

Round Table: Current trends in physical activity in Europe and Greece

Physical activity and health in Europe

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We have known for more than half a century that physically active people have substantially reduced risk of contracting virtually all of the major, chronic diseases that afflict 21st century western societies. Active people have about half the risk of disease and premature death from all causes, the greatest contributory factor being reduced risk dying of coronary heart disease. Although medical science can treat disease to the extent where lifespan is maintained – or even extended – many people live the final decades of life sub-optimally. They survive, but have to endure the burden of debilitating chronic disease. In other words, they are poor-quality life years. Our children may be most at risk, as they will be the first generation in which substantial numbers will be exposed to obesity and related metabolic disorders from an early age. The subsequent health effects of exposure to such risks from a very early age are unknown and disturbing.

There are now 20 chronic diseases and conditions, for which we have both evidence and plausible biological explanations for a protective effect of physical activity. These include both physiological and psychological disorders. It seems that the human genome – unless stimulated most days by some physical exertion (our true evolutionary, ‘hunter-gatherer’ state) – malfunctions. Such abnormal gene expression leads to the breakdown of body regulatory systems, pathophysiologies, chronic disease and early death. It is ironic that our ‘hunter-gatherer’ genes (geared to efficient conversion of food into fat), which promoted survival in times of ‘famine’ are now promoting disease in times of ‘plenty’.

Whereas these activity/disease associations have been known for 50 years, it is only very recently – probably with the onset of the ‘obesity epidemic’ in the mid 1980s – that a public health focus has been brought to bear on physical activity as a critical health related behaviour. But there is now a gathering consensus that sedentary lifestyles are probably the greatest public health challenge of the 21st century, at least in the field of preventable chronic disease.

Many public health interventions to promote active lifestyles have been attempted, but results have been disappointing. Small improvements in activity can sometimes be detected but are never sustained. The most common approach to intervention has been education and/or motivational strategies – that is, focussing on the individual as responsible for change – but there is increasing realisation that individuals – however well educated and motivated – normally fail to change. Equally powerful factors that act individually and synergistically to shape habitual behaviour include family, peer group, community, environmental and health/social policy dimensions influencing human behaviour. It may be that town and transport planners, architects and politicians hold some of the important keys to unlocking more active lifestyles. It has taken a generation to create today’s sedentary society. But if we act now, we may achieve some measure of ‘recovery’ in a hopefully shorter timescale.

Physical activity, obesity and lifestyle of children and adolescents:

The experience from studies in Crete

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Obesity among children and adolescents in Greece has been increasing and reached epidemic proportions since the last 2-3 decades. In 1982, the percentage of overweight and obese children and adolescents, aged 9-17 years, was 20,87%, while this increased to 40% by 2002 for children of the same age.

The most significant reasons for this increase are the total lack of or inadequate physical activity and the increased consumption of foods with high energy density and low nutrient content.

The consumption of foods with high energy density is mainly due to the increased availability of processed foods, containing fats of poor quality that are rich in saturated and trans fatty acids, and high amounts of sugar. Consequently, daily consumption of one or more glasses of soft drinks from pre-school children (aged 4-7 years) has been found to double the danger of a waist circumference that will exceed the 90th percentile.

High waist circumference is an indicator of central obesity. Among 8 countries, Cretan children aged 6-16 years have the highest waist circumference levels, only second to their Italian counterparts.

The quality of the abdominal fat is less favorable compared to the buttock' s fat (containing high amounts of saturated and trans fatty acids, whereas the content in mono-unsaturated and poly-unsaturated fatty acids is significantly lower).

High waist circumference combined with high arterial blood pressure, high triglyceride and blood sugar levels and low HDL-cholesterol levels are the main characteristics of the metabolic syndrome. It has been found that 3% of preschool-aged children have 3 or more of the above metabolic syndrome

risk factors, while this percentage increases among school-aged children and adolescents.

Almost half of preschool-aged children have high atheromatic indexes. The time they spend inactive watching television ranges from 2 to 4,5 hours during weekdays and in the weekends, whereas time dedicated to physical activity during the whole week is very limited (1-1,5 hours).

A change in the lifestyle and nutrition of the whole family since the pregnancy period, infantile and preschool age seems to be the only way to face this epidemic elation of obesity. Less than 10% of mothers breastfeed their babies adequately (i.e. exclusive breastfeeding for 6 months and continuance of breastfeeding along with weaning foods until the 12th month). The lack of adequate breastfeeding has been associated with more than double a risk for obesity in later life.

