

## Parental perception of childhood obesity in an inner-city area of Palermo, Italy

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### Abstract

**Background:** The objective of this study was to evaluate in a sample of parents living in an inner-city area of Palermo, Italy, the perception of weight excess as a problem in childhood and the awareness about the role of physical activity, beliefs about contributors and parties having responsibility in counteracting the obesity crisis.

**Methods:** A cross-sectional survey was performed on a convenience sample of parents of 6-13 year-old children who attended grades 1, 3 and 5 of primary and grades 1 and 3 of secondary public schools, respectively. Thirteen schools were selected in an inner urban district of Palermo, Italy, this district being characterized by having a population of low to medium income residents. Parents were asked to come to the school and participate in the investigation. The survey was administered in the spring of 2006.

After a descriptive analysis, role of specific demographic and social characteristics – education, gender, age class and BMI - of respondents was assessed by univariate and multivariate logistic regression analysis.

**Results:** Three hundred eleven parents completed the questionnaire. Eighty-three percent believed that being obese in childhood is a serious health hazard, but one third still interpreted the child's weight excess as an expression of health. The most significant contributors to childhood obesity were thought to be junk food and beverages (78.0%) and fast food (63.2%), followed by lack of exercise in school curriculum (48.7%). Beliefs about responsibilities for combating childhood obesity significantly varied according to education level.

**Conclusions:** Public support for environmental changes could more effectively rise with the increasing public awareness that many interrelated obesogenic factors in the modern environment are playing a key role.

*Key words: overweight, childhood, parental perception, obesogenic factors*

### Introduction

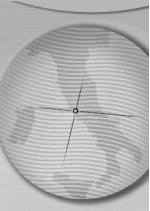
Obesity is now considered to be the most prevalent nutritional disease of children and adolescents in western countries [1,2]. Persistency into adulthood and the association with morbidity are the most relevant problems of childhood obesity [1,2].

Previous studies in Europe have shown that the southern countries, including Italy, have the highest prevalence [3]. The results of a recent study show that prevalence of overweight and obesity in 5-year-old Italian children is approximately 24%. In particular, one of six children, irrespectively of sex and the adopted BMI reference (national, International Obesity Task Force, and CDC), is overweight. The prevalence of obesity averaged 8% [4].

The prevalence of overweight and obesity in Sicilian schoolchildren is one of the highest ever reported: prevalence of overweight and obesity in a cohort of randomly selected 48,897 11-15-year-old Sicilian children is nearly 40% at age 11 and over 25% at age 15 [5].

Excessive weight during childhood stems from several interacting factors, including poor diet and exercise habits (6). However, there is a growing agreement between Public Health experts that the so-called "toxic" environment plays a crucial role in the childhood obesity epidemic through social and economic forces that synergistically encourage the consumption of excess of energy and discourage energy expenditure [6-8].

The causal chain of the crisis is complex and, accordingly, interventions to prevent and control



weight excess in childhood are generally achieving limited success [6].

Parents have an important role to play in preventing weight-related problems in their children. In particular, parental perceptions of their children's weight status may affect the family attitude towards body weight control and choices about eating and exercise [9-12]. Thus, it is not surprising that behaviour modification programs that involve parents, particularly mothers, have more impact than those that do not [2,10]. Moreover, awareness of the multiple interplaying obesogenic factors in the modern lifestyle is required to support changes in the physical, social, economical and political environment in order that a healthier lifestyle could become the "default" [13].

The objective of the present study was to evaluate in a sample of parents, living in an inner-city area of Palermo, Italy, perception of weight excess as a problem in childhood, awareness about role of physical activity and beliefs about contributors and parties having responsibility for counteracting the obesity crisis.

## Methods

### Sample

We conducted a cross-sectional survey on a convenience sample of parents of 6-13 year-old children who attended grades 1, 3 and 5 of primary and grades 1 and 3 of secondary, respectively, public schools. This education level is compulsory in Italy.

Children attending 13 schools were enrolled in the study, located in an inner urban area of Palermo, Italy, a district being characterized by having a population of low to medium income residents. The selection was based upon the willingness of the personnel working at the Health Education Service of the District 10, Azienda Sanitaria Locale 6, including the area under study, to actively cooperate to the investigation.

Parents were asked to come to the school and participate in the investigation by a written invitation from the school's faculty, who had been previously trained about the content and the objectives of the investigation and the instructions to be given. When more than one family member was present, one person only per child was allowed to fill in the questionnaire.

The survey was administered in the spring of 2006.

