

Impact of the Childhood Obesity Intervention Project on primary school children from a cluster of schools

Impacto do Projeto de Intervenção na Obesidade Infantil no primeiro ciclo de um agrupamento de escolas

Impacto del Proyecto de Intervención en la Obesidad Infantil en el primer ciclo de una agrupación de escuelas

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Abstract

Theoretical framework: The Childhood Obesity Intervention Project was implemented in a Cluster of Schools in the Alto Minho region of Portugal between 2009 and 2012.

Objectives: To assess the impact of the project on the prevalence of childhood obesity, eating habits and physical activity in children turning six by the end of each year.

Methodology: The Childhood Obesity Intervention Project used project methodology. Mixed-retrospective methods were used to assess the impact. Quantitative data were obtained by assessing the eating habits, the physical activity and the anthropometry of 381 children. Qualitative data were obtained through focus groups.

Results: The prevalence of overweight was high throughout the schools years. However, overweight children who were subjected to an individual/family intervention became normal-weight. The levels of physical activity were low and the optimal Mediterranean Diet was predominant. As regards the focus groups, perceptions related to project development emerged.

Conclusion: The project's interventions did not contribute to reduce overweight. However, from a community perspective, the intervention remains necessary.

Keywords: pediatric obesity; consumer participation; eating and physical activity.

Resumo

Enquadramento: No período letivo 2009-2012 implementou-se o Projeto de Intervenção na Obesidade Infantil num Agrupamento de Escolas do Alto Minho.

Objetivos: Avaliar o impacto do projeto na prevalência da obesidade infantil, nos comportamentos alimentares e na atividade física em crianças que em cada ano completam seis anos.

Metodologia: O Projeto de Intervenção na Obesidade Infantil obedeceu a metodologia de projeto. Na avaliação do impacto optou-se por uma metodologia mista, retrospectiva.

Os dados quantitativos obtiveram-se pela avaliação dos comportamentos alimentares, da atividade física e da antropometria de 381 crianças, os dados qualitativos através de *Focus Group*.

Resultados: As prevalências da sobrecarga ponderal, ao longo dos anos letivos, foram elevadas, todavia as crianças com sobrecarga, sujeitas a intervenção individual/familiar, passaram para normoponderal. Os níveis de atividade física foram baixos e verificou-se predominância na Dieta Mediterrânica ótima. Dos *Focus Group* emergiram perceções relacionadas com o desenvolvimento do projeto.

Conclusão: As intervenções do projeto não contribuíram para a diminuição da sobrecarga ponderal, no entanto mantem-se a necessidade da intervenção numa perspetiva comunitária.

Palavras-chave: obesidade infantil; participação comunitária; alimentação; atividade física.

Resumen

Marco contextual: En el período lectivo de 2009 a 2012 se implementó el Proyecto de Intervención en la Obesidad Infantil en una agrupación de escuelas del Alto Miño.

Objetivos: Evaluar el impacto del proyecto en la prevalencia de la obesidad infantil, los comportamientos alimenticios y la actividad física en niños que cada año completan seis años.

Metodología: El Proyecto de Intervención en la Obesidad Infantil aplica la metodología de proyecto. En la evaluación del impacto se optó por una metodología mixta y retrospectiva. Los datos cuantitativos se obtuvieron mediante la evaluación de los hábitos alimenticios, la actividad física y los parámetros antropométricos de 381 niños. Los datos cualitativos se obtuvieron a través del *Focus Group*.

Resultados: Las prevalencias de sobrecarga ponderal, a lo largo de los años lectivos, fueron altas, pero los niños con sobrecarga que tuvieron una intervención individual o familiar pasaron a normoponderales. Los niveles de actividad física fueron bajos y se observó un predominio en la dieta mediterránea óptima. De los *Focus Group* surgieron aspectos relacionados con el desarrollo del proyecto.

Conclusión: Las intervenciones del proyecto no contribuyeron a la disminución de la sobrecarga ponderal. No obstante, se mantiene la necesidad de seguir con la intervención en una perspectiva comunitaria.

