

Socio-financial mechanisms of a preventive strategy against pediatric obesity

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Abstract: Pediatric obesity is considered to be one of the most stressful health problems that in time leads to important adult obesity consequences. Although adequate prevention is required, many national strategies have failed in adopting a unitary attitude. Incorporating multilevel actions might be useful in pediatric obesity prevention and special frameworks should be designed in accordance to practical clinical observation and cost analyses. In a study conducted in the "Grigore Alexandrescu" Emergency Children Hospital, between June 2014 and December 2014, the authors enrolled patients presented for the mandatory one-year consultation, whose parents completed a detailed questionnaire which included both socio-demographic and nutritional data.

Keywords: public health, nutrition, standard of living

JEL Classification: I 180, I 130, I 310

Introduction

The most recent data show that obesity in children has become a major health issue all over the world. This changing pattern of nutritional status is seen mainly in the last decade considering that 12% of US children were overweight in 2001, and in 2011 the score goes up to one third of them being overweight (Satcher, 2011). Early nutrition is considered to be crucial for the development of persistent obesity in later life. In fact, obesogenic changes are well in place in toddlerhood,

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with the most recent data showing that prevalence rates are 9.7% among children under 2 years and went up to 12.1% in children over this age (Ogden et al., 2012).

It has been long stated that among children rights we can find the right to a healthy nutrition and this is the field where authorities should strengthen their forces in order to support families and adults. Multivariable determinants of pediatric obesity extend from individual factors to community and economic levels. No single level intervention has succeeded up to now to lower pediatric obesity levels. Thus, economic and social factors that influence childhood obesity should be taken into account when system policies are to be developed in order to obtain sustainable and long term results. Even so, an interdisciplinary evaluation of obesity prevention is insufficient (Cawley J., 2008).

Rapid increase in obesity prevalence brings up for discussion serious longterm health consequences for all age groups and enables us to state that this is one of the most important public health issues in our century (World Health Organization, 2005).

Epidemiology of pediatric obesity

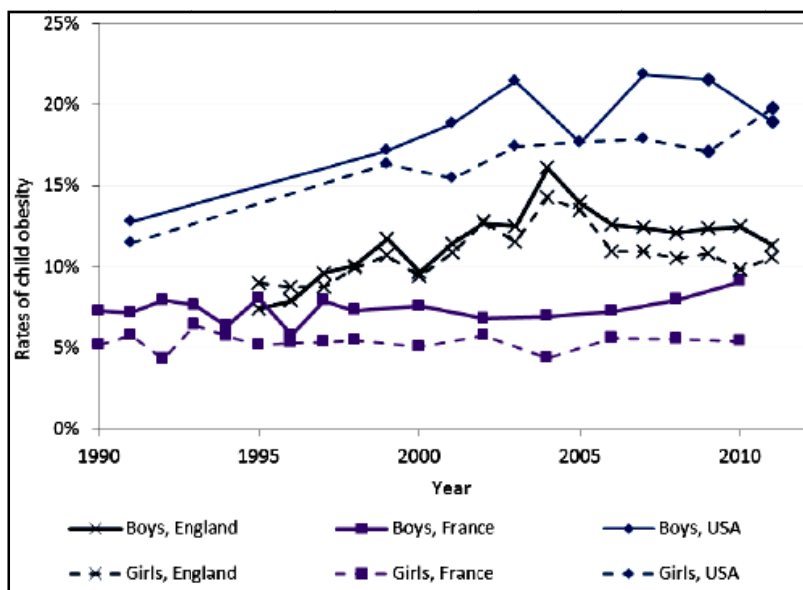
Obesity in younger ages is rapidly rising worldwide, reaching epidemic proportions. Many studies developed in various states claim that special attention should be paid to this aspect as soon as possible.

1. Globally, there is a marked tendency for obese population higher rates; data provided by IASO (International Association for the Study of Obesity) show that 10% of school-aged children are overweight or obese. Epidemiology rates vary by country and region of the world; in some Asian or African territories there is a rate lower than 5% for pediatric obesity while in Europe the prevalence is around 20% and in the Americas over 30% (Lobstein T., 2003). Also, the number of obese children aged 2-5 years doubled in the United States of America in the last 30 years; basically, 1 of 5 American citizens is obese (Flegal K.M., 2010).

