

Adequacy of Nutrients and Dietary Diversity of Rural Farmers Households In Southeast Nigeria

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ABSTRACT

Background: No single food can afford adequate nutrients required to achieve optimal health. The more food is diversified in the daily intake, the greater opportunity towards meeting nutrient requirements.

Objective: The study examined nutrient adequacy and dietary diversity of rural farmers in Southeast Nigeria.

Methods: Food Processor software was used to analyze nutrient intake of 213 farming households randomly selected from southeast Nigeria. Adequacy of calorie was achieved by comparing households' mean intake with their EER, while other macronutrients adequacy was achieved by comparing average intake with AMDR. Vitamins and minerals' adequacy was achieved by comparing mean intake with either EAR or AI.

Results: The finding indicates that the mean income of the rural farmers was ₦37,093.89, while average household size was 6 persons. Higher percentage (60.1%) of the respondents had moderate dietary diversity in the immediate past 24 hours of the study. The average energy intake per day (2766.14kcal) of the respondents exceed their mean EER (2012.78kcal). The mean energy intakes from fat (24.11%), protein (13.79%), and carbohydrate (62.06%) were within their respective Acceptable Macronutrient Distribution Range. Average intakes of Thiamine (6.47mg/day), Vitamin D (3.10mcg/day), and Vitamin E (4.95mg/day) were below their respective Estimated Average Requirement. Sodium (2183.18mg/day), phosphorus (1059.21mg/day), and copper (76.71mg/day) average intake were above their respective Estimated Average Requirement.

Conclusion: Respondents' average intake of fat, protein, and carbohydrate were within the Acceptable Macronutrient Distribution Range while intake of most of the vitamins and minerals were inadequate.

Keywords: Nutrient, adequacy, diversity, rural, farmers

Introduction

Agriculture as a crucial mainstay of livelihood for many rural farming households has remain a major source of food to a growing population. Rural households in Nigeria are mostly engage in agriculture either as a primary or secondary means of livelihood [1]. These rural farming households are responsible for more than half of

the Nigeria's food production. It is expected that food production by these rural farming households should provide a sustainable pathway out of poverty and contribute to household and national food security, but contrary to this expectation, the rural farmers remained deprived, malnourished and

marginalized [2]. [3] asserted that malnutrition is prevalent among the rural farming households. Most of these farming households in the rural areas experience irregular food supply, seasonal food shortage, low quality food, total lack of food, and inadequate diet.

The call for integration of nutrition in agricultural policies is gaining renewed attention by many development agencies [4, 5]. The reasons are obvious, good nutrition is required for good health, which are no longer seen as only outcomes of successful development but health and nutrition are now considered as a critical component in achieving economic growth and poverty reduction [6]. Agricultural production, therefore, remains essential for supply chain to support better nutrition, whereas improved nutrition in turn supports farming households' healthy platform to undertake accompany farming activities for better economic outcomes.

Nutrition has a potent influence on health, development, growth and productive life of every individual. Optimal nutrition at every stage of life is a fundamental human right with malnutrition viewed as a denial of such right [7]. Adequate nutrition is essential from conception to adulthood for proper growth, adequacy of immune system, physical development, and sound health [8].

Nutrient adequacy is a key element for human growth and development. Excess or low intake of nutrients result in poor nutritional status. The nutrients that are essential for meeting the nutritional requirements of farming households are not found in a single food item, but they come from a variety of diet composed of a number of food items [9]. Healthy diets are said to be those that contain different food groups. Diversity in households' diets have been shown to protect against chronic diseases, as well as being associated with prolonged longevity and improved health status, while unhealthy diet negatively affect nutrient intake. [10] submitted that carbohydrate intake of farming households in northwest Nigeria exceeded recommended value while protein, fibre, potassium and iron intakes were below their respective recommended values. Also, [11] found that majority of households in Osun State, Nigeria had their intake of potassium, calcium, vitamin C, sodium and magnesium below the recommended dietary allowances, whereas iron, fat, zinc, protein, and carbohydrate intake were above the recommended dietary allowances. Hence, [12] proposed evaluation of rural farmers' diet diversity and nutrient adequacy both in terms of quality and quantity. Therefore, the general objective of this study was to assess nutrient

adequacy and dietary diversity of rural farmers in Southeast Nigeria. The specific objectives were to:

- i. determine the socioeconomic characteristics of rural farmers in Southeast Nigeria;
- ii. delineate the dietary diversity of rural farmers in Southeastern Nigeria; and
- iii. examine the nutrient adequacy among rural farmers in Southeastern Nigeria.

