

Obesity: Familiarity and Unhealthy Lifestyle

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Summary. Obesity is now defined as “epidemic” due to the presence of a high prevalence with a steady increase of cases. The aim of this study was to investigate alimentary habits and anthropometric measurements referring to children aged 8 years attending public (state) schools in 2004 and 2015 in Fabriano (AN) located in Le Marche region in Italy and their parents. Data were collected using anthropometric techniques and Food Frequency Questionnaire in 2004 and 2015 in studied population (students and parents). Body Mass Index (BMI), food habits and level of physical activity were used to investigate nutritional status. In 10 years, it was observed that overweight children decreases from 27% to 24% and that children with parents overweight/obese have more probability to be overweight/obese, both in 2004 and 2015. Children daily breakfast consumption significantly increases from 80% to 92%. Physically active children increases from 20% to 46%. The analysis of the obtained data shows that, even if it is possible to observe slightly improvements, the problem of overweight and obesity presence, in particular in children, is relevant and represent a true social problem.

Key words: obesity, children, parents, BMI, food habits

Introduction

Overweight and obesity are defined as the abnormal or excessive accumulation of adipose tissue generally resulting from a chronic positive energy imbalance (1). Obesity is characterized by high prevalence with steady increase of cases, now defined as “epidemic” by WHO (1, 2). In Europe, more than 50% of population is overweight and up to 30% is obese with a worldwide prevalence doubled since 1980 (3). Moreover, in children, during the past two decades the prevalence of overweight and obesity has increased rapidly worldwide (4). These trends have been associated with various changes in social, economic and physical environment related to the nutrition transition (5). Nutrition transition is one aspect of a more general demographic, nutritional and epidemiological transition that accompanies development and urbanization (6). Changes occurred in parallel or before nutrition tran-

sition as the shift from a pattern of high fertility and high mortality to low fertility and low mortality under a demographic point of view (7, 8) or the shift from a pattern of high prevalence of infectious diseases associated with malnutrition, and periodic famine and poor environmental sanitation, to a pattern of high prevalence of chronic and degenerative diseases associated with urban-industrial lifestyles (8). In a similar pattern, large shifts have occurred in dietary and physical activity and inactivity patterns (8). Indeed, the nutrition transition is generally associated with an increase in the consumption of energy dense foods, sugar, and sweetened drinks, a decrease in physical activity and a more sedentary lifestyle (5). Modern societies seem to be converging on a pattern of diet high in saturated fat, sugar and refined foods and low in fibre – often termed the ‘Western diet’. Many see this dietary pattern to be associated with high levels of chronic and degenerative diseases and with reduced disability-free time (8).

Therefore, overweight and obesity have become serious, large-scale, global, public health concerns being also associated with a dramatic increase in related healthcare costs (5, 9).

In Italy, the impact of non-treated obesity on healthcare cost has been widely investigated by Colao and colleagues reported that during 1 year of observation of 20159 adult obese subjects experienced longer durations of hospitalisation, used more prescription drugs, required more specialised outpatient healthcare and were associated with greater costs, primarily owing to prescription drugs and hospital admissions compared with normal weight subjects (10).

Moreover, abnormal or excessive fat accumulation represent a risk to health. Indeed, obesity is a condition characterized by several clinical implications which affect wellbeing and overall quality of life (1, 11). Obesity is associated with type 2 diabetes mellitus (DM), dyslipidemia, cardiovascular disease, cancer, and obstructive sleep apnea (3, 12).

The etiology of obesity is multifactorial, involving a complex interaction among genetics, hormones and the environment (13). In this regard, this study wants to evaluate and compare food habits and anthropometric measurements referring to children aged 8 and their respective parents in order to evaluate a possible association among food habits, familiarity, environmental factors and obesity and changes over 10 years. Moreover, the efficacy of educational activities over 10 years were evaluated to understand the efficacy of educational activities to improve food habits and health status. In particular, several strategies were planned in details and scheduled during school years involving both students and teachers. The activities were lectures, laboratories and sensorial experiences. Furthermore, parents were involved in some activities of nutritional education as public events and lectures.