In 2001, 12% of the American children were overweight, but in 2011 they accounted for almost one- third of the pediatric population of the country (Satcher D., 2011). World Health Organization (WHO) reported that there are 42 million of obese children under 5 years, out of which 35 million belong to developing countries. In 2013, Lopez et al. stated that globally speaking pediatric obesity rates are somewhere around 23.8% (22.9—24.7%) for boys, and 22.6% (21.7—23.6%) for girls, in the developed countries, while in the developing ones these

rates vary from 8.1% (7.7—8.6%) to 12.9% (12.3—13.5%) and 8.4% (8.1—8.8) to 13.4% (13.0—13.9%), respectively.

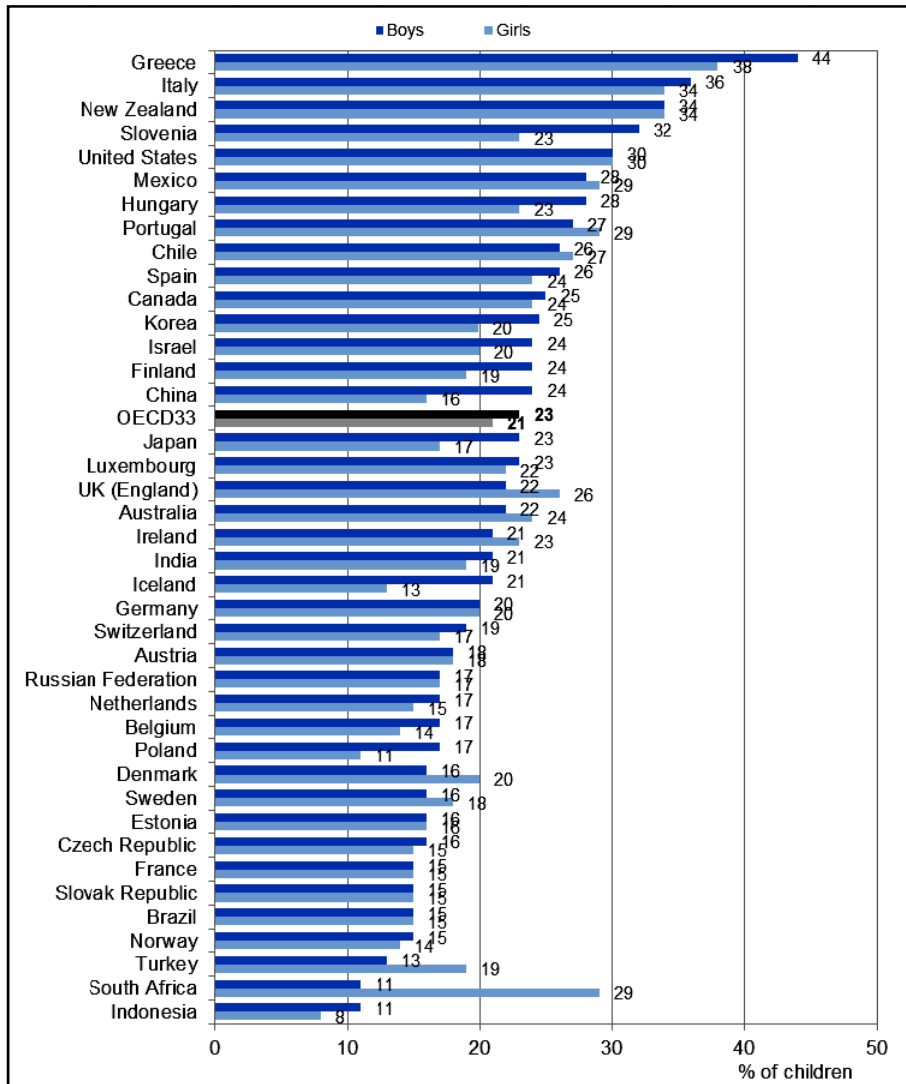
Figure 1: Trends in children obesity.



Source: OECD estimates based on national surveys.

