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Food Habits and Sport Practice According to BMI Categories and Rural/Urban Origin

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Abstract

The juvenile obesity is correlated to dietary and physical activity. Moreover, the rural or urban context could affect other aspects like time available to practice sport or the availability of sport facilities. Thus, this brief report investigated the relationship between origin and food habits in children belonging to different BMI categories. Over than 1400 primary school students were interviewed with their parents about their food habits. All answers were stratified according to origin (rural/urban) and to BMI categories as defined in literature. The percentage of normal weight, overweight and obese children between rural and urban context were similar ($p > 0.05$). All the BMI categories were familiar to have breakfast and no differences were found between rural or urban context ($p > 0.52$). Over 70% of children had the principal meal in at least 15 minutes. In particular, all of them used to watch TV during this moment: no differences were found between urban/rural or BMI categories ($p = 0.87$ and $p = 0.98$). In general, most of urban children performed physical activity less than seven hours/week, while normal weight subjects were more active than obese one ($p = 0.04$). We concluded that school promotion and municipalities/institutions intervention could be a good solution to reach all children in environment where the amount of facilities is often poor.

Subject Areas

Anthropology, Education, Environmental Sciences, Health Policy, Public Health, Sports Science

Keywords

Urban, Rural, BMI, Habits, Lifestyle, Obesity

1. Introduction

The prevalence of obesity in young people increased in the last twenty years [1] and is considered as a global epidemic [2]: epidemiological evidences demonstrated a positive correlation between high body fat percentage and health risks of mortality [3]. At the same time, the life habits changed according to the economical and technological development, often in opposition with sport practice adherence. In particular, differences between rural and urban context become important because they entail different approach to leisure time, sport activities, availability of facilities and cultural life habits [4].

Recent epidemiological data provided by the US Center Disease Control [5] showed an increase of obesity two times more than the period from 1995 to 2005 following a same trend between rural and urban context, while in China the urban and rural differences were kept [4]. These discrepancies between two countries are also affected by the life habits (*i.e.* time spent during meal consumption or watching television during dinner [6] [7] [8] [9] [10]; or the amount of sport practice (hour per week) [11]): indeed, the juvenile obesity depended on environmental-educational causes for 95% while the genetic causes were only 5% [12].

This study aimed at investigating the causes of juvenile obesity (meal domestic habits and sport practice) related to Body Mass Index (BMI) categories. In particular, students of primary school were selected to verify which life habits were prevalent in BMI categories according to the origin of residence: urban or rural context. These differences could suggest educational approach in school context, like parental education for domestic habits or sensibilization approach in classroom.

2. Material and Methods

2.1. Subjects

During the first month of the scholastic year a sample of 1476 students (age range: 9 - 11 years old) were recruited in school context in one province of North Italy. Written informed consent was obtained from all parents (or legal guardians) after a full explanation of the procedures involved.

2.2. Measures

A questionnaire was elaborated by local ministry of health office and the ministerial school department following the guidelines of already validated questionnaires [6] [7] [8] [9] [10]. A set of questions are reported in **Table 1**.

All teachers were instructed to the questionnaire administration procedure by the same coordinator teacher; they collected the parental answer during individual interview.

A specialized operator collected the anthropometric characteristic during the classes of Physical Education. In particular, standing height was measured (with the subject's shoes off and head in the Frankfort horizontal plane) to the nearest 0.5 cm using a Seca Stadiometer 208 (Seca, Hamburg, Germany), while weight was assessed to the nearest 0.2 kg (Seca Beam Balance 710).

Table 1. Sample questions proposed in the questionnaire following the indication proposed in literature. The amount oh hour spent during sport activities followed the PDPAR guidelines [11].

	Question	Answer
1	Do you have breakfast?	No Always Sometimes
2	Do you spend at least 15 minutes for having lunch and dinner?	No Always Sometimes
3	Do you watch televisions during lunch and dinner	No Always Sometimes
4	Physical Activity	Less than 7 hours Beetween 7 and 10 hours More than 10 hours

2.3. Data Analysis

All anthropometric data were matched with the questionnaire answers; BMI was calculated as weight/height^2. Thus, all students were classified according to: the urban/rural origin and BMI categories. The sex factor was not taken into account because the questions were not gender-specific and consequently the answers were not influenced by the sex [13].

In particular, we considered as "urban" students who lived in an city with more than 10,000 inhabitants, while "rural" were the students living in town with less than 10,000 inhabitants [1] [14] [15]. The BMI categories (normal-weight, overweight and obese) were set according to the linear regressions of Cole [16].

2.4. Statistical Analysis

Descriptive statistics was calculated as percentage of answer. Differences between age, BMI and origin categories were determined using a Log-linear analysis (chi-square analysis) on 3-way contingency table. Significance level was set at alpha = 0.05.

3. Results

Figure 1 shows the percentage of BMI categories within urban or rural origin context: in particular, the distribution of BMI categories was equal between urban and rural context ($p > 0.05$).

