195 - THE PREVENTION OF CHILD OBESITY IN SCHOOLS: A PROPOSAL FOR INTERVENTION

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INTRODUCTION

The adult and child populations throughout the entire world are suffering from a growing prevalence of obesity and overweight (Ballesteros 2006, Borras et al 2007). Current estimates of the prevalence of schoolchildren who are overweight or obese in 34 countries vary from figures for Malta (25% overweight, 8% obese), the USA (25% overweight, 7% obese) and Spain (25% overweight, 14% obese) to those of Lithuania (5% overweight, 1% obese) and Latvia (6% overweight, 1% obese) (Janssen 2005). In England, data from an extensive survey of very young children (aged from one month to four years of age) shows a growing predominance of overweight subjects from 1990 onwards, and current estimates are now similar to those of school-age children (Bundred 2001).

Overweight and obesity in children have significant repercussions on their physical health and psychosocial wellbeing (Hills et al 2007). Many cardiovascular problems typical of obesity in early adulthood are no doubt preceded by anomalies that occur in childhood. Hypertriglyceridaemia, high blood pressure and abnormal glucose tolerance occur with increasing frequency in obese children and teenagers, and children currently suffer from type 2 diabetes (Arslanian 2002). Additionally, child obesity is an independent risk factor in adult obesity. Obese children of over 9 years of age (defined as having a BMI higher than the 95th percentile) have an up to 80% risk of developing obesity in adulthood (BMI > 28) by the age of 35 (Guo 1999). There is also evidence of an association between obesity in adolescence and an increased risk of health problems in adult life (Power 1997).

The causes of child obesity

The growing prevalence of child obesity is the result of a higher calorie diet, less physical activity, and lifestyles that are increasingly sedentary. A broad variety of cultural and background issues have been identified as contributing toward the problem. Increases in overweight and obesity have occurred in a context of a growing incidence of asthma, behavioural problems and mental health disorders, a reduction in injuries, an increase in broken families, a reduction in the size of families, urban and metropolitan growth, and less community consensus. These factors have uneven effects across the population. In developed countries, the repercussions are significantly higher among segments of society with more health problems or a lower socioeconomic status. In developing countries, different patterns can be observed, although they are not very clearly defined. This changing background context requires a multi-faceted solution (Budd and Volpe, 2006).

The main aim of this review is to determine how effective intervention is in the fields of education, healthcare and psychological, family or behavioural therapy, counselling and treatment when it focuses on diet, physical activity and the promotion of a certain lifestyle directed at preventing obesity or an increase in weight in children, assessed according to changes in the body mass index (BMI). The specific objectives are:

·To assess the effect of intervention through dietary education versus physical activity on changes in the BMI, prevalence of obesity, rate of weight gain, and other results in children under the age of 18;

·To assess the effect of intervention through physical activity versus a control group on changes in the BMI, prevalence of obesity, rate of weight gain, and other results in children under the age of 18;

·To assess the combined effects of intervention through dietary education and physical activity versus a control group on changes in the BMI, prevalence of obesity, rate of weight gain, and other results in children under the age of 18.

METHOD

Inclusion criteria:

Data was included from randomized and non-randomized control trials lasting for a minimum of 12 weeks. The studies were classified as long-term ones (lasting at least one year) or short-term ones (lasting at least 12 weeks). The length of the study refers to the intervention programme itself or to a combination of an intervention programme plus a monitoring phase.

The method consists of a systematic review of intervention programmes aimed at preventing obesity in children and adolescents, using six electronic databases (Pubmed, Psychlist, SCOPUS, Ovid Medline, Sportdiscus and Embase), including studies up until December 2006.

Types of participants

Studies were chosen that used children under the age of 18 at the beginning of the trial. This included studies where the children's family was involved in the intervention programme, provided that separate data could be obtained for the children. Likewise, studies of intervention programmes were included featuring children who were already obese at the beginning of the trial in order to reflect the approach of the public health services, which acknowledge the prevalence of a certain weight range for the child population. Studies on intervention programmes were excluded if they were designed to prevent obesity in pregnant women or children with a critical illness or serious co-morbidity.