Materials and methods

The study was carried out in Southeast Nigeria. The Southeastern region of Nigeria is comprised of five states namely, Imo, Abia, Ebonyi, Anambra, and Enugu states. Purposively, 3 states (Imo, Enugu, and Ebonyi states) were selected. A total of 213 farming households were randomly sampled from these selected states as follows: Imo (83), Enugu (80), and Ebonyi (50). Information on farming households' socioeconomic characteristics, diet diversity, and nutrient adequacy were collected. Farming households whose caregivers were pregnant as well as those who did not give their consent were excluded from the study. The study was conducted according to the guidelines in the Declaration of Helsinki.

Purposively, caregivers in each household were interviewed. Trained enumerators were used to collect data using standard protocols. Well-structured questionnaire validated by experts (both in Rural Development and Human Nutrition), weighing balance, carpenter's tape, and 24 hour dietary recall questionnaire were the instruments used to collect data. Structured questionnaire provided data on households' socioeconomic characteristics (such as years spent in education, monthly income, household size, farm size, etc) and dietary diversity. Weighing balance and carpenter's tape were used to collect caregivers' anthropometric data. Food, water, and beverage intakes and portions consumed were collected using a 24-hour dietary recall questionnaire adapted for the study. Caregivers in each farming household aged 31 years and above were asked to recall what they had eaten in the immediate past 24 hours of the survey. Analysis of nutrient intake was performed using ESHA's Food Processor ® Nutrition Analysis software version 11.7.1.

For the evaluation of energy intake, the Estimated Energy Requirement (EER) was calculated for each caregiver using Institute of Medicine (IOM) equations [13] considering age, sex, body weight, height, and physical activity level (PAL). Physical activity level was defined as active for all caregivers based on the assessment of local investigators, since active physical activity is

common for all farmers in the region. Nigeria does not have specific recommended nutrient reference values, so nutrient adequacy was assessed by comparing nutrient intakes to the dietary reference intakes established by the United State Institute of Medicine [14]. For vitamins and minerals' intake, the prevalence of inadequacy in a group was estimated as the proportion of caregivers with mean intakes below the Estimated Average Requirement (EAR) or Adequate Intake (AI); mean intake above EAR or AI were adjudged as excess intake; while mean intake within EAR or AI were adjudged adequate. Intakes of macronutrients were evaluated as percentage of total energy intake, and inadequacy or excessive intake was classified as less than the lower limit or higher than the upper limit of the Acceptable Macronutrient Distribution Ranges (AMDR), while intake within the AMDR were adjudged adequate.

All statistical analysis were performed using SPSS.

RESULTS

Respondents' socioeconomic characteristics

The overall result on literacy level of all the respondents sampled in the study area according to Table 1 reveals that higher proportion (46.5%) had between 7 and 12 years of education, 27.7% had between 1 and 6 years of education, 23.5% had between 13 and 20 years of education, while 2.3% spent no year in formal education. The average number of years spent in education by all the respondents sampled was 10.90 years. Disaggregated results for each State shows that the mean number of years spent in education in Imo State, Enugu State, and Ebonyi State were 12.96 years, 9.28 years, and 9.84 years respectively.

