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HOUSEHOLDS WITH UNDERNOURISHED CHILDREN AND OVERWEIGHT MOTHERS: IS THIS A CONCERN FOR HAITI?

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The coexistence of child malnutrition and adult overweight/obesity typifies rapid nutrition transition and is likely widespread in poor urban populations. This cross-sectional study assessed households' anthropometric profile and socio-economic characteristics in a shantytown in Haiti. Out of 203 sampled households, 14% had a malnourished child (<10 years) and an overweight mother. Overweight mother households (32%) had a better socio-economic status, irrespective of child nutritional status, than those with malnourished mothers and children (7%), or with malnourished children only (36%). In very poor urban settings, the coexistence of child malnutrition-maternal overweight/obesity may be primarily observed in relatively better-off households.

KEYWORDS **nutrition transition, obesity, malnutrition, double nutritional burden, Haiti**

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INTRODUCTION

Obesity, a major biological risk factor for chronic diseases, is spreading in developing countries (Popkin, 1998; Popkin and Doak, 1998). This situation has been attributed to nutrition transition, which refers to changes in eating habits and lifestyle fueled by urbanization, increased (or decreased) purchasing power, and globalization (Popkin, 2002).

While obesity is spreading, undernutrition persists and remains a major public health concern in developing countries (Delpeuch and Maire, 1996). Hence, in these countries, the coexistence of obesity and undernutrition at the national, community, and even the household level exists (Popkin, 2001).

The coexistence of obesity and undernutrition at the household level has been reported in China, Russia, and Brazil. In Brazil, 11% of households have both an undernourished and overweight member and account for 45% of all households having an undernourished member (Doak et al., 2000). In China, households with both undernutrition and obesity are more prevalent in urban areas and tend to have higher income (Doak et al., 2002).

Apart from being an urban phenomenon, the coexistence of undernutrition and obesity in the same household is also characterized by a prevalent pair, i.e., an obese adult coupled with an undernourished child. In China, Brazil, and Russia this type of household accounts for 59%, 62%, and 39%, respectively of the households in which undernutrition and obesity coexist (Doak et al., 2000).

The prevalence of this particular combination of undernutrition and obesity in the household was the object of a comprehensive study carried out in five Asian, eight Latin American, and 23 African countries. Based on the recent Health and Demographic Surveys (DHS), this study explored the association between economic development, urbanization of the countries and households in which a "stunted child-overweight mother" pair coexists. This phenomenon was found in 3% of Asian, 7% of Latin American, and 4% of African households (Garrett and Ruel, 2003). The highest rates of "stunted child-overweight mother" households were observed in the developing countries of Latin America, which have a higher level of urbanization and development, whereas the developing countries with low income have a low prevalence of this type of household.

In Brazil, the study of Florêncio et al. (2001) conducted in shantytowns shows that in poor urban populations, the prevalence of the coexistence of undernutrition and obesity in the household can largely exceed the national prevalence. Indeed, the prevalence of this type of household is

11% at the national level; in the shantytown of Maceiò, it is 30%, approximately three times higher.

In Haiti, a low-income country, the national prevalence of "stunted child-overweight mother" households is 3% (Garrett and Ruel, 2003). However, the deterioration of living conditions, particularly in poor urban settings, presents a much more worrisome scenario. Since 1986, Haiti has been experiencing a major socio-political crisis which has had far-reaching consequences. Today, Haiti is ranked 153th out of 175 countries according to the United Nations Development Program human development index (UNDP) (2004). This country is considered to be the poorest on the American continent with the following socio-demographic characteristics: population density of 292 h/km^2, life expectancy of 49 years, per capita income of 231 $US, an illiteracy rate of 65%, unemployment rate of 60%, and infant mortality of 80% (Enquete Démographique et de Santé, 2000).

In this context of hardship, rural populations in search of better living conditions migrate massively towards urban areas and particularly towards the capital, Port-au-Prince, which absorbs each year approximately 13,000 migrants for a 4.8% demographic growth rate per year. Without any job qualifications, these migrants worsen the living conditions in the urban areas by increasing the unemployment rate and contributing to the growth of shantytowns (Rousseau, 1998).

