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The role of community readiness in the prevention of overweight and obesity in pre-adolescent girls

By

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A Doctoral Thesis

Submitted in partial fulfilment of the requirements for the award of Doctor of Philosophy of Loughborough University

September 2012

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Abstract

Background

Overweight and obesity prevention efforts focused on pre-adolescent girls are justified because the health of future mothers can significantly impact the health of their future offspring.

Aims and Objectives

This thesis aimed to investigate the role of community readiness in the prevention of overweight and obesity in pre-adolescent girls within the Charnwood Borough (Leicestershire) community. Specifically the objectives of this research were to: 1) further the understanding of the concept of ‘community’, 2) identify, using focus groups, the key informants and other ecological influences acting on pre-adolescent girls’ health behaviours, 3) employ the Community Readiness Model (CRM), using key informant interviews, to assess the Charnwood Borough community’s knowledge, awareness and readiness to adopt behaviours associated with the prevention of overweight and obesity in pre-adolescent girls, 4) evaluate the usefulness of the CRM for this task and 5) form recommendations for a tailored intervention.

Methods

This research used focus groups with pre-adolescent girls to identify the key informants who influence their lifestyle choices regarding dietary and physical activity behaviours. The study recruited 56 female participants aged between 6-11 years from 8 primary schools. In total 13 focus groups with between 2 to 7 participants per group were performed. To assess the level of community readiness, 33 key informants identified as informing the health behaviours of pre-adolescent girls’ were recruited. Semi-structured interviews followed an adapted version of the CRM. The model consists of six dimensions: community efforts; community knowledge of efforts; leadership; community climate; community knowledge of the issue and resources which are scored on a scale of 1 (no awareness) to 9 (high level of community readiness). The average of these scores is the community readiness stage.

Findings

In relation to the first objective, the definition of a community given by those residing in the Charnwood Borough community included: people and groups of people (e.g. school; religious and parents community groups); characteristics (i.e. geographical area; where people reside; buildings; institutions and the size of the community); sense of belonging and the attempt to improve the community for its members. By valuing the perspectives of pre-adolescent girls, a deepened understanding of the broad range of key informants (Dinner staff, Doctors and dentists, Head teachers, Girl Guide leaders, Government, Grandparents, Neighbours, Parents, Peer group, School cooks, Shop keepers, Siblings, Sports Coaches and Teachers) acting on their health behaviours was achieved (Objective 2). The community readiness score relating to healthy eating and drinking corresponded to the 'Preparation Stage' (Objective 3), whereby influential community members have begun planning efforts by deciding what to do and who will do it and the community offers modest support of efforts promoting healthy dietary behaviours. The community readiness score for physical activity was higher corresponding to the 'Initiation Stage' where there is enough information available to justify efforts and activities are underway to support healthy physical activity behaviours. Qualitatively, the key findings from applying the CRM are that: the effectiveness of community initiatives promoting healthy behaviours can be improved; there are varying levels of concern and awareness regarding unhealthy behaviours and child weight status in the community; social disparities are perceived to exist in community health behaviours; communication between schools and parents are seen as important for the success of school policies; parental attitudes and behaviours inform child behaviours; enjoyment is an important predictor of girls activity levels and aspects of the Charnwood Borough's environment do not support healthy behaviours. The CRM was shown to be an appropriate tool for assessing community readiness (Objective 4) providing the qualitative strengths of the model are emphasised. The community readiness score and the qualitative analysis informed the recommendations for an intervention in the Charnwood Borough (Objective 5). Key aspects of these recommendations include: raising the community's awareness of pre-adolescent girls' health behaviours; ensuring all initiatives are accessible and appealing to low income families by working directly with these groups; fostering a greater sense of community through increased community cohesion and social interaction; placing social interaction and enjoyment at the centre of all activities, and attempting to make the healthier option the easier choice through modifications to the environment.

Conclusions

This thesis is the first to apply the Community Readiness Model to the prevention of overweight and obesity in pre-adolescent girls in the UK and has demonstrated the value of applying a community readiness assessment prior to the implementation of interventions.

Acknowledgements

Firstly I would like to thank my supervisors Professor Noel Cameron and Dr Paula Griffiths for your support and guidance. I have learnt a great deal about the process of research from you both and I would not have been able to produce this thesis without your mentorship.

To my parents for always believing that *I can do it*, for being at the other end of the phone, and for being proud of me.

To *my* Matt - thank you for your love, patience and for always knowing the right thing to say.

To all the Staff and Students of the Centre for Global Health and Human Development (both past and present) for all your support, laughter and distraction. In particular, I would like to thank: Ceri Wilson, Diane Harper, Hannah Wilson, Jacqueline Fitt, Rachel Duckham, Rebecca Pradeilles, Ros Fleming, Silvia Costa and Tom Norris.

To all the academic support staff, especially Frank Parry, academic librarian, for his contribution to the systematic literature review presented in this thesis.

Finally I would like to thank the Charnwood Borough community and all the people who shared their experiences with me. To the girls, for making the focus groups an exciting, unpredictable and unforgettable experience. To the key informants, without whom the Community Readiness Model would not have been applied.

“Je suis pret”

Fraser Clan

Abbreviations

BMI	Body Mass Index
C4L	Change 4 Life
CBPR	Community Based Participatory Research
CHD	Coronary Heart Disease
CRM	Community Readiness Model
CRM	Community Readiness Model
CVD	Cardiovascular Disease
FDO	Football Development Officer
HLHP	Healthy Lives Healthy People
HSA	Healthy Schools Advisor
HSE	Health Survey for England
HWHL	Healthy Weight Healthy Lives
IEH	Intergenerational Effects Hypothesis
IHD	Ischemic Heart Disease
IMD	Index of Multiple Deprivation
JK	Joanna Kesten
MVPA	Moderate to Vigorous Physical Activity
NC	Noel Cameron
NCMP	National Child Measurement Programme
NIDDM	Non-insulin Dependent Diabetes Mellitus
P	Participant
P.E.	Physical Education
PG	Paula Griffiths
PHRD	Public Health Responsibility Deal
PLT	Primary Link Teacher
R	Researcher
SCT	Social Cognitive Theory
SDO	Sports Development Officer
SFA	School Food Advisor
SLT	Social Learning Theory
SSP	School Sports Partnership
TTM	Trans-theoretical Model of Stages of Change
VPA	Vigorous Physical Activity

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Chapter 1 Background

The prevalence of childhood overweight and obesity appears to be stabilising in England (1), other European countries, Australia, Japan and the USA (2). However the prevalence levels are still recognised as a significant public health problem (2-4). There is evidence for a causal association between childhood overweight and obesity and the risk factors associated with the development of chronic diseases in later life (5,6).

The Intergenerational Effects Hypothesis (IEH) illustrates that health status in late childhood and early adolescence may affect the risk of adult non-communicable diseases, including overweight and obesity, both in the mother and her eventual offspring (7-9). In addition, girls are significantly less active and more sedentary than boys in childhood (10-14) and there is some evidence to suggest that girls display a greater decline in physical activity levels during late childhood and early adolescence (15,16). Both dietary, sedentary and physical activity patterns tend to be formed and maintained from childhood into adulthood (17-19). This evidence highlights the need for research investigating the formation of lifestyle choices which inform energy balance behaviours in childhood, especially in girls. Hence, the focus of this research will be pre-adolescent girls aged 7 to 11 years. This age group will be termed 'pre-adolescence' throughout the thesis. Pre-adolescence is an age rather than a biologically defined developmental stage. However it is important to note that in pre-adolescence a variety of life stages are occurring, for instance some girls may have begun pubertal development and their 'adolescent growth spurt' (20).

Although there have been several interventions attempting to prevent overweight and obesity in children, only modest improvements to the associated risk factors have been achieved (21). A Cochrane Collaboration review of interventions designed to prevent obesity in children recommended multifactorial approaches, simultaneously addressing environmental factors, community resources, and individual behaviour change (22). This recommendation is in line with the Ecological Model of Health Promotion (EMHP) which advocates acknowledging that individuals, their health and their environment are interdependent (23,24). There are multiple factors associated with pre-adolescent girls dietary and physical activity behaviours at each level of this ecological model highlighting the need for more ecological approaches in this area. The behaviour of pre-adolescent girls is largely influenced and controlled by adults

(25). What is less clear is who pre-adolescent girls view as informing their health behaviours and how these key influences or ‘key informants’ exert their effect.

Community-based interventions (incorporating the individual, interpersonal and organisational levels) may be the most appropriate target for the prevention of overweight and obesity in pre-adolescent girls and are beginning to show promising results in children (26-29). Communities will vary in terms of the prevalence of childhood overweight and obesity, the associated risk behaviours and the resources available to address the issue, therefore efforts that are successful in one community may not be successful in another (30). Hence, community tailored strategies are needed.

The readiness of the community to accept the intended change is another important influencing factor for successful community-based interventions (30-32). There is a lack of formative research in this area. This lack of research may affect the success of an intervention. The Community Readiness Model (CRM) was developed to measure readiness of the community to address a matter of concern to public health (33). This model has been used widely in the USA, but has not yet been applied in a UK setting.

The primary aim of the research presented in this thesis is to investigate the role of community readiness in the prevention of overweight and obesity in pre-adolescent girls. The primary objectives that will fulfil the aim of the research are presented below:

1. To define what is understood by the term ‘community’ by both pre-adolescent girls and key informants within the Charnwood Borough because this concept has been previously defined in many ways.
2. To identify the key informants within the pre-adolescent girls’ community that influence physical activity and healthy eating and drinking behaviours. Specifically to understand the perceived extent of that influence and to outline how it can be channelled into designing sustainable interventions to reduce the risk of overweight and obesity.
3. To apply the Community Readiness Model in relation to the prevention of overweight and obesity in pre-adolescent girls. Specifically to investigate the Charnwood Borough community’s knowledge, awareness and readiness to take action against behaviours linked to the development of overweight and obesity in pre-adolescent girls.

4. To evaluate the Community Readiness Model and its suitability for understanding community readiness and designing overweight and obesity prevention interventions based on the experiences of applying it within the Charnwood Borough of the UK.
5. To combine the findings from the previous objectives to contribute recommendations for an intervention designed to prevent overweight and obesity in pre-adolescent girls in the Charnwood Borough community.

This thesis consists of seven chapters. Chapter two is a detailed review of the literature relevant to this research. Chapter three is a Systematic Literature Review of the effectiveness of interventions designed to prevent overweight and obesity in pre-adolescent girls. In chapter four, the methods employed for the two studies in this thesis are presented. Chapter five presents the results from the focus group interview study (Objective 1 and 2). Included at the end of chapter five is a discussion of the findings related to Objective 1 and 2. Chapter six, presents the outcomes from the key informant interviews (Objective 1 and 3). The final chapter (Chapter 7) presents a discussion of the literature relevant to the key informant interviews (Objective 3), compares the findings of both results chapters (Objective 1, 2 and 3), evaluates the strengths and limitations of the Community Readiness Model and its applicability in the UK (Objective 4), considers recommendations for a future intervention within the Charnwood Borough community (Objective 5) and draws conclusions for the thesis.

Chapter 2 Literature Review

2.1 Introduction

This chapter presents an appraisal of the literature relating to the prevention of overweight and obesity in children and in particular, literature arguing for a focus on pre-adolescent girls. This chapter is a non-systematic literature review compiled through regular updates from Zetoc Alerts of: journal searches; author searches; title searches using keywords and regular searches on Pubmed, Web of Knowledge and Science Direct (APPENDIX A). Journal article title, abstracts and full text were assessed for inclusion of the following keywords: “overweight”; “obesity”; “pre-adolescent”; “girls”; “community”; “community readiness”; “prevention”; “health”, “physical activity”; “active”; “sport”; “eating” “nutrition”; “diet”; “fruit”; “vegetables”; “school”; “family”; “parents”; “intergenerational”; “qualitative”; “focus groups” and “interviews”. Citations were also searched for relevant literature. The review has been organised into the following subsections: childhood overweight and obesity and health; prevalence, predictors and the social gradient of childhood overweight and obesity and intervention targets for childhood overweight and obesity. Finally a review of theories of behaviour change and the Community Readiness Model is presented.

2.2 Childhood overweight and obesity and health

Globally, childhood overweight and obesity are recognised as significant public health problems (5) in both developed and developing nations (34). Defined as a “pathological excess of body fat” in an individual (p8) (35), children can be classified as overweight and obese using international age and gender specific BMI cut-offs (36). Childhood overweight and obesity are associated with a clustering of disease risk factors including high blood pressure, abnormal lipid profiles and glucose metabolism; complications seen previously only in adulthood (5). These risk factors affect several systems including: cardiovascular; gastrointestinal (e.g. Non-Alcoholic Fatty Liver Disease); metabolic (e.g. Diabetes); pulmonary (e.g. Obstructive Sleep Apnea); orthopedic (6) and resulted in psychosocial consequences and an increased risk of morbidity and mortality.

