Introduction

It is important to be unambiguous in the management of childhood overweight and obesity. The present thesis describes the steps of the implementation of the integrated health care standard for overweight and obese children and the role of the general practitioner (GP) within this care. Since we acknowledge the complex and multifactorial nature of childhood obesity, in the second part of the thesis the influence of environmental factors on the development of overweight and obesity in children was investigated.

The present chapter firstly summarizes the main findings of this thesis. Secondly, methodological considerations of the research methodologies used are described, followed by interpretation of the findings and the implications for practice and research. This chapter will finish with an overall conclusion.

Main findings

PART 1: Implementation of the integrated health care standard for overweight or obese children

In chapter 2 we used semi-structured interviews to explore the expectations and needs of both overweight and obese children and their parents, as well as the factors that facilitate and prevent success in making and sustaining lifestyle behavior changes. This study demonstrated that parents and their overweight and obese children expect that they would lose weight by being physically active or by eating more healthily. Barriers to a healthy lifestyle were associated with parenting problems, specifically pertaining to the adoption of and adherence to new rules. Both parents and children lacked support from their extended family members. Within their social context, children struggled with being bullied at school. For both parents and children, support from their (overweight or obese) peers was seen as a facilitating factor. To maintain lifestyle behaviour change, overweight and obese children and their parents need support from their (extended) family, school, friends, peers and their GP. The GP should play a role in early identification and identify weight problems in time, discuss weight in a non-offensive manner and provide information on the long-term consequences of obesity.

In chapter 3 we investigated the barriers to and need for the implementation of the integrated health care standard on care of overweight and obese children as perceived by health care providers. A mixed-methods approach was applied using focus groups, semi-structured interviews, face-to-face interviews and an email based internet survey. We identified important barriers to the implementation of the key components of the integrated health care standard: reluctance to raise the subject of weight; lack of time for optimal treatment; unavailability of long-term interventions to refer to; absence of a structured multidisciplinary approach; financial constraints, and lack of feedback from other health care providers. The identified needs for implementation of the standard were: more obesity knowledge and awareness of obesity, financial reimbursement; task rearrangement; feedback of information, and a central care coordination. These barriers and needs are of great importance in defining strategies for the implementation of the integrated health care standard.

In chapter 4 we described the practicability of the integrated health care standard for overweight and obese children in Amsterdam-West and the experiences of the health care providers during the implementation period. Both quantitative and qualitative methods were used to evaluate the practicability. Working according to the integrated health care standard was feasible in this region. The three biggest hurdles were that 1) parents and children were difficult to motivate for treatment and additional support, 2) the GP could not fulfill the role of central care coordinator; and 3) there was a lack of communication and collaboration between the health care providers.

PART 2: Influence of environmental factors for a child to become overweight or obese

In chapter 5 we assessed the influence of green space, access to a garden and condition of the neighborhood measured at ages 3-5 years on being overweight or obese at age 7. In addition, we investigated whether parenting behaviours moderate or mediate this influence. Lastly, we evaluated the interaction of socioeconomic status with environmental context. We found that children living in an area with less green space, or less hospitable, and children without access to a garden had a higher chance of being overweight or obese.

In chapter 6 we enhanced our understanding of the causal relationship between environment - comprising level of green space, gardens, crime or multiple deprivation of a neighbourhood - and children's body mass index (BMI) by exploiting a longitudinal study with repeated measures on individual children and their circumstances at ages 5, 7 and 11. Decrease of BMI was associated with living in an area with more gardens or less deprivation for the entire population. A slight decrease in BMI was seen when children moved to a living environment with more gardens and less crime. We also found that a move to a worse area (less deprivation) was associated with an increase in BMI. All these relationships were modified by education level of the main respondent and the sex of the child.

Methodological considerations

This thesis contains a variety of research methods to examine different research objectives. These included qualitative research, mixed methods and several statistical methods such as logistic regression, moderation and mediation, random linear regression models, fixed effect models and change models. In the different chapters of this thesis, the particular strengths and limitations of each study have been discussed. In this chapter, the general methodological strengths and limitations of the research methodology used in the two parts are discussed. For each part, first the populations in which the research was conducted are described, followed by the methodological strengths and limitations.

