Physical activity and the prevention of childhood obesity-Europe versus the United States

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Debate

Physical activity and the prevention of childhood obesity – Europe *versus* the United States.

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Three topics were addressed in a debate:

1. Is the increased prevalence of childhood obesity in Europe and the United States the result of decreased physical activity?
2. Are there certain periods in childhood and adolescence critical to the establishment of active or inactive behaviours?
3. What are the most adequate intervention strategies with respect to physical activity in the prevention of childhood obesity?

Two panel members introduced each topic, to express their view on the topic based on either the European or the American situation, followed by a plenary discussion.

Is the increased prevalence of childhood obesity in Europe and the United States the result of decreased physical activity?

Introduction

Barbara Livingstone: In the literature, lack of activity is not the dominant factor in childhood obesity in European children.[1] In most studies, physical activity peaks around the ages of 13–14 y, with boys being more active than girls. Also it seems that boys are engaged in more high intensity physical activity. Many studies have measured physical fitness, while physical activity is the key behaviour. In case of physical activity, this variable should be treated as a continuous variable and consequently assessed in populations with low-to-high prevalence of obesity. Therefore more longitudinal studies are needed including the following factors: representative sample; seasonal effects; physical activity as a continuous variable and in units related to body size; valid and reliable measures and instruments for physical activity.

Carl Caspersen: National data show an increase in the prevalence of obesity from 7% in 1966 to 15–22% in 1994, both in girls and in boys. There seems to be a linear change over time in boys of 6–11 y and 12–17 y. More than four hours television watching per day was directly associated with the sum of skinfolds, but not so much with body mass index (BMI). It is understandable when considering a raise in sum of skinfolds together with a stable BMI. American studies have shown an annual decline in physical activity of 4–8% between the ages of 12 y and 15–18 y.

Discussion

Wim Saris: The problem is a lack of valid data to answer the question on the relation between childhood obesity and physical activity. In studies using doubly labeled water, no difference could be seen in physical activity between Europe and the US, in spite of the higher prevalence of obesity in the US.

Caspersen: An epidemiologist would ignore the results of most doubly labeled water studies because of the small number of subjects involved. Therefore, the first topic could not be answered with doubly labeled water studies.

Livingstone: There are no valid data on physical activity (and on energy intake).

Caspersen: We need panel designs of physical activity measures. Also subsamples of different socio-economical status (SES) should be used in order to cope with this confounding factor.

Michael Goran: Doubly labeled water only measures one component of physical activity and only over 14 days.

Saris: This is the normal procedure in epidemiological research.

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Dale Schoeller: The average level of physical activity in both populations can be equal when the variance may differ significantly. It is also a question as how to normalize physical activity: in absolute values (kJ/d) or adjusted for body mass.

Nino Binns: What are the recommendations for measuring physical activity without the risk of over-reporting?

Livingstone: There is no objective method for measurement physical activity in children at the present time. The best options are heart rate monitoring and accelerometers.

Goran: Physical activity is too complex to capture in one test. Especially when related to outcomes of health (for example, how much physical activity is clinically relevant). In the beginning, doubly labeled water was used to improve this technology.

Bernhard Gutin: The question of the chicken and the egg still remains. A longitudinal study is needed to address the effect of physical activity as in the development of leanness and fatness in growing children. Also, what is the effect of an increase in physical activity: an increase in energy intake and, as a result, changes in body composition?

Vicky Lambert: Measures of physical inactivity might be easier to get at. Additionally, we need to measure physical activity in units that can be translated to national policies. In the case of South Africa, we see a booming prevalence of obesity. Recent surveys show figures up to 50% due to a collapse of physical activity.

There is a dramatic decrease of physical education in the United States, while physical activity is important for all people not only for the obese. However, the obese child generally does not like physical education. Recently, the national association for sport and physical education (NASPE) has issued national guidelines for physical education teachers to improve the attitude towards physical education for obese children. A Finnish study demonstrated the important role parents play in their attitude towards physical activity. At school, it is more important for physical education teachers to learn physical activity instead of having children do physical activity during physical education lessons. School lessons are too short, but encouragement of physical activity in the lessons is possible.

