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Research Article

Dietary habits and lifestyle in school-aged children from Bucharest, Romania

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Abstract

Background. This study evaluated the difference between boys and girls in terms of nutritional status, lifestyle, and dietary habits during school life.

Materials and Methods. A descriptive and observational study was conducted in 2016, in which 251 children, aged 7-17, from 3 elementary schools and a high school in Bucharest, Romania, were evaluated. A questionnaire was used to assess food behavior, eating, and lifestyle habits.

Results. Boys had a significantly higher waist circumference (71.18±9) than girls (67.46±9.91) ($p=0.004$). Thus 27% of boys were overweight or obese compared with only 22% of the girls. Differences were also seen between the two groups in terms of main meals and snacks and following a rhythm of meals: a statistically significant percentage of girls (36.3%) skip breakfast, while most boys (63.8%) take a food package to school. A total of 23.8% of the boys and 24% of the girls state that they eat while sitting in front of the computer or TV.

Conclusions. We found that boys are more overweight or obese than girls. Obesity in the pediatric population of Romania could be explained by the country's emergence from communism 25 years ago, pattern typical of all Eastern European countries and which currently involve an overexposure of people to fast food, fizzy drinks and sweets, as well as to a high consumption of salt and food additives. Unbalanced and highly caloric food had been preferable to healthy food in the last period. Leisure time is rather spent in front of the TV, tablet, detrimental to rational physical exercise, recreational sports or hiking. The family environment is very important and all our actions should be focused on continuous education about the risks of unhealthy food and a sedentary lifestyle.

Keywords : school-aged children, obesity, eating habits, lifestyle, nutrition

Highlights

- ✓ The great majority of Romanian children do not follow a healthy schedule of meals and snacks, with many giving up breakfast deliberately.
- ✓ The boys are more obese than girls (9% vs. 5%) while the overweight figure was 27% among the boys and 22% among the girls.

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Introduction

Much evidence indicates that eating habits and lifestyle during childhood and adolescence are risk factors for different nutritional and cardiovascular diseases in adulthood. Obesity is perhaps the most frequent chronic disease in children and adolescents, affecting each group of age, beginning with infancy. However, obesity is the most common nutritional disorder in children worldwide, its prevalence growing in both developed and developing countries, affecting all social and economic categories, both sexes, all ages and ethnic groups. Obesity among children and adolescents represents a serious public health problem, since it is frequently associated with metabolic syndrome, type II diabetes mellitus, hypertension, dyslipidemias as well as more frequent sleep apnea and orthopedic diseases/osteoporosis (1, 2).

The growing rate of overweight and obesity in children is 30% higher in developing countries (classified as countries with poor and average incomes by the World Bank) than in developed countries. Data provided by the Order of the Ministry of Health in 2013 pertaining to the international situation of obesity indicate that “wealth disease” is a problem even for very many poor countries (3, 4).

The prevalence of overweight in Europe ranges between 40-59.9% in adults aged 20 years or older. The prevalence of insufficient physical activity in European youngsters aged 15 or older ranges between 20-60% depending on the country, while the number of daily calories per capita varies between 2700 and over 3500 (4).

The increase in time spent in front of the computer, TV, or video games is a significant factor in the growth of obesity at a global level (2). A study published by the Milken Institute in 2012 notes that each 10% investment of information technology generates a 1% increase in the obesity rate, while a 0.4% growth of the obesity rate due to the time spent in front of the screen leads to an overall growth of 1.4% of the obesity rate. These data show that, for example, in a country with a population of 300 million inhabitants, there will be 4.2 million new cases of obesity. The study also reveals that in countries with a large investment in informational technology, a growth of 1% in the number of physically active people can prevent a growth of 0.2% of obesity (5).

In Romania, overweight and obesity represent a serious epidemiologic and public health problem, due to its growing prevalence. Twenty percent of the children aged 6-12 years and 11% of those aged 13-17 years are diagnosed as overweight or obese. The prevalence of obesity in 2014 was 10.1% in both urban and rural areas

in Romania. This increased incidence is due to a long-term positive energy balance supported by a modern lifestyle, excess caloric feeding originating in junk-food, a sedentary lifestyle, and the lack of an adequate nutritional education (6).