PART 1: Implementation of the integrated health care standard for overweight or obese children

Population

In chapter 2, Dutch speaking parents and their overweight or obese children (4-12 years) participated in the study. The respondents were selected from the youth health care setting, primary health centre or hospital paediatric department. In chapter 3, data were collected from different health care providers with different professionals, including GPs, youth health care workers, paediatricians, dieticians, psychologists, and physiotherapists. The participants involved in the implementation of
the integrated health care standard, described in chapter 4, were GPs from the four health centres of the Academic Network of General Practitioners (ANH-VUMC) in Amsterdam-West, paediatricians and Youth Health Service (VHC) professionals.

During the inclusion of children for the study, the implementation of the integrated health care standard, 65 out of 320 overweight or obese children from the four health centres participated in the study. Of the 240 excluded children: 1) 146 children did not reach the initial consultation because their parents reported they were not overweight or obese, or we were not able to trace them, or they gave another reason for not attending; 2) after visiting the GP, 60 children appeared to be not overweight or obese anymore and 3) 34 refused participation in the study after consultation. 22 children initially were willing to participate, but did not complete an informed consent or retracted. Of the 65 participating children, only 28 children were monitored during one year of follow-up. Reasons for loss to follow-up were that respondents moved, did not reply on calls or letters despite effort of the health care provider. Monitored children are potentially the most motivated and therefore not a representative group compared to the population, however more than half dropped out. In addition, the high dropout rate among children ensured that GPs gained less experience working according to the integrated health care standard. This may have resulted in less cooperation with other healthcare providers, even though we put maximum effort in promoting collaboration between the health care providers.

In chapter 2 and 3 selection bias may also have occurred. It could be that only enthusiastic health care providers and motivated overweight or obese children and their parents with a favourable attitude towards the topic or their own experiences responded to participate in the study. Since we have no information of the non-respondents, it is difficult to know if the involved respondents are a representative sample of the population of interest. However, the qualitative studies (chapter 2, 3 and 4) have provided useful insights into barriers, facilitators and needs in lifestyle behaviour change and also understanding in the implementation and evaluation processes.

Strengths and limitations:

In chapters 2, 3, and 4 we gained information by interviews and focus groups. By using this qualitative research method, we were able to ask the respondents about their perspectives, considerations and experiences. We used an interview guide and observational protocol in chapter 2. This interview guide was developed by the research team and was based on the literature. The open nature of the questions in the interviews gave potential areas for further exploration. The observational protocol provided the researcher with extra contextual information, useful during the analysis of the data. The interviews took place at home, which allowed the respondents to feel free to tell their own story, improving the quality of the data. The respondents were selected from different lifestyle interventions and were a varied group of obese children and their parents. For the study described in chapter 4 one researcher performed all the semi-structured interviews during the implementation process, which maximized the uniformity of questions. The respondents of the focus groups meeting all participated in the implementation process and knew each other, which helped them to talk freely about their experiences, provoked useful discussions and providing rich data. An additional strength was the use of independent experienced GPs and researchers to guide the focus group meeting described in chapter 3. These helped to guide and clarify the discussions with the respondents. To increase the quality and inter-observer reliability all data collected and described in chapter 2, 3 and 4 have been coded, transcribed, summarised and discussed with at least 2 researchers.

In chapter 3 we used a mixed-method technique. The use of different kind of methods was warranted to fully account for the complexity of the barriers to and need for the implementation of the integrated health care standard. A strength of the qualitative research (focus groups and face-to-face, semi-structured interviews) was the creation of an open atmosphere for GPs and health care providers to allow them to give more detailed viewpoints and voluntarily raise issues. This provided rich data. The strength of the subsequently executed quantitative research was to confirm and supplement the qualitative results and increase generalizability. It showed that some barriers and needs were less pronounced in the survey versus the interviews and the focus groups. However, a substantial part of the survey identified the same barriers as the qualitative part of the study. This shows that qualitative research is useful in the identification of different viewpoints, but is not the right methodology to give information about the prevalence and distribution of the different points of view.