Table 1 also shows that the overall average income of the rural farmers was ₦37093.89. However, disaggregated result by States reveals that the mean income of rural farmers in Imo State was ₦57734.93, Enugu State was ₦22462.50, while Ebonyi State was ₦26240.00. As revealed in Table 1, the household size of all the respondents sampled in Southeast Nigeria ranges between 2 and 12 persons. Having an average of 6 persons among all the respondents, household size between 5 and 7 persons constituted a higher percentage (57.7%). Disaggregated results shows that mean household size in Imo, Enugu, and Ebonyi States were 5 persons, 6 persons, and 7 persons respectively.

More so, Table 1 shows that rural farmers in the study area cultivated between 0.06 and 20

hectares with average cultivated farm size of 3.03 hectares. Higher proportion (91.5%) of the respondents cultivated between 0.06 and 6 hectares while only 8.5% cultivated between 7 and 20 hectares. Disaggregated results revealed that respondents in Enugu State (\bar{x} = 4.27 ha) cultivated larger farm size than respondents in Ebonyi State (\bar{x} = 4.15 ha) and Imo State (\bar{x} = 1.17 ha).

Crop and livestock farming are important livelihood activities for the people of Southeast Nigeria. The finding on the type of farming enterprise of the farming households in the study area indicates that majority (58.7%) engaged in crop cultivation. However, 62.74%, 55.0%, and 55.0% of the respondents in Imo State, Enugu State, and Ebonyi State respectively engaged in crop cultivation.

Furthermore, the mean age of all the respondents in the study area was 37.31 years. Disaggregated results by States reveals that the average age of rural farmers in Imo, Enugu, and Ebonyi States were 38.67 years, 35.88 years, and 37.36 years respectively. It could be inferred from this finding that the rural farmers in the study area were mostly in their active years.

Respondents' dietary diversity

Dietary diversity refers to the consumption of different food groups by household members over a given reference period. The result on Table 2a shows the dietary diversity of the respondents in the immediate past 24 hours of the survey. It reveals that 82.6% of the rural farmers consumed cereals, 84.5% consumed white tubers and roots, 89.7% consumed vegetables, 31.5% consumed fruits, 59.2% consumed meat, 22.1% consumed eggs, 96.2% consumed fish and other seafood, 73.2% consumed legumes, nuts and seeds, 33.8% consumed milk and milk products, 95.3% consumed oil and fat, 56.8% consumed sweets, while 96.7% consumed spices, condiments and beverages on the precious day of the survey. Disaggregated result revealed that spices, condiments and beverages (98.8%) as well as fish and other seafood (94.0%) were consumed by majority of rural farmers in Imo State. In Enugu State, fish and other seafood (98.8%) with oils and fat (98.8%) were consumed by majority of the rural farmers; while in Ebonyi State, fish and other seafood (96.0%), oils and fat (96.0%), as well as spices, condiments and beverages (95.0%) were consumed by majority of the rural farmers.

Table 2b shows that higher proportion (60.1%) of the rural farmers in the study area had moderate dietary diversity, 39.0% had high dietary diversity, while only 0.9% had low diet diversity in the immediate past 24 hours of the survey.

Disaggregated result by States indicates that in Imo State, higher proportion (51.8%) of the rural farmers had high dietary diversity, 47.0% had moderate dietary diversity, while 1.2% had low diet diversity. In Enugu State, higher proportion (66.2%) of the rural farmers had moderate dietary diversity, 33.8% had high diet diversity, while none (0.0%) had low dietary diversity. In Ebonyi State, more (72.0%) of the rural farmers had moderate diet diversity, 26.0% had high dietary diversity, while 2.0% had low diet diversity.

Respondents' nutrient adequacy

According to the finding in Table 3, the mean calorie intake per day (2766.14kcal) for rural farmers in Southeast Nigeria exceeded their Estimated Energy Requirement (EER) of 2012.78kcal, with 18.0% of the respondents having their calorie intake below the EER value. Also, mean energy intake per day coming from fat is 24.11%, with 33.0% of the respondents having their energy from fat below the lower limit of Acceptable Macronutrient Distribution Range for fat (20% - 35%). Moreover, mean energy intake per day coming from protein is 13.79%, with 14.0% of the respondents their energy from protein below the lower limit of Acceptable Macronutrient Distribution Range for protein (10% - 35%). Furthermore, average energy intake per day coming from carbohydrate is 62.06%, with 6.5% of the respondents having their energy from carbohydrate below the lower limit of Acceptable Macronutrient Distribution Range for carbohydrate (45% - 65%). With respect to total dietary fibre intake among the rural farming households in the study area, Table 3 also indicates that the mean fibre intake among the respondents is 17.62g/day which is below the recommended Adequate Intake (25g/day - 38g/day).