According to the latest studies, Romania is now 3rd in Europe in terms of overweight, up from 23rd in 2003. Specialists state that the explanation for such a worrying phenomenon is due to the occurrence of the first “fast-food” generation among adults after the '90s. Acknowledging problems related to food quality is a starting point in solving such a problem. The formation of healthy eating habits begins in the very first years of development, yet the first years at school may lead to developing bad eating habits, for example, buying snacks from shops often found within the school (5, 6).

It is concerning that children begin watching TV from the age of 2, spending an average of 2-4 hours/day, a situation that is detrimental to physical exercise. More than 7% of children and adolescents frequently eat fast-food, which is rich in carbohydrates, lipids, salt, and sugar. Such a lifestyle is frequently seen within the entire family, especially in disorganized or single parent homes (7).

The purpose of this study was to assess differences between boys and girls regarding nutritional status, lifestyle, and eating habits in the schooling period. Developing positive lifestyle habits should become a national strategy among the young so as to promote physical exercise, understand patterns of a sedentary lifestyle and their control, impart nutritional education on a large scale among the entire population, and promote healthy norms of sleep and work schedules (8).

Materials and Methods

A descriptive, observational, cohort study was undertaken in which 251 children were assessed, with ages between 7-17 years (mean = 12.27±2.72 years) in three elementary schools and one high school in Bucharest, Romania. The children were divided into two groups based on gender: 41.8% (105) boys and 58.2% (146) girls, with relatively close ages. Data were collected between February-March 2016, in Bucharest, Romania.

The demographic, anthropometric (weight, height, waist, and hip diameter) parameters were assessed and a questionnaire was used to evaluate the eating behavior and habits and their connection to lifestyle. Data included direct observation methods, questionnaire response patterns, and physical examination. The questionnaire was comprised of lifestyle-related questions, work and sleep schedule, frequency and

schedule of meals, meal content, eating habits, and lifestyle habits among the subjects' own families. The questionnaire included questions about the consistency of daily meals, the types and the quantity of drinks consumed daily, the types of daily and weekly exercise, the number of leisure hours spent in front of a computer or TV, and questions related to compliance with recommended food groups and their introduction into the daily diet provided by the Ministry of Public Health (Romania). These school-aged children also reported about the conditions during which meals were eaten by selecting from the following categories: standing, directly from the food pot, watching TV, eating due to boredom, emotional eating, and eating at night or only in small amounts but frequently. Informed consent was given by parents.

In terms of physical evaluation, calculation of the Body Mass Index (BMI) involved measurement of both weight and height under conditions of food and beverage fasting for more than 8 hours. Children were weighed on an empty bladder and slightly dressed and their BMI was correlated with the percentile graphics specific to boys and girls.

BMI is an indicator of body fatness, so even though it cannot be used to diagnose health issues, it can be used as an early screening tool. For children and teenagers, BMI was evaluated using age and gender-specific charts that take into account different growth patterns for the sexes. Weight and the amount of fat in the body differ for boys and girls and those levels change with height and age. BMI percentiles for boys (2 to 20 years) and BMI percentiles for girls (2 to 20 years) were used (7).

Statistics

Data were analyzed using Excel and SPSS v 20, with P-values <0.05 for two-tailed tests considered statistically significant. Data are expressed as median (interquartile range) for continuous variables and as number of cases and percentages for category variables. Subjects were classified by gender, and the groups were compared using one-way ANOVA and t tests. The confidence index was higher than 95%.

Results

Regarding anthropometric indices, boys had a significantly higher waist circumference (71.18±9) than girls' (67.46±9.91) (p=0.004). In addition, comparative analysis (Table 1, Figure 1) indicated a higher percentage of obesity in boys (9%) than girls (5%) although this difference was not significant (p=0.25).

Regarding eating habits and a consistent rhythm in main meals, a significantly higher percentage of girls than boys (36.3% vs 22.9%) skip breakfast; most boys(63.8%) take a school lunch (Table 2) and only

30.5% of the boys and 40.1 % of the girls have a family meal.

Regarding meal content, boys are large consumers of fruits, eggs, meat, dairy, and farinaceous (starchy) foods, while the girls are larger consumers of sweets (65.1%) (Table 3). 79% of the boys and 73.3% of the girls have at least one weekly meal at a fast food restaurant (Figure 2). Content of the most frequent foods according to gender is represented in Figure 3.

