



Dietary Intakes of Non-Pregnant, Non-Lactating Women Participating in the ENAM Project in Ghana

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Information on the dietary intakes of non-pregnant, non-lactating (NPNL) Ghanaian mothers is lacking. A cross-sectional survey was undertaken to compare the dietary intakes of NPNL mothers living in the Coastal (n=79) and Northern Savannah (n=89) zones of Ghana. Data collection included an interviewer-administered socio-demographic questionnaire and a 12-hour weighed food record over one working and one non-working day. A food frequency questionnaire was administered to cover one week's dietary intake, from which animal source food (ASF) diversity was determined. Results showed that cereal foods were consumed on a daily basis by all participants. Fish was the predominant ASF consumed by both groups of women. The diets of both groups of women did not meet their energy requirements and were low in some micronutrients, especially calcium. The overall quality of the diets was low for the northern women compared to that of the coastal women. About 68% of the northern women compared to 22% of the coastal women had low dietary diversity. Efforts to increase women's access to quality foods all year round are needed to improve women's nutrition.

Background

Under-nutrition is a common problem affecting women in developing countries today. More than 50% of all pregnant and 40% of non-pregnant non-lactating (NPNL) women are anaemic due primarily to iron deficiency (Administrative Committee on Coordination/Sub-Committee on Nutrition - ACC/SCN 2000). An estimated 120 million women in less developed countries are reportedly underweight (Body Mass Index - BMI less than 18.5kg/m²) (ACC/SCN 2000). Malnutrition among women undermines their productivity, income-generating capacity and weakens their ability to survive child birth or give birth to healthy children, translating into high maternal and infant mortality rates.

Although women play a significant role in household food production, income generation, child bearing and rearing, attempts to improve the nutritional status of women are often linked to their reproductive roles. Not much attention, however, is given to the nutrition of non-pregnant, non-lactating (NPNL) women. Furthermore, women encounter several forms of gender discrimination that affect their nutritional status. Food distribution patterns within the household, for example, do not favour women. When faced with insufficient household food, women compromise their own intakes to meet the needs of their children and male household members (McIntyre et al. 2003).

The Enhancing Child Nutrition through Animal Source Food Management (ENAM) project provided

the opportunity to study the dietary intakes of NPNL rural women living in two ecological zones of Ghana. The objective of this study was to i) compare the dietary intakes of Ghanaian NPNL women living in the Coastal and Northern Savannah zones of Ghana and ii) to determine ASF diversity in the diets of these women.

Method. NPNL women with children between the ages of two and five years participating in the ENAM project in the coastal or northern areas were eligible. A total of 168 women were enrolled (coastal n=79; northern n=89) and provided informed consent. Semi-structured and pretested questionnaires were used to collect socio-demographic data. Dietary data were collected using a 12-hour weighed food record for two days (one working day and one non-working day) on a randomly selected sub-sample. A food frequency questionnaire was used to collect information on the types and frequency of ASF consumption during a one week period. All questionnaires were administered by trained field interviewers.

Dietary data were converted to energy and nutrient intakes using a local food composition tables (Eyeson and Ankrah 1974; Ferguson et al. 1993). Dietary diversity was determined based on the consumption of food from the following eleven food groups: (i) cereals, (ii) legumes and nuts, (iii) starchy roots and tubers, (iv) fats and oils, (v) meat or poultry, (vi) eggs, (vii) fish and sea food, (viii) milk and milk products, (ix) green leafy vegetables, (x) other vegetables, and (xi) fruits.



A mother looks after her daughter while selling tomatoes and hot peppers at a market in northern Ghana. Photo by Kimberly Harding.