This exploratory study aimed to evaluate the nutritional profile of households in a large shantytown in Haiti, in order to determine the prevalence of the "undernourished child-overweight/obese mother" households, and to establish socio-economic characteristics of these households by comparing them with other nutritional profiles. We hypothesized that the "undernourished child-overweight/obese mother" household is related to poverty and is more frequent in households having recently migrated to the urban areas.

METHODOLOGY

Settings

The study took place in "Jalouzi," a shantytown located at Petion-Ville, an urban district of Port-au-Prince. "Jalouzi" constitutes a true challenge for urban planning. Located on a mountain called "Morne Calvaire," this shantytown is split in half by a gully used as a garbage dump by the inhabitants. Although fragmentary, statistics estimate that there are some 45,000 inhabitants in "Jalouzi," with a population density that approaches

1800 people/km^2. The houses are piled one on top of the other and occupy a surface area ranging from 8 to 30 m^2 (Brailowsky, 1997).

Sample

A sample of 203 households was randomly selected. We started out at the entrance of "Jalouzi," and set out in any direction; from there, the whole shantytown was covered. Households were included in the sample if they met the following criteria: the presence in the household of the mother and at least two biological children under 10 years old, including one between 6 and 59 months, who would remain living in the household throughout the time of the study. The mother and the children were to appear in good health, that is, show no sign of illness, which could explain the gain or loss of weight. When the households had more than one child in the category of targeted age, the youngest one was chosen. Households where the woman stated that she was pregnant were excluded.

Definition of Variables

Overweight/obesity and chronic undernutrition of the mothers. We identified overweight and obesity by values corresponding to $25 < \text{BMI} < 29.9$ and $\text{BMI} \geq 30$, respectively. Chronic undernutrition corresponds to a $\text{BMI} < 18.5$ (World Health Organization, 1995).

Undernutrition of the children. Child undernutrition is determined by the anthropometric indices, weight-for-height identifying wasting, and height-for-age identifying stunting (National Center for Health Statistics, 1977). The child is considered to be undernourished if he/she has a Z-score <-2.0 as compared to the reference population. Undernutrition is regarded as severe when the indices are <-3 SD (WHO, 1995).

Classification of the households by nutritional profiles. To classify the households, the following nutritional profiles were defined:

1. Normal child-overweight/obese mother
2. Undernourished child-overweight/obese mother
3. Normal child-normal mother
4. Undernourished child-normal mother
5. Undernourished child-undernourished mother

The household nutritional profile is the result of the nutritional status of the mother and one or the other of the two children. When only one child is undernourished, the household is classified according to this child.

Weight was measured in kg to the nearest 100g with a scale (Seca) with a 150 kg capacity. Adults and children over 23 months were weighed standing and barefoot. Children younger than 24 months old were weighed using a suspension scale. Height was measured in cm to the nearest 0.1 cm with a standard stadiometer. Children younger than 24 months were measured lying down, whereas adults and those older than 23 months were measured standing and barefoot.

Socio-economic characteristics of the households. Parents' education: Parents'education was evaluated by the average years of schooling of the father and the mother. This item is coded according to educational level as follows: (0) = none; (1) = elementary; (2) = high school and more. This last category includes individuals who have higher education because there were too few of them to constitute a separate category.

Household income: Income was evaluated from proxy measurements such as durable goods, number of people sleeping in a room, type of toilet used in the household, and the source of drinking water. The durable goods considered were the following electric household appliances: radio, television, and refrigerator. The initial coding for these appliances was made by assigning the value 0 for nonpossession and the values 1, 2, and 4, respectively, for the possession of radio, television, and refrigerator. A household that does not have any of these items will have a score of 0, whereas one that has all of them will have a score of 7. Final coding includes the following three categories: low possession (0) = 0, 1, and 2; average possession (1) = 3, 4, and 5; high possession (2) = 6 and 7.

The number of people sleeping in a room is thus coded: high density (0) = 5 people and more; average density (1) = 3 to 4 people; low density (2) = 1 to 2 people.