Methods

Design and setting

This observational study was carried on in 2004 and 2015 in Fabriano (AN) located in Le Marche region in Italy. The study was performed in accordance with ethical code and the purpose was explained both children and their respective parents, a written consent

was obtained from all subjects and for subject under 18 y.o. from their parents.

Study population

The studied population was composed by children attending the 3rd year of elementary public (state) schools in 2004 and 2015 in Fabriano (AN) located in Le Marche region in Italy and their parents. The total number of recruited children was 389, of this 135 gave their consensus to participate to the study (67 male + 68 female). Of the total 643 parents, 184 gave the consensus to participate in 2004 (90 male + 94 female) (Figure 1). In 2015, the total number of recruited children was 392, of this 171 give their consensus to participate to the study (81 male + 90 female), of 671 parents, 343 gave the consensus to participate (169 male + 174 female) (Figure 2).

A full medical history, including drug used, was collected through a specific questionnaire both in children and their parents. The only exclusion criteria was related to parents that didn't agree with the participation of their children on the study. Children with severe Physical or Mental handicap were measured but data were excluded in the analyzed database.

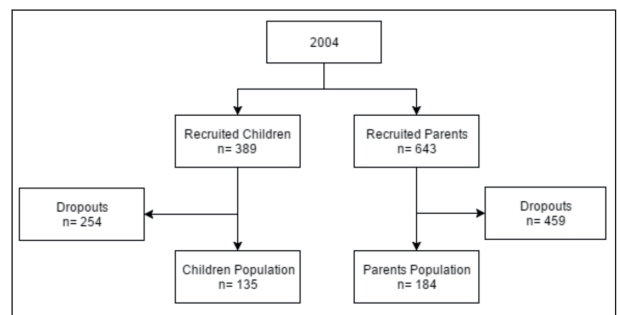


Figure 1. Studied population in 2004

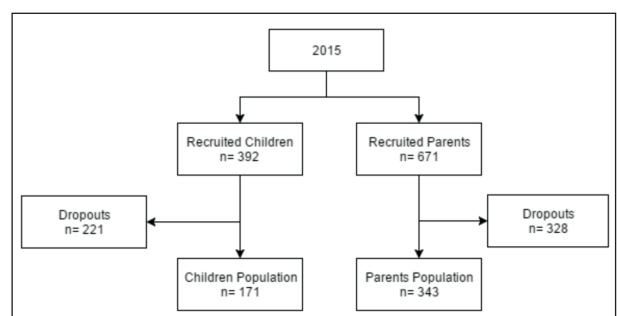


Figure 2. Studied population in 2015

Data collection

Anthropometric measurements and nutritional habits of adult population. Parents involved in the study were asked about height and weight and sex. Height and weight were used to calculate BMI (Body Mass Index) and evaluate the nutritional status of subjects. The values obtained by BMI calculations were expressed in units of kg/m^2 and compared with standard tables referred to adult population to evaluate the nutritional status of the subjects. Adults with a BMI between 25 and 30 are considered overweight, those with a BMI greater than 30 are considered obese (14).

Anthropometric measurements and nutritional habits of children population. To measure children body weight, a digital scales (TANITA HD-313) was used. Subjects were weighed to the nearest 0.1 (kg) in standard conditions: after emptying bladder and wearing light clothing. A portable height rod (SECA) was used to measure height to the nearest 0.1 (cm). Children were measured barefoot, with their feet rested on a flat surface perpendicular to the vertical bar of the height rod. The heels joined and leaning to the height rod, the tips of the feet were slightly apart and hands were hanging at the sides of the body. The head was oriented in the Frankfurt plane. In childhood BMI is both age and sex dependent; thus a BMI-for-age percentile ranking was used; a BMI from the 85th to 95th percentile is considered overweight, while a value greater than 95th percentile is considered obese (15, 16). Food habits and level of physical activity were investigated through the use of developed questionnaire based on “OKkio alla salute” questionnaire (23) with multiple choice questions. The questionnaire was administered by a qualified nutritionist during a face to face interview with enrolled subjects.