2. Very few data regarding our country show pediatric obesity trends. The most recent ones published in January 2015 show that 11.4 % of our capital children and adolescents are obese considering the WHO classification. The results showed a high prevalence of unhealthy eating habits, like very late dinner time (later than 10 pm was reported by 94.5% of participants) and daily soft drink consumption reported in 75% of them (Fica et al., 2015). Another study, developed in the western part of the country, correlated health-risk behaviour in children in order to determine the prevalence of obesity. According to the authors, a total of 3626 school-aged children were examined by medical students using a short questionnaire consisting of 5 main tasks: physical exercise, consumption of sweetened beverages, consumption of fast-food, sweets and fruits. The prevalence of overweight was 18.2% (20.7% for boys and 16.2% for girls) and of obesity was 7.2% (5.8% for girls and 9.0% for boys) and it was higher in rural areas (Emandi et al., 2013).

Figure 2: Proportion of obesity in children aged 5-17 in 2010



Source: International Association for the Study of Obesity, 2013; Bös *et al.* (2004), Universität Karlsruhe and Ministères de l'Education nationale et de la Santé for Luxembourg; and KNHANES 2011 for Korea.

Literature review

Effects of early nutrition on later obesity

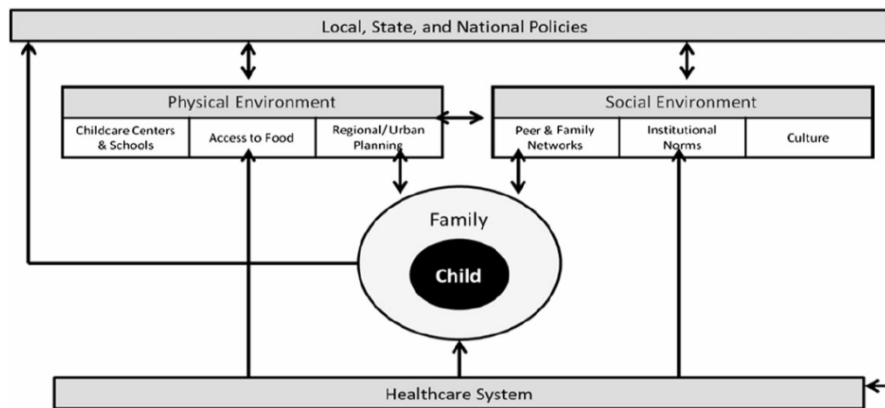
Nutritional status involving weight and height at any age reveal previous nutritional habits and abilities to interfere with environmental factors of any kind. The relationship between obesity and illness is better defined in adults than in pediatric population, but still many recent studies argue that even children suffer because of weight excess. In the following, I shall define some links between early nutritional habits of infants and their later risk for developing obesity, according to the most recent scientific literature data. Meta-analyses are the most important in reporting these data. According to Dewey, who analysed 11 studies with children aged above 3 years, the breastfed group was less likely to develop obesity.

The extend concept of system science

Frameworks like system science might be useful in building extended preventive strategies because they are characterized by identification of the complex relationships among components, influenced by both negative and positive feedback responses (Serman, 2006). Obesity applied system science is used to accurately describe environmental, economic and health factors that interfere with children evolution during their life (Figure 3). Based on this connections one may develop preventive strategies. An example of such applied system is The National Preventive Strategy laid out by the Surgeon General's Office (National Prevention Council, 2011) that focuses on national health policies using four strategic directions: (1) Healthy and Safe Community Environments, (2) Clinical and Community Preventive Services, (3) Empowering People, and (4) Elimination of Health Disparities.

Multi-level interventions are more likely to be successful than single level intervention and this concept integrates system science as a preventive strategy. For instance, creating cycling tracks on the city's streets provides a place for physical activity but if this action is not sustained by periodic maintenance, or if the area is not safe for children, or even if these are placed on crowded streets it may not be as useful as they were designed to be. Lack of attention to multiple aetiologies is an explanation for failure of single-level obesity prevention and intervention trials (Skinner & Foster, 2013).