Table 2 shows the distribution of the two samples relative to food habits questions. Below a brief explanation:

Question N.1 In both groups the answer "never" was less than 5% with the same frequency in the two contexts ($p > 0.05$). Both groups showed a strong prevalence in the answer "always" than the other two options ($p = 0.03$).

Question N.2 No differences in the BMI categories ($p > 0.05$) and a similar trend between the two sample ($p > 0.05$) were find within the answers.

Question N.3 The habit of watching TV during meal revealed that only 10% of

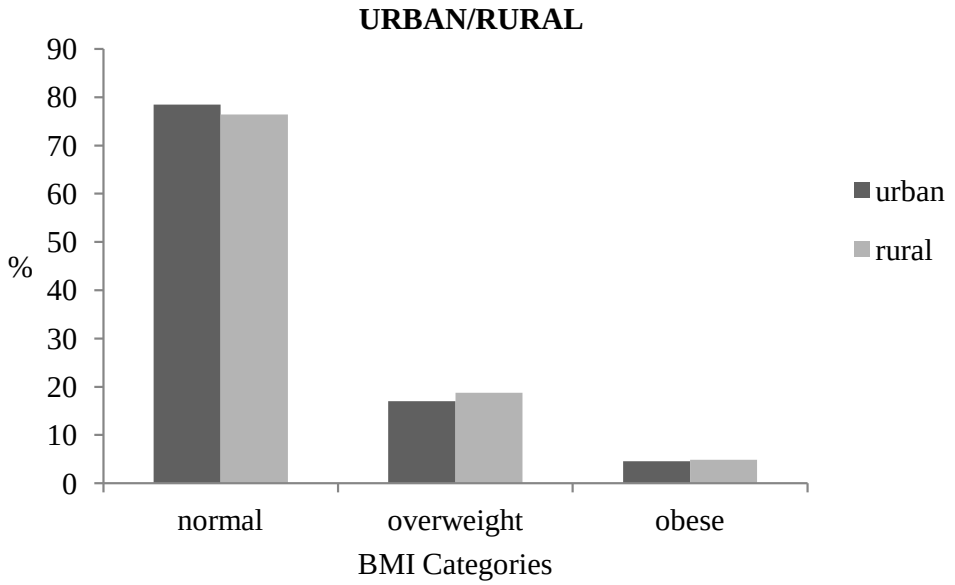

Figure 1. Distribution about BMI categories in the two samples.

Table 2. Percentage of the answers stratified by origin and BMI criteria. W = weight; N = never; S = sometimes; A = always.

		Urban						Rural					
		Normal W		Over W		Obese		Normal W		Over W		Obese	
		n	%	n	%	n	%	n	%	n	%	n	%
	N	6	0.97	5	3.73	1	2.78	2	0.45	3	2.78	0	0.00
1	S	122	19.71	26	19.40	11	30.56	82	18.64	25	23.15	6	21.43
	A	491	79.32	103	76.87	24	66.67	356	80.91	80	74.07	22	78.57
	N	28	4.52	7	5.22	2	5.56	25	5.68	5	4.63	2	7.14
2	S	155	25.04	43	32.09	10	27.78	125	28.41	41	37.96	9	32.14
	A	436	70.44	84	62.69	24	66.67	290	65.91	62	57.41	17	60.71
	N	148	23.91	30	22.22	11	30.56	114	23.65	21	19.44	3	10.71
3	S	368	59.45	77	57.04	17	47.22	227	47.10	58	53.70	20	71.43
	A	103	16.64	28	20.74	8	22.22	141	29.25	29	26.85	5	17.86

children did not watch television. The obese rural children showed a significant prevalence ($p < 0.01$) about this habit.

Figure 2 and Figure 3 showed the amount of physical activity practiced by the sample. In both context (urban and rural) the "normal weight" subjects declared "more than 10 hours" in a percentage significant higher than "obese" ($p = 0.04$).

The urban sample seems to be more sedentary: students in the category "less than 7 hours" showed a significant difference than the rurals ($p = 0.002$).