2.2.1 Blood Pressure

The positive association between waist circumference and high blood pressure in a large sample of 6-7 year old children in Taiwan suggests waist circumference may be an important risk factor for high blood pressure (37). However, the relationship between childhood BMI and adult blood pressure is mainly offset by adult BMI (38). Therefore preventing childhood obesity from tracking into adulthood is important because adult BMI has a more direct relationship with adult blood pressure.

2.2.2 Cardio-vascular Disease

Adverse lipid profiles in childhood, consisting of high cholesterol levels, increase the risk of developing Coronary Heart Disease (CHD) in adulthood. Positive associations between increased body fatness and adverse lipid profiles have been reported in children and young adults (8-18 years) (39). BMI trajectories in childhood have been shown to be related to metabolic health risk factors in adolescence, for instance those whose BMI percentiles increased from 5 to 15 years had significantly higher waist circumferences and total cholesterol levels at 15 years compared to those who exhibited delayed downward percentile crossing, 50th percentile tracking and 60th percentile tracking (40). Thus maintaining a healthy weight in childhood could prevent CHD in later life (39). Ischemic Heart Disease (IHD) (reduced blood supply to the heart muscle) is thought to be caused by Coronary Artery Disease. A longitudinal study, the Harvard Growth Study, has found that children who were overweight prior to puberty have a two-fold increased risk of IHD compared to those who were never overweight in childhood (41), whilst others have found that BMI from age 7 years

is positively related to CHD risk (42). In contrast, one review has suggested that much of the association between childhood BMI and cardiovascular disease (CVD) risk in adulthood is explained by adult BMI (38), indicating that childhood BMI does not predict adult risk of CVD independently of adult BMI. Although childhood BMI is associated with adult BMI.

2.2.3 Diabetes

Non-Insulin Dependent Type 2 Diabetes Mellitus (NIDDM) is an emerging disease in childhood (43-45). One of the earliest effects of childhood overweight and obesity is abnormal glucose metabolism (45) - a precursor for the development of NIDDM. Approximately 50% of the variance seen in insulin sensitivity is accounted for by adiposity (45,46). Betts and colleagues (46) study of insulin dependent diabetic children produced similar results to Weiss and Kaufman's (45). In this study heavier children were diagnosed with Type 1 Diabetes at younger ages, indicating that early weight gain may accelerate the onset of diabetes (46). A decline in physical activity levels has been shown to be associated with increased insulin levels and HOMA-IR suggesting energy expenditure may contribute to the pathogenesis of NIDDM (15). Given this evidence a healthy weight and physical activity in childhood have been shown to be important for the prevention of NIDDM.

2.2.4 Psycho-social consequences

In addition to the metabolic consequences of childhood overweight and obesity, there are serious psycho-social consequences resulting in social isolation and lowered self-esteem (35,47). Wardle and Cooke's (2005) review of the literature on body dissatisfaction, depression and self-esteem in relation to childhood overweight and obesity concluded that, within community samples, overweight and obese children had higher body dissatisfaction compared with normal weight children (48). However, there was little clinically significant evidence for overweight and obesity in childhood affecting depression and self-esteem (48). Nevertheless children who present to clinicians have been shown to be more likely to be psychologically affected by their obesity than community samples (48).

2.2.5 Non-alcoholic fatty liver disease

Obesity is a risk factor for non-alcoholic fatty liver disease caused by the build-up of macrovesicular fat in hepatocytes (6). In children, this condition is commonly asymptomatic making the prevalence of this condition difficult to determine.

2.2.6 Obstructive sleep apnea

Obstructive sleep apnea (OSA) is defined as a “complex disorder of neural respiratory control and upper airway dysfunction resulting in repeated complete and partial occlusion of the upper airway during sleep” p267 (49). Obesity leads to increased fat around the abdomen, chest wall and neck (pharyngeal and submental fat) which acts to decrease lung volume and increase the collapsibility of the upper airways respectively, both of which are associated with OSA (6). The hypoxemia caused by OSA is also associated with cardiovascular outcomes (6).

2.2.7 Orthopedic

Excess weight in childhood can increase the pressure on the musculoskeletal system and result in two main conditions: Blount’s disease (Tibia vara) and slipped capital femoral epiphysis (6). Blount’s disease results in a curving of the tibia and an abnormal gait caused by a mechanical deficiency of the tibial growth plate (6). Slipped capital femoral epiphysis affects the developing growth plate causing the femur rotation leading to pain in the hip/and or knee. Both of these conditions are more common in males (6).

2.2.8 Tracking of childhood experiences into later health

Models delineating how childhood experiences or events can track into later life and lead to increased risk of adult disease have been developed (50). The ‘latency model’ suggests that events which occur within critical periods in a child’s development can have independent effects on later life health outcomes. This model advocates direct action to prevent or target these critical childhood events that can leave a lasting imprint on later health. In contrast the ‘pathways model’ views early life events as having a cumulative impact: this model postulates that changes over time can help to reverse the negative effect of early life events. Hertzman and Wiens, (1996) propose combining these models and refer to early life periods when events may have detrimental effects on later health as ‘sensitive periods’, the effects of which can be modified in later life. However, it is conceivably more difficult to modify these effects later in life than targeting periods when children are most vulnerable to these risk factors in the first place (50).

The Avon Longitudinal Study of Parents and Children (ALSPAC) found the incidence of overweight and obesity in mid-childhood (7-11 years) is associated with the greatest risk ratio of becoming overweight at age 15 (73.7% of overweight and obese children at ages 7-11 years becoming overweight at age 15). This suggests efforts focused on mid-childhood are

necessary (51). Another study analysing data from the ALSPAC study found that of the cohort of children classified as overweight at 7 years one third became normal weight, one third became obese and a third remained overweight at 13 years (51). However it is important to note that puberty could have a confounding influence over the relationship between BMI at 7 and 13 years.

Overweight and obesity in childhood can also track into adulthood (52,53). A positive relationship between overweight status in childhood and persistence of overweight has been reported (54). The risk of becoming an overweight adult is twice as high in overweight children compared with normal weight children (54). Data from the National Health and Nutritional Examination Survey (NHANES) has shown that cohorts are experiencing a greater accumulation of excess body fat earlier, thus obesity is being experienced for longer periods across the lifespan which may accelerate the onset of conditions such as NIDDM (55). These studies highlight the need to develop effective overweight and obesity prevention efforts in childhood.

2.2.9 Adult morbidity and mortality

The positive association between adiposity and chronic disease risk, outlined above, results in both increased risk of morbidity and mortality. The impact of childhood and adolescent overweight and obesity on adult premature morbidity and mortality has been reviewed systematically (56). The findings suggest that overweight and obesity in childhood and adolescence, compared to normal weight, significantly increased the risk of premature mortality in 7 out of 8 studies, represented by hazard ratios (HR), ranging from 1.4-2.9 (56). Similarly, the risk of adult cardio metabolic morbidity in those who were overweight and obese in childhood was also significantly increased (HR 1.1-5.1) (56). In addition, pre-pubertal incidence of overweight has been associated with significantly increased odds of mortality from all causes (OR=1.5 95% CI 1.1-1.9) in adulthood compared with those who were never overweight in childhood, indicating that the timing of becoming overweight may contribute to mortality risk (41,52).

The causal association between childhood overweight and particularly obesity and the development of chronic diseases, calls for further research investigating the formation of lifestyle choices in childhood which inform behaviours that influence energy balance and hence risk of overweight and obesity (57).

2.3 Prevalence, predictors and the social gradient of childhood overweight and obesity

The prevalence of overweight and obesity in school aged children between the 1970's and the 1990's more than doubled in several large countries including Australia, Canada, Chile, Finland, France, Germany, Greece, Japan, the United States, and the United Kingdom (UK) (58). However, international comparisons of overweight and obesity prevalence are difficult because different methods are used across countries (59).

2.3.1 Stabilisation of childhood overweight and obesity prevalence

In the UK, the Health Survey for England (HSE) reported that the prevalence of childhood (2-11 years) overweight and obesity increased from 22.7% to 27.7% and from 9.9% to 13.7% respectively between 1995 and 2003 (60). The National Child Measurement Programme (NCMP) established by the UK government in 2005 is a population surveillance measure developed to monitor the success of a government initiative "Healthy Weight, Healthy Lives" (HWHL) in England (61). A comparison of results from NCMP surveys conducted from 2006/2007 to 2010/2011 split by age categories (Year 6, 10-11 years and reception aged children, 5-6 years) is displayed in Figure 2-1.

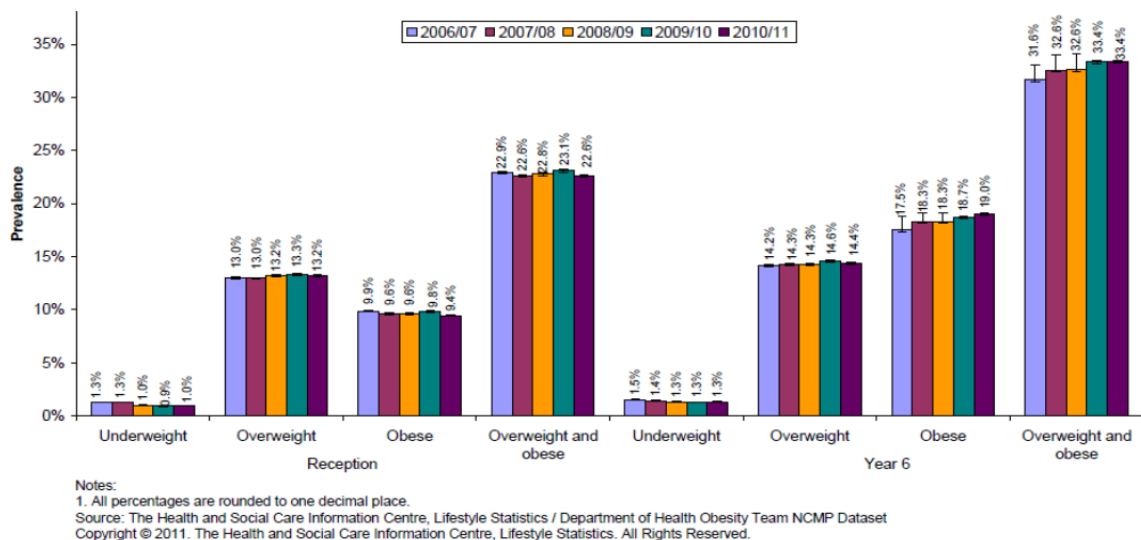


Figure 2-1 Prevalence of underweight, overweight, obese and combined overweight and obese children by NCMP year and school year, 2006/7 to 2010/11 (Children in Reception (5-6 years) and Year 6 (10-11 years) National Obesity Observatory)

Generally, the data from the NCMP suggests the prevalence of overweight and obesity is stabilising (1), however the context of the rates as the highest in history is still cause for concern (2-4), particularly as overweight and obesity are known to track into adulthood

(52,53) and are associated with health risks (5,6). Indeed a period of stabilisation in other countries (3) has been followed by an increase indicating a stepwise pattern of prevalence (2).

Three theoretical explanations for this apparent stabilisation have been offered (3,62). Firstly, it is conceivable that the reported plateau is the result of public health measures put in place to reduce the development of overweight and obesity in children. Secondly, a ‘saturation point’ has been hypothesised, in which overweight and obesity has developed in the majority of those who are susceptible to it (3,62). Finally, levelling off in prevalence rates could also be due to recent surveys samples being biased towards those with lower BMI’s as the stigma of being overweight has increased (3).

2.3.2 Future overweight and obesity prevalence predictions

An update by the UK government’s scientific think tank, Foresight, adjusted predictions for 2020 to 22% for overweight (6% reduction) and 12% for obesity (4% reduction) in children aged 2-11 years, as a reaction to recent figures demonstrating a plateau in prevalence rates (63). However, predictions based on linear relationships should be considered with caution as the relationship may be stepwise rather than linear (2). It should also be acknowledged that predictions do not account for the multifaceted influences on overweight and obesity development (64).

The NCMP, HSE and Foresight prevalence and prediction data demonstrate the urgent need to address childhood overweight and obesity levels in the UK to protect the health of the future generation of adults. Efforts should particularly focus on those exposed to the most risk factors, who are often those in the lowest social position.

2.3.3 Social gradient of overweight and obesity

Higher socio-economic status is related to better health outcomes along a gradient (50). Identifying the factors which disproportionately protect higher socio-economic status groups from the development of chronic diseases such as overweight and obesity may help improve the health outcomes of those in lower social position groups (50).