Palabras clave: obesidad infantil; participación comunitaria; comida; actividad física.

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Introduction

The increasing prevalence of obesity is not only evident in adolescents and adults, but also identified in children younger than 10 years.

The Childhood Obesity Intervention Project (*Projecto de Intervenção na Obesidade Infantil* - PIOI) integrated within a Community Care Unit (*Unidade de Cuidados na Comunidade* - UCC) was implemented among primary school children during three school years.

The main goals of the PIOI were to reduce the prevalence of obesity in children turning six years old by the end of each school year, and to improve their eating habits and physical activity.

The PIOI applied the project methodology and was based on the Ecological model, associated with the empowerment paradigm directed to children.

The intervention strategies focused on the promotion of healthy lifestyles (healthy diet and regular physical activity), the prevention and treatment of obesity-related health problems, and were divided according to two areas of intervention: individual/family and group/community.

A qualified multidisciplinary team composed of nurses, a nutritionist of the UCC, a food engineer and a psychologist of the Town Hall worked in partnership to implement the PIOI.

After three years of execution of the project, it became necessary to assess its impact on the sampled children, as well as evaluate its contribution, based on results, for the improvement/continuity and for an effective intervention in childhood obesity. Therefore, this study focused on the following PIOI goals: to determine the prevalence of childhood obesity in children born in 2003, 2004, 2005, and 2006 in the period between 2009 and 2012; to analyse the evolution of the prevalence of obesity in children born in 2004 and 2005 after individual and family intervention; to identify the score of eating habits in children born in 2003, 2004, 2005, and 2006 during the period between 2009 and 2012; to identify the level of weekly leisure-time physical activity in children born in 2003, 2004, 2005, and 2006 during the period between 2009 and 2012; to capture the opinion of community partners and the multidisciplinary team about the PIOI as an intervention project for the treatment and prevention of childhood obesity; to identify the perception of parents/tutors and

teachers regarding the effect of PIOI interventions on the eating habits and physical activity of the children who participated in the project.

Background

Obesity is a chronic disease with its own space. The meaning of the expression *own space* arises from the acknowledgment that obesity is not only a risk factor for the development of some diseases affecting Western society, but it is also a disease that threatens the life expectancy and quality of life of obese individuals. According to the WHO (2004), it is considered the epidemic of the 21st century.

In children, the aetiology of obesity is multifactorial, but with a predominance of exogenous, behavioural and environmental factors (Rito & Breda, 2006), related to an inappropriate and unbalanced diet and sedentarism.

In 2010, it was estimated that approximately 43 million children under the age of five were obese worldwide (WHO, 2009). Within the European Union, Portugal is in one of the most unfavourable positions, as it has one of the highest prevalence of childhood obesity (Carvalho, Carmo, Breda, & Rito, 2011).

In 2009, the Childhood Obesity Surveillance Initiative found that the prevalence follows the trend of the previous results and indicated that 32% of primary school children were overweight, with a prevalence of overweight and obesity of 18.1% and 13.9%, respectively (Rito & Breda, 2009).

According to Carvalho et al., "Childhood obesity is currently one of the most serious Public Health challenges" (2011, p. 149) and also a stimulus for the implementation of community intervention strategies, including empowerment processes directed not only to children, but also to key members of the community (Tripodi, Severi, Midili, & Corradini, 2011).

The implemented projects and the studies carried out at an international level consider that the school plays a central role in children's education and in the development of their critical thinking skills and healthy options (Tripodi, Severi, Midili, & Corradini, 2011). In most articles, physical activity, even more than diet, was referred to as a key determinant in the reduction of the Body Mass Index (BMI) in overweight children. The high prevalence of childhood obesity in Portugal determines the need to develop intervention

projects to provide innovative responses to families with overweight children. The efforts made in Portugal in this area are recent. However, community interventions in childhood obesity are scarce, as evidenced by the few publications on the Portuguese community interventions. The programme to fight childhood obesity in the Algarve region is a recent example of community intervention with positive effects (Ordem dos Nutricionistas, 2014).