The qualitative research method used in chapters 2, 3, and 4 had some limitations. The interviews in chapter 2 were conducted by vocationally trained GPs. In chapter 3 by trained medical students and in chapter 4 by the researcher of this thesis. Since the interviewees had different backgrounds and therefore different personal characteristics this might have influenced the respondents. Therefore all data collected have been discussed with at least 2 researchers to increase the quality of the data. Furthermore, the interviews were face-to-face, which may have resulted in socially accepted and desirable answers. To prohibit this limitation and to get more objective measures, we have 1) continued interviewing until no new information emerged in chapter 2; 2) in chapter 3, we conducted a large-scale e-mail based internet survey 3) in chapter 4, we asked the members of the focus group meeting to fill in a questionnaire in advance, to investigate their opinions on the actions taken during the implementation.

PART 2: Influence of environmental factors for a child to become overweight or obese.

Population:

We used the nationally representative UK Millennium Cohort Study (MCS) website (www.mcs.ac.uk/mcs). The MCS is a multi-topic, multipurpose longitudinal cohort survey of around 19000 children born between September 2000 and January 2002 in the United Kingdom. UK Cohort members were sampled from universal (universal) Child Benefit records relating to children born within this period. A stratified clustered sample design was employed to oversample children living in disadvantaged areas and from ethnic minority groups. At the first survey, the cohort children were aged around nine months. They have since been followed up at around age three (2003-2004: MCS1), five (2005-2006: MCS3), seven (2007-2008: MCS4) and eleven (2011-2012: MCS5). The MCS provided an opportunity to simultaneously assess environmental and family factors for childhood obesity using an ecological...
systems approach. To analyse the MCS data it was important to account for non-response. Non-response is a concern since people who do not respond are likely to have different characteristics than respondents. Non-response is not random, meaning the sample is biased and no longer represents the sample it is supposed to. Therefore, probability weights were created to account for non-response.

In the studies described in chapter 5 and 6 we restricted our sample to those children living in England at the time child weight and the predictors were measured. We excluded families if more than one child was in the cohort, where information was missing or whether the family moved between contacts.

Due to the design of the study, in which children living in disadvantaged areas and from ethnic minority groups are over-sampled, not all participants had an equal selection probability. The prevalence of obesity is higher in low social classes and some ethnic minority groups in the United Kingdom. This gave us a representative cohort with enough overweight or obese children.

Strengths and limitations
The strength of the studies described in chapter 5 and 6 was the long follow up period of the children and their caregivers, giving us useful information about the variables measured in early life being associated with overweight or obesity later in life (age 7 or 11) (chapter 5). Furthermore, information bias may have occurred. The health related data, including direct measures of height and weight, were collected through interviews with main respondents in the home by trained interviewers. Since the questionnaires dealt with the past, respondents might have had difficulties answering (recall bias) and since the interviewers were present, the respondents might have given socially desirable answers (reporting bias). Nonetheless, the quality of the data is considered to be high because the fieldwork was carried out to a technical specification, the fieldwork was preceded by thorough piloting, and the data were rigorously checked.

Interpretation of findings
In the introduction of this thesis we indicated that childhood overweight and obesity is a major public health concern. To explore directions to invert this major public health problem we implemented and evaluated the integrated health care standard for overweight and obese children from the perspective of the GP within this care. As described in the introduction of this thesis the social-ecological framework by Birch and Ventura showed that a child’s weight status is influenced by the intake and expenditure patterns of that child, but these patterns are embedded within the larger ecology of the child’s family, community and demographic characteristics. Therefore, in the second part we explored the influence of several environmental factors on childhood overweight and obesity.

Findings from our study indicated that lifestyle behaviour change for overweight and obese children and their parents is difficult to fulfil without support from the extended family, school, friends, peers and their GP. Similar to other studies, we found that obese children need support to overcome their indicated barriers in behavioural change, namely: absence of parenting, difficulties with other family members, discontinuation of their lifestyle intervention and bullying. If we compare these findings with the findings of chapter 4, where a large number of parents and their overweight or obese children were unable to be monitored for a longer period, we might conclude that not only support from the extended family is important, but motivation of the parents and their children to change their lifestyle behavior is an even more important factor to successfully overcome their weight problem. It has been identified that recognizing family behavior and the child’s commitment to weight loss and the support of the family were important to successful weight loss. These factors could account for the children lost to follow up in the study described in chapter 4.