Are there certain periods in childhood and adolescence critical to the establishment of active or inactive behaviours?

Introduction

Goran: Results from a longitudinal study (unadjusted, raw data) of 11 boys and 11 girls showed that the activity induced energy expenditure increases in American girls from 5.5–6.5 y, but decreases at the age of 9.5 y by 50%. The age of 9.5 y is approximately one year prior to the onset of puberty. For American boys, activity induced energy expenditure still increases at the age of 9.5 y. The same holds for physical activity expressed in hours per week. Thus, a part of puberty influences activity induced energy expenditure.

Han Kemper: Data from longitudinal measurements of daily physical activity show, at least in the Netherlands, an exponential decrease between the age of 11 and 21 y. Physical activity decreases with 4 h/week at the age of 13 y, 2 h/week at the age of 16 y and 1 h/week at the age of 21 y. There is an overall decrease in medium physical activity of 75%. The critical point for physical activity is not in childhood but in puberty. Adolescents play fewer games, hang around, watch more TV and change from bike to moped or public transport. Besides, they have less free time available, due to homework for school. Possible solutions for increasing physical activity in children are: physical activity must be made attractive and enjoyable for children and normal daily physical activity should be maintained. At the age of 14 y in the Netherlands, 20% of total activity is from sports and 80% is from transportation (being in the streets, walking the dog) and being at home active doing all kinds of jobs.

Discussion

Saris: Is there an explanation for the decrease in physical activity in American girls from 6–10 y? Data from a study we did in the past showed no real drop in activity induced energy expenditure at this age. The large difference between high and low activity levels was explained, at least in the younger age group, by playing outside or inside. Could this also be an explanation for the results found in American girls?

Goran: American girls probably like to hang around at a younger age than European girls do. For boys we don't know yet if there comes a drop in activity induced energy expenditure, because we haven't been able to follow them long enough.

Angelo Tremblay: Is there data available of babies body weight status before voluntary physical activity is influenced by the environment?

Claudio Maffeis: Body mass of children born in 1960 and born in 1990 are comparable, but the prevalence of prematurely born children has increased.

Kemper: A high or low physical activity level at a certain age does not say that this is still the same 10 years later. The tracking coefficient for physical activity is not high. Inter-period correlation over a period of 15 years was approaching zero. This means

that over a period of 15 ys, you cannot predict whether a child who is active, is still active 15 y later or predict the opposite.

Gaston Beunen: A critical period in childhood and adolescence must be changed into a sensitive period, because you can still change from a low to a high physical activity. A critical period means that you cannot change after that period and that is not the case here.

Kemper: Data from a twin study on sports activity reveal that the sports activity in non-identical twins (12–18 y) is not predicted by the sports activity of the parents, but of their peer-group.

Edgar van Mil: A decline in physical activity might also be influenced by biological changes like maturation. Puberty costs energy and therefore you may see an earlier decline in physical activity in girls than in boys.

Goran: There is a conservation of energy use prior to puberty (a hypothesis of us published in Pediatrics,[2]) achieved through a marked reduction of physical activity.

Beunen: I question that, because then you would see a remarkable impairment of the growth and maturation of youngsters who are active in sport, and that is not the case.

Goran: There is a delay of menarche in girls who are very active in sports.

Beunen: A late maturation in some sports by girls is often combined with disordered eating patterns. Besides, it is a predisposition to be good in that sport more likely than the effect of training.

Mikael Fogelholm: Physical activity is not related in parent and child, but physical inactivity is related between parent and child. Inactivity would be more a lifestyle of a family.

What are the most adequate intervention strategies with respect to physical activity in the prevention of childhood obesity?