RESULTS

The combined effects of dietary intervention programmes and physical activity

The Pathways RCT (randomized control trial) (Caballero 2003), conducted in the USA, involved 1704 children from 41 schools randomly allocated to an intervention or control group. The children were third or fourth-grade US citizens (aged 8 to 11), with an average age of 7.6 years (SD: 0.6). At the baseline, the mean BMI was 19.0 for the intervention group and 19.1 for the control group, with a mean subscapular skinfold thickness (mm) for the triceps of 13.3 and 13.1 respectively (the SD were not given). Pathways was a multi-site, multi-faceted intervention programme, based in schools, aimed at reducing the percentage of body fat. The programme, which was given by existing school staff, had 4 components: *1*) a change in dietary intake, *2*) an increase

in physical activity, *3*) a classroom curriculum focused on healthy eating and a healthy lifestyle, and *4*) a family-involvement programme. The curricular programme included two 45-minute sessions each week for 12 weeks in the third and fourth grades and 8 weeks in the fifth grade. The US Department of Agriculture and Pathways Behavioural Guidelines were used to modify the food provided in schools so as to introduce a more low-fat diet. The activity-based components consisted of physical education in schools (30 minutes of moderate to vigorous activity three to five times a week), a games module, and breaks with exercises in the classroom (from two to ten minutes each time). Family involvement included action packs to take home with ideas for meals and family events in school, like cookery demonstrations or physical activity. Details of the control group were not reported and so probably this group received the normal curricular programme. The results were measured at the baseline and after three years. They included the BMI, subscapular skinfold thickness of the triceps, and percentage of body fat, together with behaviour in terms of diet, physical exercise and knowledge. Although information was not made available about the concealment of the randomized allocation process, there were other methodological issues, like errors in the unit of analysis. Pathways was based on the Social Cognitive Theory. At the end of the three years, no significant differences were found in the BMI, subscapular skinfold thickness or percentage of body fat. The findings of the movement sensor (which assessed physical activity) were not significantly different either when the intervention and control groups were compared, but there was a tendency to move in the right direction. Observed school meals showed a diet with a reduced fat content (percentage of energy from fat: intervention group 28.2; control group 32.4; CI of 95%: - 7.1 to -1.3), and there were significant results in the intervention group when the personally reported data was analysed (their 24-hour delay intake recall and a questionnaire on physical activity).

The randomized control trial by Mueller et al. in Germany (Mueller 2001) gathered initial data on 1640 children, although the intervention programme was initially conducted with just 414 of them, with 6 schools randomly assigned to a control or intervention group (Kiel Obesity Prevention Study, KOPS). The children were aged between five and seven and were recruited from a general population among whom 20.7% of this age group was overweight or obese. The median BMI (no reported DE) for the children at the baseline was 15.4 for the control group and 15.2 for the intervention group, and the median subscapular skinfold thickness (mm) for the triceps of 297 children (no reported DE) was 10.7 and 10.9 respectively. The control group had a mean percentage of overweight children of 27.7%, as compared with 24.1% for the intervention group. The intervention programme featured nutritional education and “active breaks” during the curricular programme. Key messages that were given were to eat fruit and vegetables every day, reduce the consumption of food with a high fat content, keep active for at least one hour a day, and reduce the time spent in front of the television to less than an hour a day. The programme was headed by a skilled nutritionist, working in conjunction with a teacher. Family intervention was also offered, plus a structured programme of sports for families with obese or overweight children or obese parents (n=25). The control group received the usual schooling during the period, but a crossover year in the middle was included. The measurements that were used to gather results were the BMI, subscapular skinfold thickness of the triceps after a year, and behaviour relating to diet and physical activity after three months and one year. After three months, the subjects' personally reported awareness and conduct had improved significantly in the intervention group. After a year, there was no difference in the mean change in the BMI of children in the control and intervention groups: 16.3 (control group) and 16.1 (intervention group).