The Marmot Review “Fair Society, Healthy Lives” highlights the importance of addressing the social gradient of health (65). The report proposes not only addressing those at the extreme end of social deprivation, (although a seemingly logical approach), because it is argued this would shift the problem up the scale rather than addressing the entire gradient. Therefore there needs to be a universal approach which is proportionate to the level of

disadvantage. This is termed ‘Proportionate Universalism’ (65). Amongst the policy objectives raised by this report is the assertion that every child should have the best start in life and that the government should strive to create a society in which individuals may reach their potential and possess control over their lives (65). To achieve these national objectives, the review asserts that local area delivery systems must be effective and able to tailor initiatives to the needs of local people (65).

There are strong socio-economic disparities in childhood overweight and obesity (66,67) which have significantly increased over time with those in the lowest socio-economic position suffering the most (66). In children aged 10-11 years (2009-2010), who were measured as part of the NCMP, the most deprived 10% of the population have approximately double the prevalence of obesity than the least deprived 10% (Figure 2-2) (68). This highlights the need to develop health messages which can reach lower socio-economic status groups (66).

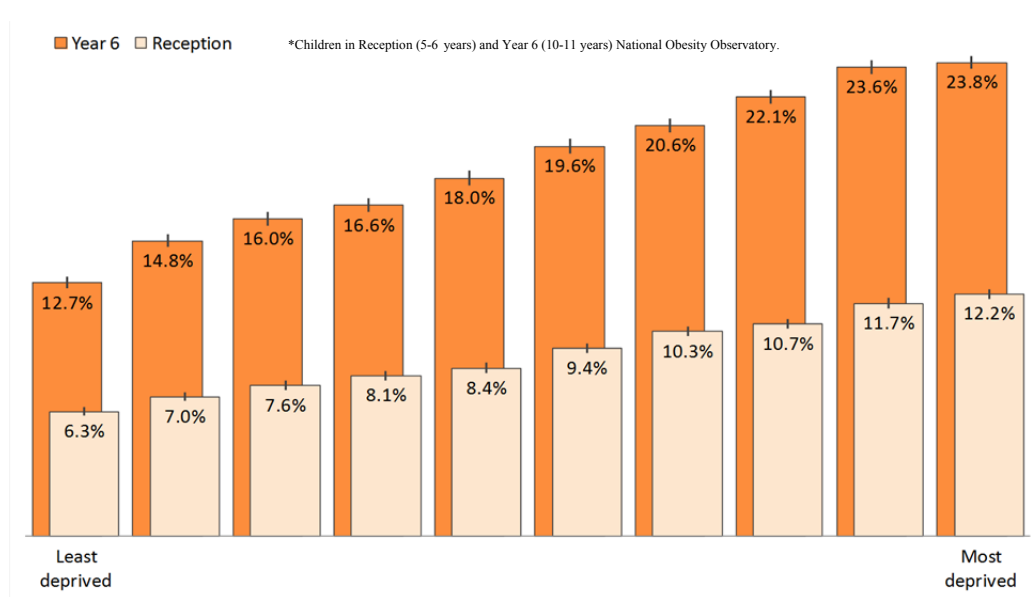


Figure 2-2 Prevalence of obesity by deprivation decile. National Child Measurement Programme 2010/2011. Source: National Obesity Observatory. Prevalence of obesity by deprivation decile. Children in Reception (5-6 years) and Year 6 (10-11 years). National Child Measurement Programme 2010/2011

During the epidemiological transition the groups affected by obesity have transitioned from those in the highest socio-economic position to those in the lowest (67). Socio-economic inequalities have a greater impact in females and can progress from childhood into adulthood (67,69). Adiposity has been shown to mediate the relationship between socio-economic inequalities and cardiovascular disease risk factors (69).

Many social factors (e.g. education, income, occupation, wealth etc.) contribute to socio-economic status, therefore it is a multidimensional construct and should be measured as such by researchers (70). One measure of socio-economic status, such as educational status, cannot be interchanged for another measure such as income, therefore it is important to justify the choice of socio-economic status indicators (70). For example education is conceivably a more stable variable than income or occupation which may explain why parental education has been shown to have a stronger inverse association with adiposity in children than occupation and income (71). This review of forty-five studies found that in 19 studies socio-economic status was inversely associated with adiposity in children, 12 found no association and 14 reported mixed associations (inverse and mixture) (71).

The link between socio-economic disadvantage and health outcomes such as overweight and obesity indicate the importance of addressing social factors, such as social equity, in public health prevention efforts (72).

2.4 Intervention targets for childhood overweight and obesity prevention

The pathogenesis of overweight and obesity is a complex issue. The Foresight report “Tackling Obesities: Future Choices” describes obesity as the result of complex interactions between “individual biology, eating behaviours and physical activity, set within a social, cultural and environmental landscape” (p79) (73). It is this complexity which means simple recommendations for reduced energy intake and increased energy expenditure as both a treatment and prevention strategy are often unsuccessful (74). Prevention of obesity offers a less expensive, more effective approach than treatment and can potentially benefit the health of all children in the population (75,76).

Baranowski and Baranowski (2009) advocated the use of a Mediating Variable Model which addresses those factors which predict whether behaviour can be changed (77). Interventions which can effectively modify mediating variables associated with behavioural outcomes are expected to result in changes to behaviour (78). In this model it is firstly necessary to identify what factors are most influential in predicting behaviour and go beyond ‘one size fits all’ approaches which cannot address the needs of all individuals (77). This task can be difficult because there may be multiple mediating variables which predict behaviour outcomes (78). Baranowski and colleagues concluded that interventions attempting to change behaviours through the Mediating Variable Model have been largely ineffective firstly because theories

of mediating processes have not been able to fully explain behaviour and secondly because the methods of changing the mediating variables are currently ineffective (78).

In the past, health programmes were aimed at the individual level of behaviour change, disregarding the multiple social, physical, actual and perceived environmental influences acting on health behaviour (24,79) (i.e. understanding “what puts people at risk for the risks” (p85) (80,81). Similarly, public health interventions which only change the environment, without accounting for individual differences, will affect individuals’ health differently (79). Most public health issues are too complex to approach using a single level analysis (79,80). Instead, research points to an interdependence between people, their health and the environment (82). To identify environmental influences, it is necessary to define what is meant by an environment, what the environment means to individuals and how the environment interacts with other social and personal factors to affect health behaviours (83). The environment can be divided into the ‘macro’ referring to the wider society and the ‘micro’ factors with direct impact on the individual (84).

The ecological approach advocates acknowledging the multidimensional features of the environment (social and physical), the levels of settings in which individuals exist (individuals, interpersonal, organisational, community and society) and the multidimensional nature of health. However the complexity of these environmental interactions and their impact on individual behaviour and health outcomes can be difficult to measure (76). Ecological approaches share some principles with Social Cognitive Theory (described in more detail later on p64) such as the interaction between individuals, their environments and their subsequent behaviours (23).

Several ecological models delineating the relationship between individuals and their environments have been developed.

2.4.1.1 Ecological models

In 1979, Urie Bronfenbrenner described the Ecology of Human Development (Figure 2-3) (85). Bronfenbrenner expressed the importance of research focusing on the interactions between the developing human and the immediate environment. The Ecological Model of Human Development proposes that the ecological environment is comprised of four systems (Figure 2-3). The ‘microsystem’ has the strongest influence on development and represents the developing human and the direct interactions the child has with their parents, peer groups

and teachers. Within the ‘microsystem’ the developing individual can actively interact with and learn from the environment. Exposure to the activities of others is likely to encourage the developing person to engage in similar activities (85). The ‘mesosystem’ signifies the interactions between different microsystems. These interactions may work to enhance and support the development of individual microsystems, for instance a strong relationship between the school and home environment through shared values and communication may positively influence academic achievement. The ‘exosystem’ represents interactions where the developing human does not take a participatory role but is indirectly affected. ‘Exosystems’ influence ‘microsystems’, for instance parents’ education, career and income can affect the parenting style they adopt and their ability to provide opportunities necessary for the child’s development. The ‘macrosystem’ encompasses the previous systems and represents the society to which the developing person belongs including belief systems and culturally specific practices.

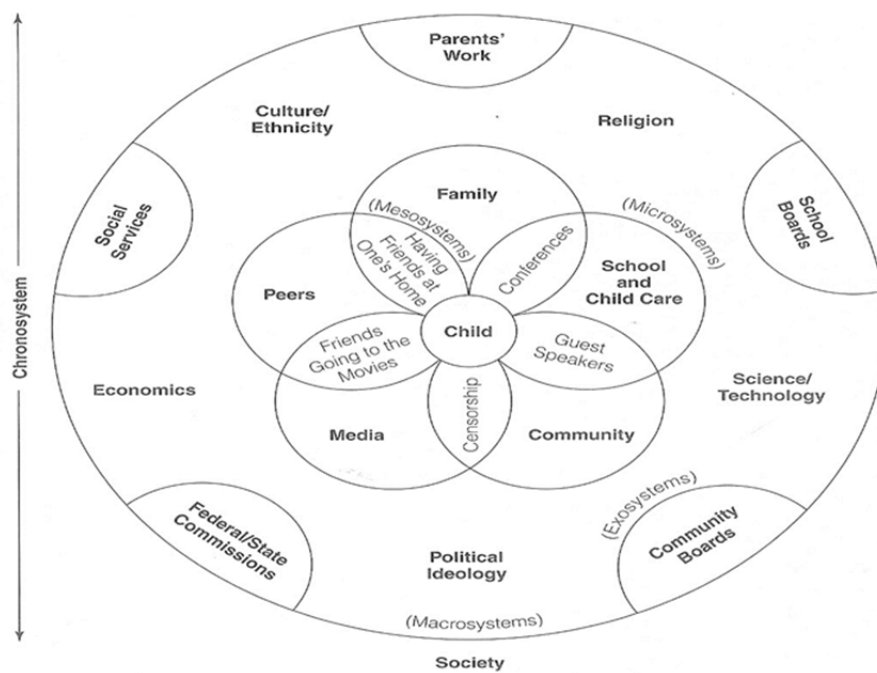


Figure 2-3 An Ecological Model of Human Development. Source: Based on concepts from Bronfenbrenner 1989. Source: Berns, 2007

The intention of the Ecological Model of Human Development is to study development ‘in-context’ (86). This concept encourages “discovery” over “hypothesis testing” (p36). Therefore, rather than isolating a single variable and controlling all others, the ecological experiment attempts to “control in” (p38) (85) all aspects of human and environment interactions. The main effects of studies using this design are likely to be interactions. The primary outcome for ecological models is patterned behaviour of individuals as determined

by the interaction between the individual and environment (87). Richard and colleagues proposed the principles of an ecological approach to health promotion as: incorporating individual and environment ‘targets’ and implementing at least two strategies; one which modifies the individual and another which modifies aspects of the environment (88).

The ecological approach has been criticised for its broad scope which can fail to highlight the most important drivers of health behaviours (89) or not looked in enough detail at important aspects (90). The ecological approach also relies on the researcher to decide what to include in their approach within each level (88). In addition, it is challenging to analyse ecological programmes because individuals may choose to engage in different parts of the programme (88). It is difficult to have a control community which will make no changes during the intervention period (88).

The Ecological Model of Health Promotion (EMHP)

There have been various ecological models developed from Bronfenbrenner’s Ecological Model of Human Development (23,24,79,91-93). Most of these ecological models share some common levels.

There are six levels of the Ecological Model of Health Promotion deemed to influence behaviour beginning with the individual (Figure 2-4). The individual is firstly considered a “postulate” (p11): dependent on their environment; interacting with other individuals within a population; possessing behavioural variability; having an innate desire to “preserve and expand life” (p11); and having a limited life-span. Secondly the individual can be considered a “unit of measurement” (p11) (94). The second level is the interpersonal relationships individuals form, for instance in the family and other social networks. These interpersonal relationships can be clustered together to form the third level; organisations an example of which is the school. The fourth level is communities. Communities are collectives of people with common values (24). Decisions are made about communities by organisations. The fifth level is society; Kok (2008) describes societies as having control over several aspects of communities, organisations and individuals (24). Finally more than one society is defined as a supranational level which encompasses the previous levels. This research will adopt the Ecological Model of Health Promotion (EMHP) as its theoretical framework because it is considered to offer a clear ecological framework (24). Kok et al, adapted the EMHP from Richard et al. (93): making the model one-dimensional by removing the concept of

intervention settings; emphasising levels and creating levels for the individual and interpersonal relationships (24).

The first five levels of the Ecological Model of Health Promotion (EMHP) will be used to discuss the contributing factors and potential targets for the prevention of childhood overweight and obesity. The supranational level will not be employed because this research is set in one society, the UK.