To overcome this in future research, the support and motivation of the family needs to be addressed in interventions.

In chapter 2 parents and their overweight or obese children indicated that they need support from their GP to change their lifestyle behavior. In chapter 3, the GPs indicated that they experienced difficulties in identifying obese children and indicated lack of competence in this area. These two findings are in contrast with each other. We might argue that if we want parents and their children to make a lifestyle behavior change, we first need the GPs to change their behavior, by making them feel competent to identify the children, and raise the issue during consultation. In the study described in chapter 4, GPs were trained in identifying childhood overweight or obesity. After the training they felt more competent. Despite the GP training, more than half of the children dropped out. It is possible that this is due to the fact that parents did not recognize that their child was overweight or obese, which impedes motivation to change lifestyle behavior. We can conclude that even when the GP supports overweight or obese children to change their behavior, it does not seem to be enough for the motivation and behavior of parents and children to successfully succeed in behavioral change.

In chapter 7 the health care providers recognized the difficulties of continuity of care (i.e. lack of monitoring) and a multidisciplinary approach (i.e. lack of coordination, absence of task rearrangements) in the management of childhood obesity. The majority of health care providers considered the appointment of a central care coordinator as a viable solution to these barriers. As described in the literature, the critical problem is the creation of support systems for its implementation at the level of primary health care. During implementation actions were taken to achieve continuity of care (is the delivery of a ‘seamless service’ through integration, coordination and the sharing of information between different providers) and a multidisciplinary approach (work agreements about collaboration and the means of internal communication, facilitation by Zorgmail (secure way of communicating) and GPs becoming central care coordinator). During the implementation it became apparent that GPs find it to be too time consuming to address overweight and obesity. The low response rates led to a lack of motivation to invite children periodically. Despite having received training, and despite the periodic meetings and the allocation of extra time resources in the health centres to spend on the children, the GPs persisted in their conviction that they were not able to fulfill the role of central care coordinator. Communication and collaboration mainly between the youth health care and the GPs was lacking.

In chapter 5 our findings showed that children living in an area with less green space, or which was less hospitable, and children without access to a garden had a higher chance of being overweight.
or obese. Our results and those of other studies show a relationship between child overweight/obesity and the choices made by parents regarding physical activity and having rules and family discipline. This implies that parenting and the environment are independent factors for child overweight/obesity. In chapter 6 the results suggest that environmental variables such as the number of parks, recreational facilities, or the level of multiple deprivation of a neighborhood may have driven selection. That is, these families that were less likely to have overweight children were more likely to choose to live in greener areas.

Integrated care is paramount for childhood obesity. The chronic care model is often used to describe integrated care. According to the chronic care model and the results presented in this thesis, I think the following elements are necessary to achieve integrated care: 1) a multidisciplinary team is needed, requiring time to provide coordinated care; 2) the team should consist of a mix of people involved in somatic care and social aspects or well-being; 3) the role of team members need to be clear including the role of coordinator; 4) a platform is required for all care providers involved, to communicate, to plan, to manage, and ultimately to evaluate the care for these children; 5) the team members should be trained regularly, for example, in how we do work together, what skills are required; 6) care must be available for a longer period of time, sometimes for several years; 7) a good care coordinator is an appointed care coordinator, preferably an inspiring leader (formal or informal); 8) a care plan communicated to all care providers, and agreed with the parents and children involved. In addition, it is also crucial that parents (extended family) and the children are involved optimally and that interventions are tailored to their cultural norms and values. Last but not least, the team climate has to be motivating, with respect for each other’s expertise and mutual trust.

