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Interrelationship in nutrient intake of Nigerian mothers and their children: nutritional and health implications

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Summary

This study examined the interrelationships in the nutrient intake of mothers and their children. One hundred and eight mother-child pairs participated in the study. The children were aged 36-59 months (mean age 44 months) while the mean age of the mother was 31.0 years. The subjects were drawn from rural locations, were largely illiterate, and farming and petty trading were main occupations. Intakes of energy, protein, total fat, and iron were assessed from 3 consecutive 24 hour recalls given by the mothers. There were significant positive correlations between energy, total fat, and iron intakes of mothers and their children. There was no significant correlation in protein intakes of mothers and children. The results also indicate that total fat and protein make little contribution to the total energy intake of the subjects. Mother's age was significantly correlated with child's protein intake ($r = 0.21$, $P < 0.01$) but not with child's energy, total fat, or iron intakes. Although mother's energy intake was significantly correlated with child's energy intake ($r = 0.39$, $P < 0.001$) this was not the case with the intakes of the other three nutrients. The results indicate aggregation of nutrient intakes in mothers and their children which has important nutritional and health implications.

Résumé

Cette étude a examiner les relations entre consomations des nutriments des mères et de leurs enfants. Cent huit paires de mère-enfant ont participé à l'etude. Les enfants étaient âge moyen des mères étaient de 31 ans. Les sujets étaient originaires des regions rurales, où les travaux champêtres, le petit commerce étaient leurs principale occupations. De plus, elles étaient illetres la consomation d'energie, proteine, les matieres grasses, et du fer ont été mesure/evaluer à partir de rappelles des mères, pendant 3 fours consequitifs. Il y avaient des correlations significatives positives entre: l'energie, les matieres grasses, et des élements mineraux provenant des apports nutritifs entre les mere et leurs enfants. Il n'y avaient pas de correlation significative positive d'apport proteinique entre l'alimentation des meres et des enfants. Ces resultats indiquent que la quantité total de graisses et de proteine consomés font une très faible contribution à la quantite tonergie dépense. L'âge de la mère a eu une correlation significative sur la consomation proteinique des enfants ($r = 0.21$, $P < 0.01$), mais pas avec l'énergie des enfants. Il en est de meme des graisses et des éléments mineraux. Quoique, l'apport énergetique des mères était correlé de mainere significative à celui des enfants ($r = 0.39$, $P < 0.001$); ceci resultats indiquent l'aggregations des apports alimentaires chez les mères et leurs enfants, ce qui a une importance implication nutritionel et sanitaire.

Introduction

Studies examining nutrient intake in parents and their offspring are very scarce. For most children, the family exerts an important influence on their dietary habits [1,2]. In the few studies that have examined the relationship between dietary intake of parents and their children. close associations in dietary intakes have been reported [3-6].

Studies on nutrient intake of family members are important role in aetiology and pathogenesis of these diseases. For example, it is well established that risk factors for coronary heart diseases (CHD) such as obesity, high blood pressure, and serum lipoproteins aggregate within families [7-11] and diet influence these risk factors [12,13]. Most of these studies rely on estimates of intakes using a variety of methods including 24 hour recall, diet records, food frequency questionnaires, and others. Each of these methods has its own inherent limitations and adequate intake does not necessarily translate to adequate status of the nutrient. Nutritional status is influenced by a host of physiological factors independent of intake.

In Nigeria, although there have been studies on the nutrient intake of women and children, none had looked at the relationship in nutrient intake of mother-child pairs. The objectives of the present study were to: assess the nutritional status of mothers and children and Examine the relationship between nutrient intakes of mothers and their children.

Methodology

Subjects

One hundred and eight mother-child pairs from 3 Local Government Areas (LGAs) in southeast Nigeria were included in the study. One child per mother participated in the study. The children were aged 36-59 months (mean 44 months). The mothers lived in rural centres, were largely illiterate and petty trading and farming were the main occupations. The mean age of the mothers was 31.0 years. Both mothers and children were apparently well at the time of the study.

Data collection

The nutrient intake of a mother and her child were estimated from 24-hour dietary recall given by the mother. The children also volunteered some information on his or her dietary intake in the previous 24 hours which the mother forgot to mention. Because 24-hour recall is associated with large within-person variability [14] and thus limited in its use as a means of assessing usual intakes, the recall was obtained on 3 consecutive days including a weekend day in an attempt to approximate the usual or habitual intakes of the nutrients by the study subjects.

Portion sizes or quantities consumed were estimated by use of model portions used by food vendors or local household measures. Intakes of energy, protein, total fat, and iron were calculated from published food composition tables [15] or other local unpublished tables.

Statistical analysis

Mean nutrient intakes were calculated for mothers and children. Logarithmic transformations were carried out on all the nutrients to normalize the data. Association between intakes of a mother and child was assessed by computing Pearson Correlation Coefficients for each nutrient.