In a poor urban environment, the households that are able to buy bottled water (treated) enjoy higher economic conditions than the others. This variable is coded, (0) = others; (1) = bottled.

Just like the source of drinking water, the type of toilet used in a poor urban environment is an indicator of household economic status. Some cannot afford this facility, whereas others use modern ones. The following coding was applied: (0) = basic pit/no toilet; (1) = improved latrines; (2) = flush toilet.

Housing conditions: Housing conditions can be an indicator of prosperity or poverty. In this shantytown, houses were made of cement, wood, or tin. We evaluated floor material, thus coded: (0) = earth/sand/stone; (1) = cement, based on the Demographic and Health Survey for Haiti (EDS, 2000).

Mothers' occupation: This variable includes two categories: housewives and mothers who have an income-generating activity like petty trade and cooking or housecleaning outside the shantytown. This categorization is guided by the fact that the mother's income has a lot of influence on children's nutritional status. Indeed, using data from 1990 Nigerian DHS, Festus and Chirayath (2003) showed that when women are economically active, children are protected from stunting, and this advantage is greatest for women who earned cash from their work.

Urbanization: Urbanization was evaluated by the length of urban residence of the household categorized as < 5 years or ≥ 5 years.

Sanitation: Unsanitary surroundings can lead to infections, particularly in children. The home's immediate general appearance was evaluated through observation and coded as follows: clean, average, and unclean.

Socio-economic status score: A socio-economic status (SES) score was created with the parents education, income, and the housing conditions (Cronbach $\alpha = 0.72$). The variables "mothers' occupation" and "sanitation" were not included among the variables composing the SES score because the correlation with the other elements of the score was too weak. The variable "urbanization" was treated separately.

The SES score is the result of the sum of the following variables: education of the parents + possession of durable goods + number of people per room + drinking water + type of toilet + housing conditions. The final coding is as follows: scores from 0 to 3: low SES; 4 and 5: average SES; 6 to 12: high SES.

Protocol

Recruitment of subjects was done by in-home visits. The author, accompanied by a resident of "Jalouzi," went from house to house to explain the project and obtain the consent of the households solicited. The data

were collected over a period of 2 months (July–August 2003). The socio-economic data were obtained from the mothers by questionnaire. This questionnaire was inspired by the DHS (EDS, 2000) of Haiti and supervised by a local resource person specializing in public health and epidemiologic studies. The study was approved by the Ethics Committee of the Faculty of Medicine (Université de Montréal).

Statistical analysis

EpiInfo 2002 (CDC in the U.S.) and SPSS for Windows v.11.0 (software package for Social Statistics, Chicago) were the software packages used for data processing. The EpiNut module of EpiInfo made it possible to calculate the anthropometric indices and SPSS was used to carry out the statistical analyses.

RESULTS

Socio-economic characteristics of the households

The socio-economic data are summarized in Table I. In "Jalouzi," site of the study, the women seem a little less educated than the men. In this shantytown, an average of six people live in each household and 50% of households have five people and more per room. The use of refrigerators is not very common, whereas televisions and radios are a little more so.

As for drinking water, 30% of the households use untreated water, 64% tap water, and 5% bottled water. Flush toilets are used in 7% of the households. For the others, 77% use improved latrines, and 16% had basic pits or no toilets. The practice of sharing toilets is quite common (41%). Half of the households are considered average in terms of cleanliness—19% are clean and 31% are not clean. Single-parent households (mother) account for 13% of the households.

Household and individual nutritional profiles

The average height of the mothers is 156 ± 7.5 cm for a mean body mass index (BMI) of 23.7 ± 5.3. Chronic undernutrition affects 7% of the women—23% are overweight and 8% obese. Body Mass index is normal for 62% of them (Table II).