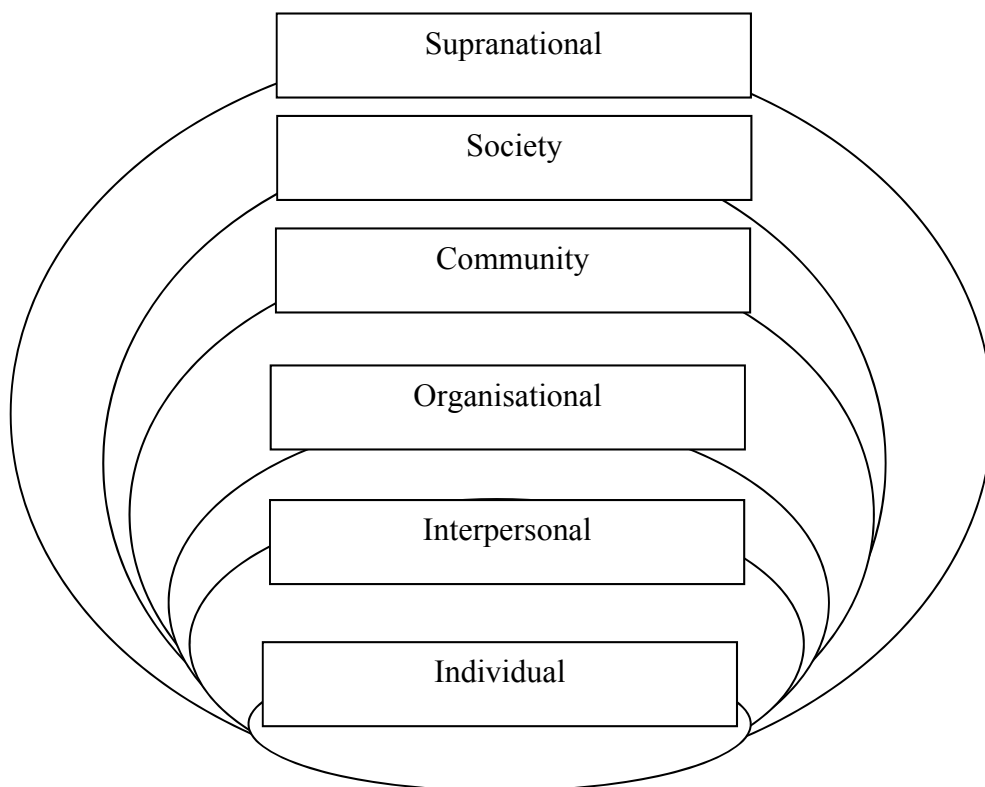


Figure 2-4 Schematic of the Ecological Model in Health Promotion Programs. Adapted from Richard et al.1996

Individual Level

The EMHP highlights the importance of focusing on environmental factors that influence health (24), combined with personal attributes such as health practices, genetic attributes and behavioural patterns (79).

Genetic contribution to body weight regulation

Genetics can influence an individual's susceptibility to becoming overweight and obese under certain environmental conditions (57). The role of genetics is likely to be contributed to by multiple genes (84). Genome-wide association studies have proposed several genes which

are linked to energy regulation (95). The obesity epidemic may have been contributed to by a genetic predisposition towards environments of food insecurity, experienced in the past, where it was advantageous to consume energy-dense foods (76). However, in the current food stable environment there is a resultant “mismatch” between what our genes are adapted for and what is required (p39) (76).

Speakman and colleagues present models to explain the regulation of body weight (95). The ‘set-point’ regulation model is a negative feedback system working to maintain a target ‘set-point’. In this model, adipocytes (fat cells) release a hormone called leptin which signals to the brain whether fat levels are higher or lower than the target. Support for this model includes the discovery of genetic mutations in the gene encoding the leptin hormone in hyperphagic and obese individuals. However, most obese individuals do not have leptin mutations. In addition this model fails to acknowledge any environmental influence on body weight regulation.

Wilkin supports the principles of a negative feedback loop regulating physical activity called an ‘activity-stat’, suggesting it may not be possible to permanently alter children’s physical activity levels (96). To make the argument that physical activity is controlled centrally, Wilkin firstly, draws on evidence that children’s physical activity levels on weekdays correlate with weekend days suggesting different environments do not effect activity levels (96). Secondly, he suggests that if physical activity is not centrally controlled then different environments such as ‘Plymouth’ and ‘Glasgow’ should vary in child activity levels. Because these two areas do not vary in physical activity levels this is considered evidence for the ‘activity-stat’ hypothesis, (96) however it is questionable that the ‘social culture’ in Plymouth compared to Glasgow is significantly different as to cause differences in activity levels. Thirdly, compensation for activity levels was evidenced through a study comparing schools with markedly different physical activity provision showing that overall physical activity levels were comparable between schools because children in the very active school compensate for their higher activity levels at school (96). However, it is arguable that social influences may explain this apparent compensation, because parents of children in schools providing a lot of activity may subsequently not invest in additional activities for their child after school. Additionally differences in the length of the school day between these schools may mean children in the more active schools have less time for physical activity after school. Lastly, Wilkin suggests that interventions attempting to modulate physical activity levels have merely disturbed the ‘activity-stat’ system and the interventions influence will reverse

(activity levels will return to the central set point) once the disturbance is removed (96). This he suggests explains the short term changes in physical activity achieved by interventions. However, it is also possible that if initiatives were sustained then changes to physical activity may also be sustained.

In response to Wilkin's arguments, Reilly has critiqued the evidence against the 'activity-stat' hypothesis and proposes it is too premature to believe that physical activity cannot be increased in young people because it is tightly regulated by internal controls (97). Additionally, contrary to the 'activity-stat' hypothesis, evidence suggests that active child (8-13 years) behaviours (school physical education, school recess periods, active transport and sport or informal activity) may be positive predictors of higher overall physical activity levels (98).

The 'settling-point model' suggests that the regulatory system does not include a single set point but rather, regulation is passive (95). A 'dynamic equilibrium' fluctuating in response to changing levels in energy intake and expenditure exists. Therefore increases in energy intake will result in corresponding increases in energy expenditure. Whilst the 'set-point' model focused entirely on biological and genetic factors the 'settling-point' is a purely environmental model. Therefore neither of these models adequately accounts for both the rapid increase in overweight and obesity levels which suggest environmental contributions or the inter-individual differences in the rising obesity levels suggesting a genetic component (57,95).

In agreement with the notion that interactions between genetics and the environment have a role in body weight regulations the 'dual intervention point model' proposes upper and lower regulatory limits within which the body tries to remain using physiological processes. Individual variation in the size of the gap between the upper and lower limits explains inter-individual responses to the same environmental conditions. This model has an evolutionary explanation in that the lower limit attempts to prevent starvation in times of food poverty and the upper limit tries to avoid predation. As humans are no longer under threat from predation the upper limit and the genes encoding this limit may have shifted upwards for some people and not others, again explaining the individual variation in obesity susceptibility in certain environmental conditions.

Given the evidence presented above it is important to emphasise the factors which are within personal control and not attributed to one's genetics because focus on the latter can lead to a feeling of helplessness (99).

Physical Activity

Definition

At the centre of the 'causal model' for obesity is the energy balance between energy expenditure and energy intake (73). Patterns of dietary and physical activity behaviours are developed in childhood meaning this is a critical period for intervening and preventing overweight and obesity (76,100). Physical activity can be defined as energy expenditure brought about through a raised heart rate (101). Physical activity can be categorised under the following domains: occupational; domestic; transportation or leisure time (102). Two examples of leisure time physical activity are sport which involves competition (103) and exercise which is a type of physical activity performed to enhance physical fitness (e.g. jogging) (103).

Guidelines

The UK-wide guidelines recommend that children and young people (5-18years); participate in Moderate to Vigorous Physical Activity (MVPA) for a minimum of 60 minutes per day, engage in vigorous intensity activity at least three days a week and minimise the time spent in sedentary behaviours (101). Meeting these guidelines is predicted to be associated with better physical and mental health in young people now and as they develop (101).

Physical activity and health

Low physical activity levels in childhood and adolescence are recognised as being associated with risk factors linked to poor health outcomes (14). The WHO announced in 2010 that physical inactivity is the fourth leading risk factor for global mortality (104). Thus there is enough evidence to advocate for political action to promote physical activity (105). The Child Heart and Health Study in England (CHASE) assessed the association between objectively measured physical activity and the cardiovascular health of 5000 children aged 9 to 10 years (106). This cross sectional study found positive associations between high levels of physical activity and HDL-cholesterol and negative correlations between high levels of physical activity and several cardio-metric risk factors including adiposity markers, fasting insulin, diastolic blood pressure and LDL-cholesterol. These results are supported by an earlier large cross sectional study conducted in Denmark, Estonia and Portugal (10). This study showed

that physical activity, specifically MVPA and vigorous physical activity (VPA) acted as independent predictors of adiposity in 9-10 year old children. Both these studies cannot make causal conclusions or suggest the direction of the association, due to their cross-sectional designs, but are able to provide strong evidence of an association between physical activity and adiposity in children. Findings from the EarlyBird study suggest that excess adiposity may precede inactivity (107). After adjustment for time spent being sedentary and other confounding factors (including age and gender), greater levels of MVPA were associated with more favourable cardiometric profiles in a large meta-analysis of 14 studies utilising accelerometer measurements (14). In terms of psychological wellbeing, children (9-11 years) meeting the physical activity recommendations of 60 minutes of MVPA per day score significantly higher scores on most measures of wellbeing (108). These studies provide evidence for the positive health effects of being physically active in childhood. However, prospective evidence of the association between adiposity and physical activity indicates that physical activity may not be a main determinant of positive energy balance (109). Instead the relationship could be bi-directional (110).

Sedentary behaviours

Sedentary behaviours are often misinterpreted as any behaviour considered not physically active. Rather they are behaviours which predominantly involve sitting or lying and expending low levels of energy (1.0-1.5 Metabolic Equivalents) (111) for instance watching Television (112). Sedentary behaviours have been shown to be independently associated with chronic conditions (112,113). Furthermore studies have shown that raising physical activity levels without accompanied declines in sedentary behaviours have had little impact on metabolic markers (113). A systematic literature review of studies assessing the association between sedentary behaviours and health related outcomes in children and young people aged between 5-17 years concluded that more than two hours of sedentary behaviours per day are detrimental to a number of variables including measures of body composition and physical fitness and social factors such as self-esteem, pro-social behaviour and academic achievement (114). The latter is interesting given that it might be expected that young people who are most sedentary may be spending this time engaging in academic activities.

Television viewing

Time spent watching television is one of the most common sedentary behaviours performed by young people (115). Understanding the factors related to television viewing in young

people is necessary to identify targets for interventions aiming to reduce this behaviour (115). Factors identified as positively related to television viewing by this review of 68 studies included: ethnicity, body weight, snacking between meals, weekends and possessing a television in the bedroom (115). Variables found to be unrelated to television viewing were: gender, socio-economic status, body fatness, indicators of fitness, psychological variables such as emotional support, physical activity levels, dietary variables and being an only child (115).

Research suggests that sedentary behaviours appear to be negatively associated with physical activity behaviours (116,117), for instance children reporting low levels of MVPA reported significantly higher mean minutes of TV viewing compared with those reporting medium or high levels of MVPA (116). In contrast, there is evidence of children achieving both high MVPA and high sedentary behaviours (118). In particular sedentary behaviours in this study were higher immediately after school, suggesting efforts could be focused on this period of the day (118).

Time spent watching television and consuming meals whilst watching television may be related to healthy food preferences and healthy food habits (119). In this cross-sectional study with a six year follow up of 232 participants aged 8-10 years at baseline, greater self-reported time spent watching television was associated with lower healthy food preferences in both boys and girls (119). Consuming meals in front of the television was associated with lower healthy food preferences in boys and higher healthy food preferences in girls (119). This gender difference may be due to girls being more likely to have healthier food preferences than boys in general (119). This study also found a negative association between time spent watching television and meals consumed whilst watching television and healthy food habits. Although arguably foods consumed at 8-10 years are likely to be highly controlled by parents which may contribute to this association (119). Results from the Heartbeat! study (116) suggest that girls consuming a high fat diet are significantly less physically active than girls consuming a low fat diet, whereas boys classified as consuming a high fat diet did not show this association with physical activity levels.

Gender differences

Objectively measured physical activity data from the Health Survey for England (HSE) has shown that fewer than half of the children measured met the government physical activity guidelines and girls were less likely to achieve this than boys (21% and 33% respectively)

(16,101). Girls are significantly ($p < 0.001$) less physically active and engage in significantly more sedentary behaviours than boys (10-14,120). Although systematically reviewed, longitudinal evidence supports a decline in physical activity levels during pre-adolescence and adolescence in both genders (121), others have found girls show a greater decline with age in physical activity than boys (16,101). Evidence suggests this decline begins earlier for girls than boys (121). Maturation differences (e.g. earlier maturation in girls) may partially explain some of the gender differences in physical activity levels (13,121).