The above-mentioned elements were supported in a systematic review evaluating interventions aimed to improve primary care providers’ identification, assessment, prevention and/or management of obesity in children and adolescents using the components of the chronic care model. Results showed that interventions that included more components of the chronic care model were more effective. During the implementation, some of these elements were not adhered to, despite many efforts of the researcher. It became apparent that the necessity of the urgency was not always felt by the various authorities involved. In addition, certain health care providers, mainly GPs, with overcrowded practices, are not able to add this to their daily practice. If so, it must be financially compensated, which was not the case. Finally, the health care organisations were not able to cooperate with each other especially between the youth health care service and the GPs there was a lack of cooperation.

Implications for research, practice and future perspectives
During recent years, thousands of papers have been published on childhood obesity. Despite all research child and teenage levels of obesity have risen ten-fold in the last four decades. The recent analysis from the World Obesity Federation looked at obesity trends in 200 countries. They found that the rising trends in children and adolescents’ body mass index have plateaued in many high-income countries, albeit at high levels, but have accelerated in parts of Asia. Since the start of this research project in 2012 things have changed in Amsterdam. In 2013 one in four children was overweight or obese. That was the reason for the council and health department of Amsterdam setting out a long-term approach, signed by twenty parties from the care and welfare chain the Amsterdam Healthy Weight Programme (https://www.amsterdam.nl/Bestuur-organisatie/organisatie/bedrijven/Amsterdam-healthy/). Since the start of the programme in 2013 (one year after the start of the research project described in this thesis) the numbers of overweight or obese children (2 to 18 years) decreased from 21% to 18.5% from 2012 to 2013. Examples of actions taken in this programme: 1) obligate water at school; 2) ban unhealthy school canteens; 3) stop unhealthy food marketing for children; 4) promote healthy schools (jump-in). Despite the continued decline in overweight or obese children, we have to be vigilant that all the effort contributes to healthy and happy children.

Since childhood obesity is a complex social and multifactorial problem the approach is also multifactorial. The integrated health care standard with a central care coordinator might be an important step to reduce the prevalence of childhood obesity. In order to come to this solution, it is important to evaluate the effects of the current national implementation. Our suggestion would be not only focusing on BMI, but focus on the quality of life of the children. Did they manage to change their lifestyle? What is the number of children of follow up? Research should focus on mixed methods approaches to get an insight into which method is economically profitable. In my opinion, this can only be accomplished when the implementation circle is revised every year. Allowing an answer to be found of the barriers, potential solutions the implementation and evaluation the following year.

Currently, following regional and national developments implementing the health care standard, the youth health care takes on the role of central care coordinator. According to our results we find it important to evaluate this development, since we have our doubts that the collaboration and communication between youth health care and the GP is improved and will result in better management of childhood obesity and increased quality of life of these children.

Another barrier indicated in chapter 3 was the advertisements for unhealthy food contributing to an obesity-promoting environment. In 2015, an alliance was established to stop children marketing for unhealthy food in the Netherlands (www.StopKindermarketing.nl). The municipality of Amsterdam was one of the first municipalities to support this alliance. This is a positive turn to tackle childhood obesity from different angles. It would be interesting to monitor what the effect is of this action and whether “unhealthy products” are bought less after this agreement.

It is also important to realize that it is hard to motivate overweight or obese children and their parents to lose weight in an overloaded world with an overload of advertising for unhealthy products. Is health care responsible for solving this societal problem? Our study has shown that the dissemination of the guideline (integrated health care standard) is not enough. To use the guideline, specific strategies need to be developed. These strategies should be able to contribute to practical use of the guideline and should be reviewed periodically on the experience gained with using the guideline.
The results in this thesis show that lifestyle behavior change is complex and therefore difficult for parents and their overweight or obese child. Motivation is important for children and parents to change their lifestyle, but motivation is also important for all the care providers involved. Due to the complex and multifactorial nature of childhood obesity, the government and the municipality should also take a role. The role of the GP is limited to identification, awareness, motivating and support parents and children in finding their way. In addition, health care providers should cooperate and make task arrangements. The municipality should ensure the reduction of an obesogenic environment, like oblige water at school, prohibit unhealthy school canteens, build cycling paths and playgrounds to promote physical activity in all neighborhoods, and promote education at schools for healthy food. Ultimately, the government is in charge to make agreements with food suppliers. However, given the complexity and the different roles, the question remains: Childhood Obesity: who cares?

References