Major Findings

Socio-demographic information. Background characteristics showed that mean age and marital status were not significantly different between the coastal and northern women. However, coastal women had significantly higher education (3.9 ± 2.5 y vs. 2.2 ± 1.6 y, $p=0.05$), were more likely to be household heads (53.2% vs. 6.7%, $p<0.001$), and had significantly higher weekly incomes ($\$6.8 \pm 2.7$ vs. 3.9 ± 2.4 , $p<0.001$) and significantly lower number of births (3.5 ± 1.4 vs. 4.2 ± 2.2 , $p=0.01$) than women in the northern group.

coastal zone had significantly higher diversity than the diets of women from the north. Using a dietary diversity score < 5 as an indicator of low diet diversity (Ruel 2002) about 68% of women in the north compared to 22% from the coast had low dietary diversity.

Animal source foods consumed. Using the food frequency questionnaire, researchers determined the types of ASF consumed by the two groups within one week. Not surprisingly, fish was the most frequently consumed ASF.

Table 1. Foods groups consumed by women in two ecological zones of Ghana (based on 12-hour weighed food records). ¹ Chi square test significant at $p<0.05$. ² This food group includes tomatoes, pepper and onions.

Food Group	Ecological zone		p-value ¹
	Coastal zone (n=36)	Northern zone (n=36)	
	n (%)	n (%)	
Cereals	36 (100.0)	36 (100.0)	
Legumes and nuts	23 (63.8)	36 (100.0)	<0.001
Starchy roots and tubers	29 (80.6)	7 (19.4)	<0.001
Fats and oils	28 (77.8)	15 (41.7)	0.032
Green leafy vegetables	7 (19.4)	30 (83.3)	<0.001
Other vegetables ²	36 (100)	36 (100.0)	
Meat or poultry	4 (11.1)	1 (2.8)	0.16
Eggs	4 (11.1)	0 (0.0)	0.05
Fish	36 (100.0)	24 (66.7)	0.005
Milk and milk products	8 (22.2)	1 (2.8)	0.001
Fruits	2 (5.6)	1 (2.8)	0.33

Table 2. Energy and nutrient intakes and dietary diversity of women in two ecological zones of Ghana (based on two-day 12-hour weighed food records). ¹Estimated Average Requirement (for non-pregnant, non-lactating women). ²Student t-test significant at $p < 0.05$. ³Recommended Daily Requirement.

	EAR ¹	Ecological zone						p-value ²
		Coastal zone (n=36)			Northern zone (n=36)			
		mean ± SD						
Energy (kcal)	2200	1926.2	±	906.8	1735.1	±	493.7	0.271
Protein (g)	46 ^a	57.1	±	34.5	35.2	±	8.99	< 0.001
Vitamin A (ug RE)	500	1291	±	1041.9	153.3	±	300.7	<0.001
Thiamine (mg)	0.9	0.78	±	0.39	0.77	±	0.38	0.90
Riboflavin (mg)	0.9	0.79	±	0.52	0.35	±	0.19	0.005
Niacin	11	15.9	±	11.2	7.37	±	3.2	<0.001
Iron (mg)	8.1	23.2	±	12.7	28.7	±	12.2	0.061
Calcium (mg)	1000 ³	471.2	±	323.9	395.0	±	167.2	0.214
Zinc (mg)	6.8	8.9	±	4.6	7.6	±	2.7	0.160
Dietary diversity score		6.3	±	0.9	5.1	±	1.7	0.002
		n (%)						
Dietary diversity score <5		8 (22)			24 (68)			<0.001