As regards farming households' intake of vitamins, Table 3 reports that the average intake per day of Thiamine, Riboflavin, Niacin, Vitamin C, Vitamin A, Vitamin B₆, Vitamin B₁₂, Vitamin D, Vitamin E, Vitamin K, and Folate is 6.47mg/day, 1.29mg/day, 24.53mg/day, 58.05mg/day, 418.13mcg/day, 1.46mg/day, 17.99mcg/day, 3.10mcg/day, 4.95mg/day, 9.89mcg/day, and 244.39mcg/day respectively. On vitamins intake adequacy level, Table 3 further reveals that 53.0%, 44.1%, 30.0%, 70.8%, 84.5%, 56.3%, 60.5%, 92.4%, 91.0%, and 72.3% of rural farming households' intake of Thiamine, Riboflavin, Niacin, Vitamin C, Vitamin A, Vitamin B₆, Vitamin B₁₂, Vitamin D, Vitamin E, and Folate respectively were below the recommended Estimated Average Requirement (EAR); while only 0.4% of the respondents' intake of Vitamin K was

above the recommended Adequate Intake.

More so, the finding in Table 3 indicates that the mean intake of calcium, phosphorus, iron, sodium, zinc, magnesium, potassium, selenium, and copper is 593.40mg/day, 1059.21mg/day, 22.37mg/day, 2133.18mg/day, 11.44mg/day, 378.07mg/day, 1814.37mg/day, 83.86mcg/day, and 76.71mg/day respectively. On minerals intake adequacy level, Table 3 also shows that 76.0%, 27.7%, 71.3%, 26.0%, 33.8%, 43.1%, and 0.4% of the respondents' intake of calcium, phosphorus, iron, zinc, magnesium, selenium, and copper respectively were below the recommended EAR; while 49.3%, and 93.43% of the respondents' intake of sodium and potassium respectively were below the recommended AI.

Discussion

This study reported nutrient adequacy and dietary diversity of farming households in southeast Nigeria. Both simple random sampling and purposive sampling techniques were used at different stages to select a robust sample across the chosen states in the study area. Anthropometric measures were collected, and usual nutrient intakes were estimated to present a robust view of the nutritional issues facing these farming households. In this study, findings on farming households' socioeconomic characteristics indicated that they were literate, low income-earners, small-scale farmers, with fairly large household size. Low income and large household size are likely to affect nutrient intakes among household members negatively. The reason is because when households are faced with food shortage, the coping strategy they adopt is to eat less preferred, cheap and often less nutritious foods which are often below the Dietary Reference Intake according to [15].

About 98.8% of the farming households in the study area consumed between 5 and 12 food groups in the previous day of the survey. Following this finding, it could be inferred that majority of the farming households in the study area had moderate to high diet diversity. High consumption of diversified diets increases the intake of different nutrients which consequently helps to prevent diseases [16].

With respect to macronutrients intake among the farming households in the study area, mean energy intakes were above the Estimated Energy Requirement (EER), while average Protein, fat and carbohydrate intake were within the Acceptable Macronutrient Distribution Range (AMDR). Protein, fat, and carbohydrate intakes of the households were compared with the AMDR, while calorie intake was compared with EER. Total dietary fibre intake was inadequate as their

average intake was below the Adequate Intake (AI) of 25g/day to 38g/day.

The *a priori* expectation with respect to contribution of carbohydrate foods to total dietary fibre was that high consumption of carbohydrate foods would translate to high total fibre intake and vice versa, but despite high consumption of carbohydrate foods among the farming households in the study area, total dietary fibre appears low. A critical look into each foods consumed by the respondents indicates that information about the dietary fibre of some of these foods (*fufu, eba,*) were unavailable.