Tracking of energy expenditure behaviours

Tracking of sedentary behaviours in children and adolescents have been found, indicating that behaviours developed at a young age may be maintained (17).

Of concern is the evidence suggesting that physical activity levels decline with age (12,15) with the transition between primary and secondary school (at age 11 years) marking a critical period in the decline of physical activity levels, particularly in girls (16,120,122). A qualitative investigation of the reasons behind physical activity decline amongst female adolescents (mean age 13.6) found two individual level broad themes: ‘sense of self’ and ‘individual issues’ (123). Girls in this study talked about not taking advantage of the available activities because physical activity was not viewed as important during adolescence (123). ‘Sense of self’ went from being positive in primary school whilst being active to being negative at secondary school. Finally ‘individual issues’ included adolescent priorities changing for example increased school pressures (123). For girls, positive predictors of physical activity maintenance from childhood and adolescence to adulthood include: a diverse range of available sports and positive perceptions of sports competence (124). The negative predictors include: smoking; time taken to run 1.6km and having younger siblings (124). Whilst there are several correlates (demographic, biological, psychological, behavioural, socio-cultural and environmental) of physical activity in children, only gender and age appear consistently associated with physical activity within the literature (120). In part this is due to limitations of the methods used to measure these correlates (120).

Transport to school

Commuting to school is a necessary part of childhood and provides an opportunity to engage in regular physical activity (125). Across England, data from the HSE in 2008 found that 64% of 5-15 year old respondents walked to school, 3% reported cycling and 33% did neither, suggesting an inactive mode of transportation (126). Those actively travelling to school were

more likely to meet physical activity guidelines (although this was only statistically significant for cyclists) than those who do not and displayed a trend towards reduced risk of obesity although this did not reach statistical significance (126). Therefore transport to school is an important contributor to overall physical activity levels. In agreement with the national findings, a UK cohort of children from the SPEEDY study conducted in Norfolk, established that active commuting to school is associated with increased minutes of MVPA during weekdays and overall physical activity levels compared to non-active commuters (127). These associations were mediated to some extent by the distance children travelled to school (127).

Nutrition

The second component of the energy balance equation is energy intake (128). To achieve stable childhood growth the energy consumed must match the requirements of energy expenditure which include demands from “basal metabolism, growth, thermo-genesis, the thermic effect of food and physical activity” (p1104) (128).

Diet in England

One indicator of a healthy dietary pattern is the consumption of fruit and vegetables. Based on evidence synthesis of nutrient consumption related to health maintenance (defined as the absence of “diet-related diseases” (p54)), the WHO made recommendations for $\geq 400\text{g}$ per day of fruits and vegetables (commonly referred to as ‘5-A-Day’(p56)) (129). The HSE has been measuring self-reported fruit and vegetable intake since 2001 and has shown an increase in girls (5-15 years) reported mean intake from 2.6 portions per day in 2001 to 3.3 in 2010 (130). The increases in the proportion of girls meeting the WHO’s recommendations for 5 or more portions ($\geq 400\text{g}$ per day) from 11% to 20% between 2001 and 2010 is promising, although it still suggests that 80% of the population may not be consuming enough portions of fruit and vegetables for health maintenance (130).

Dietary tracking

Evidence of dietary tracking from childhood to early adolescence (19) and through to adulthood suggests dietary patterns may be established in childhood (18) and may be linked to cardiovascular risk factors (131). This finding has been replicated in the Earlybird study within the UK over a period of 8 years (5-13 years). In this study, moderate stability of dietary patterns (healthy/unhealthy), assessed using Food Frequency Questionnaires

completed by parents, suggests dietary habits are formed and maintained in childhood (132). Deterioration of dietary patterns was more common than improvements (132).

Diet patterns and risk of overweight

In a study conducted in Norway, children who were overweight at baseline (9-10 years) and remained overweight at 12 to 13 years tended to shift their dietary pattern away from the “varied Norwegian” (p4) pattern characterised by traditional Norwegian foods which meet nutritional guidelines and moved towards a “dieting” (p4) pattern comprised of foods associated with dieting behaviours and weight control (19). These findings suggest that dieting behaviours may be ineffective strategies to reduce weight. Dietary components associated with the risk of obesity (e.g. dietary energy density, fibre density and percent energy from fat) have been found in the ALSPAC cohort of children, at ages 5 and 7 years using 3 day diet diaries, to be associated with greater fat mass and higher odds of excess adiposity in children at 9 years of age, even after adjustment for potential confounders (TV viewing, child overweight, socio-economic status and parent BMI) (133).

A qualitative study, using focus groups with 11-12 year old children, found that there are more perceived barriers than facilitators for healthy eating and drinking (134). ‘Healthy’ foods in this study were described as tasting and looking less appealing than ‘unhealthy’ food. The cost and time to prepare healthy food was also perceived to be greater than for ‘unhealthy’ foods and the desire to rebel from parents at this age was also a predictor of not wanting to consume healthy diets. The reasons for consuming healthy foods given by children aged 7 to 17 years in a qualitative study included: cognitive function; physical performance; psychological factors (e.g. wellbeing); physical feelings; energy replenishment; appearance; weight control; future health and parental control over food consumption (135).

Body image

Body image concerns may influence dietary choices and lead to disordered eating behaviours (134). A positive perception of body image is also linked to higher levels of physical activity (12). To understand the determinants of body image satisfaction in adolescent girls, Kelly and colleagues compared the differences between girls with reported high and low body satisfaction (136). This study found that African-American adolescent girls were more likely than Caucasian girls to report high body satisfaction suggesting an association between body satisfaction and ethnic group. Younger girls were more likely than older girls to report high body satisfaction. Children with high body satisfaction were more likely to report caring

about being healthy and less likely to weigh themselves or diet regularly. The authors of this paper concluded that encouraging girls to value their health from a young age is important (136).

To ensure girls develop a positive body image and do not develop eating disorders it is important that overweight and obesity prevention efforts do not convey damaging messages surrounding body image (137). An overemphasis on achieving and maintaining healthy weight status can be at the expense of other psychological, social and physical health outcomes (137). Therefore it is important for public health efforts to promote child health in a global sense.

Summary

This concludes the discussion of literature relating to the individual level of the EMHP. Whilst it is not possible to modify our genetic structure in the short term, key targets at the individual level are energy balance behaviours. Specifically physical activity should be encouraged in girls, especially prior to adolescence, because on average girls have lower levels of physical activity and a greater decline in activity levels during adolescence than boys. In addition limiting sedentary behaviours is an important intervention target. On the other side of the energy equation, dietary patterns appear to be established in childhood and track throughout life therefore interventions which can instil healthy habits in childhood are necessary. Finally all interventions in young people, particularly with girls, should be careful to prevent negative body image perceptions in young people and should emphasise health over appearance.

Interpersonal level

Interpersonal networks with the potential of reducing the risk of childhood overweight and obesity include the family and the peer group.

Family

The family is a central component of a child's physical and social environment (138,139), in which health messages from beyond the family (i.e. peer group, media) can be either reinforced or highlighted as inappropriate (140). The risk factors for overweight development have been found to cluster within families (141). In Davison's (2001) study of girls, which assessed BMI at age 5 and again at 7 years, both child (dietary intake) and parent factors

(parent weight status, physical activity, dietary intake) were predictors of increases in BMI over a two year period (141).

Modelling behaviours

Within the family unit, parents are important role models for healthy behaviours (139,142,143). For instance, a systematic literature review has shown that parental modelling, encouragement, parental fruit and vegetable intake, fruit and vegetable availability within the home and family rules are positively associated with children's fruit and vegetable intake (143). Thus if parents are unwilling or feel unable to change their own and their children's unhealthy behaviours, either through "perceived helplessness" (i.e. the belief that their health is hereditary) (p1081) or through "high optimistic bias" (i.e. the preference for current behaviours and unwillingness to change) (p1081) then health promoting interventions will be unsuccessful (144). Focus groups with parents of overweight children found that the main barrier to changing child behaviour is changing the parents' behaviour (145). Children whose parents perform healthy behaviours with them have higher odds of consuming the recommended amount of fruits and vegetables per day and achieving higher levels of MVPA (142). These associations were different in girls compared with boys. Parental support (e.g. transport and financial) of physical activity behaviours appear to be a good predictor of girls activity levels, whilst for boys going to fast-food restaurants was negatively associated with activity levels and fruit and vegetable intake suggesting interventions may need to be gender specific (142).

Parenting styles

There are four generally accepted parenting styles: 'authoritarian' (command compliance and obedience from offspring by not entering into verbal negotiation or reasoning); 'authoritative' (apply reasoning and negotiation to achieve objectives and value the child's rights as well their own); 'permissive' (pander to offsprings demands thus becoming a resource for the child to utilise), and 'negligent' or 'uninvolved' (limited control over children's behaviour) (146).

In the Bristol 3 P's project, 'permissive' maternal parenting styles were associated with approximately five times greater risk of children (10-11 year olds) watching greater than 4 hours of television (above the 1-2 hours recommended limit) than mothers with an 'authoritative' parenting style (147). However this study relied on child classification of parenting styles (147). Parenting styles in this study were also associated with physical

activity levels, with permissive parenting styles being associated with girls spending a greater amount of time in MVPA compared to girls with mothers with ‘authoritarian’ parenting styles (148). These findings suggest that ‘permissive’ parenting styles have both beneficial and negative effects on energy expenditure behaviours. Unfortunately neither of these studies looked at paternal parenting styles and their association with offspring behaviour, because the authors were attempting to reduce participant burden (148).

In contrast to physical activity levels, the most beneficial parenting style for healthy dietary practices appears to be the ‘authoritative’ approach which involves encouraging children to consume healthy foods whilst also fostering independence in children to choose what they wish to consume (149). ‘Authoritative’ parenting styles were positively associated with the availability of fruit and vegetables, attempts to feed children dairy, fruit and vegetables and children’s consumption of these foods (149).

Parenting practices

Research suggests that parenting practices (behaviours performed in specific situations) can influence children’s healthy behaviours. Parental reports suggest that giving children what they like is viewed as an easier option than trying to provide a healthier alternative (150).

A qualitative study of families living in areas of high disadvantage (index of income, education and employment) found that parents of children considered resilient to an environment which encouraged unhealthy eating and were of normal weight, performed active strategies to encourage healthy eating (151). These strategies included: controlling the foods children consumed; verbally encouraging and educating children on the benefits of consuming a healthy diet; enforcing eating rules (breakfast must be consumed, no dessert before vegetables have been eaten); and role modelling healthy behaviours in front of children (151). Although this study offers potentially successful intervention strategies for low income families the small sample size limits the generalizability of these findings (151). Children’s preferences for unhealthy food have also been highlighted as a barrier to parents attempts to get children to consume a healthy diet (152). Ritchie and colleagues commented that using food as a reward tends to increase children’s preference for those foods whereas putting pressure on children to consume certain foods before receiving a reward tends to reduce children’s preferences for those foods (138). This review also discusses the potentially negative impact that high parental control can have on the child’s ability to self-regulate their energy intake (138).

Parental practices may vary depending on the behaviour they are trying to encourage. Encouraging the consumption of fruit versus vegetables may result in different strategies being adopted by parents (153). To encourage vegetable consumption parents in this study were most likely to use ‘positive information’ (telling the child the food is healthy, tasty and they like to eat it too) and ‘pressure’ (being strict to ensure the child consumes the food) whereas fruit intake was associated with giving the child choice, making sure fruit is available to the child and providing positive information (153). The negative predictors of children consuming fruit and vegetables included putting ‘pressure’ on the child and creating a ‘negative atmosphere’ whilst positive predictors included parents consuming fruit and vegetables and allowing the child autonomy over their consumption (153). The authors state that it is unclear whether adopting the strategies which were negatively associated with consumption were the cause or consequence of the child’s consumption (153). Importantly fostering choice for children appears to be an effective strategy, although if children react less favourably to vegetables than fruit initially this practice may be difficult to implement (153).

The parenting practice of ‘logistic support’ incorporates behaviours such as transporting children to places where they can be physically active and signing children up to physical activities. Logistic support has been shown to have gender specific associations, with maternal logistic support being positively related to girls physical activity (mean accelerometry counts per minute) and paternal logistic support being positively related to boys physical activity (higher daily MVPA) (148).

Parental encouragement has a positive impact on child physical activity behaviours. For example research has shown that the number of different physical activity locations and the frequency of visits to these different locations were positively associated with parental support for physical activity, parental discouragement of sedentary behaviours and physical activity equipment in the home (154). This is important because more physically active children (assessed using accelerometers) use a greater number of physical activity locations (e.g. homes, parks, playgrounds) than less physically active children (154).

