Summary
Perspectives on the encouragement of healthy energy balance related behaviour in the school environment
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Tackling the high prevalence of overweight and obesity is a worldwide major challenge for public health in the 21st century. Overweight is associated with chronic health problems such as cardiovascular diseases and type 2 diabetes, psychosocial problems and a reduced quality of life. The onset of overweight starts at a young age. In the Netherlands, the prevalence of overweight and obesity in youth (2 - 21 year) increased with 5% since 1980 and was 14%, including 2% obesity in 2009. Overweight children are faced with health problems, such as an increased risk for type 2 diabetes and psychosocial problems. Because childhood overweight is a strong predictor for overweight in adulthood, prevention of overweight should start early in life. Overweight is caused by a higher energy intake than energy expenditure resulting in excessive weight gain. The underlying mechanism is a complex system of genetic, hormonal, psychological and environmental factors. Prevention of overweight should be realised by balancing energy intake (nutrition) and expenditure (physical activity). Therefore a healthy lifestyle with healthy dietary behaviour and physical activity should be encouraged in adolescents and sedentary behaviour should be limited.

Encouraging a healthy lifestyle during adolescents needs special attention. In the transition phase from childhood to adolescence, adolescents gradually gain more independency and autonomy in making personal, behavioural health decisions. Parental control lessens and the influence of peer norms becomes more important, especially outside the home environment. As a result, the energy balances related behaviour pattern of adolescents becomes unhealthier: a decrease of the consumption of fruit, vegetables and breakfast, an increase of the consumption of snacks and sugared drinks, a decrease of physical activity and an increase in screen time (pc and TV). This unhealthy behaviour is likely to track into adulthood. Schools are considered a strong setting to encourage healthy behaviour in youth because of their potential to reach youth including their parents, and their responsibility and capacity to educate youth. However, the results of school-based interventions targeting adolescents are still limited on the long term. Teachers are key persons in school-based health promotion, as they have a powerful influence on the learning of students and deliver interventions in classroom. Involvement of parents, being key persons at home, is considered essential to extend school-based health promotion to behaviour at home. However, the roles and motivation of teachers and parents are underexposed in studies on school-based health promotion.

The aim of this thesis is to gain a better understanding of the EBRB and perceptions of adolescents themselves and of key persons in the school context, namely teachers and
parents, who are involved in encouraging healthy EBRB in adolescents in order to find directions to strengthen school-based overweight prevention. The focus was especially on the perspective of adolescents, their parents and teachers in prevocational schools.

Methods

Focus group interviews were carried out in 2007 to investigate the awareness, beliefs and priorities of adolescents (n = 37) with regard to overweight and health behaviour. At the same time, focus groups with school staff (n = 20) and parents (n = 10) were conducted to investigate the awareness and beliefs of school staff and parents regarding adolescents’ overweight and energy balance related behaviour, their motivation for health promoting activities and suggested actions in the school environment. All focus group interviews took place in three prevocational schools in the Zwolle area, in the Netherlands.

In 2010/2011, the CheckTeen study was conducted among students (age 13-15 years) in grade 2 of 9 of the 12 secondary schools in Zwolle, the Netherlands. The cross-sectional CheckTeen study was an adapted version of the ChecKid study carried out in primary schools in Zwolle in 2006, 2009 and 2012. Data collection consisted of anthropometric measures (height, weight) and a digital questionnaire on socio-demographic characteristics, dietary, physical activity and sedentary behaviours and beliefs about school-based interventions. In the digital questionnaire, questions on EBRB on school days were copied from the ChecKid study and modified for adolescents if necessary. Questions on determinants of behaviour, obtained from the focus group interviews and literature, were added. Part of the added questionnaire concerned parental influences on health behaviour, as perceived by adolescents and adolescents’ beliefs about school-based health interventions. Anthropometric measures (height, weight) were taken by school nurses of the local public health service (GGD IJsselland) during the periodical medical check that is part of the nationwide Youth Health Care program. Data of 1,084 adolescents were used for analysis in this thesis.