This study revealed that of all the vitamins, only vitamin C mean intake was within the Estimated Average Requirement (EAR). The fact that the farming households' mean intake of vitamin C (58.05 ± 94.56) is within the EAR with about 70.8% of their intake below the EAR suggest that the vitamin C intake of the different households sampled differs widely. However, average intake of other vitamins did not fall within the EAR or AI used for comparison. Low intake of vitamin D is expected as skin production is the key means of producing the vitamin and not diet.

Farming households' average intake of iron and zinc were within their respective EAR, whereas mean intake of other minerals (calcium, phosphorus, sodium, magnesium, potassium, selenium, and copper) were either below or above their respective EAR or AI.

To the best of the authors' knowledge, this study is the first time in southeast Nigeria usual nutrient intake estimations were used to assess adequacy of nutrient intakes of rural farming households. However, there might be difficulty in recalling exact quantity of foods and drinks consumed in the immediate past 24 hours of the survey among the caregivers.

Conclusion

The study concludes that majority of the rural farming households in southeast Nigeria consumed between 9 and 12 food groups in the immediate past 24 hours of the survey. Respondents' average energy intakes from fat, protein, and carbohydrate were between their respective Acceptable Macronutrient Distribution Range. Rural farmers in the study area had low intake of majority of the vitamins and minerals. However, higher percentage of the respondents had excess intake of sodium and copper.

Recommendations

Rural farming households should minimize their intake of sodium due to the harmful effect of excessive sodium intake. Also, respondents should be encourage to increase their consumption of fruits, meats, eggs, milk and milk products as these are the primary sources of vitamins and minerals.

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Statement of no conflict of interest

The authors declare that there is no conflict of interest in this study.

Table 1: Distribution of the respondents according to their socioeconomic characteristics

Variables	Imo State (n = 83)		Enugu State (n = 80)		Ebonyi State (n = 50)		Pooled (n = 213)	
	F	%	F	%	F	%	F	%
Years of education								
0 year (No formal education)		0.00	2	2.5	3	6.0	5	2.3
– 6 year(s) (Primary education)	6	7.2	34	42.5	19	38.0	59	27.7
7 – 12 (Secondary education)	42	50.6	41	51.2	16	32.0	99	46.5
13 – 20 years (Tertiary education)	35	42.2	3	3.8	12	24.0	50	23.5
Mean±SD	12.96±2.99		9.28±3.50		9.84±4.67		10.90±3.96	
Monthly income								
5000 – 75000	61	73.5	80	100.0	49	96.1	189	88.7
76000 – 145000	12	14.5		0.0	2	3.9	14	6.6
146000 – 200000	10	12.0		0.0	0	0.0	10	4.7
Mean±SD	57734.93±52366.45		22462.50±11980.93		26240.00±21534.55		37093.89±38687.55	
Household size								
2 – 4	29	34.9	18	22.5	9	18.0	56	26.3
5 – 7	47	56.6	50	62.5	26	52.0	123	57.7
8 – 12	7	8.4	12	15.0	15	30.0	34	16.0
Mean±SD	5.0±1.66		6.0±1.80		7.0±2.27		6±1.95	
Farm size (ha)								
0.06 – 6	81	97.6	70	87.5	44	88.0	195	91.5
7 – 12	2	2.4	6	7.5	2	4.0	10	4.7
13 – 20		0.00	4	5.0	4	8.0	8	3.8
Mean±SD	1.17±1.69		4.27±3.95		4.15±4.75		3.03±3.79	
Type of farming enterprise								
Crop	52	62.7	44	55.0	44	55.0	125	58.7
Both crop and livestock	30	36.1	36	45.0	36	45.0	86	40.4
Poultry	1	1.2	0	0.0	0	0.0	1	0.5
Crop and fishery	0	0.0	0	0.0	0	0.0	1	0.5
Age								
Mean±SD	38.67±5.11		35.88±3.81		37.36±4.56		37.31±4.67	