The Study of Early Child Care and Youth Development found that high levels of reported parental exercise were associated with higher levels of girls MVPA levels at age 9 (155). This study also found that parenting practices such as monitoring (knowledge of child location and activities) were not significantly associated with the decrease in physical activity level in children between years 9 to 15 years (155).

Time constraints

A common issue for parents is a lack of time to devote to healthy food preparation and physical activities as a family unit, especially in single parent households (138,139,150). Time limitations have been reported by parent focus groups as a greater restriction than cost (145). Linked to time constraints is parental employment. Maternal employment has been positively associated with offspring overweight and obesity possibly due to resultant poorer diets, lower physical activity levels and increased sedentary behaviours (e.g. being more likely to be driven to school) (156). The authors of this study suggest greater support is needed for working mothers (156).

Affordability

Cost has also been reported as a perceived barrier to children's healthy behaviours amongst some parents (139,142,150). Pearson and colleagues found that high levels of parental financial support of girls increased the odds of girls achieving high levels of MVPA (142). In addition, high parent income and education and two parents versus single parent households are negatively related to television viewing among young people 2-18 years (115). In other research, a lack of motivation to be active and inadequate or unaffordable facilities were amongst the issues raised by mother and daughter semi-structured interviews (144,157,158).

One solution to the cost barriers families' face is the promotion of family walking activities. The benefits of this approach include the involvement of the entire family unit, regardless of physical fitness and the fact that child-care is covered (159). The evaluation of the Furness Families Walk 4 Life project suggests that the social aspects of parent groups walking with their children and the support from other parents in keeping children 'under control' were strong motivating factors in this study.

Others have found that low income parents decide which foods to buy by considering the health properties, quality of foods, freshness and in some cases are less concerned about price as long as children will consume the healthy product provided (152). This study found that parents attempt to "balance quality and cost" (p1837) (152). Parents in another qualitative study commented that when eating out in a restaurant they would only try to influence their child's choice if the cost was an issue not the healthiness of the food (160).

Social networks

Individuals define themselves by their social networks including their relationships with family, friends and the community (161). Late childhood leading into early adolescence is characterised by increasing independence from parents (162,163) and increasing connections with peer groups (161,163) which increase in size as children develop connections both within and outside of school and develop ‘pro-social’ behaviour (cooperate with each other more) (164).

Peer groups in children aged 10 to 11 years of age have been reported as influential factors for the enjoyment, initiation and maintenance of physical activity behaviours (165). Using focus groups this study found that the initiation of physical activity was encouraged by the peer group through: “co-participation”; “modelling” and “verbal encouragement” (p5) (165). The social status attached to being physically active differed by gender. In boys, Jago and colleagues suggest that physical activity was important for popularity and social status within the peer group (165). However in girls social status attached to physical activity was dependent on the friendship group. In some groups being physically active enhanced your social status however in other groups physical activity was devalued beneath other pursuits (165). Self-reported physical activity with friends at home and in the local neighbourhood has been shown to be associated with achieving higher objective measures of physical activity than those only reported to be active with friends in the school environment (166), suggesting friends may have a positive impact on physical activity levels.

Intergenerational effects hypothesis (IEH)

The IEH was proposed by Emanuel in 1986 as “those factors, conditions, exposures and environments experienced by one generation that relate to the health, growth and development of the next” (p27) (167). The conditions in which a mother is born and grows up and the conditions within which pregnancy occurs are associated with reproductive success (167), warranting a research focus on childhood (Figure 2-5).

Poor in utero environments can be detrimental to adult physiology, including the adult intrauterine environment which may lead to physiological changes in the subsequent generation (168). The IEH is illustrated by the children of mothers born during the Dutch Famine of 1944-1945. These offspring were also born small, reflecting intergenerational transmission of nutritional experiences of the mother when she was a fetus (168).

Intergenerational transmission of body composition

Intergenerational transmission of body mass index (BMI) could be the result of shared environments, genetic influences or a combination of both. Research points to childhood as a critical period for the reproductive health of future mothers (7,9). Hypponen and colleagues showed that a mother's childhood height at 7 years is positively related to offspring birth weight using data collected for the 1958 British birth cohort study (7). These associations were stronger in the mothers than the fathers, suggesting that focusing research on girls is justified. In support of Hypponen and colleagues findings, strong positive associations have been shown between mother's childhood height and offspring birth weight (9). This study suggested that childhood pre-pubertal growth rate is an important area in which to focus research because earlier growth and improved nutrition may increase the blood supply to the placenta which will contribute to better nutrition for the offspring and thus to higher birth weights (9).

BMI levels in parental early life (7-16 years) can increase the risk and early development of overweight and obesity in the offspring (8). Parental excess weight gain during childhood results in an increased risk of overweight in offspring, independent of parental adult BMI levels (8). Li and colleagues demonstrated similar associations between maternal and paternal childhood BMI and offspring BMI, however, the risk of overweight and obesity in offspring at age 9 was not significantly associated with paternal BMI at ages 7 and 11 (8), whilst in mothers the association was significant. The positive association between parent and offspring BMI in the 1958 British birth cohort has been shown to persist over four generations, possibly explained by tracking of BMI levels into adulthood, the effects of shared environments and genetic contributions (169). Therefore overweight and obesity prevention efforts in pre-adolescent girls are warranted.

Maternal maturation

Maternal maturation may be a factor influencing the intergenerational transmission of offspring growth rate and body fatness (170-172). Greater pre-pubertal body fatness has been associated with earlier maturation (marked in females by age of menarche <11 years), suggesting there may be a threshold for maturation (172). Earlier maturation may also predict fatness in later life although it has been suggested that this may be mediated by earlier levels of fatness tracking into later life (170,172). Not only is early maturation a positive predictor of maternal weight status and growth tempo, but the tempo of offspring childhood growth

and the risk of overweight and obesity may also increase (170,171). Using ALSPAC data, Ong and colleagues found that compared with the mother's in the oldest quintiles of age of menarche, the offspring of mother's in the youngest quintiles of age of menarche had a 5 times greater risk of obesity (170). This finding has been supported by Basso and colleagues who found that mother's age at menarche negatively predicted offspring height and weight, particularly at ages 7 and 8 years, with a small but significant effect (171).

Childhood hardship

Childhood hardship (adverse situations e.g. financial hardship, family dysfunction, violence within the family etc.), may contribute towards the relationship between childhood and adult reproductive health (173). Greater childhood hardship experienced in childhood and adolescence was associated with increased odds of low birth weight offspring who were born prematurely, which was partly explained by maternal smoking behaviours (173).

The IEH illustrates that appropriate lifestyle choices (associated with weight status) during late childhood and early adolescence may significantly reduce the risk of adult overweight and obesity both in the mother and her eventual offspring. Late childhood and early adolescence is also an ideal time to focus research efforts as lifestyle habits are still being formed (174).

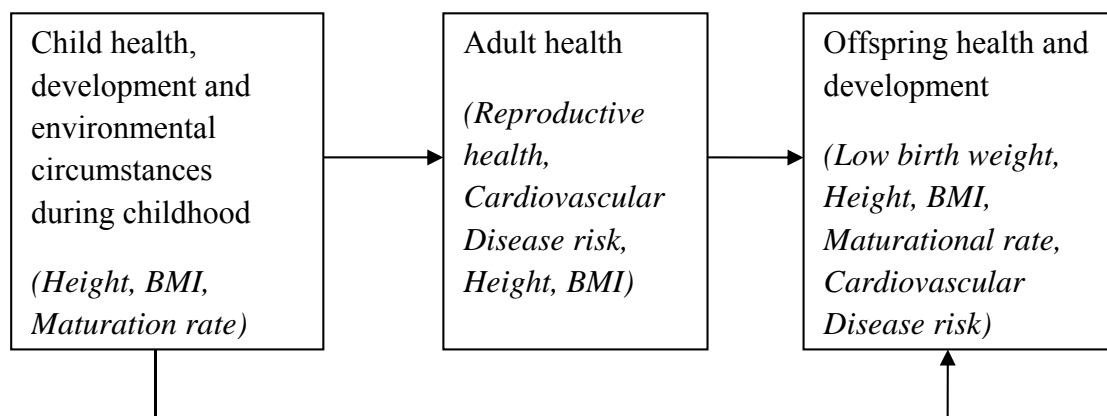


Figure 2-5 Intergenerational Effects Hypothesis summary depicting the rationale for a focus on overweight and obesity prevention in pre-adolescent girls

Summary

The intervention targets within the interpersonal level include parents, the peer group and the critical period of forming healthy behaviours in pre-adolescence. Interventions with parents should encourage: modelling of healthy behaviours; the adoption of authoritative parenting

styles for dietary behaviours; more permissive parenting styles for physical activity behaviours, and parenting practices which facilitate healthy behaviours. Whilst encouraging these practices, interventions should also address the barriers faced by parents, for example time constraints and the affordability of healthy behaviours. Harnessing the influence of the peer group through interventions may be an important predictor of success. Finally, at the interpersonal level the period of pre-adolescence in girls is a critical time to intervene because overweight and obesity at this age may increase the risk of this condition in the eventual offspring. **Evidence from the IEH and the prevalence of overweight and obesity in pre-adolescent girls presented above provides support for “priority action” (p732) to prevent obesity in this population group according to the evidence-informed framework (175).**

Organisational level

There are several organisations which affect the development of childhood overweight and obesity including the girl guides/scouts (used as an intervention setting in two studies included in the Systematic Literature Review (p44) (176,177)) the food industry and the National Health Service. The organisation with potentially the most direct influence on children is the school. Schools have the opportunity to provide health education to children whilst also directly influencing what children eat and the amount of physical activity they do during a large proportion of the day through school dinners and physical education (P.E.) (92,178). Therefore the school is recognised as an appropriate setting for childhood overweight and obesity research (174).

School effect on obesity

Using nationally representative data from the NCMP, the association between deprivation in different settings (area level compared to school level) and childhood overweight and obesity outcomes has been assessed (179). Multilevel modelling was applied in this analysis to account for the clustering of schools within Primary Care Trusts, and the grouping of individual children within schools which are set in different areas. The findings from this study suggest that there is a significant positive relationship between free school meal uptake (school level deprivation indicator), Child Wellbeing Index (area level deprivation indicator) and BMI z-score (179). The variance explained by these independent variables was also greater in the 10-11 year old children than the 5-6 year olds pointing to a cumulative effect of deprivation on BMI z-scores (179). The difference in the age groups stemmed from a greater

proportion of the BMI z-score variance being explained by the school level deprivation than by the area level deprivation, suggesting the school environment is particularly pertinent as children get older (179). In support of the importance of the school environment, cross-sectional analysis has shown that the more policies schools have which promote healthy eating the higher the odds that pupils will report consuming fruit and vegetables daily and at lunch-time (180).

The impact of P.E. and break times on BMI trajectories has been investigated as part of the Early Childhood Longitudinal Study-Kindergarten Cohort (ECLS-K). This study found that an additional hour of break time and meeting the American recommendations for break time (20 minutes per day) was associated with a significantly reduced BMI percentile whereas no significant associations were shown between P.E levels and BMI (181). However this study found a low number of schools meeting the P.E guidelines so this may have attenuated any effects P.E could potentially have on BMI levels.

School environment

The number of school playground facilities has been shown to be significantly associated with objectively measured physical activity levels in 16 schools with a sample of 441 children in New Zealand (182). The number of school policies designed to promote physical activity, however, were not significantly associated with physical activity levels (182). Furthermore, it can be argued that the effectiveness of physical activity policies cannot be accurately assessed through quantification alone. In addition, active commuting is significantly associated with school activity policies and cycling to school is positively associated with cycling infrastructure surrounding schools (125).

Government School Policies

The UK government involves schools in child health initiatives through the National Healthy Schools Programme which was launched in October 1999 (183). This initiative focuses on four key areas: Personal Social, Health and Economic Education; Healthy Eating; Physical Activity and Emotional Health and Wellbeing. Efforts made at the school level are hoped to improve children's health as they develop (183).

In 2001, food based standards for school meals were introduced by the Department for Education and Skills. Prior to this Local Authorities were only obliged to provide free school meals to eligible children. A survey to assess whether the 2001 standards were being met in

2005 found that school food standards were poor. In the same year the government set up a School Meal Review Panel to update and revise the nutritional standards and survey primary school meals. The School Food Trust was set up to act on the panel's recommendations in 2005. Primary schools have been required to comply with food standards by law since 2008 (184).