The literature review focused on conceptual frameworks, studies, published works and information regarding the used methodology, all of which reflected the state-of-the-art in childhood obesity and its respective approach.

Research questions

This study is based on the following research question: What is the impact of a project aimed at the prevention and treatment of obesity on primary school children from a cluster of schools after three school years of implementation?

Methodology

The methodology used to implement the PIOI consisted of an anthropometric assessment and application of the questionnaire on eating habits (KIDMED) and leisure-time physical activity (Godin & Shephard) to 1st, 2nd, 3rd and 4th grade children of the Cluster of Schools in the school environment. At the beginning of each school year, the children who were participating in the PIOI for the first time were assessed and those who had already been part of the project in previous years were reassessed.

In the individual and family intervention to overweight children/family, a first consultation with the multidisciplinary team (Nutrition, Nursing, and Psychology) was proposed to them, followed by three Nutrition consultations.

In the group/community intervention, the target group was composed of parents, teachers, and primary school students. Within the scope of this intervention, several recreational-educational activities were organised, such as the Workshop on healthy cooking, Workshops for parents *With my parents, I eat and move, smiling* and for teachers *With*

my teachers, I eat and move correctly, Pedagogical Vegetable Gardens, Sowings, and the Competition *Make your own soup Faz a tua sopa*.

To assess the impact of the project, the research methodology adopted an epistemological focus of quantitative and qualitative nature.

This quantitative study is longitudinal retrospective because all of the data on the phenomenon were descriptive in nature and registered before this research started (Fortin, 2009). Monitoring data were obtained through anthropometric assessments (weight, height and Body Mass Index), the score of eating habits using the KIDMED (Mediterranean Diet Quality Index), and the level of physical activity, using the Godin- Shephard questionnaire, in a sample of 381 primary school students (1st to 4th grades) born between 2003 and 2006.

The inclusion criteria (n=382) were students turning six years old who were enrolled in primary schools of the Cluster of Schools of Ponte da Barca and participated in the PIOI during the school years between 2009 and 2012.

The exclusion criteria were students with special educational needs and reduced mobility; and students enrolled in the Cluster of Schools but whose parents did not allow them to participate in the PIOI activities. Based on the inclusion and exclusion criteria, only one student born in 2005 with motor and cognitive disability was excluded as he used a wheelchair and was not present in the room.

At the beginning of each school year, *i.e.* 2010/2011, 2011/2012, and 2012/2013, from October to November, the PIOI team registered anthropometric measurements and data on the eating habits and physical activity in an Excel spreadsheet.

Monitoring data were obtained using the following procedures:

Weight – A SECA analogue scale in kilograms was used. The child is placed at the centre of the platform, barefoot and using swimwear;

Height – A height measurement tape was used. The child stands with his/her back against the tape, barefoot and with his/her feet together. Height is measured in meters between the vertex and the reference plane of the equipment which supports the feet.

BMI – It was established by the Center for Disease Control and Prevention (CDC) of the United States of America. A child whose BMI falls between the 85th and 95th percentile for age and gender is considered

overweight. A child whose BMI is higher than the 95th percentile for age and gender is considered obese. Since September 2005, the Portuguese Directorate-General of Health is using the growth charts and percentile curves established by the CDC.

Score of Eating Habits - The KIDMED Questionnaire is composed of 16 questions aimed at analysing the daily consumption and the frequency of consumption of some foods. It was originally developed to estimate adherence to the Mediterranean Diet of Spanish children and adolescents aged between 2 and 24 years. The questionnaire was adapted to the Portuguese population. Questions denoting a positive connotation regarding the Mediterranean Diet are scored as (1) and questions denoting a negative connotation are scored as (-1). The total score ranges between 0 and 12, making it possible to identify the adherence to the Mediterranean Diet. Results higher than 8 indicate an optimal Mediterranean diet; between 4 and 7, indicate a Good Diet but with need for adjustments; and lower than 3 indicate a very low diet quality.