Table 2a: Respondents dietary diversity

Food groups	Imo State (n = 83)		Enugu State (n = 80)		Ebonyi State (n = 50)		Pooled (n = 213)	
	F	%	F	%	F	%	F	%
Cereals (rice, maize, sorghum, millet, wheat, semovita, agidi, moimoiuka, noddles spaghetti)	72	86.7	67	83.8	37	74.0	176	82.6
White tubers and roots (cassava, cocoyam, potatoes, yam, fufu, tapioca, African salad, garri)	71	85.5	62	77.5	47	94.0	180	84.5
Vegetables (pumpkin, bitter leaf, green, water leaf, okasi, oziza, oha, utazi, pepper, carrot, scent leaf, tomatoes, onions, cucumber)	69	83.1	76	95.0	46	92.0	191	89.7
Fruits (orange, pawpaw, pea, avocado, guava, bitter cola, water melon, kola nut, cocoa, apple, coconut banana, plantain, African bread fruit (ukwa), grape, pine-apple, African star apple (odara))	37	44.6	21	26.3	9	18.0	67	31.5
Meat (beef, pork, chicken, goat, lamb, rabbit, snail, dog meat (406))	57	68.7	43	53.8	26	52.0	126	59.2
Eggs	41	49.4	6	7.5	0	0.0	47	22.1
Fish and other seafood (periwinkles, crayfish, prawns)	78	94.0	79	98.8	48	96.0	205	96.2
Legumes, nuts and seeds (beans, groundnut, soybeans, African oil bean seed (ugba) moimoi, cowpea (akidi) walnuts, akara, melon (egusi), ugboguru, palm kernal)	42	50.6	71	88.8	43	86.0	156	73.2
Milk and milk products (cheese, yougurt, powdered milk, tin milk or evaporated milk)	45	54.2	17	21.3	10	20.0	72	33.8
Oils and fat (palm oil, vegetable oil, butter)	76	91.6	79	98.8	48	96.0	203	95.3
Sweets (sugar, honey, cake, snacks, soft drink)	60	72.3	39	48.8	22	44.0	121	56.8
Spices, condiments and beverages (maggi, ogiri, ngu, coffee, liquor, beer, palm wine, raffia wine, ginger, garlic, tea, salt, milo, bournvita)	82	98.8	76	95.0	48	96.0	206	96.7

Table 2b: Categorization of respondents by level of dietary diversity

Dietary diversity categories	Imo State (n = 83)		Enugu State (n = 80)		Ebonyi state (n = 50)		Pooled (n = 213)	
	F	%	F	%	F	%	F	%
Low dietary diversity (0 – 4 food groups)	1	1.2	0	0.0	1	2.0	2	0.9
Moderate dietary diversity (5 – 8 food groups)	39	47.0	53	66.3	36	72.0	128	60.1
High dietary diversity (9 – 12 food groups)	43	51.8	27	33.8	13	26.0	83	39.0

Source: Field Survey, 2021

Table 3: Nutrient intake of farming households whose caregivers were between age 31 and 50 years