It is necessary to spend 2-3 hours in physical activity daily and to limit inactive time, as well as choose fresh, unprocessed foods without added fats, sugar, salt and chemical substances. Appropriate education beginning at nursery school, with children's active participation in health, nutrition and environmental issues will help tackle the obesity epidemic.

An example of such a program is the one conducted in the University of Crete between 1992-1998. At the beginning of each school year, teachers of each class were given seminars on preventive health and nutrition issues. The intervention group was consisted of all 4500 pupils registered in the first grade of primary school in 1992 in 2 counties of Crete, whereas the control group consisted of all 1500 pupils, registered in the same grade, in a third county of Crete.

Each pupil received a series of educational booklets, which differed for each grade of primary school. In addition, both parents and teachers obtained appropriate booklets. Finally, the teachers attended seminars on how to implement the intervention.

The evaluation of the intervention and its effectiveness were assessed every 3 years among a representative sample of 1000 children (600 pupils in the intervention group and 400 in the control group).

The pupils in the intervention group had significantly better blood lipoprotein levels at the first 3 years' assessment but also at during their last assessment in 2002, 4 years following the intervention in the sixth grade of primary school.

The more favourable lipoprotein levels of the intervention group resulted from the children's improved food choices but mainly to their improved cardiovascular resistance, since they devoted significantly more time to physical activity during the week compared to the control group.

The effect this intervention had in health matters was also obvious 4 years following the end of the intervention, when only 7% of children in the intervention group, compared to 13% of children in the control group, were smokers. From a public health perspective, this is an extremely successful experiment since it could result in a 35% decrease in smokers on a national level.

Since children in the intervention group devoted more time in physical activity, this could possibly mean that they increased their awareness about health issues and that most of them will make better lifestyle choices in the next years.

Effectiveness of interventions promoting physical activity in young people in Europe

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Lifelong physical activity reduces the risk for a variety of chronic diseases developed in adulthood (Department of Health, 2004). As most of these diseases result from processes that begin early in life, promoting active lifestyles in children presents an attractive strategy for promoting adult health (Boreham & Riddoch, 2001), pushing physical activity promotion high on the health policy agenda for children and young people.

Despite a significant evidence base about the benefits of physical activity, most children remain resistant to adopting and maintaining active lifestyles. There have been several large studies of the physical activity characteristics of children and youth in Europe over the last decade. European boys of all ages participate in more physical activity than European girls and the gender difference is more marked when vigorous activity is considered. There is a marked reduction in activity over the adolescent years (Armstrong & Welsman, 2006).

Accelerometry data from the European Youth Heart Study on 2185 nine and 15 year-old children and youth demonstrated a large drop in moderate to vigorous physical activity (MVPA) over this time (Riddoch et al., 2004). More recently, the Avon Longitudinal Study of Parents and Children stressed the low number of children who meet the recommended levels of physical activity. Among 5,000 11-year old children only 2% met the criterion for continuous MVPA of at least 20 minutes duration, instead undertaking most activity at a lower intensity. This large cohort study confirmed that boys are more active than girls as 40% of boys undertook MVPA for 5 minutes whereas the equivalent figure for girls was 22% (Riddoch et al, 2007).

At the lower end of the physical activity continuum, sedentary behaviour corresponds to a complementary dimension of physical activity

behaviour (Katzmarzyk et al., 2007). The amount of sedentary behaviour might be more important to measure than physical activity levels especially with pre-school children. Cross-sectional and longitudinal data show that more than 2-3 hours daily of inactivity has been associated with increased overweight and obesity in pre-school children, whereas, high amounts of TV viewing in infants has been shown to track into childhood. Shifts at the patterns and levels of sedentary behaviours over time and the causes for these shifts need to be examined. Studies should broaden their focus from solely examining markers of television viewing to the investigation of the so-called "small screen recreational activities" (Katzmarzyk et al 2007:6) which include use of computers for surfing the internet and playing video games. This dimension of sedentary behaviour will require the development and validation of new measurement tools.

Several types of interventions have been used in increasing physical activity levels of young people in Europe. In a recent systematic review of interventions to promote physical activity in young people, Van-Sluijs et al. (2007) identified 57 studies worldwide, from which 17 were contacted in Europe (9 in UK, 3 in Greece, 1 in Ireland, 1 in France, 1 in Finland, 1 in Netherlands, and 1 in Spain). Eight of the 17 European exhibited high methodological quality.