Primary school food surveys (conducted by the School Food Trust) are designed to "observe and record" (p2) school food provision to ensure that schools are adhering to regulations (184). The 2009 school food survey was conducted between February and April 2009 and included a sample of 136 schools across England including over 6000 pupils who consumed a school meal and over 3000 who consumed a packed lunch brought from home (184). For five consecutive days all food and drink provided by these schools was recorded. More in-depth analysis of what food and drink was selected and eaten was conducted with ten pupils from each school who consumed a school meal and five pupils who brought a packed lunch. In comparison to a similar survey conducted in 2005 the foods provided and selected had improved with regards to their healthfulness. For example servings of vegetables and salad taken by pupils had increased from 59% in 2005 to 74% in 2009 (184). With regards to meeting the nutritional standards, the actual provision, based on direct observation within schools, was below the standards for sodium content, and above the standards for non-milk extrinsic sugars, fat, saturated fat, iron and zinc (184). Although 'less healthy' foods can still be served these were restricted to three times per week across the school day. There is concern regarding the amount of these foods served on these days which resulted in more children consuming these less healthy options (184).

Interestingly the school food standards do not apply to packed lunches brought from the child's home. Although many schools have developed their own packed lunch policies the suitability and acceptability of these policies is unclear. Research comparing the composition of school meals to packed lunches has found that although the energy intake was similar, packed lunches had twice the amount of sugar and significantly higher sodium and calcium but were more likely to include fruit (185). Whereas school meals were more likely to provide at least one portion of vegetables (185). Within the School Food Trust's, Primary School Food Survey in 2009 a comparison between school meals and packed lunches was made (186). In comparison to school meals, children consuming a packed lunch consumed more dairy products and a greater proportion of fruit or fruit-based desserts (186). In terms of meeting nutrient standards, both school meals and packed lunches met the standards for

vitamin C, protein and fat intake, whereas only the packed lunches met the standards for calcium intake (186).

The School Food Trust, which develops and monitors the nutritional standards of school meals commented that because packed lunches are largely unregulated, (apart from in schools which apply their own nutritional standards to packed lunches), they are susceptible to being less healthy than school meals (186). This they conclude means that more work should be done to encourage children to consume school meals. Although the Trust provides information on developing packed lunch policies their main focus is on school meals. It would seem more sensible and appropriate for the School Food Trust to produce nutrient standards that operate across the whole school (including packed lunches) rather than use packed lunches as further evidence of why school meals have improved and should be the preferred option.

Physical education

Teachers

Primary level education is one of the earliest opportunities for children to engage with organised physical activity which is compulsory and potentially can increase the probability of physical activity participation over the life-course (187,188). One teacher covers every subject within the curriculum in primary education which facilitates effective encouragement of physical activity through close relationships (188). However, being required to have expertise in every subject can mean that primary school teachers are not specialists in P.E and in some cases have received insufficient training (189) and time to develop an understanding of the subject, resulting in an increased risk of low confidence in their teaching abilities (188,189). Thus enhancing the teaching skills of P.E in non-specialist primary school teachers may be beneficial (188,189). To improve the provision of P.E in primary schools, some schools in England are beginning to employ external sports coaches who are expected to raise the expertise of primary school teachers through lesson observations and the provision of lesson plans. Additionally, external sports coaches could encourage children to attend physical activity clubs in the wider community.

Limiting factors

As a research setting, the hectic schedules of schools has been cited as a significant barrier to effective intervention implementation (190,191). To illustrate this limitation, the 'Great Fun 2 Run' controlled trial achieved positive intervention effects in physical activity and body

composition measures in intervention school children after 10 months (192). However, when followed up at 20 months, the differences between the intervention and control school children were no longer present. One explanation the authors gave for this finding is that the majority of teachers felt unable to maintain the intervention implementation as a result of competing pressures from other areas of the curriculum (192).

Summary

The primary intervention target identified at the organisational level is the school. The main targets within schools are the provision of P.E., availability of equipment to be physically active with at break times and the provision of food. However this organisation is noted as being difficult to work with due to the time pressures faced by teachers.

Community Level

Recommendations for Community Focused Research

It has been suggested that population or community level approaches may be most effective because often moderate changes at the population level can cause greater improvements in population disease levels than a small number of individuals making large changes (193). The Working Group of the International Obesity Task Force (IOTF) firstly advocated intervening at the environmental and society level to facilitate individual behaviour change to prevent obesity (194). Secondly they suggest it is important to position initiatives at the local community level to allow tailored approaches to meet the needs of the community (194). The National Heart, Lung, and Blood Institute Working Group in America also recommends community-based interventions in childhood overweight and obesity prevention research (195). Recommendations for community-based strategies to prevent obesity in America include increasing the availability of healthy food and drink, increase opportunities for physical activity both within and outside of schools and community's should form partnerships amongst diverse groups (e.g. public and private-sector) to address obesity prevention (196).

Community-Based Participatory Research

Community-Based Participatory Research (CBPR) is in agreement with the above recommendations and proposes a “partnership approach to research that equitably involves community members, organizational representatives and researchers in all aspects of the research process” (p1464) (197). The main benefits of this approach are that it addresses issues that are of concern to the community itself, addresses the complexity of public health

problems by drawing on expertise from different areas, utilises the knowledge of community members which increases the validity of the research, creates partnerships between the researcher and the researched and can effectively improve health outcomes of the community (197,198).

CBPR, involving adolescents, parents and community stakeholders, has assessed the barriers to adolescents' (12-14 years) healthy eating and physical activity (199). Perceived barriers were described at the community, family and school level (199). At the community level unhealthy foods were perceived as low-cost and too easily accessible. A lack of parental nutritional knowledge was cited as a family level barrier and the provision of unhealthy foods within the school environment was highlighted (199).

A second study using CBPR principles to implement an intervention was able to reduce BMI Z scores in children aged 8 years at baseline over a two year intervention period, in those whose caregivers completed the intervention lessons (200). This study suggests community participation is beneficial for health promotion interventions.

Engaging and empowering communities

In the UK a duty to engage local people in activities and decisions which impact them was enacted by the Local Government and Public Health Act in 2007 (201,201). To achieve this duty, attempts must be made to engage with those who are most difficult to reach which will only be possible if all community groups are known (202). Empowering the community will allow its members to foster control over underlying factors that influence health (158). Empowerment can be achieved using approaches which begin with the issues and needs expressed by the community itself (23,197). Barriers to community cohesion and the ability to actively participate in community decision-making procedures were indicated by participants of the "Well London" project. These barriers included: low availability of activities or knowledge of activities; low usage of community space (which could be due to cost or a lack of information); language barriers; racism; lack of safety due to high crime rates; negative relationships between young and older groups and a high population turnover (203).

Built environment

The built environment is a part of the community setting because community's will interact with their built environment differently. The built environment is defined as the

“neighborhoods, roads, buildings, food sources, and recreational facilities in which people live, work, are educated, eat and play” (p90) (204). Residing in a suburban environment has a beneficial impact on physical activity and overweight levels amongst adolescents (205). The beneficial features of a suburban environment include: physical activity facilities; community organisations; and low levels of crime (205). Additional research assessing the built environment has found a negative relationship between the number of physical activity facilities and the odds of being overweight in 12-18 year olds (206). The lack of paths and streetlights, has been highlighted as a barrier to physical activity (206). The association between a healthy weight status and proximity to parks may not be as important as the playground facilities available (207). In a study including 108 children (2-17 years), the presence of a park with playground facilities was associated with a five times increased odds of being a healthy weight (207).

There appears to be a complex relationship between features of the built environment, (e.g. road density, directness of routes to school) and the likelihood of active transport to school being adopted. For example in the SPEEDY study greater road density is associated with a higher likelihood of active transport methods whilst more direct available routes to school are associated with a lower likelihood of active transportation amongst children (aged 10-11 years) (125). Parental concerns regarding the safety of the local environment may mediate these perhaps unexpected associations (125). Another study using the same SPEEDY cohort supported the suggestion that attitudes towards the local environment may be related to the likelihood of actively travelling to school (208). In this study parental concerns about dangerous traffic on the route to school was associated with decreased walking or cycling to school and was moderated by the distance to school with those living further from school having a stronger association with perceptions of safety (208).

A relatively new approach to assessing the built environment’s impact on active transport to school in children involves the use of Geographic Information Systems (GIS) which objectively measure the built environment using digital images. A systematic review of studies using this method to investigate the association between aspects of the built environment (residential density, distance from home to school, land use diversity, walkability index competing uses and locations, aesthetics, slope of streets) and active transport to school found that distance to school was the only consistently negatively related measure (209). The authors of this review comment on whether perceptions of the built environment are of greater influence on behaviours than objective measures and whether the

measures chosen in the studies reviewed are the most appropriate variables to assess (209). In support of the importance of perceptions, a cross-sectional study of older children (11-16 years) found a negative perception of neighbourhood safety was inversely associated with caregiver reports of youth physical activity levels (210).

The built environment can also affect eating behaviours. Davis and Carpenter (2009) reported that children in California who attended a school close to a fast-food restaurant were more likely to be overweight and obese (211). However evidence for the relationship between fast-food availability (proximity to fast-food restaurants within 3km of home) and consumption of fast-food is limited (212). There has been limited research on the built environments impact on children's food consumption in the UK. The SPEEDY (Sport, Physical Activity and Eating Behaviour: Environmental Determinants in Young people) study used the UK's Ordnance Survey 'Points of interest' to locate food retailers in proximity to children's addresses and related this to a measure of children's food choices (213). Skidmore and colleagues found that the distance children lived from food outlets and the density (per square kilometer) of food outlets, had a small effect on children's food choices in the UK (213). Residing further away from convenience shops was associated with lower consumption of unhealthy confectionary (chocolate and crisps) and white bread (213). The density of supermarkets produced mixed associations with higher vegetable intake and breakfast cereal and higher intake of unhealthy foods such as sugary drinks, sweets and white bread (213).

2.5 Theories of behaviour change

Whilst it is important to identify appropriate settings for intervention it is also necessary to understand, develop and apply theories of behaviour change if interventions are going to effectively modify behaviour. Arguably, one theory will not be able to completely explain all the complexities of behaviour. A Cochrane review of obesity prevention interventions in children, found that approximately half of the included interventions reported theoretical underpinnings (214) such as: behaviour change theories, the socio-ecological framework, social learning theory, health promotion theory and trans-theoretical models. Therefore it is important to set this research in the context of the main relevant theories of behaviour change which are: Attribution Theory; Health Locus of Control; Unrealistic Optimism theory; Trans-theoretical Model Stages of Change (discussed on p66); Social Learning Theory; Social Cognitive Theory.

Attribution Theory proposes that causal justifications for behavioural outcomes (e.g. health) exist and are determined by causal criteria including: a distinctive or individual specific cause of behaviours and consensus regarding the cause which is shared by others (215). This theory has been applied to assess the public's perception of the causes of obesity and how these attributes relate to the support that individuals possess for government policies related to obesity in the UK (216). The attributes which explained the most variance in the data using a principal components analysis were individual and availability attributes (both viewed as causes of obesity) and structural (e.g. cost of unhealthy foods) and genetic attributes (both not seen as causes of obesity).

The Health Locus of Control (LOC) Theory addresses whether individuals perceive their health as controllable (internal locus of control) or beyond their control (external locus of control) (217). Reinforcement or rewards are understood to inform expectations regarding the outcomes of behaviour (217). Thus reinforcements of a behaviour performed at one time will be expected when a similar behaviour is performed in the future. This is known as 'generalized expectancies' (217). The effect of reinforcements will depend on whether individuals possess an internal or external LOC. For example, the more an individual views a certain behavioural outcome as having an external LOC (or occurs primarily by chance) the less influence this expectancy will have over individual differences in behaviour (217).

The Unrealistic Optimism theory was developed to explain why individuals perceive themselves to be less likely than others to experience a negative life event in the future (218). An optimistic bias (perception that others are more likely to experience negative health related and non-health related issues than oneself) has been found in children aged between 8-9 years (219) suggesting this tendency is present from a young age. In this study, compared to girls, boys were characterised as significantly more optimistic in both health and non-health related issues (219). Similar findings have been replicated in parents, who considered their child as having a greater chance of experiencing positive health outcomes and being less likely to experience negative outcomes (220). Realistic optimism about child health may be necessary to ensure parents adopt and encourage appropriate health behaviours in their children (220).

Social Learning Theory (SLT) suggests that new behaviours are learnt through the observation of others' behaviour and the consequences of these actions (221). Learning through modelling or observation has four components: "attentional processes" which

determine what is selectively observed; “retention processes” that is the retention of behaviour; “motor reproduction processes” converting what has been observed into action and “motivational processes” is the reproduction of behaviours people want to repeat (221).