Another randomized control trial conducted in England, Be Smart (Warren 2003), randomly assigned 218 children from 3 schools to four conditions (a nutrition group, physical activity group, combined nutrition and physical activity group, and control group). The children (51% boys) were aged between five and seven, with a mean age of 6.1 years (SD: 0.6). There was no significant difference in the mean BMI (SD) at the beginning, which for all the groups was 15.9 (2.1). Neither was there any difference in the percentage of children classified as being obese, with a percentage of 4% for all groups. [Obesity was defined as a BMI higher than the 98th percentile, as per the reference charts of the *International Obesity Task Force*]. The intervention programme lasted for 20 weeks, over a period of four school terms (about 14 months), and it took place during lunchtime clubs, where the research team provided an interactive nutritional programme or physical activities by ages, including a 'parent' age group. The intervention programme was aimed at raising the value of desirable behaviour through message reinforcement, helping the participants to taste healthy food, providing non-competitive activities, and developing related skills. The control group received an education programme that covered non-nutritional aspects of food and human biology. The results at the baseline and after the intervention programme focused on the BMI, behaviour in terms of diet and physical activity, and nutritional knowledge. Methodologically speaking it was not a rigorous study, since information on several points was not reported. Nonetheless, it was based on the Social Learning Theory. In the final phase, no significant changes were observed in overweight or obesity rates as a result of the three different approaches that were taken, and the number of subjects was too small for statistical analyses. Positive significant changes were found in personally reported knowledge and dietary intakes in the four groups, with some evidence of an improvement in physical activity in the intervention groups. The questionnaires for parents on the frequency of food intakes showed very little change, because at the baseline they reported an intake that was low in fat and moderate to high in fibre. This study may have been subject to ceiling effects, since the target population had received a relatively good education and 39% of the parents had a degree or postgraduate qualification. The evaluation of the intervention included lesson evaluations, phone calls and letters to parents, together with a survey of key messages to assess their impact. The parents and teachers also filled in a survey on satisfaction. In synthesis, the children enjoyed the practical tasks, questionnaires and food tasting, 83% of the parents thought their children had benefitted from the programme, and all the teachers believed that the components should be integrated in the syllabus of the subject *Personal, Social, Health and Citizenship Education*. However, a lack of trained staff might prevent the initiative from continuing.

'Physical activity versus control group' intervention programme

In another randomized control trial in the USA, lasting for 12 weeks (Pangrazi 2003), 606 children were randomly allocated by school (n = 35) to four groups. The children were in the fourth grade (aged nine to ten, with a mean age of 9.8 [SD: 0.6]), and they included 315 girls and 291 boys. Baseline data was not presented. The programme, called PLAY (*Promoting Lifestyle Activity for Youth)*, comprised 4 groups: PE & PLAY, PLAY alone, PE alone, and a control group (with neither PE nor PLAY). Physical activity was measured using the YAMAX pedometer at the beginning and end of the intervention programme for four days on each occasion, with recorded questionnaires to identify activities and missing data. The PLAY intervention programme comprised three stages: Step 1: to promote play behaviour (first week) with the participation of teachers and students, walks and less time standing or sitting. The children received information on the importance of physical activity and they identified suitable adult role models. Step 2: teacher-directed activities (three weeks) with games and fun activities which could be done outside school. Step 3: encouraging self-directed activity (eight weeks), in which the students tried to do 30 minutes of activity per day outside school, without the teacher. In the control and PE groups, the children were given log sheets similar to those of the PLAY groups, but they were asked to record their out-of-school activities (active and sedentary). The results (the BMI and step count) were measured at the beginning and after 12 weeks. The study seemed to have methodological limitations, because information was not reported on several methodological issues. However, it only used relatively objective results and it has been adopted in

primary schools in Arizona, where 24,000 children have had access to it. This intervention programme has probably improved with experience, but it lacked theoretical fundaments. Protection against contamination was assumed by including children who could have taken part in the programme before. When the BMI was monitored after the intervention programme, the results were not significantly different when schools taking part in the intervention programme were compared with the control group. However, girls were significantly more active in the PE & PLAY group and PE group, but not in the PLAY group alone when compared with girls from the control group. The boys did not show significant differences in the step count, because boys in the non-treatment group were initially more active than average 10-year-olds in the area (data from a previous study).

