18-24 years) among the farmers (16%) and traders (15%) than among the teachers (1.2%). The farmers and traders had little or no education, while the teachers had

above West African School Certificate (WASC) or its equivalent. Incomes of the study women were low (<$100 per month), although the teachers earned more. Some teachers were also engaged in farming (76%), conducting evening lessons (7%), and poultry keeping (5%) to earn extra income. The mean age-at-marriage and first birth were significantly lower ($p<0.05$) for the farmers and traders than for the teachers (Table 1). The mean family size, number of pregnancies, and number of children were not significantly different ($p>0.05$) for the three groups of women. However, there were significantly ($p<0.05$) more dead children among the farmers and traders than among the teachers. Significantly ($p<0.05$) more teachers (61%) had good scores for nutrition/health knowledge (70-100%) than had the farmers (9%) and traders (7%).

Societal rating of women

About 82% of the farmers and petty traders agreed that women were rated lower than men in the society; 76% of the teachers shared this opinion. Some responses were as follows:

"Women are considered slaves in the society" (middle-aged farmer).

"Women are not just rated as slaves but as goats that are meant to be sold after a while" (young trader).

"Men rate women lower, because that is how nature has made it to be" (middle-aged farmer).

Table 1. General characteristics of study women

Characteristics	Farmers	Traders	Teachers	Total
(a) Mean age-at-marriage (years)	16.5±3.0[a]	17.1±4.0[a]	24.0±7.3[b]	
Mean age-at-first birth (years)	18.0±2.5[a]	18.8±3.5[a]	25.6±8.2[b]	
Mean family size (persons)	5.71±2.1	6.1±2.4	6.7±2.1	
Mean number of pregnancies	4.97±2.6	4.67±2.3	4.1±2.3	
Mean number of children	3.70±2.1	3.76±2.1	3.62±1.87	
Mean number of dead children	1.99[b]±1.8	0.89[b]±1.0	0.45[a]±0.81	
(b) Nutrition knowledge scores (%)	(n=100)	(n=99)	(n=98)	(n=297)
Poor (0-30)	29[b]	24.2[b]	3.1[a]	18.8
Fair (40-60)	62	68.9	35.7	55.5
Good (70-100)	9[b]	7.1[b]	61.2[a]	25.6

[a,b] Values with different superscripts in the same row are significantly different ($p\leq0.5$)
χ^2= 103; $p<0.01$, $z=3.13$ (for poor score category); $z=4.5$, $p<0.05$ (for good score category)

The activity patterns of the women are shown in Table 2. Generally, the reported hours were much lower than the observed hours for work and work-related activities for the traders and teachers. The traders spent more time (11 hours) in work and work-related activities than the farmers (9 hours). The farmers reported longer working hours (8.8 hours) than the traders (6.9 hours) and teachers (6 hours).

Women's self-rating

About 70% of the young and middle-aged women claimed that they rated themselves as high as men. From the survey, more teachers (65%) than farmers (19%) and traders (32%) rated themselves equal to men. However, according to an elderly woman, "*Societal degradation is the lot of womanhood which should not be fought against."*

Table 2. Reported and observed hours of work for farmers, traders, and teachers

Working hours and leisure activities	Farmers (n=82)	Traders (n=88)	Teachers (n=66)	Total (n=236)
Reported working hours	8.8±3.1	6.9±2.4	6.0±1.2	7.2±2.2
Observed hours	(n=9)	(n=9)	(n=10)	
Work and work-related activities*	9.1±2.2	11.1±1.2	11.2±2.0	10.7±20
Voluntary activities†	3.3±1.2	2.6±1.0	3.4±1.9	3.1±1.34
Subsistence‡	11.3±1.2	10.7±0.9	10.1±1.5	10.7±1.3

* Economic activities, housework, childcare, and food chain activities
† Social and religious activities
‡ Sleep, rest, or relaxation

Sex discrimination

"There are shouts of joy whenever a male child is born" (middle-aged male farmer).

"The lying in period for a mother who delivered a male child is seven native weeks (28 days), while it is only three native weeks (12 days) for the delivery of a female child" (middle-aged male farmer).

The women also desired to bear as many sons as possible, because, as they reported,

"We want our husbands to like us and care for us and the children" (middle-aged trader).

"*We want to be accepted in the society*" (young farmer).

Both young and middle-aged men reported that there was no preferential treatment between male and female children in terms of family food distribution and healthcare services. According to a middle-aged male farmer, *"The female child was formed with the father's blood, so she should be cared for."*

However, when the discussion focused on education, the two groups had different views. *"When resources are limited, the female child should be trained, if she is more intelligent* " (young male farmer).