Age groups	EAR/AMDR		AI		UL		Intake Mean±SD	10 th	25 th	Percentile			% above/below EAR/AMDR/AI
	M/F	M/F	M/F	M/F	50 th	75 th				90 th			
Calorie(Kcal)							2766.14±945.44	1678.9	2183.4	2604.83	3225.78	4190.44	
Total fat (%)	20*	-	-	35*	-	35*	24.11±8.90	14.35 ³	18.46 ¹	23.39	28.40	35.29	33%<AMDR
Fat(g/day)	-	-	-	-	-	-	73.96±46.01	31.19	45.10	61.65	91.21	127.11	
Protein (%)	10*	-	-	35*	-	35*	13.79±5.23	8.89	10.89	12.57	16.01	18.70	14%<AMDR
Protein(g/kg/day)	-	-	-	-	-	-	96.22±69.22	41.89	62.72	80.60	114.78	147.70	
CHO (%)	45*	-	-	65*	-	65*	62.06±11.11	48.14	56.07	62.99	68.46	74.51	6.5%<AMDR
CHO(g/d)	100	-	-	-	-	-	402.35±129.177	245.72	318.56	387.85	475.46	577.79	
Total fibre (g/day)	-	-	38/25	-	-	-	17.62±12.40	3.41	7.95	16.40	24.78	32.31	
Vitamins													
Thiamine (mg/day)	1.0/0.9	-	-	-	-	-	6.47±41.59	0.29	0.55	0.96	1.67	2.42	53.0%<EAR
Riboflavin (mg/day)	1.1/0.9	-	-	-	-	-	1.29±1.00	0.30	0.59	1.04	1.77	2.55	44.1%<EAR
Niacin (mg/day)	12/11	-	-	35	-	35	24.53±25.77	4.65	9.17	16.83	29.00	50.91	30.0%<EAR
Vitamin C (mg/day)	75/56	-	-	2000	-	2000	58.05±94.56	0.00	2.74	24.13	67.23	162.41	70.8%<EAR
Vitamin A (mcg/day)	625/500	-	-	3000	-	3000	418.13±933.54	0.00	15.60	58.28	270.84	1396.01	84.5%<EAR
Vitamin B₁(mg/day)	1.1/1.1	-	-	100	-	100	1.46±2.65	0.19	0.56	0.96	1.61	2.95	56.3%<EAR
Vitamin B₂(mcg/day)	2.0/2.0	-	-	-	-	-	17.99±62.18	0.00	0.70	1.57	3.99	11.46	60.5%<EAR
Vitamin D (mcg/day)	10/10	-	-	100	-	100	3.10±5.81	0.00	0.00	1.45	3.99	7.32	92.4%<EAR
Vitamin E (mg/day)	12/12	-	-	1000	-	1000	4.95±4.92	0.27	1.22	3.64	7.43	11.61	91.0%<EAR
Vitamin K(mcg/day)	-	-	120/90	90	-	90	9.89±16.81	0.11	1.00	4.10	11.52	24.15	0.4%>AI
Folate (mcg/day)	320/320	-	-	-	-	-	244.39±180.84	24.30	95.25	218.58	338.20	517.45	72.3%<EAR
Minerals													
Calcium (mg/day)	800/800	-	-	2500	-	2500	593.40±369.16	222.06	326.71	492.80	746.61	1103.69	76.0%<EAR
Phosphorus (mg/day)	580/580	-	-	-	-	-	1059.21±771.01	392.08	552.06	870.26	1274.14	1947.68	27.7%<EAR
Iron (mg/day)	13.7/29.4	-	-	-	-	-	22.37±10.35	10.91	14.47	20.28	27.58	34.89	71.3%<EAR
Sodium (mg/day)	-	1500/15	2300	-	-	-	2133.18±3096.8	378.33	888.81	1439.29	2455.89	3151.45	49.3%>AI
Zinc (mg/day)	14.0/9.8	-	-	-	-	-	11.44±5.76	5.28	7.98	10.44	13.43	18.94	26%<EAR
Magnesium (mg/day)	350/265	-	-	350	-	350	378.07±229.92	144.71	230.37	329.43	483.77	666.88	33.8%<EAR
Potassium (mg/day)	-	4700/47	5100	-	-	-	1814.37±1296.5	495.57	973.98	1492.04	2355.34	3374.84	6.5%>AI
Selenium (mcg/day)	45/45	00	00	400	-	400	83.86±101.98	4.59	17.81	50.75	114.70	194.97	43.1%<EAR
Copper (mg/day)	0.7/0.7	-	-	10	-	10	76.71±374.24	6.74	10.97	18.11	31.60	44.71	0.4<EAR
EEI (Kcal/day)							2012.78±233.92	1732.3	1893.4	1984.93	2152.61	2311.40	18.0%<EEI

Source: Field Survey, 2021

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