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Results

Table 1 shows the mean (±SD) intakes of the nutrients in the mothers and their children. Total fat intakes in the mothers averaged 22.6% of energy while the children fat intakes accounted for about 21.0% of energy. The mean energy intake of mothers (7158.59 ± 828.19 KJ) was significantly higher than that of the children (5218.12 ± 980.94KJ, $P < 0.01$). In both mothers and children, protein intake accounted for less than 10% of total energy. The mean protein intake of children (24.87 ± 7.58g) and that of mothers (42.26 ± 9.48g) were both lower than the RDA for their age[16]. The mean daily iron intakes of mothers (25.21 ± 10.84mg) and their children (14.96 ± 7.17mg) were above the RDA but 18 out of the 108 mothers (16.7% and 21 children (19.4%) had iron intakes below the RDA for their ages. There was no significant difference in the nutrient intakes of boys and girls.

The total energy intake of mothers was significantly; correlated with the total energy intake of the child ($r = 0.39$, $P < 0.001$) as was iron intakes ($r = 0.55$, $P < 0.001$). Also total fat intake of the mother was positively correlated with total fat intake of the child ($r = 0.64$, $P < 0.001$). There was no significant correlation in the protein intake of mother and child. Table 2 shows the correlation between age and energy intakes of mothers and their children's intakes of energy, protein, total fat and iron. Mothers age was significantly correlated with the child's protein intake ($r = 0.21$, $P < 0.01$) but not with child's energy, total fat, and iron intakes. Similarly, a mother's energy intake was only significantly correlated with the child's energy intake but not with the other three nutrients.

Table 1: Mean nutrient intakes of mothers and children and the mother-child correlations for nutrients intakes

Nutrients	Nutrients Intakes		*	P value
	Mothers	Children		
Energy (kJ/day)	7158.59±828.18#	5218.12±980.94	0.39	< 0.001
Protein (g/day)	42.26±9.48(9.9)+	24.87±7.58(8.0)+	0.07	NS
Total fat (g/day)	43.04±12.05(22.64)+	28.52±9.28(20.58)+	0.64	< 0.001
Iron (mg/day)	25.21±10.84	14.96±7.17	0.55	< 0.001

* Correlations were based on log transformed data and on 3 consecutive 24 hour recalls
\# mean ± SD
\+ % energy.

Table 2: Correlation between age and energy intake of mothers and nutrient intake of their children

Children's nutrient intakes	Correlation coefficients*	
	Mother's age	Mother's energy intake
Energy	-0.06	0.39#
Total fat	0.09	0.03
Protein	0.21**	0.07
Iron	0.11	0.15

* Correlations were based on log transformed data
** $P < 0.01$
\# $P < 0.001$

Discussion

The 24-hour recall method used to collect dietary intake data in this study is subject to a large within person variation [14]; the use of 3 consecutive 24-hour recalls in the present study was an attempt to reduce the variance in intakes and to estimate more correctly habitual intakes which a single 24 hour recall was not likely to provide. Recent reports have shown that the food frequency questionnaire which is used widely for this type of study [17,18] is not appreciably better than the 24-hour recall in placing individuals in the distribution of habitual diet [19].

Except for protein, significant correlations were recorded between the nutrient intakes of mothers and their children. The correlation coefficient recorded for energy intake (0.39) in the present study is higher than the correlation recorded for mother and child pairs in the Framingham study [20] which was not significant, but comparable with correlations recorded in other studies [4-6]. The population from which the present study sample was drawn is mainly traditional and illiterate with the children having little or no say as to the choice of diet to consume. The children in the present study are at an age when they are totally dependent on their parents for all their needs including dietary intake [21]. Children of similar age groups in Western societies tend to have more "freedom" in the choice of food to consume than children in the present study.

The mean energy intakes recorded in this study were generally lower than the RDA [16]. It is significant to note also that protein intake in the mothers and children in the present study accounted for less than 10% of total energy in contrast to the data from the Framingham study where protein intake contributed 17% and 14% of energy in mothers and their children, respectively. Total fat intake in mothers and children in the present study were also lower than intakes in Western middle class families where total fat accounted for over 30% of energy in mothers and children in the Framingham study. In the present study, fat intakes in mothers and their children accounted for only slightly higher than 20% of total energy. These data demonstrate the relatively small contribution of protein and fat in the diet of rural families with important health implications.

The very high correlation in fat intakes of mothers and children in the present study has important health implications from the point of view of coronary heart diseases. However, experience shows that most of the dietary fat is polyunsaturates from vegetable oils and the per caput consumption of animal products is so low as to make the contribution of saturated fats to total energy intake quite negligible. This is in contrast to diets in Western countries where per caput animal consumption is higher and saturated fats contribute a significant proportion of total energy and where, consequently, the prevalence of diet related heart diseases is higher. It is saturated fats which result in elevated blood cholesterol, a potent risk factor for heart diseases. However, if the situation arises when more of the dietary fat in the study subjects is contributed by saturated animal fats then, the very high correlation in fat intakes of mothers and their children will have serious health implications as both mothers and children will carry similar risks of heart disease, a phenomenon quite rampant in families in Western countries.

The low intake of protein in children in the present study and the lack of association between the protein intake of mothers and their children is not unexpected. Foods of high protein like eggs, meat, and milk are often withheld from your children or fed in very small quantities, not only because of their high costs but also because of the erroneous belief that consumption of such food items may encourage children to *steal* as they grow older. So, while adults may feed on these excellent sources of proteins, their children do without.

Maternal and childhood anaemia are common in Nigeria [22]. The present study points to adequate iron intakes in mothers and children and therefore makes iron deficiency unlikely as one of the major causes of anaemia in mothers and children in the three LGAs studied.

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