Data analysis

Statistical analyses were performed using EPI INFO 3.3TM. Data were statistically described and the relationship between variables was assessed using chi-square test. Results are presented as means \pm SD. Significance level was set at $p \leq 0.05$.

Results

Anthropometric measurements and nutritional habits of adult population. From adult population investigation in 2004, 60% of adult subjects were found to be normal weight, whereas 31% overweight and 9% obese. The association of nutritional status with sex shows that among adult female subjects, the 6% is obese, the 18% overweight and the 76% normal weight. Among adult male subject 11% is obese, 45% overweight and 44% normal weight.

In 2015, 60% of adult subjects were found to be normal weight, whereas 32% overweight and 8% obese. The association of nutritional status with sex shows that among adult female subjects, the 7% is obese, the 18% overweight and the 75% normal weight. Among adult male subject 10% is obese, 47% overweight and 43% normal weight (Figure 3).

Anthropometric measurements and nutritional habits of children population. From anthropometric measurements of children, in 2004, 62% of the subjects were found to be normal weight, whereas 27% overweight and 11% obese. Nutritional status was also analyzed considering sex. Male obese subjects accounts for 15% whereas female for 6%. Male overweight subjects accounts for 25% whereas female for 30%. Female normal weight subjects were 64% against 60% of male (Figure 4).

Children’s food habits and level of physical activity. Children’s food habits and level of physical activity were investigate through the analysis of children questionnaire. Among food habits, one of the most

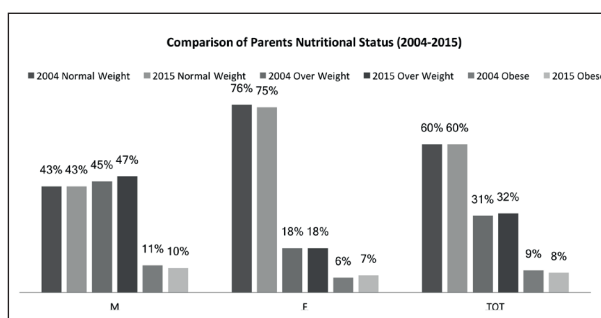


Figure 3. Comparison of Parents BMI (2004-2015). BMI < 18.5 underweight, 18.5 < BMI < 24.9 = normal weight, 25.0 < BMI < 29.9 overweight, BMI > 30.0 obese. No statistical significant difference was found.

important aspect was breakfast consumption. In 2004, the 20% of subjects do not have breakfast daily. Dividing the population according to nutritional status, 18% of normal weight subject, 20% of overweight and 36% of obese do not have breakfast.

In 2015, the 8% of subjects do not have breakfast daily. Dividing the population according to nutritional status, 50% of normal weight subject, 29% of overweight and 21% of obese do not have breakfast (Figure 5).

Through the use of the questionnaire, physical activity was evaluated considering times of activity during a week (from 0 to 5 hours a week or more than 5 hours). Data were compared with BMI of studied population (Figure 6).

Relationship between adult population and children population. Figure 7 shows children population divided according to nutritional status (excessive weight and normal weight) and compared with nutritional status of their parents.

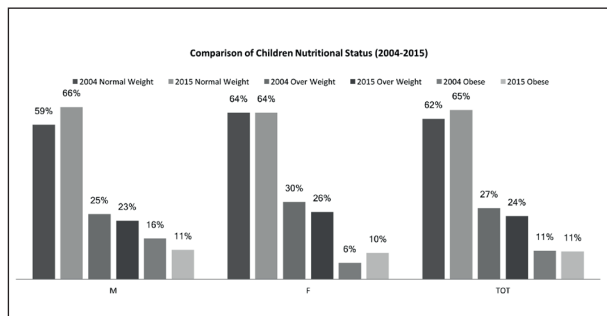


Figure 4. Comparison of children percentile BMI (2004-2015). < 85th percentile= normalweight, from 85th to 95th percentile = overweight, percentile >95th = obese. No statistical significant difference was found.