Figure 3. A system science framework of pediatric obesity prevention, including feedback mechanisms involving families, the physical and social environment, the health care system, and local, state, national policies



Source: Modified after Nader *et al.* (2012), "Next steps in obesity prevention: Altering early life systems to support healthy parents, infants, and toddlers" [*Child Obesity*] 8, pp. 195-204.

Multidisciplinarity in population based preventive strategy

World Health Organization set the guidelines that should be followed by decisional state entities in order to prevent obesity. The document is based upon clinical and extended social research (World Health Organization, 2010). The main principles interfere with sustainable development principles of people care, equity, environment support or transparency.

The following guiding principles for the development of a population-based childhood obesity prevention strategy are based on those developed as part of the WHO Forum and Technical Meeting on Population-based Prevention Strategies for Childhood Obesity.

Integrated strategy

No single level intervention has proved to be successful in preventing obesity; political, social, economic, cultural, educational, food manufacturing and many other aspects come together in support of valuable preventive measures. Low and middle income countries are vulnerable in these situations because they need to use the resources for basic everyday life needs and obesity prevention should be integrated with the related issues of food security and undernutrition prevention (World Health Organization, 2008).

Equity

Every preventive measure should be applicable to all social classes, considering that mainly the high economic masses benefit from good medical information. Children are vulnerable groups in general, and no difference between social levels should interfere with their right to a healthy diet.

Transparency

Partnership and availability of information are always public in a system based on transparency. Public-private partnerships create funding sources to ensure sustainability. It is mandatory to prevent any potential conflict of interest. Many concerns took into consideration food industry companies on their interest for prevention children obesity (World Health Organization, 2010).

Coordination

Multi-sectoral engagement is crucial in developing a preventive strategy; public and private areas should stay together in order to develop, apply and sustain programs regarding parenting, nutritional seminars for both medical staff and parents. Governmental implication is necessary for a good coordination between factors involved in the process.

Priority setting

Chaotic implementation of preventive measure is often unsuccessful and discriminating. Results from population trials improve decision making and make those more systematic (World Health Organization, 2012). The prioritization process enables decisional factors to act gradually, by a long term-plan. Approaches to obesity prevention must take into account social and country factors, availability of the resources and training programs.

Sustainability

Strategies that improve the program sustainability include: i) building on existing frameworks, recommendations, policies and datasets; ii) developing community ownership; and iii) influencing social norms (World Health Organization, 2010). Childhood obesity preventive programs use long-term actions and they proved to be cost-effective balanced. Sustainability is based on appropriate funding sources and the private area is a major part of this action.

Contextualization

It is important to decide which measures are more feasible and appropriate to use depending on local and regional characteristics. Implementing intervention requires contextualization taking into account the social and economic level of the societies without causing disparities and assuring everyone gets the right message.

Multiple-level actions

Effective preventive strategies require multiple-level intervention. It implies local changes (urban planning, education, community and school), governmental actions, investments in agriculture and marketing politics.

Broad components in population preventive strategies

After setting the main principles of an extended national obesity preventive strategy, it is mandatory to find the socio-economic and politics structures for implementing the strategy.

As it has been stipulated by WHO, there are 3 broad components of the actions:

1. Governmental structure that ensures the legislative background and empowers other components;
2. Population-wide policies regarding marketing actions;
3. Community-based interventions design as local programs in order to satisfy the necessities of every society in part.

In Figure 4 we present the framework of these broad components integrated as a preventive strategy against pediatric obesity.

Figure 4: Model framework for implementation of a healthy lifestyle

POPULATION-BASED APPROACHES TO CHILDHOOD OBESITY PREVENTION		
Structures to support policies & interventions	Population-wide policies and initiatives	Community-based interventions
<ul style="list-style-type: none"> • Leadership • 'Health-in-all' policies • Dedicated funding for health promotion • NCD monitoring systems • Workforce capacity • Networks and partnerships • Standards and guidelines 	<ul style="list-style-type: none"> • Marketing of unhealthy foods and beverages to children • Nutrition labelling • Food taxes and subsidies • Fruit and vegetable initiatives • Physical activity policies • Social marketing campaigns 	<ul style="list-style-type: none"> • Multi-component community-based interventions • Early childcare settings • Primary and secondary schools • Other community settings