"Only the male child should be trained whenever resources are limited" (middle-aged male farmers). This response was unanimous among these middle-aged males for the following reasons:

"*The male child is the one who will take over the family responsibilities from the father when he dies, so he must be made to become somebody*."

"*It is the males who solve problems in the society*."

"*Training a female child is like spending money on a stranger who can leave to an unknown destination any moment*."

"*If you train a female child, when she marries all the money spent on her is lost*."

"*Training a female is like training a cat. After spending money to nourish a cat to maturity, it cannot be killed and eaten rather it will be left in the house till one day when it will be fed up with the house it will then run away*."

The two groups of men believed that, if a girl is in school and suitors come, she should leave school and get married.

From the women's point of view, evidence of sex discrimination against them include the following:

"Women are not allowed to go to school" (middle-aged teacher).

"*Women do not have any right to our father's property*" (middle-aged petty trader).

"We are not supposed to own any landed property, except when purchased" (middle-aged female farmer).

"We are forced to marry early" (young female farmer).

The cross-sectional survey revealed that most farmers (99%) and traders (99%) and 52% of the teachers accepted that their educational attainments were inadequate. The women's major reasons for not having had adequate education were: (a) parents had no money (41% of farmers, 30% of traders, and 28% of teachers respectively), (b) parents preferred to train males (27%, 23%, and 2%), (c) got married while schooling (26%, 1%, and 41%), and (d) husband did not permit it (1%, 12%, and 15%). About 4% and 7% of the farmers and traders respectively did not like going to school, while 5% and 4% of the traders and teachers respectively got pregnant while in school. Interestingly, about 6.5% of the teachers hoped to continue education.

Food distribution within the family

The women agreed that some discriminatory practices in food distribution in the family still exist.

"A woman must dish out her husband's portion of food before her own and that of children" (young female farmer).

"The best portion of food goes to the husband" (middle-aged female trader).

"If the man is not around, his share must never be given out to anybody" (middle-aged female farmer).

"No matter how small the food may be, the woman must give her husband first if she must eat out of it herself" (middle-aged trader).

According to men, *"a good woman (wife) must serve her husband first and give him the best portion of the meal, because he is the head of the family"* (middle-aged man).

Table 3 shows that more women (11%) in the farmer category would give their husbands preference when the amount of food is small. The greatest preference was given to children by traders and farmers. More teachers

(27%) than farmers and traders would share the food equally. More farmers and traders (over 50%) would give their husbands the best portion of food than the teachers (22%). The 24-hour recall, however, showed that about 13% of the women skipped breakfast, 10% lunch, and 1% supper.

Table 3. Food distribution system/food allocation within the households of farmers, traders, and teachers

Food distribution pattern	Farmers (n=100)	Petty traders (n=99)	Teachers (n=96)	Total (n=295)
Measures taken when food is small				
Shared equally	8.0	11.1	27.1	15.3
Give to children only	81.0	85.9	68.8	78.6
Give to husband	11.0	3	1	5.1
Share between mother and children	-	-	3.1	1.0
Who receives best portion	(n=100)	(n=99)	(n=98)	(n=297)
Husband	62.0	50.5	24.5	45.8
Children	16.0	15.2	27.5	19.5
Children/husband	16.0	27.3	28.6	24
Self and husband	2.0	2	5.1	3
Share equally	4.0	5.1	14.3	7.7
When mother's portion is dished	(n=100)	(n=99)	(n=98)	(n=297)
Along with husband	18.0	24.2	66.3	36
After husband	24.0	14.1	1	13.1
After husband and children	57.0	55.6	31.6	48.2
None of above	1.0	6.0	1.0	2.7
% of total cooked food consumed*				
Husband	28.6±11.9	24.92±10.14	25.30±4.97	26.27
Mother (wife)	19.33±7.76	18.63±7.13	21.4±4.5	19.78
Wife: husband	1:1.4	1:1.3	1:1.2	1:1.3

* Derived from the food intake weighing exercise

(25%). Also more teachers would give the best portion of food to children (28%), give to children and husband (29%), or share it equally (14%). More than half (57%) of the farmers and traders and 32% of the teachers would dish their food after serving their husband and children. However, more teachers (66%) dished their food along with their husbands' compared to the farmers (18%) and traders (24%). Generally, the husbands consumed about 26% of the total cooked food, while the women consumed about 20%. The ratio of wife:husband portion was 1:1.4 for the farmers, 1:1.3 for the petty traders, and 1:1.2 for the teachers (Table 3).