In 2012, a descriptive study was carried out to determine the teachers’ problem awareness, their motivation, actions and perceived barriers regarding teaching healthy dietary and physical activity behaviour to Dutch prevocational students. A digital questionnaire based on the Integrated Change Model was completed by 33 HE teachers and 17 PE teachers of prevocational schools in Dutch municipalities, that have adopted the JOGG approach (the Dutch version of the EPODE approach), and of schools in the network of the teacher training department of the Windesheim University of Applied Sciences.
"We are healthy, so we can behave unhealthily" (chapter 2)

In focus group interviews (chapter 2), adolescents pointed out the basic principles and the importance of a healthy bodyweight and healthy lifestyle. However, matters concerning health had no priority in their decision-making. Being overweight was considered negative in terms of health and social wellbeing, but adolescents did not take any specific actions to prevent themselves from gaining weight. In addition, adolescents had an optimistic perception of their ability to control their bodyweight.

Adolescents held their parents primarily responsible for providing opportunities for healthy behaviour and expected to learn about healthy behaviour in school. To encourage healthy behaviour, adolescents suggested that their parents should set a good example and did not provide unhealthy snacks on a regular basis. At school, healthy food should be made more attractive, cooking lessons could focus more on health aspects and opportunities to be physically active in school could be expanded. The focus group study indicated that adolescents seem to behave unhealthily when being responsible themselves, and displayed healthy behaviour when their parents provided the right opportunities. Learning to take personal responsibility should be an important goal for interventions, that encourage healthy behaviour in adolescents, especially in the school setting where adolescents are more autonomous than at home.

"Parents are responsible, but a bit support from school is welcome." (chapter 3)

The focus group interviews with school staff and parents (chapter 3) revealed that both school staff and parents were aware of overweight as a health problem, but underestimated the prevalence and impact of overweight and unhealthy behaviour in their personal environment or their own school. There was consensus that taking care of health-related behaviour of adolescents was primarily the responsibility of parents, but also that the school staff had a pedagogical responsibility. Parents and school staff agreed that health promotion efforts would have more impact on adolescents’ behaviour, when school-based activities were supported by parents and parental efforts were supported by school health promotion. Therefore, parental efforts and school-based activities should be aligned by developing and expressing shared norms about healthy behaviour and parents should be taught how to discuss healthy dietary and physical activity behaviour with their child. To tackle peer group culture and the obese environment, parents’ and school staff’s efforts should be part of an integrated community approach.
**Encouraging healthy behaviour in adolescents should be tailored to educational level and gender (chapter 4)**

In the CheckTeen study (chapter 4), the overweight prevalence (boys 18.1%, girls 19.3%) increased with decreasing educational level, especially in boys. Discrepancies were found between the measured BMI-category and perceived body weight status. Boys seemed to underestimate their body weight, while girls were more inclined to overestimate their body weight. Girls behaved healthier than boys regarding daily consumption of fruit (35% vs. 29%), vegetables (58% vs. 48%), ≤1 snack/candy (36% vs. 26%), and ≤3 glasses of sugared drinks (80% vs. 73%) (all p<0.05). Unhealthier dietary behaviours were associated with lower educational level, except for eating snacks. Snacks and sugared drinks consumed at school were mostly brought from home (61.6% resp. 68.5%). Overweight students had less often breakfast, snacks and sugared drinks than non-overweight students. Of all students, 40% spent ≥1 hour per day cycling to school. Students with lower educational level reported less organized sports activities than higher level students, but they played outside and had other activities more often. Overweight students were less involved in cycling to school (boys) and participating in organized sports (girls). More girls than boys were interested in lessons about healthy nutrition (44.4% vs. 31.7%). Boys suggested more PE classes (63%) to stimulate physical activity, girls advised more variation (47%) and choice (43%). A healthy school canteen (57%) and offering free fruit (67%) were suggested by boys and girls as promising interventions to stimulate healthy behaviour in the school environment. An approach to encourage healthy behaviour in adolescents should be tailored to educational level and gender. School-based interventions should address education and the school environment and be coordinated with parents.