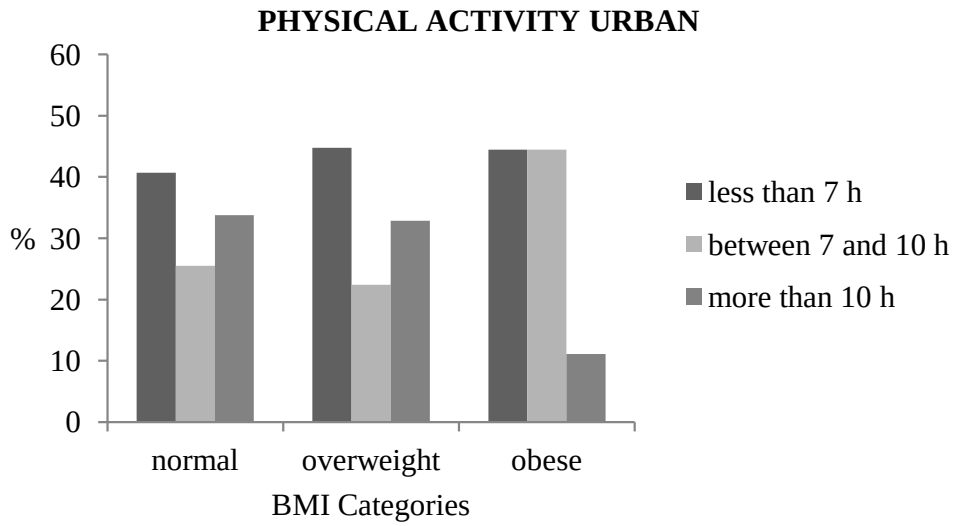

Figure 2. Amount physical activity according to BMI Category in urban sample.

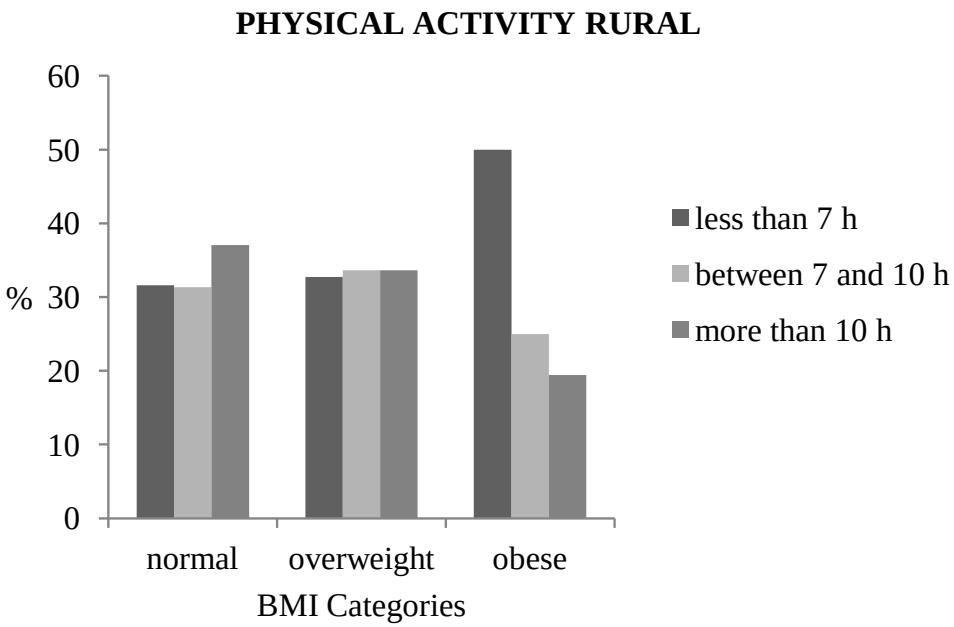

Figure 3. Amount physical activity according to BMI Category in rural sample.

4. Discussion

The juvenile obesity is correlated to meal habit [6] [7] [8] [9] [10] and the socio-economic context could determine different approaches to diet, sport practice and domestic habits. In this study, the habits during meal and the amount of physical activity were investigated in children living in urban and rural context. In particular, the habits were also matched within BMI categories.

No differences were found in the BMI distributions between urban and rural context as showed in American studies [5], where the economical development revealed a general uniformity.

In general, we could highlight a positive prevalence of children who had breakfast that was a strong recommendation to avoid juvenile obesity [17]. Moreover, our Italian sample reveals a consumption time of lunch and dinner of more than 15 minutes, which is a good practice to avoid diet correlated diseases [10] even if about 30% of the sample was too quickly consuming the principal meals. In point of this, the first intervention of health education could be applied about parental instruction for a slow eating.

The answer about watching TV during meal allowed an essential social consideration (at least in Italy): the presence of TV was not a symbol of urbanization or treasure. Then, the approach of a teacher could be the same in all cases (suggest the good habits in urban or rural school).

The physical inactivity is the major reason of obesity and even if the sport practice depends on lot of causes (scanty physical education classes, difficulties of the parents to bring children to sport facilities for geographical and economical reasons and municipality sport promotion), a strong awareness campaign could be planned, especially in rural context where 75% of obese children did not practice physical activity more than 10 hours/week. School promotion and municipalities/institutions intervention could be a good solution to involve the highest number of children when the amount of facilities is scanty.

We acknowledge that a limitation of the study consists in the short class age and that the middle school (11 - 14 years) could be the better threashold to define juvenile obesity and body mass for lifespan because hormonal changes become important and fitness/sport habits suffer widespread drop-out.

A further investigation could include other criteria to evaluate the free approach to sport and food habits: the familiar income or the Socio-Economic-Status might reveal different findings between economic welfare and correct lifestyles [18] [19].

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