Food habits

More teachers (58%) ate at least three times a day compared to 23% and 28% of the farmers and traders respectively. The number of meals eaten depended on the availability of food as reported by 77%, 72%, and 42% of the farmers, traders, and teachers respectively. Over 75% of the women reported skipping meals at one time or the other. The major meals skipped were breakfast and lunch. Significantly ($p<0.05$) more farmers (75%) and traders (66%) skipped lunch than the teachers

The most important and common foods consumed by the farmers were *apku*/*garri*/pounded yam and soup for breakfast and dinner and boiled *yam*/*cocoyam* with palm oil for lunch. For the traders, breakfast and dinner were similar to that of the farmers. However, for lunch they consumed more legume or cereal-based meals. The teachers ate less cassava-based meals for breakfast but ate more legume and cereal–based meals. The teachers followed by the traders had more varied diet/meals.

During the FGDs and cross-sectional survey, over 60% of the women, mentioned snake, caterpillar, snail, grasscutter, gizzard, owl, and monkey as forbidden foods. Snail and grasscutter were particularly forbidden for pregnant women. The survey showed that only 11% of the farmers, 9% of the traders, and 5% of the teachers adhered to these culturally-forbidden foods.

The younger ones reported, "*we are being encouraged at health centres to eat snail, but our problem is that they are costly*." Interestingly, most young women were not aware of some culturally-forbidden foods, because they are scarce and are rarely part of the family-food menu.

Efforts to break cultural barriers on women

A good number (>80%) of women of all age groups agreed that women now make an effort to break cultural barriers placed on them by "*trying to be educated"* and "*learning all sorts of trade*." Most elderly persons did not see any need for such efforts. According to one of them, "*it is our duty to teach our daughters and daughters-in-law to operate within the societal standards*."

Health and nutritional status of women

The mean age and weight of teachers were higher, but not significantly different from those of the farmers and traders (Table 4). There were significantly ($p<0.05$) more under-weight women (BMI <18.6) among the farmers and traders than among the teachers. On the other hand, there were significantly ($p<0.05$) more over-weight women among the teachers than among the farmers and traders. Angular stomatitis was visible in 3% and 2% of the farmers and traders respectively. Also, more cases of muscle wasting were observed among the farmers (16%) and traders (14%) than among the teachers (6%).

The nutrient intake by the three groups of women varied. It was observed that none of the groups met the iron, riboflavin and niacin requirements. In addition, the traders did not meet their thiamine requirement, while protein and energy intakes were marginal. The farmers, in addition to riboflavin, niacin, and iron, did not meet their protein, energy and thiamine requirements. All the groups met their calcium, vitamin A and vitamin C requirements.

Relationship between age-at-marriage, nutrition knowledge and some socioeconomic variables with BMI and nutrient intake

Age-at-marriage had a positive correlation with BMI and all the nutrients investigated (Table 5). However, this relationship was significant ($p<0.05$) for protein

Table 4. Health status and nutrient adequacy of farmers, traders, and teachers

Parameter	Farmers (n=100)	Petty traders (n=99)	Teachers (n=99)
Anthropometry			
Mean age (years)	31.4±3.9	30.7±3.6	34.3±6.5
Mean height (cm)	158.9±5.4	158.0±4.4	161.0±6.5
Mean weight (kg)	53.5±6.3	52.7±5.7	61.8±1.2
BMI ranges			
Low (<18.6)	16.0[a]	13.0[a]	4.9[b]
Desirable (18.6-23.8)	72.7	78	49.2
Over-weight (>23.9)	11.3[a]	7.8[a]	45.9[b]
Mean±SD	21.1±2.5	21.0±2.3	23.8±3.7
Clinical signs			
Angular stomatitis	3	2	-
Muscle wasting	16.0	14.1	6.1
Nutrient intake*			
Mean weight (kg±SD)	57.7±1.2	64.0±3.1	63.0±3.5
[c]Energy (Mj)	4.8±0.5(74)	5.9±0.6(91)	6.4±0.74(99)
[c]Protein (g)	35.8±8.4(80)	43.1±5.0(96)	58.6±13.8(130)
[d]Calcium (mg)	472±1.6(105)	491±68.6(109)	623.1±129.0(138)
[e]Iron (mg)	17.5±11.9(60)	16.9±2.4(58)	22.2±3.5(77)
[f]Thiamine	0.61±5.1(67.6)	0.79±0.18(87)	0.95±0.1(105)
[f]Riboflavin (mg)	0.34±0.08(26)	0.40±0.60(31)	0.52±0.1(40)
[f]Niacin (mg)	4.8±1.5(30)	6.20±1.30(41)	11.2±1.7(71)
[e]Vitamin A (µg retinol)	1540±587(308)	1325±970(265)	2410±150.0(48)
[g]Ascorbic acid (mg)	30.4±10.8(101)	30.0±7.2(100)	52.7±14.0(175)