Introduction

Saris: Dr Goran, could you tell us what you would do if you would have a million dollars to spend on the prevention of obesity in childhood: what would be your strategy?

Goran: With one million dollars we could not do anything. Looking at the literature, there are some key features for behavioural intervention that need to be addressed. These features have to be theory based, with the social cognitive theory as the most used one; certainly it has to involve a family component; the school should be the basis of intervention or at least the vehicle in which the intervention is delivered; they have to address multiple health behaviours and have to be focused at the general public, in addition to targeting high risk subgroups and individuals. But in general, this intervention is primary prevention and universal public health promotion. The Social Cognitive Theory is based on multiple factors that interrelate with each other. These factors are personal, environmental and behavioural. Within these factors, this theory addresses issues as outcome expectancies and school based interventions, and it has been shown that they evoke a significant change in behaviour that needs to occur. Indeed, most of the successful school-based interventions were designed using this theory.

Maffeis: Giving the example of a heart-rate measurement of an average 10-year-old girl in Italy, it can be seen that the time spent on high intensity activities is < 30 min per day, when 11 h per day are spent on low intensity activities (for example, homework, television viewing, time at school, etc.). The Physical Activity Level (PAL) or the ratio of total energy expenditure and basal metabolic rate (BMR) of this girl is roughly 1.4. When we would be able to reduce the low intensity activities from 11 h to 9.5 h a day and consequently increase the high intensity and moderate intensity both to 1 h per day, the PAL would reach 1.85 and total energy expenditure would be significantly increased. It is thought that a PAL of 1.6–1.7 would be preventive of further weight gain.

In order to achieve this increase in the amount of daily activity, it is absolutely necessary to have the cooperation of the family. If this is the case, then an important target should be the promotion of an active lifestyle for the family and a reduction in television viewing. As was shown in the data of the Centers for Disease Control that was presented earlier, there is an increased risk of obesity in children who watch television for > 2 h a day. Furthermore, the media can play an important role in promoting an active lifestyle; and the community is responsible for facilitating physical activity in the child's environment. Additionally, the school could create the possibility for children to be physically active. If a child could spend one hour a day of high intensity activities at school, its physical fitness will improve, which is again another factor in the prevention of overweight.

Therefore, with a budget of one million dollars, health care should focus its attention on the identification of children with a high risk of obesity and promotion of an active lifestyle for the family.

Discussion

Saris: One of the basic questions to answer is whether we should promote the increase of physical activity or promote the reduction of physical inactivity. So again,

if you were given a budget of one million dollars what would be the first step to take?

Goran: There is no simple answer for such a multidimensional phenomenon as physical activity. There is also no risk in trying either of them, but it seems more logical to focus on both matters. Certainly, targeting the amount of television viewing would be beneficial, but how would you accomplish this? How do you suddenly get children to stop watching television? Promoting the reduction of inactivity is important, but in practical terms, the way to displace inactivity is by promoting physical activity.

Saris: We have learned from the alcohol prevention programs that it is important to reduce the alcohol consumption of the general population at first, before focusing on the at risk population.

Jean-Francois Gautier: Children are naturally very active, but their parents are restraining them. Children are only allowed to be physically active if the adults decide it is appropriate.

Livingstone: In many countries, parents nowadays are terrified to let their children out of doors. Television viewing is a very good way of shutting them up. Most parents would love to see their children play out of doors, but they are just too terrified. This is a major public policy issue.

Kemper: In this discussion, television is viewed as the ultimate inactive behaviour, but in earlier days, parents stimulated their children to read. On the other hand, former soccer fields in the cities are now packed with cars, and therefore it is also a matter of changing the environment. Driving to the fitness center with your children is not the solution. As long as we do not change our environment, we cannot change the behaviour of our children.

Saris: At this moment, we are buying our physical activity in attractive sports- and free-time facilities. The lower socio-economical classes cannot afford it and are forced to spend their free time in front of the television set.

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