The studies (13 out of 17) focusing on children (<12 years) employed educational (6 studies), environmental (4 studies), and multi-component (3 studies) interventions. Three high quality educational studies, 1 high quality environmental study, and 1 high quality multi-component study reported a significant positive effect. All except one (family-based intervention) study of children involved school-based interventions. Five studies were restricted to the school setting only and six evaluated school-based interventions which also included family or community components. Four of the school setting only interventions, and four of the school plus family or community reported a significant positive effect. The studies (4 out of 17) focusing on adolescents (>12 years) employed educational (2 studies) and multi-component (2 studies)

interventions. Only 1 multi-component study was considered to be of high quality and this study reported a significant positive effect of a school plus family or community component.

The limited number of European studies highlights the need for more high quality studies. From the 13 studies conducted with children, 8 reported a significant positive effect and they were all school-based interventions. Only 4 European studies focused on adolescents, stressing the urgent need for interventions targeting this population. Overall, the evidence from the 57 studies worldwide was inconsistent for children with the strongest effects coming from studies with adolescents. Specifically, some evidence of effect was shown for environmental interventions targeting children, whereas multi-component interventions may make important differences in physical activity levels in adolescents.

These findings support recent calls for the incorporation of both individual-level and environmental-level factors in an integrated approach to physical activity research and practice. This approach is the base for a shift to the transdisciplinary paradigm which combines concepts and methods from disciplines ranging from exercise and behavioural sciences, to urban planning and transportation (Sallis et al, 2006). Considering multiple levels (e.g., intrapersonal, interpersonal, home, school, community, policy) of influence on young people's behaviour will contribute to the understanding of the principal determinants of PA and the causes of the inactivity among young people. This approach requires interventions that are context-specific, expand outside the school setting and are developed locally. Research conducted in naturalistic settings, and from an ecological approach could provide valuable insights into our currently restricted knowledge of why physical activity is decreasing, and how we might tackle it. Although there are currently no interventions which could be described as a model for "best practice", new interventions need to mesh better with how the problem of inactivity is dealt in real life settings. That in turn, requires close collaboration between researchers and decision makers and development of new evaluation tools for

complex multi-method physical activity promotion programmes (Nutbeam and Bauman, 2006).

Sixty-seven per cent of the studies reviewed by Van-Sluijs et al showed a positive intervention effect; this varied from a 42% increase in participation in regular physical activity to an increase of 83 minutes per week in MVPA. In order to conduct a meaningful overview of the results of different trials the different levels of PA need to be clearly differentiated in results sections. Studies often contain information about physical activity of more than one intensity or type, and we need to reinforce the importance of reporting the relationship between the determinants, mediators and intervention manipulations separately for each.

The variety of measures of PA expressed in terms of duration (e.g. in minutes), frequency (e.g. times per week), intensity (e.g. vigorous) or a combination of these, i.e. in terms of volume (e.g. METs or kcal) carries several implications. The lack of precision in exposure variable (PA) leads to underestimation of strength of relationships with outcome (health) variables. Self reported PA carries substantial error and hence until very recently, our ability to detect relationships was limited. Assessing physical activity in children poses specific challenges because their movement is characterised by short bursts of activity and velocity and movement types can vary considerably. Children also, find it more difficult than adults to accurately recall activity (Oliver, Schofield, & Kolt, 2007). The development of objective methods of measuring PA have greatly improved our measurement precision and uncovered strong relationships with health parameters. This picture will further be improved by new developments in the use of global positioning systems (GPS) in monitoring young people's activities within their physical environments.

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Factors which affect and determine the nutritional behavior of children and their relation to body weight.