	Boys	Girls
Number of children assessed	105	146
Underweight (< 5th %ile)	8%	7%
Normal (5th - 85th %ile)	66%	71%
Overweight or obese (≥ 85th %ile) (6)	27%	22%
Obese (≥ 95th %ile)	9%	5%

Table 1. Group distribution according to gender and percentile;

⁶Terminology based on: Barlow SE and the Expert Committee. Expert committee recommendations regarding the prevention, assessment, and treatment of child and adolescent overweight and obesity: summary report. Pediatrics. 2007; 120 (suppl 4):s164-92.

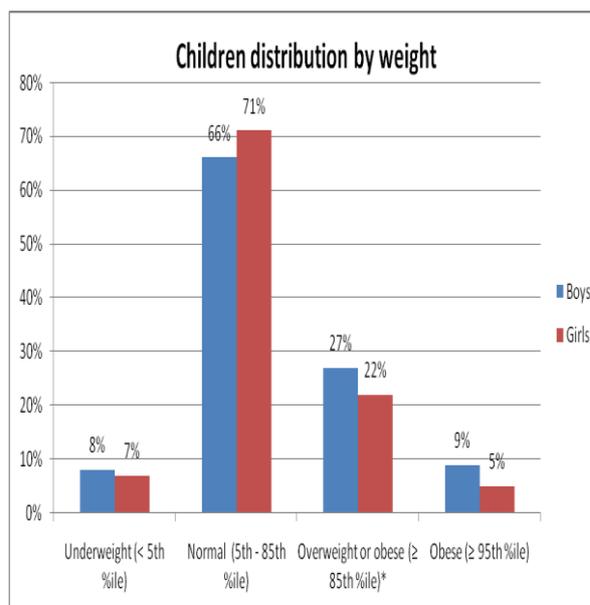


Figure 1. Group distribution according to weight and gender

As for fluid consumption, 28.6% of the boys consume more than 2 glasses of fizzy drinks a day, while only 16.43% of the girls consume more than 2 glasses; 29% fail to drink at least one glass of water a day (Figure 4).

	Male		Female		p
	Yes	No	Yes	No	
Breakfast	Yes	77.1% (81)	Yes	63.7% (93)	0.023
	No	22.9 (24)	No	36.3% (53)	
School package	Yes	63.8% (67)	Yes	47.3% (69)	0.009
	No	36.2% (38)	No	52.7% (77)	
Lunch	Yes	78.1% (82)	Yes	75.3%(110)	0.641
	No	21.9% (23)	No	24.7% (36)	
Snack between lunch and dinner	Yes	72.4% (76)	Yes	62.3% (91)	0.097
	No	27.6% (29)	No	37.7 % (55)	
Dinner	Yes	80% (84)	Yes	67.8% (99)	0.032
	No	20% (21)	No	32.2% (47)	
Eating all the time	Yes	30.5% (32)	Yes	27.7% (41)	0.906
	No	69.5% (73)	No	72.3% (105)	

Table 2. Meal and snack intake according to gender

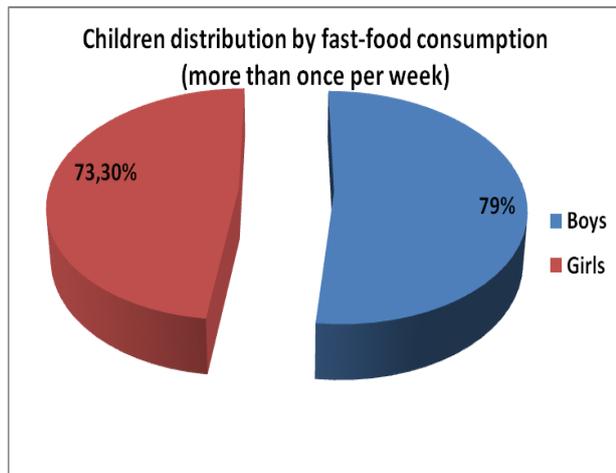


Figure 2. Distribution of fast food consumption according to gender and frequency

The rhythm of meals is important, along with a hygienic-dietary regimen important for this age category. 9.5% of boys and 6.2% of girls eat at night; 3.9% of boys and 3.8% of girls eat when upset; 23.8% of boys and 24% of girls report eating in front of the computer or TV. A surprising result was that all children in this study reported eating due to boredom at least once a week.

These observations suggest a compulsive aspect of eating, which may lead to the development of poor eating habits in adulthood and to the previously mentioned chronic complications.