Level of Physical Activity - The physical activity per week was assessed based on the questionnaire proposed by Godin and Shephard and adapted to the Portuguese population. It aims at quantifying leisure-time physical activity during a 7-day period. Its final score is obtained using the following formula: PAWeek = (9xstrenuousPA) + (5xmoderatePA) + (3xlightPA).

Data were analysed using the statistical software SPSS, version 11.5.

As regards qualitative research, the Focus Group methodology was chosen due to its capacity to promote the sharing of ideas, viewpoints and new

ideas. Two focus groups were conducted: one composed of the multidisciplinary team/community partners and another one composed of the parents/teachers. Data collected from the interviews were subjected to the content analysis technique.

In order to comply with the key ethical principles of any research study, permission was asked, and granted, to conduct the study to the Ethics Committee of the Local Health Unit of the UCC. Then, information on the study objectives was provided to the privileged informants, and both data anonymity and confidentiality were ensured. The students' parents were informed about the project and its assessment process, and asked to give their consent.

Results

The students assessed in 2010 had a mean age of 6.8 (± 0.58) years, those assessed in 2011 had a mean age of 7.2 (± 0.87) years and those assessed in 2012 had a mean age of 7.8 (± 1.10) years.

It should be highlighted that the prevalence of obesity in children turning 6 years old decreased during the years of assessment: 16.1% (children born in 2004, assessed in 2010), 15.5% (children born in 2005, assessed in 2011), and 13.8% (children born in 2006, assessed in 2012). In relation to the prevalence of overweight, it increased from 15.1% (children born in 2004, assessed in 2010) to 20.9% (children born in 2005, assessed in 2011) in the same group of children and decreased to 11.3% in children born in 2005, but assessed in 2012 (Figure 1).

	Thinness		Normal weight		Overweight		Obesity		Total	
	N	%	N	%	N	%	N	%	N	%
Year 2010										
2003	2	2,4	62	73,8	14	16,7	6	7,1	84	100
2004	2	2,2	62	66,7	14	15,1	15	16,1	93	100
Year 2011										
2003	2	2,4	61	71,8	15	17,6	7	8,2	85	100
2004	3	3,0	75	74,3	12	11,9	11	10,9	101	100
2005	--	1,8	68	61,8	23	20,9	17	15,5	110	100
Year 2012										
2003	1	1,2	60	71,4	17	20,2	6	7,1	84	100
2004	1	1,0	69	68,3	17	16,8	14	13,9	101	100
2005	5	4,5	65	59,1	22	20,0	18	16,4	110	100
2006	4	5,0	56	70,0	9	11,3	11	16,4	80	100

Figure 1. Prevalence of nutritional status of children born in 2003, 2004, 2005, and 2006 in the different moments of assessment (2010, 2011, and 2012).

The prevalence of overweight in primary school children according to the year of assessment are high, ranging from 22.8% to 36.4% (Figure 2).

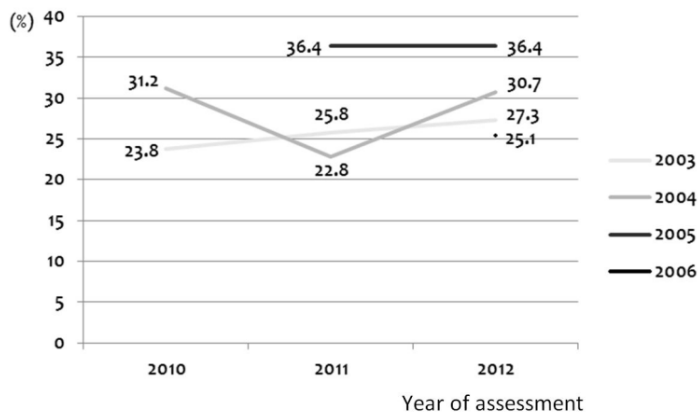


Figure 2. Prevalence of overweight in primary school children according to the year of assessment.