### Questionnaire and procedures

A structured questionnaire was developed that

included also an adapted version of some questions drawn from Evans WD et al, 2005 [9]. Answers were not mutually excluding.

The questionnaire was self-administered to the parents at school in the presence of a trained component of the working group who assisted the data collection according to a standardized procedure.

Verbal consent of participants was elicited and confidentiality was warranted.

The questionnaire included a section containing some information about socio-demographic characteristics of respondents (gender, age in years, race/ethnicity, marital status, relationship with the pupil, number of family components, family education level) and self-reported anthropometric measures.

Race/ethnicity was self-reported by participants, who were categorized as Italian and non-Italian, due to the small size of this last group.

Marital status was self-reported and categorized as married, divorced/separated, cohabitating, never married.

Relationship with the pupil was self-reported and categorized as mother, father and other.

Family education level was assessed in the questionnaire as reported by the respondent for both mother and father. In the analysis, education level was entered as a categorical variable: low = less than high school; high = high school diploma, more than a high school degree.

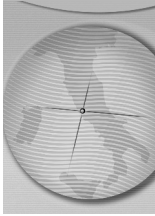
Height and weight were self-reported by participants. Body Mass Index (BMI) was calculated as weight (kg) divided by height squared (m<sup>2</sup>). Standard thresholds were firstly used to classify individuals as normal/underweight (BMI <25), overweight (BMI = 25-30) and obese (BMI >30); then collapsed into two categories (normal and overweight) due to small numbers.

Parents responded to the items about perception of excess of weight as a problem, physical activity and health threats, contributors and agents responsible for intervening against childhood obesity, using three options, "yes", "no" and "don't know".

EpiInfo software ver.6.0 (CDC, Atlanta, GA, US) and Stata software ver. 9.2 (Statacorp LP, Texas, US) were used for data management and analysis.

Descriptive statistics including frequencies, means and standard deviations were calculated.

To assess whether belief about contributing factors and responsibility for intervention against excess of weight varied by specific demographic and social characteristics of respondents, cross tabulation and chi-square statistics were firstly



used. All variables that were significant at the  $p \leq 0.1$  level were placed in a multivariate logistic regression analysis. Odds ratio (OR) and 95% confidence intervals (CIs) are reported. In all analyses, differences were considered statistically significant at  $p \leq 0.05$ .

## Results

### *Sample characteristics*

Three hundred-eleven (20% approximately) of the 1,500 parents who were invited to fill in the questionnaire went to school and completed it.

Table 1 summarizes socio-demographic characteristics of respondents. Median age of respondents was 37.0 years (range 23 - 67). Eighty-three percent of respondents were female and more than 90% were of Italian nationality. This is likely due to the expected difficulties in compiling the questionnaire by the non-Italian parents.

Marital status and number of family members were consistent with the most prevalent family patterns in Italy. Only 37% of mothers and 30% of fathers, respectively, had at least 9 years of education. Frequencies of both family composition and education level were consistent with those obtained from nationally representative samples of the Italian population and from census data [14].

Of interest, 35% of the respondents refused to report or did not know the father's education level.

Cross-tabulation analysis was carried out to examine possible association between the respondents who reported the education level of father versus those who did not report it and demographic characteristics, such as education of mother and number of components of the family. No significant association was found. Thus, the subsample of respondents who did not report the education of father was not different from the larger portion of respondents who did report it.

Self-reported BMI of participants was also consistent with data published from the Italian Institute of Statistics about the population of southern Italy [14].

### *Perception of childhood obesity, contributing factors and responsibility for fighting weight gain*

Our results revealed that 83.3% of participants believed that weight excess in childhood is a serious health hazard, such as underage smoking and drinking. No significant association was detected with age and gender. Mothers with a high education level held this belief with a statistically significant higher frequency (high vs

low educational level, 93.9% vs. 77.5%,  $p < 0.001$ ). Relationship with the father's education level revealed a similar answer pattern (high vs. low educational level, 92.4% vs. 78.0%,  $p < 0.05$ ).

Nonetheless, one third approximately of participants interpreted the overweight in childhood as an expression of health. No significant association was found with age and gender. Again, a higher education level of parents was significantly associated with a lower prevalence of this perception (mother, high vs. low educational level, 15.5 vs. 44.1%,  $p < 0.001$ ; father, high vs low educational level, 18.3 vs. 45.1%,  $p < 0.001$ ).