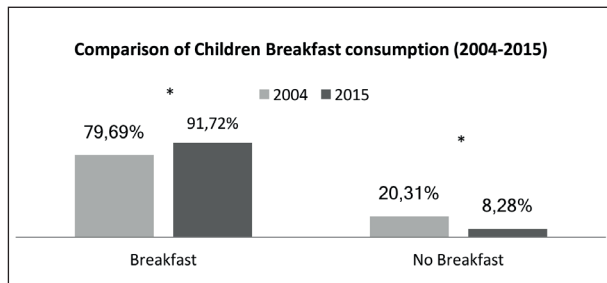


Figure 5. Comparison of percentage of children that daily have breakfast (2004-2015). * p<0.05

Discussion

Even if the interest in nutritional education is now increasing and Institutions as Schools, Sport Teams, Health Ministry are now involved in specific educational programs (17-20), analyzing the anthropometric measurements of studied population, it was observed that the incidences of obesity and overweight over 10 years remains almost the same.

Comparing the data according to sex, higher incidence of obese and overweight is observable in male respect to female both in 2004 and 2015. Moreover, this reflects the national trend of higher incidence of these two situations on male respect to female over the last 10 years (17, 21-25).

This trend could be related to different factors that have been see to be linked to onset of obesity and so to

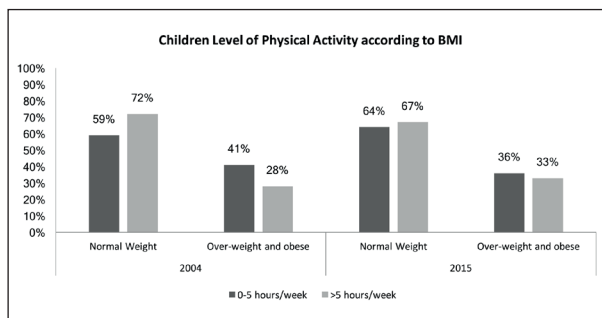


Figure 6. Children Level of physical activity (considering times of activity during a week (from 0 to 5 hours or more than 5 hours), according to BMI percentile. No statistical significant difference was found.

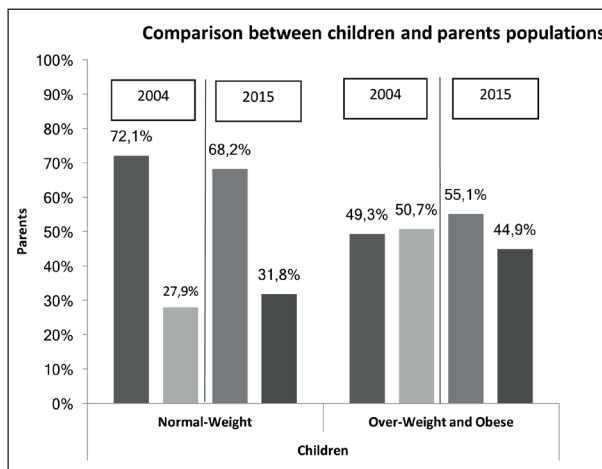


Figure 7. Comparison between nutritional status of children and parents population in terms of BMI (2004-2015)

the incidence of overweight and obesity. Factors such as genetic, biological, and psychological can interact with obesogenic environmental conditions to promote inactivity and poor food habits with consequent weight gain situation (26). There are several factors that drive gender differences in food consumption (27) and nutrition transition has affected excess weight gain among both genders, with a greater impact on physical activity levels of women (27).

Obesity and the metabolic syndrome are complex diseases regulated by many genetic and environmental factors. It is well known that risk, development and manifestations of obesity-related conditions such as diabetes and atherosclerosis are sexually dimorphic. Indeed, sex differences in obesity are strongly influenced by gonadal hormone effects (27).

From this study, over 10 years, the nutritional status of parents remains almost the same, on the other hand, children population increases in the percentage of normal-weight subjects with a decrease in overweight. The fact that adult population wasn't affect by any changes is an important sign that educational programs should be implemented in terms of parents involvement and participation.