Regarding leisure time spent in front of a TV, tablet, or phone, boys spend 3.47 ± 2.6 hours daily, significantly higher than girls who spend 2.57 ± 2.1 hours/day. This

difference is further reflected in the weekly time spent in front of devices: boys spend approximately 17.38 ± 5.55 hours/ week vs. girls who spend 10.8 ± 4.33 hours/ week, a significant difference (Figure 5).

Food		Male	Female	p
Vegetables	<3	81.9%(86)	76.7% (112)	0.049
	>3	18.1% (19)	23.3% (34)	
Fruits	<3	79% (82)	76.7% (112)	0.54
	>3	21% (23)	23.3% (34)	
Milk	<3	81% (85)	78.1% (114)	0.934
	>3	19% (20)	21.9% (32)	
Eggs	<3	59% (62)	39.7% (58)	0.023
	>3	41% (43)	60.3% (88)	
Meat and cold meats	<3	82.9% (87)	72.6% (106)	0.034
	>3	17.1% (18)	27.4% (40)	
Butter	<3	45.7% (48)	41.1% (60)	0.567
	>3	54.3% (57)	58.9% (86)	
Pasta	<3	38.1% (40)	31.5% (46)	0.314
	>3	61.9% (65)	68.5% (100)	
Bread	<3	81% (85)	71.2% (104)	0.05
	>3	19%(20)	28.8% (42)	
Sweets	<3	64.8% (68)	65.1% (95)	0.075
	>3	35.3% (37)	34.9% (51)	

Table 3. Frequency of food intake per week according to gender

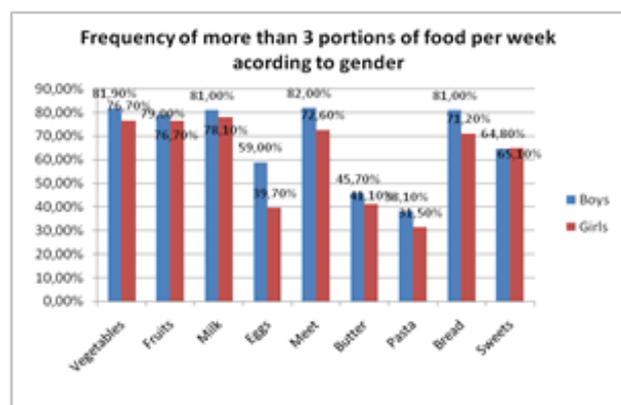


Figure 3. Content of the most frequent foods according to gender

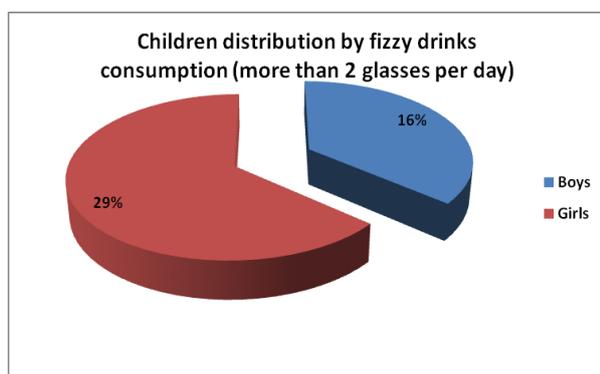


Figure 4. Fizzy drinks consumption by gender

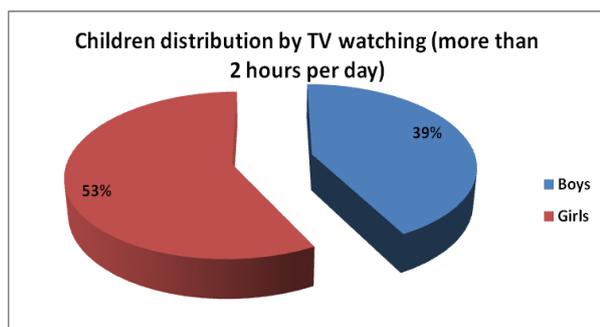


Figure 5. Children distribution by TV watching

Regarding physical activity, as in adults, increased physical activity has been associated with increased life expectancy and decreased risk for cardiovascular disease. Physical activity triggers overall physical, psychological, and social benefits (9). Analysis of the time spent outdoors engaged in favorite or recreational sports indicates roughly 2 hours daily for both boys and girls. When asked if they participated in other physical activities, only 29% answered affirmatively. Favorite activities included football, dancing, skating, modern dancing, basketball, karate, swimming, walking, movement to music, fitness exercise, Pilates, and gymnastics. However, a significant percentage did not engage in any physically active behavior (27% of the boys and 19% of the girls).