The most significant contributors to childhood obesity were thought to be junk food and beverages (78.0%) and fast food (63.2%), followed by lack of exercise in school curriculum (48.7%). Interestingly, there was a relatively low prevalence of positive answers to questions about contribute of viewing TV  $\geq 2$  hours per day (30.6%) and using PC, videogames or Internet  $\geq 1$  hours per day (26.0%).

Ninety-seven percent of participants considered parents as having the primary responsibility for fighting childhood obesity. Between 16.4% and 26.0% of participants attributed some responsibility to parties external to the family, such as food companies, school, Public Health or government. The answering pattern did not vary significantly by age and gender of participants.

These data are summarized in Table 2.

### *Role of physical activity*

During the survey setting up, some questions were specifically introduced to test awareness of respondents about role of physical activity in prevent weight gain in childhood and support in favour of physical activity-based interventions. Ninety-two percent of parents believed that physical activity should deserve more time and relevance in childhood education, including school curriculum. Moreover, higher prevalence of positive answers - 85.2% and 71.7% - were obtained in favour of increasing supervised intramural physical activity in school beyond regular classes and extra-school physical activity at one's own expense, respectively. Restricting the amount of time spent with TV, PC or Internet could positively contribute to health and wellbeing of children for 79.8% of respondents. No significant differences were detected by age, gender and education level.

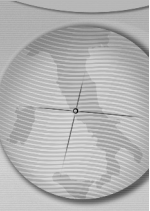


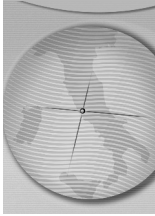
Table 1. Characteristics of the participants to the study.

Demographic group	n	%
<b>Overall</b>	311	100.0
<b>Gender</b>		
female	259	83.3
male	52	16.7
<b>Age (ys)</b>		
25 - 34	101	32.5
35 - 44	161	51.8
> 45	47	15.1
refused/don't know	2	0.6
<b>Nationality</b>		
Italian	290	93.2
Non-Italian	20	6.5
refused/don't know	1	0.3
<b>Relationship with the pupil</b>		
mother	256	82.3
father	48	15.4
other	7	2.3
refused/don't know	0	0
<b>Marital status</b>		
married	275	88.4
divorced/separated	18	5.8
cohabitating	10	3.2
never married	7	2.3
refused/don't know	1	0.3
<b>Total number of family members</b>		
≤ 3	68	21.9
4-5	212	68.2
≥ 5	14	4.6
refused/don't know	7	2.3
<b>Education level of the mother (ys)</b>		
≤ 8	188	60.4
9-13	90	28.9
>13	26	8.4
refused/don't know	7	2.3
<b>Education level of the father (ys)</b>		
≤ 8	109	35.0
9-13	70	22.6
> 13	23	7.4
refused/don't know	109	35.0
<b>Self-reported weight status of the participant</b>		
normal/underweight	174	55.9
overweight/obese	118	37.9
refused/don't know	19	6.2

### ***Influence by socio-demographic characteristics of parents***

Table 3 presents the statistically significant

results obtained from a cross tabulation analysis examining association between education level of parents and perceptions about contributors and

**Table 2. Perception of relevance of overweight to health and factors contributing in childhood.**

	n	%
<b>Believe that overweight in childhood is a health hazard, such as other dangerous habits (e.g. underage drinking and smoking)</b>	311	83.3
<b>In your opinion, overweight in childhood may be a symptom of health and wellbeing</b>	311	33.1
<b>Believe that the following factors have significantly contributed to increased prevalence of overweight in childhood</b>		
Junk food and beverages	310	78.0
Fast food	310	63.2
Viewing TV $\geq$ 2 hours per day	310	30.6
PC, videogames or Internet $\geq$ 1 hours per day	310	26.0
Lack of exercise in school curriculum	310	48.7
Lack of places to exercise	310	31.6
Lack of security in the neighbourhood	310	37.5
<b>Believe that the following have most responsibility to fight weight gain in childhood</b>		
Parents	310	97.0
Children	310	14.1
Food companies	310	20.7
TV and Internet advertising	310	21.4
Schools	310	26.0
Health care services	310	33.2
Government	310	16.4

**Table 3. Beliefs about childhood overweight as influenced by education level of parents (statistically significant associations in the univariate analysis).**