[a,b] Values with different superscripts in the same row are significantly different ($p<0.05$)
* Values in parentheses indicate the percentage of daily requirements met by the women
[c] Protein and energy requirements (8)
[d] Calcium requirements (10)
[e] Vitamin A and iron requirements (11)
[f] Thiamine, riboflavin and niacin requirements (12)
[g] Ascorbic acid requirements (13)

(r=0.362), calcium (r=0.358), iron (r=0.364), niacin (r=0.634) and vitamin C (r=0.476) intake.

Table 5. Correlation among BMI, nutrient intake, income, and selected variables

Variable	Age-at-marriage	Level of education	Income	Workload	Nutrition knowledge
BMI	0.250	0.176	0.405*	-0.032	
Energy	0.259	0.334*	0.463*	0.239	
Protein	0.362*	0.149	0.541*	-0.346*	
Calcium	0.358*	0.293	0.379*	-0.139	
Iron	0.362*	0.172	0.410*	-0.186	
Thiamine	0.106	0.140	0.371*	-0.033	
Riboflavin	0.634*	0.239	0.325*	-0.049	
Niacin	0.634*	0.330*	0.645*	0.291	
Vitamin C	0.476*	0.348*	0.175	0.047	
Income	0.719*	0.837*	-	-0.078	0.601*

* 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=0.334), niacin (r=0.330) and vitamin C (r=0.348) intake.

There was a significant ($p<0.05$) positive association between income and all the nutritional variables, except for vitamin C intake (r=0.175, $p<0.05$). Income was also strongly correlated to age-at-marriage (r=0.719; $p<0.05$), level of education (r=0.837; $p<0.05$), and nutrition knowledge (r=0.601, $p<0.05$). However, it had a negative non-significant ($p<0.05$) association with workload (r=-0.078).

The association between workload and most nutritional variables was negative, except for energy, niacin and vitamin C intakes. However, workload was significantly ($p<0.05$) correlated with protein intake (r=-0.346).

DISCUSSION

Based on the data presented in this paper, it can be said that education influences the health and nutritional status of rural women in Nigeria. As expected, the more-educated women had higher incomes, had significantly ($p<0.05$) better health and nutrition knowledge, food habits, nutrient intakes, health, self-concept, and less adherence to detrimental cultural practices, and had a higher mean age-at-marriage and age-at-first birth. Poor education of the women was attributed to lack of money from parents, sex discrimination, and marriage while in school, among other reasons.

Sex discrimination in education arises from the fact that, in the older generation in Nigeria as in many other societies, girls become members of other families upon marriage and do not bear the social responsibility of supporting their parents in their old age (14,15). Our FGDs revealed that, for the older generation and probably the poorly-educated in the villages, education of females was seen as '*training a stranger,' 'wastage of money,'* and '*training a cat.'* Interestingly, this perception has been changing among the younger generation. Sex discrimination, according to them, is applied in education when resources are limited. *"The female child was formed with the father's blood, so she should be cared for*" was a typical response from a young male discussant. It appears, therefore, that if resources are available, both male and female will be given equal opportunities. Poverty, almost exclusively a problem of developing countries, has left a growing number of households unable to meet their basic needs.

The higher mean ages at marriage and first birth of the teachers lend support to other studies, which have demonstrated that education delays marriage and first birth (16–18). Late marriage implies a later, safer childbearing and a lower fertility lifetime. We observed that there was no significant difference in the mean number of children of women, and the majority desired to bear more children. The FGDs revealed that childbearing, particularly for male children, was linked to high social prestige. "*We want our husbands to like us and care for us and all the children"* and *"we want to be accepted in the society*" were some of their responses. Thus, age-at-marriage becomes a major determining factor for the number of children the women would bear. The better-educated mothers will likely end up with a lower number of children than other groups because of their lower fertility lifetime.