Among the boys' favorite activities were: basketball, 17.6%; cycling, 6.7%; football, 21.4%; swimming, 4%; rugby, 3.8%; roller-skating, 2.9%; and other, 16%. Among girls' favorite activities were: dancing, 10%; ballet, 3.4%; cycling, 4.1%; gymnastics, 12%; swimming, 4%; roller-skating, 5%; tennis, 7%; volleyball, 6%, and other, 11%.

Discussions

The problem of pediatric overweight and obesity is already a serious public health problem in Romania. In our study, we noted that 27% of the boys are overweight or obese compared with 22% of girls. Obesity among the pediatric population in Romania might partially be explained by the country's emergence from communism

25 years ago, a pattern seen in all Eastern European countries, where children's diets are now characterized by overexposure to fast foods, fizzy drinks, and sweets, as well as high consumption of salt and food additives (2).

Imbalanced and high caloric diets were preferable to healthy food. Spending free time in front of the TV, phone, or tablet has become preferable to rational physical exercise, recreational sports, or hiking. Family environment is critically important, as it should provide modelling for children as well as continuous education regarding the risks of unhealthy food and a sedentary lifestyle.

Although daily breakfast consumption is considered healthy for nutritional status, cognitive function, and body weight control, school-aged children appear not to know this information. In a meta-analysis on the benefits of breakfast consumption by school-aged children, conducted by Szajewska and Ruszczynski in 2010, 13 of 16 studies revealed that breakfast has a protective effect against becoming overweight or obese (10). Our study indicates that 36.3% of the girls and 22.9% of the boys skip breakfast. The finding that girls skip breakfast more than boys has now been reported in multiple studies and has been interpreted as girls being more concerned about body image and dieting, hoping that skipping breakfast will reduce their overall calorie intake and weight (11). In general, about half the adolescents consume vegetables, fruits, and red meat more than three times a week.

A strategy of preventing overweight/ obesity in children should directly address the entire family, encouraging the consumption of fresh fruits and vegetables, grain cereals, moderately low fat dairy products and cheese, and unprocessed meat products (as opposed to pre-cooked food, junk food, and fizzy drinks). Nevertheless, the education of children in school settings is also critical, with the requirement and/or promotion of nutritional educational programs and various outdoor activities.

The low intake of fruits and vegetables is of particular concern since such foods are protective against certain chronic diseases, including obesity, cardiovascular diseases, and some types of cancer (11). High consumption of fast foods presents a considerable risk factor for obesity (12), with our study revealing that around 70% of children eat fast-food at least once a week. As for meal content, most children regularly eat bread, meat, and vegetables.

Studies have also demonstrated that snacking between meals could be a protective factor against obesity, although this depends greatly on the quality and quantity of the snacks. The low intake of fruits and

vegetables in the daily diet of children in this sample is a serious problem, particularly since the consumption of such foods categories are well-known protective effects. Girls specifically ingest a lower quantity of such foods, as seen in our study, and this may be due to the generalized tendency (especially in female teens) to maintain a lower body weight by sacrificing at 1-2 meals/ day and giving up snacks. Regarding meal content, girls consistently consume less food than boys, probably associated with girls' overall smaller size, smaller waists, and lower obesity (5% vs. 9% in boys).

Increased television watching, playing video games, and protracted use of the Internet are contributory factors to an increased sedentary behavior during free time, which can lead to decreased physical activity (13-15). Our findings indicate that both girls and boys spent approximately 2-4 hours/day in front of the computer or TV, undoubtedly due to the current widespread availability of TV sets and computers. Free time devoted to sports or physical activities consumes roughly 2 hours/day in both girls and boys, which most likely corresponds to compulsory classes in physical education within the school's daily schedule (16).