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It is well known and well documented that childhood obesity plays a critical role to their health and especially to their health in adolescent life. The reason for childhood obesity has a multifactoral explanation and one main cause is child's nutrition. There is evidence that food preferences are based not only at the very beginning of their life but even earlier, during the last months of pregnancy. Ultra sound icons taken after a sweet drink consumed by the mother showed a "satisfactory" reaction of the fetus and in some other case carrot juice consumption prior to birth showed a positive approach to the taste of carrot for the toddler. So, women during pregnancy should be careful about their fetus future health but also should know that their own food preferences will affect their children's future preferences. The next fact that most of the parents may not know is that infants are born carrying basic food preferences that are based mainly on the energy content of these foods. So, at birth, sweet and fat tastes are preferred due to their energy value and sour and bitter tastes are rejected because they are associated with a possible contaminated or toxic food. Salt preference emerges about 4 months of age and in early childhood is even stronger than adulthood. It is not surprisingly why infants are pleased when fed with mainly sweet foods and this may spoil children by imposing this behavior using such feeding practices. Parents use this practice to keep their children "quiet" and calm when they are crying for some reasons and other family members or friends use this "technique" to be loved by the children. Such practices establish an early life nutritional behavior which follows children for almost the rest of their life. This is a very important point because it can have major lifelong consequences. It is possible that food preferences formed early in life persist to affect adult food selection;

that is what a child learns to like in his early years can built his food preferences and food choices as an adult.

Another aspect that we may not take in account is that infants from birth to 11-12 months old normally can regulate their energy balance. It means that infants eat as much as they need to reach their caloric needs, which are higher during the first months because their growth is very fast, greater than the next months and years. Parents normally worry very much and overfeed infants, something that they continue when they get toddlers and in most cases for all the next childhood years. They (parents) worry if their kids don't drink all the bottle of milk, they continue with their creams (solid food introduction) and they end by pushing them to finish up all their plate food. The quantity of food served usually is greater than the actual needs and this fact play an important role in the development of childhood obesity. Another important cue in the progress of preferences is the availability and the quality of foods offered at home. Studies show that when a child sees something often, especially consumed by others (parents), it is very probable that will choose it. This information comes together with another one, saying that a child will like or dislike foods and that needs time and repeated efforts to adjust to new tastes. Usually 10 to 15 efforts to try new foods are needed to establish a new preference. Parents quit their efforts to introduce a new food after 3-4 times and this may work adversely to the variety of foods that are essential for optimal nutrition.

It is very common and normal that children dislike vegetables, meats and some not so sweet fruits. From the age of 6-7 months we can add slowly new foods in the diet but one different taste every 10-15 days. After the first year toddlers start to develop their preferences and for the majority of publications up to the age of two years it critical that children try many different tastes. Parents play an important role, to have available proper foods, to introduce them, to be patient and the most important to act as the main model for their children. From the age of two to 5-7 years old, children start to have strong preferences, they develop behaviors and they are

influenced more by the environment in which they grow up. The choice of foods to offer and the child feeding practices parents use also have enduring effects on food preferences and the controls of food intake. A very good example is the body weight of parents. Obese or overweight parents “serve” as negative model for the children and therefore it is very probable that these parents will have obese or overweight children. Family meals, normal and stable hours, friendly and encouraging environment are essential parts for positive responses by children. Dietary restriction is another, very common, strategy used by many parents to control the access to foods they believe that are unhealthy for children. An additional strategy is to pressure children to eat foods that are good for them, such as fruits, vegetables and whole grains. Research shows that the stronger the restriction the greater the response to consume these foods when available. Overall, the results of several studies indicate that restricting children’s access to foods can lead to enhanced preferences, increased attention to restricted foods, increased intake of those foods, even when not hungry. These findings are shown to be stronger for girls than for boys.

Another strategy that parents often use, and the social and marketing environment promotes it, is the use of foods as reward for some of children’s achievements. Research on this topic says that children learn to prefer a food when it is used as a reward and usually this food is a sweet. After all these approaches we conclude that children’s food preferences are important determinants of their food intake and that many different factors can affect it. The mere approach that the predisposition to prefer sweet and fatty tastes and avoid sour and bitter do not any more explain the promotion of over consumption and obesity in the plentiful times we live in 21st century in the developed countries. So, food preferences are the end product of an inter-play between genetic and environmental factors resulting in substantial individual differences in the extent to which children are suspicious and fussy about food in general and in their likes and dislikes for specific foods. The advantage of the malleability of human food preferences is that dislike for a

food can be reduced or even reversed by a combination of modeling and taste exposure. Unfortunately, few parents and child-care persons receive any guidance in how to promote food acceptance and how to resist to social and marketing strategies for wrong food promotion. We need a great, long term, effort and education to ensure that we can really develop effective strategies and interventions that can be widely disseminated to improve the eating patterns of young children and face the obesity epidemic in our developed world.