**Parental influences have impact on adolescents’ energy balance related behaviour (chapter 5)**

The CheckTeen study (chapter 5) showed that parental influence, as perceived by adolescents, was positively associated with healthy behaviour when parents ensured practical guidelines and created a family culture where healthy behaviour was the norm and healthy food was available. The availability of snacks at home had a negative association with eating snacks (boys and girls) and consuming sugared drinks (boys). Girls and students with a lower educational level perceived less parental influences compared with boys and higher level students. These results are in contrast with the low self-efficacy of parents as they had expressed in the focus group interviews (chapter 3). Parents need to learn how to balance between being strict and caring parents and giving their child
autonomy. On the one hand, parents should actively encourage healthy behaviour by acting as role models and providing opportunities and establishing rules that need to be very specific and practical in order to be effective. On the other hand, parents should offer their child the opportunity to make its own choices and develop self-regulation skills. Schools can offer parents support by educating adolescents in health behaviour and creating a favourable physical and social environment. School-based interventions should not only focus on adolescents’ EBRB, but also include parents – especially regarding lower educational level students. Preferably, home- and school based health promotion activities are aligned with each other and embedded in a multifaceted, integrated community approach.

**Teachers should be competent in teaching and in health promotion (chapter 6)**

According to the digital questionnaire (chapter 6), teachers at prevocational schools felt motivated and competent to address EBRB in their lessons and supported by the school staff. Although teachers were content with the used teaching materials and perceived that their lessons had a positive influence on the students’ health behaviour, several barriers that could hamper the effect of classroom-based health promotion were identified. Mostly, the learning goals were not established in a school health policy, but set by teachers themselves. Most teachers aimed to improve their students’ health behaviour and felt their lessons had a positive influence. However, especially health-related behavioural goals, which are informal and not qualifying to move up to the next grade, were assessed informally by classroom evaluations or not at all. Therefore, teachers had no objective information on the impact of their lessons on the EBRB of their students. Teachers made little use of available theory-based interventions, but were content with using the textbook and self-made materials. Therefore, it is fair to state that health promotion strategies were not systematically applied. Considering that intervention programs do not always fit with the school’s or teachers’ needs and opportunities, teachers should be competent in health promotion and allowed to adapt intervention programs to their specific situation. Teachers considered the school canteen (72%) and the physical school environment (76%) unfavourable for students to behave healthily. As only minority of the teachers collaborated with colleague-teachers (39%), the school care team (11%), local retailers (7%), local youth care (22%), in most schools school-based health promotion was not embedded in a wider community approach. To enlarge the impact of school-based health promotion, health-related behavioural learning goals should be made explicit in a school health policy and the physical school environment should entice
healthy behaviour. Teachers should be trained in health promotion competence and collaborate with parents, colleague-teachers and stakeholders in the community in order to be able to design, deliver and evaluate lessons that enable students to achieve health-related academic and behavioural goals.

**Final conclusion (chapter 7)**

In chapter 7, the main findings of this thesis are summarized and discussed. Strengths and limitations of the studies in this thesis are discussed and recommendations for practice, public health policy, professional education and research are made. The need for interventions targeting adolescents’ EBRB is apparent, considering the prevalence of adolescent overweight and the change towards unhealthy behaviour when entering adolescence, which is prone to adult overweight and associated health problems. The home and school environment are important settings to influence adolescents. Parents should be stimulated and supported in their efforts to encourage healthy behaviour in their children by an integrated, multilevel community approach. Efforts of several stakeholders should be aligned to counteract influences of the obesogenic environment. School-based health promotion should include education and a favourable social and physical environment. The role of teachers should be specified and with regard to health promotion, the focus should be on strengthening the teachers’ competences and helping them to build a professional identity as health educators.