It was found that the prevalence rates increased over the years in children born in 2003. As regards children born in 2004, the prevalence rates decreased between 2010 and 2011, and increased in 2012. As to children born in 2005, the prevalence rates remained the same between 2011 and 2012.

With respect to children born in 2004 and assessed as overweight in 2010, 31% moved to the normal weight category after individual/family intervention between 2010 and 2011. These children did not participate in the individual intervention in the following year and 10.3% of them gained weight (Figure 3).

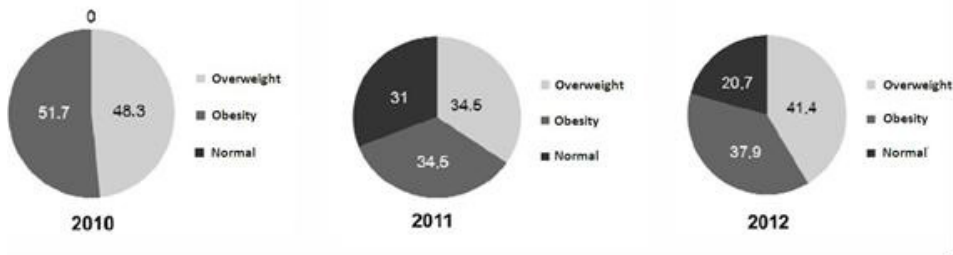


Figure 3. Percentage of children born in 2004 with overweight and obesity who participated in the individual/family intervention in the different years of assessment.

With respect to children born in 2005 and assessed as overweight in 2011, 17.5% moved to the normal

weight category after individual intervention between 2011 and 2012 (Figure 4).

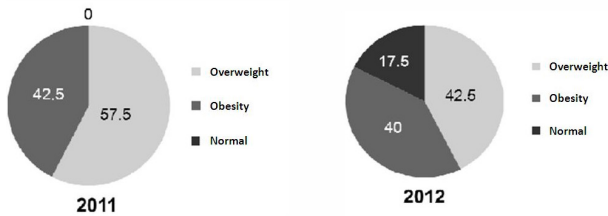


Figure 4. Percentage of children born in 2005 with overweight and obesity who participated in the individual/family intervention in the different years of assessment.

With respect to eating habits (Figure 5), a predominance of the Optimal Mediterranean Diet over the Good Diet and the Low Diet Quality

was observed in the different years of birth. This predominance remains throughout the different years of assessment.

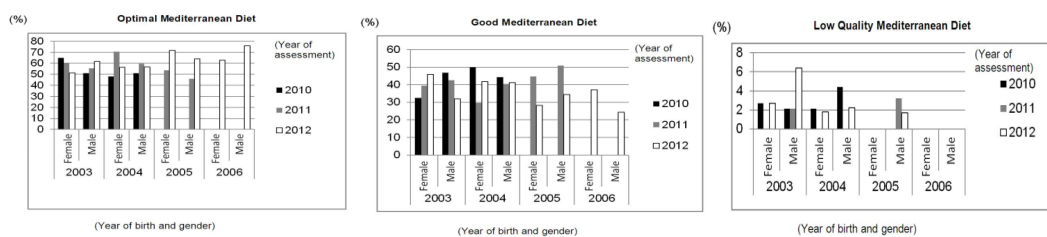


Figure 5. Score of eating habits according to year of birth and gender in 2010, 2011, and 2012.

The total mean values of physical activity were low in both boys and girls (Figure 6).

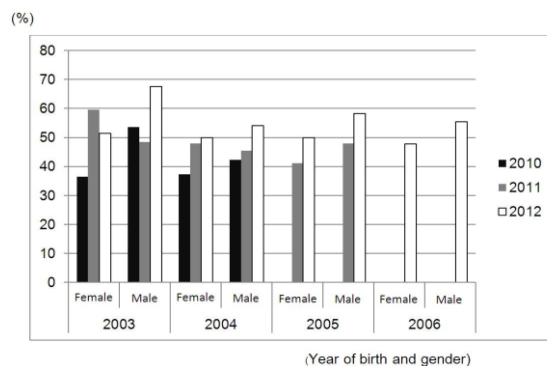


Figure 6. Mean values of physical activity according to year of birth and gender.