Source: World Health Organization, (2006), "Global strategy on diet, physical activity and health: a framework to monitor and evaluate implementation"

Early nutrition strategy

In the last 10 years, much attention has been paid to the early life strategies for obesity prevention, based on sustained research covering the first 1000 days of life (from conception to 24 months of life). Scientific data showing the necessity of the wellbeing of mothers (physical, emotional and nutritional) at the moment of the conception and all along the 9 months of pregnancy (Institute of Medicine, 2011) was a help for implementation of supportive social and economic policies for women. Some of them are regular prenatal medical visits, post-conception nutrition programs for mothers, food industry research for the use of new milk formulas for pregnant mothers, information and community activities based courses regarding the importance of this period throughout the life of the newborn. Pediatricians are also interested in rapid weight gain in the first 24 months of months witch was proved to increase the risk of obesity later on (Ong, 2010). Every preventive strategy regarding early prevention of childhood obesity should be guided and implemented around some critical areas, as Nader affirmed in a recent meta-analyse (Nader *et al.*, 2012): (1) promote optimal preconception weight, (2) avoid excessive gestational weight gain, (3) return toward a healthy postpartum weight, (4) breastfeeding promotion, (5) monitor infant growth for rapid weight gain, (6) promotion of healthy weaning foods, (7) limit screen time, and (8) childcare practices that promote healthy nutrition and physical activity for young children.

Teams of multidisciplinary are most wanted when facing preventive strategies, including medical, social and economic decision factors. First, the measures should be addressed to parents, who are an important target in the equation. For instance, in a study published by Hager in *Archives of Pediatric and Adolescent Medicine* in 2012, researchers showed that mothers of overweight toddlers are not aware of their children body size and don't want them to get thinner (Hager *et al.*, 2012). Accuracy may be improved if guided discussions are carried out with the pediatrician, psychologist and nutritional therapist.

Main demo-social-economic nutritional characteristics of the studied population

In a study conducted in the Ambulatory of the "Grigore Alexandrescu" Emergency Hospital for Children in Bucharest between June 2014 and December 2014, the author enrolled patients present for mandatory one-year consultation of the pediatric physician, with age range of 12 ± 1 months. Mothers, as the legal guardians, completed a detailed questionnaire which included data concerning both socio-demographic and nutritional data, as follows:

- Patient’s socio-demographic conditions: gender (male/female), residence (urban vs. rural), mother’s level of education (high: higher education; middle: high-school, low: middle school), and classification of the family’s income (the average income per family member) throughout the previous six months were taken into consideration: low (<90 euro per family member), average (>90 euro and <180 euro per family member), high (>180 euro per family member), according to the evidence provided by the National Statistics Institute with respect to the national average wage.
- Type of nutrition since birth and duration. Parents were asked to answer the following questions: “What type of feeding did the child receive in the first 3 months?”; the possible answers given were “exclusively natural”, “mixed feeding”, “exclusively artificial feeding”. “For how long was the infant naturally breastfed?”, the answer was given in months.
- Age in months at the onset of complementary feeding.
- Nutrition-related information sources for parents

Table 1: Characteristics of the group under study

Age (months) (median (SD))	11.80+/-0.3		
Gender (n male/ n female)	48/25		
Living environment (n rural/ n urban)	42/31		
Mother’s level of education (n (%))			p
low education	12	16.5%	0.368
middle education	31	41.9%	0.234
high education	30	41.6%	0.456
Mother’s age (years) (median (SD))	21.3+/-1.8		
Living standard (n (%))			p
low	18	24.3%	0.563
average	38	53.1%	0.344
high	17	22.5%	0.445

Source: data obtained by author’s own research

Initially, a total of 88 mothers responded the questionnaire, but only data from 73 of the children were used in the study, as only these subjects had complete medical records with accurate information.

Out of the 73 infants enrolled in the study, 25 infants (34.2%) received artificial or mixed feeding since birth. The remaining 48 subjects were breastfed since birth (65.7%), while only 29.6% were exclusively breastfed for four (4) to six (6) months.