Table I. Socio-economic characteristics of households from a shantytown in Port-au-Prince, Haiti (N = 203)

Mothers' schooling	%
None	32
Elementary	46
High school	22
Father's schooling (n = 177)	%
None	9
Elementary	54
High school	37
Households assets	%
Radio	62
Television	42
Refrigerator	8
Source of water	%
Treated water	5
Tap water	64
Untreated water	30
Cleanliness	%
Clean	19
Average	50
Unclean	31
Type of toilet	%
Flush toilet	7
Improved latrines	77
Basic pits / No toilet	16
Mother's occupation	%
Housewives	54
Income generating activities	46
Length of urban residence	%
< 5years	39
≥ 5years	61

Wasting affects 7% of all the children studied, with 1% of them presenting the severe form, i.e., a weight-for-height Z-score < –3.0. Chronic undernutrition or stunting affects 32% with 14% of them suffering from the severe form, that is, a height-for-age Z-score < –3.0 (Table III). Only 5% of the children are overweight (weight-for-height Z-score >2), and nearly all of them (81%) are in the younger age category (below 5 years

Table II. Nutritional status of women in a shantytown in Port-au-Prince, Haiti (N = 203)

Nutritional Status	% (n)
Underweight (IMC < 18.5)	7% (14)
Normal (18.5 < IMC < 24.9)	62 % (126)
Overweight (25 < IMC < 29.9)	23 % (46)
Obese (IMC ≥ 30)	8 % (17)
Total	100 (203)

Table III. Nutritional status of children (<10 years) from a shantytown in Port-au-Prince, Haiti

Nutritional Status	Mean Z-score (SD)	< -3 ET[a] (n)	< -2 ET (n)	≥ -2 ET (n)	> +2 ET[b] (n)
Height-for-age	–1,35	14%	32%	68%	2%
N = 404	(1.65)	(18)	(128)	(276)	(8)
Weight-for-height	–0.1	1%	7%	93%	5%
N = 403	(1.3)	(0.29)	(29)	(374)	(21)

[a]Included in the % of < -2 ET.
[b]Included in the % of ≥ -2 ET.

Table IV. Household nutritional phenotypes

	n	%
Underweight child-normal mother	73	36.0
Normal child-normal mother	51	25.1
Normal child-overweight mother	35	17.2
Underweight child-overweight mother	29	14.3
Underweight child-underweight mother	15	7.4
Total	203	100

of age). The contrasting findings are that 31% of the women are overweight/obese while 32% of the children stunted.

The prevalence of the different nutritional profiles is presented in Table IV. The nutritional profile "undernourished child-normal mother" is predominant (36%). This profile is followed by the "normal child-normal mother" household (25%). The third most common nutritional

profile is that of "normal child-overweight/obese mother" which accounts for 17% of the households. Then the ranking is as follows: the profiles "undernourished child-overweight/obese mother" (14%), and "undernourished child-undernourished mother" (7%). The profile "normal child-undernourished mother," accounting for only 1% of the households, was combined with the "undernourished child-undernourished mother" households after checking that it did not present a significant difference with the other profiles for the SES.

Nutritional status according to households SES

Household nutritional profiles. In the low SES bracket (Figure 1), the profile "undernourished child-undernourished mother" occurs most frequently (47%). The profile "undernourished child-normal mother" comes in second with 45% of these households found in the low SES bracket. The most privileged group, according to our SES index, is the "normal child-overweight/obese mother" with 49% of them classified in the high SES bracket. This group is followed immediately by the "undernourished child-overweight/obese mother" households, which account for 41% of households in the high SES bracket.

ANOVA comparisons of the different profiles show that the SES score for the "normal child-overweight/obese mother" households is