This is also important in terms of familiarity influences, indeed the influence of family was observed in this study. Comparing the anthropometric measurements of children and their parents, it was found that children with parents in overweight or obesity situation have more probability to be in overweight or obesity both in 2004 and 2015.

To study the influence of metabolic factors related to incidence of obesity, breakfast consumption was analyzed.

Scientific data increasingly shows that breakfast plays an important role in ensuring the good health and wellbeing of an individual. Nevertheless, studies of the eating habits of different population and age groups reveal how the first meal of the day is often underrated. In the United States and Europe, from 10% to 30% of children and adolescents regularly skip breakfast, with a higher percentage among adolescents and the female population (28). Data observed in 2004 reported that the 20% of children do not have breakfast daily, in 2015 the percentage of children that do not have breakfast significantly decrease to 8%.

Breakfast was demonstrated to help in the regulation of energy intake during the rest of the day. Due to a heightened feeling of hunger, children and adolescents who regularly skip breakfast tend to eat more food at their next meal, especially high-density, high-fat, food. They also tend to consume greater quantities of added sugar. In particular, breakfast characterized by an improper ratio among nutrients can exert a negative impact over food intake for the rest of the day: it is well known that nutrients influence both the release and the activity of certain hormones, for example gastric inhibitor peptide (GIP), glucagon-like peptide-1 (GLP-1) and cholecystokinin; these hormones regulate postprandial satiety and glycaemia (28).

The Italian survey named "OKkio alla Salute" showed a statistically significant relationship between regular breakfast consumption and prevalence of overweight/obesity: children who do not have breakfast have a higher risk of being overweight or obese compared to who eat a healthy breakfast (23, 24). Breakfast is the first opportunity to intake the energy needed to perform daily activities. Correct nutritional intake (both in terms of nutrients and their daily distribution) improves long term cognitive performance, regulates energy intake during the other meals of the day; this improves nutritional status throughout life and has a positive effect on the prevention of chronic-degenerative diseases such as overweight, obesity, hypertension, and Type 2 diabetes (28).

So, due to the importance of breakfast typology, it would be interesting to investigate also the composition of breakfast and to understand the correlation between low or high-glycemic index and health.

Obesity and overweight are complex situations regulated by genetic, metabolic and environmental factors. The environmental changes were linked to the promotion of the intake of energy-dense foods and/or reduction of physical activity above all due to the increase in sedentary jobs and urbanization (29).

Physical activity was demonstrated by previous studies to be a particularly effective way of controlling body weight in individuals above all in those with a genetic predisposition towards obesity (30).

Authorities as the World Health Organization, the U.S. Department of Health and Human Services, recommend that adults should get the equivalent of two and a half hours of moderate-to-vigorous physical

activity, each week and children should get even more, at least one hour a day (31, 32).

From this study, it is possible to observe that physical activity level increases over ten years from a 20% of children that do more than 5 hours of Physical Activity per week to 46%. It is possible to observe that the level of physical activity is inversely proportional to BMI both in 2004 and 2015, this is related to the important role of physical activity as healthy preventing factor. So regular physical activity and healthy diet seem to be effective and safe ways to prevent obesity onset. Physical activity and dietary habits are key modifiable behavioral risk factors in the onset of obesity. As such, they are the cornerstones of any preventive strategy in children and adolescents (17, 33).

The analysis of the obtained data shows that the problem of overweight and obesity presence, in particular in children, is relevant and represent a true social problem. Moreover, from the study it was found that there are several factors that are able to influence obesity and overweight onset. Some of these factors, such as genetic, could not be controlled but others (i.e. environmental) can be controlled adopting a healthy lifestyle characterized by good food habits and presence of physical activity. This is strictly related to the importance of nutritional educational programs that should be well defined and should involve institutions, children and parents. In conclusion, the importance of both health nutrition and physical activities was underline meaning that this two concept should be the central focus of educational interventions.

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