As to qualitative research, the focus group including the multidisciplinary team and the partners was composed of two nurses of the UCC, a food engineer and a nutritionist (as the multidisciplinary team), a chairman of the parish council, a member of a Private Institution of Social Solidarity (*Instituição Particular de Solidariedade Social* - IPSS), a teacher of the Cluster of Schools of Ponte da Barca, and a representative of the Town Hall (partners). The second focus group was composed of three teachers and five parents.

The results obtained in both focus groups concentrated on the development of the project during the 4-year period. The following negative aspects emerged: the fact that the PIOI was constantly reformulated in terms of goals, scope of interventions, team composition, with the gradual request for partnerships; the fact that the parents' representative was not part of the team in charge; the negative connotation of the project's title; the parents' low adherence; the lack of cost centres; the difficulty in assessing health gains, since the project monitoring and assessment were somehow unclear due to the repeated changes.

The following positive aspects were found: the PIOI followed the stages recommended in the project

methodology; Reformulations improved the project with the contribution of the new members; the PIOI intended to promote healthy lifestyles, particularly a healthy diet; the PIOI was considered interesting, creative, a promoter of student participation, free of charge, and important for all students; practical activities had a greater impact on the children's eating habits and physical activity; and the importance of the participation of the community as a whole in the future reformulation of the project.

Discussion

The prevalence rates of overweight in each year of assessment were high, with a tendency to increase. These results are closer to the national figures (Rito & Breda, 2009).

A year after participating in the individual/family intervention, children showed a decrease in overweight. According to Carvalho et al. (2011), this shows that behaviour interventions focused on the family and on a healthy diet and physical activity have more effective results in reducing childhood obesity. These children's levels of physical activity are lower

than those found in a similar study, in which the mean value of physical activity for girls was 69.7%, and the mean value for boys was 84.25% (Sousa & Maia, 2005). This shows that the children of this cluster of schools are not very physically active.

Given the project's objectives in relation to the eating habits, the diet of the children under analysis over the 3-year period followed the patterns recommended by the traditional Mediterranean diet, which is the current healthiest diet (Serra-Majem et al., 2004).

According to Carvalho et al. (2011), since the community intervention positions the involvement of the partnerships and the promotion of health determinants focused on family and groups as a strategic axis in dealing with childhood obesity, the PIOI project gets closer to this purpose of intervention.

Every research has both strengths and weaknesses, and this study is no exception. The following limitations may explain some difficulties encountered over the course of the study. However, these limitations may be overcome by future projects so that results may be enhanced. Some difficulties arose in finding literature on community interventions in the area of childhood obesity in Portugal.

One of the main limitations of this study was the lack of time for the selection and in-depth analysis of all data collected during the empirical study.

Conclusion

The prevalence of obesity was high in children of the different age groups who were subjected to the childhood obesity intervention project (except for children born in 2006) during a 4-year period. Thus, it was concluded that the problem of overweight and obesity remains.

Children born in 2004 and 2005 who were subjected to individual and family intervention on healthy diet and physical activity showed a decrease of overweight, which confirms the importance of the behaviour intervention in reducing childhood obesity. The mean values of physical activity among these children were low; however, they have adequate eating habits. In view of this reality, there is a need to improve the intensity and duration of the children's physical activity, maximising the interventions covered by the PIOI, and to continue organising

initiatives related to the promotion of a healthy diet. In such a scenario, and based on the parents' and teachers' perception, the intervention should continue to be available as a way to treat and prevent childhood obesity and promote a healthy diet and regular physical activity, within a structured and participated project from a perspective of community intervention.

It is essential to establish contact points between schools, parents' associations and community entities (partnerships) since the beginning of the project, with a view to an overall, cross-sectional, and evidence-based approach.

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