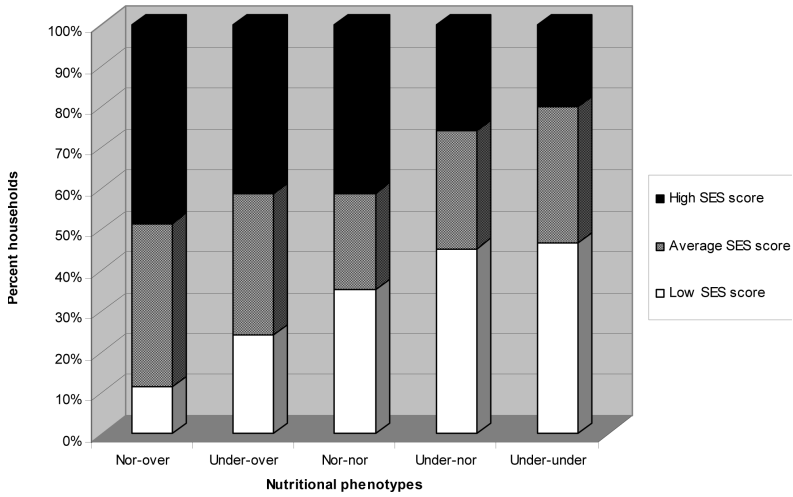

Figure 1. Household nutritional profiles according to SES score.

significantly higher than the score for households where both mother and child are undernourished ($p < 0.01$) and the score for households where there is an "undernourished child-normal" mother ($p < 0.01$) (Table V). The profile "undernourished child-overweight/obese" mother does not differ significantly from the other profiles.

In the "undernourished child-undernourished mother" households, the proportion of women with income-generating activities tends to be higher, whereas the "normal child-overweight/obese mother" ones have the highest proportion of housewives, but the difference is not statically significant ($p = 0.1$).

There is no difference between the various households' nutritional profiles when compared in length of urban residence.

Mothers' BMI. Obesity (BMI $\geq$ 30) and overweight (BMI > 25) are more highly prevalent among women of high SES, whereas undernutrition (BMI < 18.5) is more frequent in the less-privileged group. Indeed, 47% of the obese women are from high SES bracket, whereas 43% of those who are undernourished are from low SES bracket ($p < 0.05$).

The mean BMI is 22 ± 3.7 for the mothers from low SES, 24 ± 4.5 for those of average SES, and 25 ± 6.8 for those of high SES. These values are significantly different for the mothers of high and low SES ($p < 0.01$). There is a positive correlation between mothers' BMI and household SES in this population ($r = 0.30$; $p < 0.01$).

Height-for-age and weight-for-height indices. The height-for-age Z-score of the children is positively associated with household SES. This association is weaker for children under 5 years old ($r = 0.19$; $p < 0.01$) than for the older ones ($r = 0.23$; $p < 0.01$). There is no association between the weight-for-height Z-score and the household SES.

Table V. SES score of households according to nutritional phenotype

	Mean SES (SD value)
Normal child-overweight mother	6.29 (2.53)[a]
Underweight child-overweight mother	5.14 (2.32)
Normal child-normal mother	5.06 (2.54)
Underweight child-normal mother	3.90 (2.1)[b]
Underweight child-underweight mother	3.73 (2.21)[bc]

[abc]Means without a common superscript was significantly different ($p < 0.01$).

Table VI. Household nutritional phenotypes according to sanitation

	Sanitation (%)		
	Clean	Average	Unclean
Normal child-overweight mother	30.3	57.6	12.1
Underweight child-overweight mother	24.1	58.6	17.2
Normal child-normal mother	23.9	45.7	30.4
Underweight child-underweight mother	14.3	45.1	28.6
Underweight child-normal mother	8.5	57.1	46.5

A positive correlation is observed between the mother's height and the height-for-age Z-scores of the children. The correlation is slightly stronger for the children $\geq$ 5 years ($r = 0.17$; $p < 0.01$) than for the younger ones ($r = 0.12$; $p < 0.05$).

Sanitation. The "undernourished child-normal mother" households are the most prevalent (46%) in the unclean category, whereas the "normal child-overweight/obese mother" ones are more frequent (30%) in the clean category ($p < 0.05$) (Table VI).

DISCUSSION

Coexistence of child undernutrition and maternal overweight/obesity in poor urban settings

The "undernourished child-overweight/obese mother" households account for 14% of the households studied, i.e., approximately four times the national rate (3%). This suggests that this phenomenon could be exacerbated in the poor urban settings. In our study, the phenotype "wasted child-overweight/obese mother" accounts for only 3% of the households sampled. According to the approach of Garrett and Ruel (2003), considering only the pairs "stunted child-overweight/obese mother," the coexistence of undernourished child and overweight/obese mother in the same household would be 11%, a value which is still higher than that observed at national levels. Maternal overweight (31%) is as highly prevalent as child chronic undernutrition (32%) in this population. This scenario is particularly conducive to the "undernourished child-overweight/obese mother" household.