Age-at-marriage had a positive correlation with BMI and nutrient intake. Although its association with BMI was not significant, it is very likely that the nutritional status of these women was jeopardized by early childbirth. According to Kurz *et al.*, the heavy nutritional demands of pregnancy, childbirth, and lactation when a girl is still growing, jeopardize her own growth and development which can have effects on her health and nutritional status well into adulthood (18).

Education determined the type of job the women were doing. The less-educated (WASC or below) women formed the bulk of farmers (100%) and traders (100%). Studies have shown that low educational background limits women to employment in the informal sector where workload and stress are usually high (19,20). Generally, these women worked long hours (6–11 hours per day). This is in line with other studies which showed that women worked 8–10 hours a day (21). The difference between the reported and the observed hours of work for the traders and teachers could be attributed to under-reporting/under-estimation of their workload. Economically, women's labour, which is worth 25–40% of the world gross national product, is not usually accounted for (1). Not only economists but women themselves also have the tendency to under-estimate the total workload of women.

The type of work the women did and the number of hours spent affected their food intake. The longer the hours of work, the higher the energy intake, and the lower the protein, iron, calcium, riboflavin and niacin intake, the lower the BMI. This also confirms earlier studies which stated that a heavy workload for women might lead to poorer diets not only for their children and other members of the families but also for women themselves (22). Types of food eaten by these women, especially the farmers, were mainly based on unbalanced starchy root and tuber meals, e.g. boiled *cocoyam*/yam, and palm oil/boiled cassava slices. Another major cause of poor diets could also be linked to low income, since it determines the quality and quantity of foods consumed. Hence, these women were unable to meet their iron, niacin and riboflavin requirements. Lack of iron has often led to the high prevalence of iron-deficiency anaemia among women. According to Jun-Yao Peking, riboflavin plus niacin decreases the incidence of oesophageal cancer by 14% (23). Thus, deficiencies of these vitamins among Nigerian women may have far-reaching nutritional implications.

Food taboos did not have any important impact on the nutritional and health status of the study women. The very fact that only a few adhered to these taboos speaks for itself. The statement by a young woman that *"we are encouraged at health centres to eat snails, but our problem is that they are costly*" also suggests that purchasing power rather than taboos is the constraint. Besides, with urbanization these bush animals are becoming very scarce. Where available, they are expensive. This study confirms the views of other researchers who reported that food taboos are more often breached than followed (21).

Food distribution within the households and the sacrificial tendencies of women have been implicated as major determinants of the health and nutritional status of women. Although the teachers had better food-distribution practices, we did not find any significant difference in the quantity of food consumed by all three groups of the study women. This suggests that it is not just the quantity of food that matters but also its quality. Definitely, the teachers had a better income and a more varied diet. There was also not much difference in the ratio of wife:husband portion of food among the three groups. The slightly higher proportion of food eaten by men may also be related to their higher energy needs for maintenance of weight and physical exercise.

The findings of our study have showed that where the amount of food is small, the above practices could be harmful, since most women would give preference to their husbands and children. This cultural practice is prevalent in many parts of the world. Wandel and Homboe-Ottesen reported that, in Sri Lanka, poor women took pride in being able to provide their husbands and children with satisfying and adequate meals every day even if they had to work extra hours to reduce their intake (22). These practices had little or no effect on our study teachers, since they probably had a better income and better knowledge of their food needs. They probably could afford to cook and consume more nutritious meals.

Kurz *et al.* reported that girls who stay in school longer have higher self-esteem and self-confidence (18), because they develop social contacts outside their homes, which contribute to their self-concept and aspirations for the future (24,25). It was not surprising then that the teachers in this study rated themselves higher, despite the low societal rating of women. Increased self-esteem means that these women know their worth as individual family members and would not, therefore, work within unfavourable cultural norms. It is, therefore, not surprising to see that the teachers had better health and

nutritional status than the other groups who both show high levels of chronic energy deficiency (low BMI), low nutrient intake, and evidence of riboflavin deficiency.

This study has shown that the major determinants of the health and nutritional status of women are socioeconomic and cultural. The study has also shown that education of girls/women and men can largely help modify the cultural barriers that discriminate against women. We, therefore, recommend that female education be given the highest priority. Free or subsidized primary and secondary education for females is imperative. Adult literacy classes and training in income-generating activities also need to be intensified for those who have lost the opportunity for formal education. The current poverty-alleviation programme in Nigeria aimed at improving the economic condition of parents is a step in the right direction The more income women control, the better their health and nutritional status. Nutrition education of the masses needs to be intensified to encourage a healthy lifestyle. Food fortification programmes to include iron and B-vitamins are also advocated.

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