To prevent childhood obesity, parents should encourage healthy eating habits (i.e., plenty of vegetables, fruits, and whole-grain products, low-fat or non-fat milk or dairy products, lean meats, poultry, fish, lentils and beans for protein, plenty of water and fewer sugar-sweetened beverages and less sugar, sodium, and saturated fat), ensure that their children understand the benefits of being physically active, encourage them to be active and reduce sedentary time (on TV, video games, Internet, etc.) to no more than 2 hours/day, and develop new fun and engaging physical activities with other family members or simply on their own (17, 18).

Conclusions

This study found that boys are more obese than girls (9% vs. 5%) while the overweight figure was 27% among the boys and 22% among the girls. Obesity in the pediatric population of Romania may be related to the country's communist period, which later favored the overexposure to fast food, fizzy drinks, and sweets as well as high consumption of salt and food additives (19, 20). Unbalanced and highly caloric food has been preferred to healthy food (21, 22).

The most important conclusion of our study is that the great majority of children do not follow a healthy schedule of meals and snacks, with many (especially girls, over 36%) giving up breakfast deliberately. Most school-aged children in this study also did not follow a regimen consisting of main meals and snacks throughout

the day (breakfast, the morning snack, lunch, the afternoon snack, dinner). School-aged boys favored dinner (80%), while girls (75%) favored lunch.

An important tradition in Romanian society is the mother's position at the center of the family and the one responsible for preparing meals (22, 23). As such, she typically ensures at least one cooked dish/day, an assumption confirmed by more than 80% of all children. Many girls and boys have at least one family meal/ day (30% vs. 40%), but many also eat fast food occasionally (73% vs. 79%).

One behavior that needs to be encouraged is eating the snack at school that most school-aged children still eat although girls are more likely to skip it, hoping to maintain a lower body weight (63% of the boys and 47% of the girls eat the snack). This snack could consist of a sandwich, fruits or, as expected, sweets (65%). In the daily diet of school-aged children we mainly find bread or polenta, potatoes, fruits and raw vegetables, milk and dairy products, butter or margarine, fish or meat and sweets. Almost one third (29%) do not consume water at all during the day, and boys consume at least 2 glasses of sweetened fizzy drinks/day (28.61%) compared to girls (16.43%). Regarding the conditions during which daily meals are consumed, a sizable portion of children eat while watching TV (approximately 24% of both girls and boys) or out of boredom - "sometimes"-100%. Some of the boys and girls also prefer to eat at night (9.5% vs. 6.2%).

A large number of school-aged children attend physical education classes (75%) and engage in various outdoor activities (65%; football is the favorite sport among children in this group with a percentage of 17.24%), spending 2 hours a day for each one (physical education, 59% of all children attend classes and 27% - outdoor activities). Yet, the number of those who watch TV daily and weekly is very high, the vast majority choosing to spend 2-4 hours daily in front of the TV, roughly 17 hours/week for boys and 10 hours/week for girls (24).

As a result of this study, in order to prevent a growing prevalence of overweight among the pediatric population in Romania, we suggest the following recommendations for school-aged children regarding food and lifestyle:

1. Implementation of educational programs for both families and schools via special classes on prevention. If parents adopt a healthy lifestyle, thus being a good example to follow, their children will be more likely to follow the same path.

2. Development of a long-term national strategy that incentivizes the benefits of an appropriate diet while

concomitantly drawing attention to non-healthy alternatives:

- Decrease in the frequency of fast-food meals, which have become increasingly popular
- Higher consumption of fruits and dairy products instead of chips and sweets at school
- Promotion of compotes, homemade cookies, and jam instead of candies and chocolate as preferred sweets
- Promotion of cooked main meals, and the organization of school canteens/menus in which children should be involved
- More natural juice made of raw fruit/ vegetables and fewer or no fizzy drinks
- Age appropriate water consumption mandatory for all school-aged children, with simultaneous limitation of energetic beverages and coffee

3. Limitation of the leisure time in front of the TV or computer:

- Overall less than 2 hours daily
- No TV, video games, computer interactions during mealtimes
- No TV, video games, computers interactions due to boredom, offset by the introduction of engaging recreational activities

4. Greater attention to physical activities by the school-aged child:

- Greater involvement in household chores as appropriate
- Increased number of sports classes at school
- More attractive extracurricular activities to stimulate school-aged children's participation
- Introduction of recreational activities designed for whole family participation

5. Scheduling regular visits to the family physician—especially if an obvious weight gain or loss is noticed—who will communicate to parents a body mass index outside the normal limits.

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All authors have equally contributed to this paper

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