Although the length of urban residence did not have an impact on the frequency of the "undernourished child-overweight/obese mother" in this study, in countries with low income such as Haiti, considering the socio-demographic distribution of overweight, this would more likely be an urban phenomenon. In sub-Saharan Africa, for example, obesity is more concentrated among urban women (Martorell et al., 2000). In rural areas, only 17% of Haitian women are overweight as compared to 37% of those living in the metropolitan area (EDS, 2000).

In Brazil and now in Haiti, the data seem to suggest that living conditions of poor urban populations increase the rate of the "undernourished child-overweight/obese mother" households. The assumption is, in urban settings, adult overweight is supported by changes in food habits and lifestyle (Popkin, 1998), whereas the extreme poverty of the shantytown would be conducive to child undernutrition (Garrett, 2000).

Stunting (32%) is more prevalent than wasting (7%) among the children of this population. These results are consistent with the fact that this population has been experiencing trying times over a long period. Indeed, chronic undernutrition is a reflection of growth disturbances over a long period of time, whereas wasting expresses recent food deficits and infectious episodes (WHO, 1995). Indeed, for over 15 years, social indicators in Haiti have been declining: lower life expectancy, increased rate of unemployment, expansion of shantytowns. In this critical situation, the children are the first victims.

For children under 5 years old, the prevalence of stunting (34%), in our study, is higher than that (23%) recorded by the DHS for Haiti (EDS, 2000). An explanation of this higher value probably lies in the fact that, although it was carried out in an urban setting, the study concentrated on a shantytown, an area of extreme poverty. The prevalence (36%) of "undernourished child-normal mother" households clearly shows the extent of child undernutrition in this environment. Other data support similar findings in urban settings in countries such as Honduras, Malawi, and Zambia (UNICEF, 1999a).

Maternal overweight appears to be a real problem in this population. For only 7% of women with chronic undernutrition, 31% are overweight and 8% obese. These data are supported by the study by Florêncio et al. (2001) in Brazil, where one-third of the households had at least one overweight parent.

Household nutritional profiles and socio-economic status

The "normal child-overweight/obese mother" profile has the highest SES score. It thus seems that maternal overweight is supported by slightly better-off, socio-economic conditions, a tendency that reflects the characteristics related to nutrition transition where improvement of standard of living in an urban setting is accompanied by an increase in obesity (Popkin, 2002). However, no significant difference in SES was found between these households (17%) and the "normal child-normal mother "households (25%). The BMI difference between the mothers of these two profiles would probably be the expression of factors related to the mother herself such as food energy intake, physical activity, and physiological mechanisms. As far as the physiological mechanisms are concerned, it is possible that in the long-term, stunting could lead in adulthood, to changes such as lower energy expenditure, higher susceptibility to high fat foods because of weak oxidation of lipids, and a disruption in regulation of food (Sawaya and Roberts, 2003). These factors contribute to the development of obesity. In the study by Florêncio et al., (2001), 30% of the stunted individuals were obese or overweight. In China, Russia, South Africa, and Brazil, the association between stunting and obesity is also supported by a study conducted by Popkin, Richards, and Monteiro (1996).

The profile "undernourished child-normal mother" is the most prevalent of the sample (36%). Their higher prevalence (46%) also among the unclean households suggests that poverty is not the only explanatory factor for child undernutrition in these households. Indeed, although relatively poorer than the households of the type "normal child-overweight/obese mother," their SES score is not different from that of the "malnourished child-overweight/obese mother" households or "the normal child-normal mother" households. Uncleanliness can in fact maintain germ proliferation which favors infectious diseases that can lead to child undernutrition (Peña and Bacallao, 2002).

The households where both mother and child are undernourished are significantly the most prevalent in the low SES bracket. They are the poorest segment of the shantytown population. The presence of maternal undernutrition in this group suggests a situation of chronic food insecurity.