In Spain, the Nin@s en Movimiento programme (Gussinyer, 2008), by Vall d'Hebron Maternal & Children's Hospital, achieved more hopeful results, with a reduction in weight by 83.72% of the children taking part in it. The programme we propose is based on the fundaments of Nin@s en Movimiento.

Practical applications

The results of the studies show that so far intervention programmes have had little significant effect on children's weights, except for the Nin@s en Movimiento programme. This review brings to light a paradoxical situation. At a time when preventing obesity has become a priority for the public health services, only a limited number of studies on intervention programmes are available for analysing findings.

We strongly recommend that all intervention programmes are accompanied by a well designed, carefully analysed assessment of the programme, facilitating a sufficiently powerful statistical analysis to demonstrate what works, what does not and who it is useful for.

PROPOSED INTERVENTION PROGRAMME

Table 1. Scope of intervention in the prevention of child obesity in schools

INDIVIDUAL	FAMILY/SCHOOL	MUNICIPAL	REGIONAL
	Leisure activities		
	Sports facilities	HEALTH SERVICE	URBAN PLANNING DEPT.
INCREASED ENERGY EXPENDITURE	Domestic tasks		
	School transport	SCHOOLS	EDUCATION AUTHORITY
	Place of study		
	Family games	SOCIAL SERVICES	DEPT. OF HEALTH & CONSUMERISM
	Physical education		
BETTER NUTRITION	Out-of-school sports activities	FOOD	MASS MEDIA
	School dining rooms		
	Family diet		

Initiatives in schools:

•Support for institutional public health campaigns and the creation of school campaigns.
•The partial redesign of physical education as a subject.
•The development of innovative intervention projects in schools.
•Intervention in school dining rooms and nutritional control of school meals.
•The provision of equipment for doing physical exercise during break times in schools.
•Finding out the level of physical activity and physical condition of our schoolchildren.

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Keywords: Child obesity, school intervention programmes, health

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THE PREVENTION OF CHILD OBESITY IN SCHOOLS: A PROPOSAL FOR INTERVENTION

Abstract:

Current evidence suggests that numerous dietary and exercise-related initiatives aimed at preventing child obesity are not effective in preventing an increase in weight, but they can help to promote a healthy diet and higher level of physical activity. Being too overweight (obese) can cause health, psychological and social problems in children. Obese children are more likely to have weight and health problems when they are adults. Programmes designed to prevent obesity focus on modifying one or more factors that are considered to lead to this problem. This bibliographical review includes assessment studies of a variety of intervention programmes that featured an increase in physical activity and dietary changes, either alone or in combination. From the trials, there is no sufficient evidence to prove that any programme in particular can prevent child obesity, although exhaustive strategies aimed at fostering changes in diet and physical activity, together with psychosocial support and changes in the children's background context can help. There is a tendency for more recent initiatives to involve the local community and to include evaluations. Future research might regard changes in favour of the population as a whole as being useful, such as improvements in the type of available foods in schools and in the availability of safe places to run and play, and they should evaluate the effects on health and the costs over a period of several years.

Keywords: Child obesity, school intervention programmes, health.

PRÉVENTION DE L'OBÉSITÉ INFANTILE EN MILIEU SCOLAIRE: PROPOSITION D'INTERVENTION

Résumé:

L'évidence actuelle suggère que de nombreuses interventions basées sur le régime alimentaire et les exercices physiques pour prévenir l'obésité chez les enfants ne sont pas effectives pour prévenir la prise de poids, mais peuvent l'être pour promouvoir une alimentation saine et une plus grande activité physique. Être en surpoids (obésité) peut causer chez les enfants de graves problèmes de santé ainsi que des problèmes psychologiques et sociaux. Les enfants obèses ont une plus grande probabilité d'avoir des problèmes de poids et de santé à l'âge adulte. Les programmes conçus pour prévenir l'obésité visent à modifier un facteur ou plus parmi ceux considérés comme promoteurs de l'obésité. Cette révision bibliographique inclut des études qui évaluaient une série de programmes d'intervention parmi lesquels l'augmentation de l'activité physique et les changements d'alimentation, de façon séparée ou combinée. Nous ne disposons pas à partir des tests d'un degré d'évidence suffisant nous permettant de démontrer qu'un programme particulier peut prévenir l'obésité chez les enfants. Néanmoins, les stratégies exhaustives pour aborder le régime alimentaire et l'activité physique renforcées par l'appui psychosocial et le changement d'environnement peuvent être utiles. Il existe une tendance dans les interventions les plus récentes à impliquer la communauté concernée et à inclure des évaluations. La recherche future pourrait évaluer utilement les changements introduits au profit d'une population tout entière, tels que les progrès réalisés par rapport au type d'aliments offerts dans les écoles et à la disponibilité de lieux sûrs pour courir et jouer, et elle devrait évaluer les effets sur la santé et les coûts sur une durée de plusieurs années.