	Education level of mother (low vs. high) n = 304			Education level of father (low vs. high) n = 202		
	OR	95%CI	p	OR	95%CI	p
<b>Contributing factors</b>						
Junk food and beverages	0.39	0.21 – 0.72	< 0.001	0.60	0.26 – 1.38	NS
Lack of exercise in school curriculum	0.47	0.29 – 0.75	< 0.001	1.09	0.63 – 1.90	NS
Lack of places to exercise	0.61	0.37 – 0.97	< 0.05	0.96	0.53 – 1.53	NS
<b>Responsible for intervention</b>						
Food companies	0.51	0.29 – 0.90	< 0.05	0.78	0.40 – 1.50	NS
TV and Internet advertising	0.53	0.30 – 0.94	< 0.05	0.82	0.43 – 1.55	NS
Health care services	0.54	0.33 – 0.88	< 0.05	0.64	0.35 – 1.14	NS
Government	0.53	0.28 – 0.97	< 0.05	0.64	0.32 – 1.29	NS

NS = not significant

responsibilities in childhood overweight crisis. More educated mothers were significantly more likely to recognize as contributing factors not only junk food and beverages, but also lack of exercise in school curriculum and lack of places to exercise. Moreover, more educated mothers were significantly more likely to attribute some responsibility to food companies, TV and Internet advertising, health care services and government. In no cases was father's education level significantly associated with identification of some contributing factor or responsible subject.

Among the other socio-demographic variables, BMI class only was significantly associated to identification of junk food and beverages as contributing factors to childhood overweight

(overweight vs. normal weight OR 0.47, 95% CI 0.27 – 0.83,  $p < 0.05$ ).

Logistic regression revealed that a lower mother's education level was negatively and significantly associated with perception of junk food and beverages, lack of exercise at school, lack of places to exercise and lack of security as health threats in childhood. Furthermore, mother's low education was negatively associated in a statistically significant manner with attribution of responsibility to fight overweight to food companies, school and healthcare services.

Being overweight did not have a considerable influence: the effect was significantly negative for junk food and beverages only within contributors and significantly positive for healthcare services

only within parties involved in combating childhood weight gain.

No reporting education level of father was significantly and positively associated only with identification of junk food and beverages as contributing factor.

These results are illustrated in Table 4.

**Table 4. Factors influencing beliefs about childhood overweight (logistic multivariate regression analysis, n = 287)**

	Education level of mother (low vs. high)		BMI class (overweight vs normal)		Education level of father (absent vs present)	
	OR	95% CI	OR	95% CI	OR	95% CI
<b>Contributing factors</b>						
Junk food and beverages	<b>0.46*</b>	0.22 – 0.95	<b>0.48*</b>	0.24 – 0.93	<b>3.49*</b>	1.86 – 6.56
Lack of exercise in school curriculum	<b>0.45*</b>	0.27 – 0.76	1.15	0.65 – 2.01	1.29	0.76 – 2.18
Lack of places to exercise	<b>0.52*</b>	0.30 – 0.90	0.79	0.72 – 1.48	0.79	0.42 – 1.48
Lack of security in the neighbourhood	<b>0.55*</b>	0.32 – 0.93	1.03	0.58 – 1.84	0.94	0.55 – 1.63
<b>Responsible for intervention</b>						
Food companies	<b>0.49*</b>	0.26 – 0.93	1.86	0.95 – 3.62	1.29	0.65 – 2.55
School	<b>0.35*</b>	0.19 – 0.64	1.69	0.88 – 3.22	0.98	0.52 – 1.85
Healthcare services	<b>0.45*</b>	0.26 – 0.79	<b>2.07*</b>	1.15 – 3.74	0.92	0.52 – 1.85

\* Odds Ratio significantly different from 1 ( $p \leq 0.05$ ) (**bolded**)

## Conclusions

The literature points consistently toward parents as the parties having the key role in the prevention of weight-related problems in childhood [9-12]. They are generally seen as the first role model of a healthy lifestyle from both eating habits and physical exercise standpoints. Accordingly, interventions addressing knowledge and practices of parents, rather than children, are more likely to be successful [2,10]. However, several studies suggest that many parents are unaware of overweight of their children or do not consider it as a health threat [15-16]. Furthermore, considerable evidence suggests that diet and lifestyle of children are strongly influenced by multiple and interplaying social, cultural, economic and political layers, that require innovative prevention approaches [7,13].

It's not astonishing, hence, that delegations from 48 countries at a conference organized by the World Health Organization Regional Office for Europe in October 2006 agreed on changes to be made on both sides of the energy balance, i.e. nutrition and physical activity [17]. It has been also recognized that fighting weight excess, especially in childhood, requires an ecological and trans-disciplinary approach, including social, cultural, economical and political actions at the international, national and local level [17].