Normal households (without undernutrition or overweight) do not show any significantly distinct characteristics from the other profiles. A positive deviance approach could perhaps highlight the factors enabling

them to keep a normal nutritional profile while living in the same environment (Pryer et al., 2003).

Socio-economic status and its measurement

No measurement of socio-economic status is perfect. Measurements within the same population using different tools often produce different classifications (Khe et al., 2003). The impact of the choice of a SES measurement on inequality level based on health indicators was shown by a study carried out in 10 developing countries (Houweling et al, 2003). Comparing the World Bank (WB) index to three other indices, the results showed that household's ranking on the SES national scale varied a great deal from one index to another and that inequalities between rich and poor based on health and survival parameters for children under 5 also changed in proportion and direction according to the country, the SES index, and the health indicator. We thus make a point of moderating the use of our score although we think it is adapted to the population studied. Indeed, this score was built from data collected for this purpose in the DHS (EDS, 2000). Moreover, like the WB index, our score included data on housing conditions, drinking water, and sanitary facilities, in addition to education and income.

An unequivocal definition of poverty still remains to be found. Reviewing four definitions and approaches to measurement of poverty—monetary, capability, social exclusion, and participatory methods, Laderchi et al. (2003) highlighted the fact that there is no unique or objective way to define and measure poverty. Consequently, measurements of poverty reflect the interpretation of various realities of what should be good living conditions according to an outsider's perceptions. Based on the households' socio-economic conditions, it is possible to say that living conditions in this population are precarious. We view the various SES levels—low, average and high—as a poverty gradation.

In this context, it is understandable that undernutrition is most prevalent in households with low SES. Indeed, even though all children in poor households are not undernourished, the inability to meet fundamental needs as a result of lack of resources is nevertheless an important determining factor of children's nutritional status in a household (UNICEF, 1999b). For adults, in the absence of disease or famine, chronic undernutrition is without a doubt the result of extreme poverty.

The highest rate of overweight and obesity in households of average and high SES follows a logic based on poverty level. These households, although poor, have relatively better socio-economic conditions than the households with undernutrition, which probably gives them access to more than enough food (Stunkard, 2000). This energy surplus can come from low nutritional quality and high-energy density foods, which are more accessible to the poor (Drewnowski and Specter, 2004). Contrary to developed countries, in low-income countries, obesity and its consequences tend to be more prevalent in the better-off social brackets. Stunkard (2000) reports a direct and strong relation between obesity and SES in developing countries, whereas the relation is opposite for the developed countries. In India, for example, the prevalence of obesity and its consequences are higher among urban women of high social class (Singh et al., 1999). Consequently, considering the shantytown as a micro-environment on its own, it can be admitted that obesity first appears in households with relatively high SES. Thus, obesity appears to be an SES indicator in this population.

It is, however, necessary to take into account the interpretation of BMI for the population being studied. It would seem that, for the same BMI, the percentage of fat is lower for individuals of African origin than for Caucasians (Deurenberg et al. 1998), whereas Gallagher et al. (1996) suggest that BMI, as an indicator of body fat, is race independent between Whites and Blacks.

CONCLUSION

Maternal overweight and child undernutrition, both frequent (31% and 32%, respectively) within this Haitian shantytown, create a favorable ground for the "undernourished child-overweight/obese mother" households (14%).

The households with higher SES scores also have higher rates of maternal overweight/obesity. These data lead to the assumption that the nutrition transition effects in this population are mainly felt only in the relatively better-off households.

The range of these results should, however, be regarded with caution. First, only the households that met our inclusion criteria took part in the study. Second, only the mother and two of her biological children were evaluated for obesity or undernutrition, whereas other members of

the households could also be affected. Finally, specific BMI cut-off points for Blacks would have permitted a more accurate evaluation of obesity in this population.

This study, intended as exploratory, shed light on some important aspects for the comprehension of the "undernourished child-overweight/obese mother" household. While still largely ignored in Haiti, this phenomenon is nevertheless responsible for a double nutritional burden for the households and the health system.

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