Mots-clés: obésité infantile, interventions scolaires, santé.

PREVENCIÓN DE LA OBESIDAD INFANTIL EL ÁMBITO ESCOLAR: PROPUESTA DE INTERVENCIÓN

Resumen:

La evidencia actual sugiere que numerosas intervenciones de dieta y ejercicios para prevenir la obesidad en los niños no son efectivas para prevenir el aumento de peso, pero pueden serlo para promover una alimentación saludable y mayores niveles de actividad física. Poseer demasiado sobrepeso (obesidad) puede causar problemas de salud, psicológicos y sociales en los niños. Los niños obesos tienen mayor probabilidad de presentar problemas de peso y de salud cuando sean adultos. Los programas diseñados para prevenir la obesidad se centran en modificar uno o más de los factores que se consideran promotores de la obesidad. Esta revisión bibliografica incluye estudios que evaluaban una variedad de programas de intervención que incluían el incremento de la actividad física y cambios alimentarios, solos o en combinación. No hay suficiente evidencia a partir de los ensayos para probar que cualquier programa en particular puede prevenir la obesidad en los niños, aunque las estrategias exhaustivas para abordar el cambio en la dieta y la actividad física, junto con el apoyo psicosocial y el cambio ambiental, pueden ayudar. Existe una tendencia de las intervenciones más recientes a involucrar a la comunidad respectiva y a incluir evaluaciones. La investigación futura podría evaluar de manera útil los cambios realizados en beneficio de toda una población, como las mejorías en el tipo de alimentos disponibles en las escuelas y en la disponibilidad de lugares seguros para correr y jugar, y debería evaluar los efectos sobre la salud y los costos durante varios años.

Palabras clave: Obesidad infantil, intervenciones escolares, salud.

PREVENÇÃO DA OBESIDADE INFANTIL NO ÂMBITO ESCOLAR: PROPOSTA DE INTERVENÇÃO

Resumo:

A evidência actual sugere que inúmeras das intervenções de dieta e exercícios para a prevenção da obesidade nas crianças não são efectivas na prevenção do aumento de peso, mas podem sê-lo na promoção de uma alimentação saudável e de maiores níveis de actividade física. Possuir demasiado excesso de peso (obesidade) pode causar problemas de saúde, psicológicos e sociais nas crianças. As crianças obesas têm uma maior probabilidade de apresentarem problemas de peso e de saúde quando forem adultos. Os programas desenhados para prevenir a obesidade centram-se na modificação de um ou mais factores considerados como promotores da obesidade. Esta revisão bibliográfica inclui estudos que avaliavam uma variedade de programas de intervenção que incluíam o incremento da actividade física e alterações alimentares, isolados ou combinados. A partir dos ensaios não existe uma evidência suficiente que prove que qualquer programa em concreto possa prevenir a obesidade nas crianças, embora as exaustivas estratégias para abordar a alteração na dieta e na actividade física, juntamente com o apoio psicossocial e a mudança ambiental, possam ajudar. Existe uma tendência por parte das intervenções mais recentes para implicar a respectiva comunidade e incluir avaliações. A investigação futura poderia avaliar de uma forma útil as alterações realizadas em benefício de toda uma população, como as melhorias no tipo de alimentos disponíveis nas escolas e na disponibilidade de lugares seguros para correr e brincar, e deveria avaliar os efeitos sobre a saúde e os custos ao longo de vários anos.

Palavras-chave: Obesidade infantil, intervenções escolares, saúde.