Complementary food was given around 4 and 6 months, in 80.8% of the cases, while 16.4% of babies were prematurely given complementary foods, before the age of 4 months. Complementary feeding was introduced late for 2.8%, when they were older than seven (7) months.

A total of 44.7% caregivers declared they followed the pediatrician advice upon complementary feeding. This is mainly the case for urban population (56.0% vs. 21.6 %), highly educated mothers (69.2% vs. 11.1%) and high economic level (69.8% vs. 12.9%). Friends and family are the most important sources for nutrition information mainly for mother in rural regions, low incomes and basic educational level ($p < 0.05$, CI 95%). Multivariate analyses showed that friends and family used as nutrition information sources are among risk factors for inappropriate complementary feeding practices ($p < 0.001$, CI 95%).

Final remarks and conclusions

Methodological and theoretical approaches

The review presented here highlights the progress made in the field of social-financial policies in order to early prevent pediatric obesity. There is still more to be done until the implementation of the strategy produces to valuable results. The framework provided by system science involves the entire community, gives a vision about how obesity is not only an individual problem but also a community, governmental and national issue.

Wellbeing of our children resembles in our capacity of understanding the complex interplay of system components that should work together in order to prevent obesity endemics.

A convincing body of clinical, demographical and scientific data shows that obesity development during childhood is influenced by utero growth, linear growth after birth and early nutrition habits. Malnutrition has a double burden meaning that undernourished individuals early in life are exposed to adiposity gain later but environmental, behavioural and social factors act together and influence the health evolution. Thus, policy implications are profound and need to act over an extended period and mainly in the most disadvantage elements of the societies.

Childhood obesity prevention rises like a particular issue considering future implications of the disease upon wellbeing of the organism. Childhood obesity research should include large epidemiological data collection from the entire country concerning the total number of obese children of all ages, socio-economic issues, parents educational level, living conditions.

One should also take into account national research tools having headquarters in all university pediatric clinics with pediatric obesity as main topic. Thus, enlarged regional data can be provided as in other countries from Europe. In the meantime, only a small amount of evidence exists regarding effectiveness managing household expenditure on infant diet. Importantly, these kinds of data are missing mainly in low and middle income countries, particularly regarding sustainability of interventions for future development of the children through adulthood. Using the existing data, community may facilitate family intervention, using even public-private partnerships in order to help families manage their budget.

A comprehensive childhood obesity prevention programme will incorporate various key components such as step-down interventions in communities (including family interventions), financial and legislative elements that can facilitate achievement of healthier food for young children, cross-sectoral platforms and facilities for private area in order to obtain support in interventions.

Practical remarks

Little is known regarding the dietary patterns of the Romanian children in the first years of life. The way that pediatric obesity contributes to adulthood co-morbidities indicates that this should be a major concern in public health. Decision making factors play an important role in coordinating meetings between nutrition experts and primary healthcare, educational support for parents regarding preventive nutritional and lifestyle habits. On the other hand, our estimated data suggest that infant food expenditure managing can be very challenging in any household, mainly due to its importance for future development of the organism. Sometimes, meal advice providers may be an option for these families, consisting in someone who is aware of the benefits of a full nutrient diet but who also has the trained skills to achieve best cost-efficacy products.

Creating information materials about obesity metrics will aware parents against rapid weight gain.

For the future, there is a growing need for nutritional education in communities living in all areas. Scientific committees should formulate national obesity action

plan focus on the first 1000 days of life, including pregnancy advice, breastfeeding support, and infancy nutrition special recommendation.

Broad perspectives that emphasize the complexity of the relationship between different social and economic factors are necessary for a proper understanding of weak compounds that can be influenced by future interventional measures.

One should also take into account that demonstration projects undertaken to identify best nutrition intervention programmes or pilot studies will provide feasibility testing before extending to a whole area of the society. Assessment protocol including, dietary habits, social, demographic, economic factors, as well as anthropometric evaluation helps us to identify the problem during a particular period of life. Such project should be sustained and financed further in the future for the reasons presented before.

Multi-level actions are more likely to be successful than single level intervention and this concept integrates system science as a preventive strategy. Public and private areas should stay together in order to develop, apply and sustain programs regarding parenting, nutritional seminars for both medical staff and parents.

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