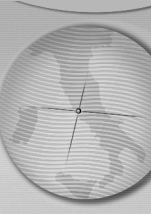
In this study, perceptions and beliefs about

childhood weight excess of a sample of parents living in an inner district of a large urban centre of southern Italy, such as Palermo, were investigated. Ability to recognize in the environment obesogenic agents that influence childhood weight excess and association with some socio-demographic variables were also analyzed.

Not surprisingly, a large majority of participants were mothers. Data about education suggest that, although participation to the survey was on a voluntary basis, the final sample of participants was not skewed toward a higher education level. However, influence of a more acute attention to health problems of childhood, whether spontaneous or driven by a more favourable informational micro-environment, could not be excluded.

Within the survey participants, awareness of overweight as a serious health hazard for children appeared to be widely diffuse, accounting for more than 80% of respondents. However, one third of parents held the opinion that weight excess an indicator of wellbeing and health, perpetuating the historic belief that considers overweight children as better nourished individuals and "good eaters", susceptible to cause their parents less concern than the thinner ones. The apparently contradictory answering pattern is likely attributable to the optimistically biased perception of weight status of their own children by the mothers [15]. Interestingly, a statistically significant positive association was evident between a high parent's education level and perception of overweight as a health problem. Conversely, more educated parents consider at a significantly lower frequency an overweight child as a healthy child. Our data are consistent with those of previous studies, showing that mothers with a low education more frequently are likely to misidentify overweight status of their children and, when correctly categorize them, do not consider this as a health concern [9,15].

A high percentage of the survey participants agreed on the positive contribution to education and health of childhood of more time and relevance to physical activity as well as of less recreational time spent with PC, Internet, TV or



videogames. Moreover, the respondents overwhelmingly favoured requiring more physical activity in school, though fewer favoured extra-school physical activity at one's own expense. Nevertheless, within the proposed list of possible contributors the eating style related options proved to be largely more established as obesogenic factors than sedentary behaviours and reduction in physical activity. Consistently with findings by other Authors, more educated mothers were significantly more like to be aware of the unhealthy role of a limited energy expenditure in the weight-related problems of childhood [9,15].

The majority of respondents identified the parents as the parties having most responsibility for intervention aimed at controlling and preventing weight excess in children. Parents feeding style and, more generally, lifestyle has a crucial role in their children's lives [18,19].

However, there is a growing agreement within Public Health experts on the influential role of the so-called "toxic environment" and the need of reversing the obesity-generating environment by economic and politic interventions and broad changes of many aspects of the present lifestyle [7,8,13]. Again, within the survey participants, more educated mothers were significantly more likely to attribute responsibility for combating childhood obesity to food companies, school and healthcare services.

This survey confirms that parents should better understand the interplay of environmental and familial influences on the obesity epidemic, and hence should be appropriately empowered. But, according to previous studies, in low education contexts parental perception about the causal chain of the childhood obesity crisis is likely skewed toward a failure of personal responsibility [13]. Moreover, balance between the two categories of obesogenic factors, those encouraging the consumption of excess energy and those discouraging energy expenditure, is likely distorted in favour of the first ones. Given low education level as an indicator of low income, our study suggests that a poor perception of external influences is probably more established in low income households, where their pressure is expected to be more effective [20-23].

There are some limitations in this study. First, the study population consisted of a convenience sample of eligible parents, leading to selection bias. However, because of the peculiar socio-cultural setting, the inherent biases of the convenience sampling had been preliminarily balanced against the very limited chance to obtain an acceptable number of participants after a

probabilistic sampling. On the other hand, to our knowledge, previous attempts had never been undertaken to explore opinions about this topic in an urban area like the one we targeted. Hence, the results of this epidemiological investigation may be useful to generate hypotheses for further studies. In addition, the low response rate and the characteristics of the study population, including predominately inner-city inhabitants of Italian nationality, may limit the generalization of the results. Moreover, the self-reported nature of the data and the cross-sectional study design need to be considered when interpreting the results.

Public support for environmental changes, such as banning school vending machines or advertising to children, is growing, but it could more effectively rise with the increasing public awareness that many interrelated obesogenic factors in the modern environment are playing a key role.

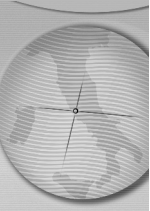
Additional knowledge about public awareness may help health care providers to raise better understanding of health issues related to childhood obesity and support more cost-effective solutions.

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