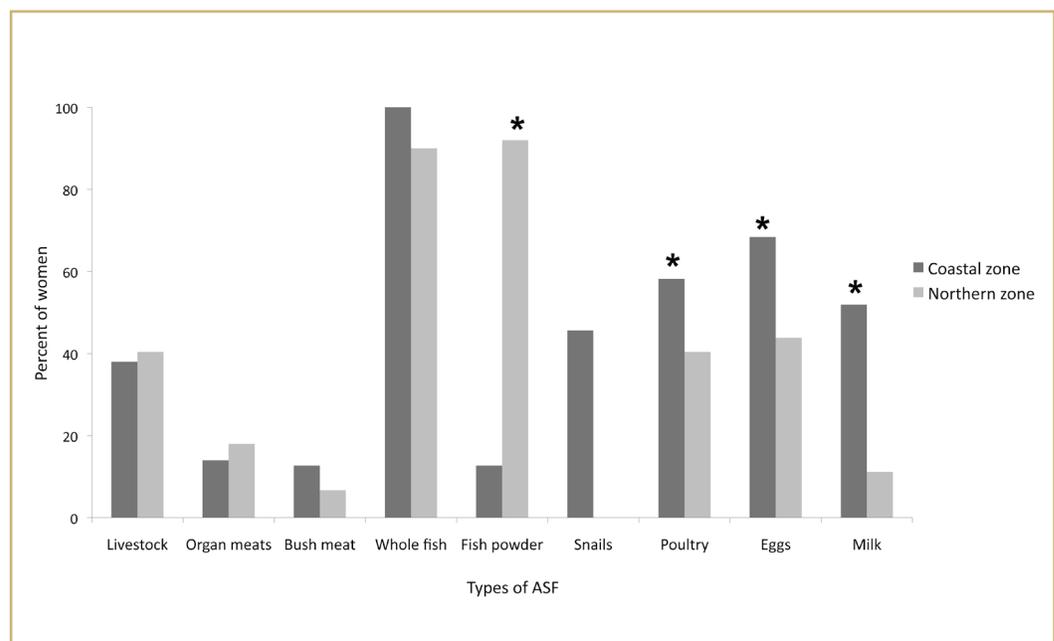
Significantly, more coastal women consumed snails, eggs and milk than the northern women (Figure 1). In the north, fish powder is used as a condiment and is added in small quantities to soups and stews during preparation, explaining such a high proportion.

Practical Implications

This study shows that NPFL Ghanaian women are at risk of nutrient deficiency. The low energy intake sets the stage

for other nutrient deficiencies. The high reliance on a few food groups explains the low diet diversity. Although iron intakes appear to be adequate, most of the dietary iron comes from plant sources which have very low bioavailability. The low consumption of fruits, and likely vitamin C, with the usual diet would also negatively affect iron bioavailability. The main source of bioavailable iron was fish, and this was consumed in small quantities, especially by the northern women. Low intakes of iron from bioavailable sources may contribute to iron deficiency anemia.

Figure 1. The proportion of mothers consuming different ASF in the past seven days. *Chi-square test is significant at $p < 0.05$.



The intake of calcium, in comparison to the Recommended Daily Allowance of 1,000 mg, was low for all the women. Milk and milk products, which are the best sources of calcium, were rarely consumed due to their high cost as well as local dietary customs. Fish powder (which includes the bones) is the main source of dietary calcium for the women. In comparison to coastal women, the diets of the northern women were deficient in several micronutrients. The quality of the diet of rural northern women was relatively low. This, coupled with their low socioeconomic status makes them vulnerable to nutrient deficiencies. There is a need to pay attention to the nutritional needs of all rural Ghanaian women and not just pregnant and lactating mothers.

Efforts to improve access to food (especially to increase the consumption of ASF and fruits either through increased purchasing power or improved home production) throughout the year and support women's income generating activities are important interventions to improve women's nutrition. The ENAM project approach, which helped to alleviate economic constraints while simultaneously improving the caregivers' nutrition knowledge about young children and dietary requirements, could target women of reproductive age in the future. Nutrition education about women's dietary requirements and the importance of achieving good nutrition *prior* to becoming pregnant is needed to assure healthy births, healthy children, and healthy women.

Further Reading

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The GL-CRSP Enhancing Child Nutrition through Animal Source Food Management (ENAM) project was established in 2003 and, through research, training and outreach, monitors the multiple pathways that might increase availability, accessibility and utilization of animal source foods in the targeted communities of Ghana. The project is led by Dr. Grace Marquis, Iowa State University and McGill University. Email: grace.marquis@mcgill.ca.



The Global Livestock CRSP is comprised of multidisciplinary, collaborative projects focused on human nutrition, economic growth, environment and policy related to animal agriculture and linked by a global theme of risk in a changing environment. The program is active in East and West Africa, Central Asia and Latin America.

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