In 1986 Bandura developed the Social Cognitive Theory (SCT) using the principles of SLT (222). SCT also postulates that behaviour is learnt through observation. The constructs of SCT and their meaning are presented in **Error! Reference source not found.**

Table 2-1 Social Cognitive Theory constructs

Construct	Definition
Reciprocol determinism	Interdependent relationship between individuals, their environments and their behaviours (222,223)
Self-efficacy	The context-specific confidence a person feels about performing certain behaviours (222,224) and is described by SCT as the most important predictor of behaviour change
Outcome expectations	Outcome expectations are important prior to attempting a new behaviour. Before attempting a behaviour, individuals consider the predicted outcomes which are often informed by previous experience (222). Outcome expectancies are a quantifiable value which individuals assign to a particular outcome of behaviour and can either be positive or negative. Under normal circumstances, individuals will attempt to maximize the positive outcomes expectancies and minimize the negative.
Reinforcement	Reinforcement is the response of others towards a behaviour resulting in an increased (positive) or decreased (negative) likelihood that the behaviour will be repeated (222).

2.5.1 Limitations of psychological models of behaviour change

These models are often unsuccessful in predicting both intentions of behaviour and behaviour change itself (215). Reliance on self-reported data can lead to validity problems, although appropriate objective measures may not be available (215). The use of similar and overlapping concepts across these models highlights the need to reach an agreement on key concepts necessary to predict behaviour change (215,225). Health beliefs and behaviour may not be causally related, for example biological and environmental factors may contribute (215) therefore social cognition models may be more appropriate. Currently, it is not possible to detect causality between these concepts and behaviour change because studies are often performed cross-sectionally and can therefore only consider associations (215).

2.6 Community Readiness Model (CRM)

2.6.1 Introduction

The CRM proposes the integration of a “community’s culture, resources and level of readiness” (33) to effectively address community issues. Readiness refers to the preparedness of a group to “take action on an issue” (p3) (33). Readiness can predict the likelihood that change will be achieved and supported by a community (33). An important influencing factor for successful interventions is the willingness or unwillingness of the community to accept the intended change (30). It is the consideration of this willingness, preparedness and readiness which may hold the key to successful prevention strategies. Prevention programmes utilising local peoples’ knowledge and resources, to solve local issues, effectively encourages ownership of the programme by local people, a critical element for programme success (226). A sense of community cohesion and the ability to work together, may be a key determinant of whether community initiatives are successful (227).

2.6.2 Theoretical background

The model has developed from two research traditions; Psychological Readiness and Community Development (30,31) (**Error! Reference source not found.**). Psychological Readiness is represented by the Trans-theoretical Model of Health Behaviour (TTM). The TTM draws together principles from multiple theories to provide as complete a model as possible (224). The constructs of the TTM are: that behaviour change occurs in stages over time; self-efficacy (224) and decisional balance (the balance between the pros and cons of behaviour change) (224). The TTM processes of change are those factors which influence whether individual behaviour change can or will occur (224) (See **Error! Reference source not found.**).

Table 2-2 Theoretical traditions of the Community Readiness Model

Research Traditions		Psychological Readiness	Community Development	
Model		Trans-theoretical Model of Health Behaviour	Innovative Decision Making Model	Social Action Process
Stages of readiness/change	Appearance of need to change	Pre-contemplation (No intended action, individuals at this stage are unmotivated and disinterested in change)	Knowledge (initial awareness of a new idea)	Stimulation of interest (Recognition of the need for a new idea. This may come from within or outside of the community.)
	Information attainment/Consideration of alternative behaviour	Contemplation (Intention to change and raised awareness both of the benefits of changing and the cons)	Persuasion (Efforts made to change attitudes towards the new idea)	Initiation (Community members are the first to propose new programmes and policies. The greater the number of people aware of the innovation the higher the chance of implementation success)
	Planning for a change	Preparation (Planning behaviour changes. It is considered appropriate to develop an intervention for individuals at this stage)	Decision (judgement made on adopting the new idea)	Legitimation (Local leaders accept the need for action)
	Implementation of change	Action (Observable behaviour changes have been made)	Implementation (The new idea is tried out)	Decision to act (Specific plans to act are developed)
	Maintenance of change	Maintenance (New behaviours are current and attempts are made to avoid relapse, individuals may have increasing self-efficacy in their abilities at this stage)	Confirmation (There are several options; the new idea is adopted or the old ideas are reverted to or another idea is tried out)	Action (The plans are implemented)
	Previous behaviour is no longer a temptation	Termination (Individuals possess very high self-efficacy in their ability to maintain their behaviour and the previous behaviour is not a temptation for the individual)		

Table 2-3 The processes of change in the Trans-theoretical Model of Health Behaviours

Process of change	Description
Consciousness-raising	Increasing awareness of the causes and consequences of the behaviour that is of specific interest.
Dramatic relief	The increase in emotional response which can be reduced if the appropriate behaviour is performed (e.g. role-playing)
Self re-evaluation	The consideration of one's-self with and without performing the behaviour under question
Environmental re-evaluation	Consideration of the environment and the affect personal behaviour has on those around the individual.
Self-liberation	The self-belief that change is possible
Helping Relationships	To support this self-liberation it is important that those surrounding the individual provide social support for behaviour change
Counter-conditioning	The consideration of the alternative to the current unhealthy behaviour
Contingency management	Increasing awareness of the consequences of behaving in a certain way
'Stimulus control'	The removal of unhealthy triggers and the increase in prompts for positive health behaviours
'Social liberation'	Increased opportunities to perform healthy behaviours

The TTM model proposes 6 stages of personal readiness: Pre-contemplation; Contemplation; Preparation; Action; Maintenance; Termination, described in **Error! Reference source not found.**

The TTM is similar to the CRM in the stages of 'action' or 'initiation' as both require an attempt to change. Both the CRM and the TTM note the importance of the specificity of the issue. For instance, a community may be willing to make a change relating to one issue but be in a state of 'denial' regarding another (30). The stages are progressive and, as such, the previous stage becomes less important as change develops. The critical difference between the TTM and the CRM is that the TTM applies to individuals rather than to communities.

The second origin of the CRM is in Community Development relating to two theoretical processes: the Innovative Decision Making Process and the Social Action Process (31). These processes recognise the complexity of communities and the importance of community member interaction which lead to collective action (31). The Innovative Decision Making Process (228) describes the individual and group adoption of behaviour change (31). An innovation is defined as an "idea, practice or object that is perceived as new to an individual or another unit of adoption." (p11) (228), whilst diffusion "is the process by which an

innovation is communicated through certain channels over time among the members of a social system” (p5) (228). The consequence of diffusion is social change, defined as changes to the “structure and function of a social system” (p6) (228). Rogers (1983), recognises the difficulty of adopting new ideas (228) and viewed innovation diffusion as occurring through five stages: Knowledge; Persuasion; Decision; Implementation and Confirmation (31,228) (**Error! Reference source not found.**). The Social Action Process (229) specifically addresses how change is implemented in a community. Whilst different stages have been proposed for community change, the Social Action Process was informed by stages which parallel the psychological readiness (TTM) and Innovation-Decision Making model stages: Stimulation of interest; Initiation; Legitimisation; Decision to act and Action (**Error! Reference source not found.**) (31).

2.6.3 Community readiness model development

To incorporate these theories into an assessment of community readiness two techniques were employed by the original developers of the model. Firstly, key informant surveys were utilised because it is believed that within every community there will be people with extensive knowledge about the issue under study and the ability to suggest ways of tackling the problem (31). Secondly, anchored rating (short) statements describing a series of “critical incidents” needed to perform a certain task were produced through expert consultation (p667) (31) (APPENDIX B). Similarly, the stages of readiness were developed through a series of revisions. All aspects of the model were repeatedly re-examined and revised with a panel of experts utilising their experiences within the field. During this revision process it was decided that the anchored rating statements needed to be divided across five dimensions (**Error! Reference source not found.**). To finalise the anchored rating statements for each dimension, a modified Delphi procedure was adopted, whereby a group of experts were given the stages of readiness along a continuum and were asked to place each anchored rating statement per dimension along the continuum (i.e. ranking the anchored rating statement according to the readiness level to which it corresponds). This procedure was revised until the expert panel had agreed for the majority of anchored statements (31).

2.6.4 Application of the CRM

There are six steps in the CRM which are applied to address a specific issue within a community (Figure 2-6**Error! Reference source not found.**). Step one involves identifying the issue under study. Step two identifies the ‘community’ with specific reference to the issue.

The CRM defines a community as a “geographical area, a group within that area, an organization, or any other type of identifiable ‘community’” (p6) (33). Developing a consensual definition of a community is necessary to allow comparisons across research (230), however, several definitions of ‘community’ have been offered. Kok (2008) defines a community as “collectives of people identified by common values and mutual concern for the development and wellbeing of their group or geographic area” (p437) (24). Warren, 1978 (229) views common residence as a minimum community membership requirement. CBPR defines a community as a “unit of identity” (p184) in which members share a common membership and shared interest (197). A definition of community has been developed, from the work of three sources (231-233), with 6 components: “1) membership-a sense of identity and belonging; 2) common symbol systems-similar language, rituals, ceremonies; 3) shared values and norms; 4) mutual influence-community members have influence and are influenced by each another; 5) shared needs and commitment to meeting them; and (6) shared emotional connection-members share common history, experiences, and mutual support” (p151) (234). In contrast to a neighbourhood which is more of a spatial construct, community implies “connection” for instance, social, or cultural connections (235). Finally, three definitions of the term community have been offered (87). The first is similar to Bronfenbrenner’s concept of ‘mesosystems’, the “face-to-face primary groups to which individuals belong” (e.g. families, friends, neighbourhoods) (p363) (87). The second, comprises groups of organisations within a defined area and finally a community can be defined in geographical and political terms (87).

Given the diverse nature of the concept of community and the lack of an agreed consensus, it is the researcher’s responsibility to consider carefully what constitutes a community regarding the issue under study. The research in this thesis is interested in defining the pre-adolescent girls’ community, particularly those community members who influence lifestyle choices related to healthy eating and drinking and physical activity patterns. This research allows pre-adolescent girls to define their community or communities, thus adding to the current literature defining a pre-adolescent girls’ community.

Step three is used to determine the community’s stage of readiness to address the issue and this step is completed by conducting a community readiness assessment using interviews. The CRM proposes that key informants are aware of the current situation within their community and are capable of planning and implementing interventions (30). Key informants should have a good understanding of the issue under study, do not necessarily have to be a

community decision maker or 'leader' but should know about the community situation and culture, developed through a substantial period of residency and be involved in community matters (236). In one of the earliest studies to use the CRM, focus groups were adopted to determine who the community itself viewed as the key informants (237). Key informants can also be referred to as stakeholders: individuals with experience, knowledge and information regarding the environment and local problems (199). Key informants are equipped to suggest appropriate social actions within their community (199). It is important to consider the experience or background of each key informant as this may affect their assessment of the community's readiness (199). The CRM proposes identifying and interviewing approximately six key informants who are involved in community affairs. This number of people is believed to allow an accurate scoring of community readiness (33). The CRM suggests that key informants should represent different areas of the community (33). Edwards et al. (2000) suggests using a generic semi-structured interview consisting of approximately 30 questions (33). Those implementing this interview guide previously suggested that it is sometimes either not possible or necessary to ask every question because questions can be answered in different sections (237). The answers from the key informant interviews are then used to assess community readiness.

Step four is undertaken post community readiness assessment and involves analysing both the assessment and interview data in order to generate a score for each of the six readiness dimensions (Table 2-4**Error! Reference source not found.**) and an overall community readiness stage (Figure 2-7 and Table 2-5**Error! Reference source not found.**). The community readiness stage derived falls between one ('No awareness') and nine ('Professionalisation'). The process of scoring the transcripts to determine community readiness will be described in detail in the Methods Chapter.

Step five is used to develop and implement strategies that are appropriate for the stage of readiness of the community. Each stage of community readiness has an accompanying strategy. The strategies for stages 1-4 involve raising community awareness in terms of: the issue (Stage 1-'No Awareness'); the presence of the problem within the community (Stage 2-'Denial'); the ability of the community to solve the issue (Stage 3-'Vague Awareness') and the ability to develop concrete ideas to reduce the problem (Stage 4-'Pre-planning'). As the readiness stage increases the strategies become more applied. For example, Stage 5 ('Preparation') involves the planning of intervention and evaluation approaches with influential community members. When enough information is available it is recommended

that an intervention be implemented in communities at Stage 6 ('Initiation'). The momentum of the intervention is maintained at Stage 7 ('Stabilisation') and finally, Stage 8 and 9 ('Expansion' and 'Professionalisation') focus on developing and continuing the present efforts and evaluating the strategy's success.

Finally, step six is used to evaluate the effectiveness of the implemented strategies after they have been in place for a period of time by repeating steps three and four to recalculate the new community readiness score. In addition, a seventh step has been suggested for the CRM, whereby a second issue is identified and the knowledge gained from the first issue is used to implement strategies for dealing with the second issue.

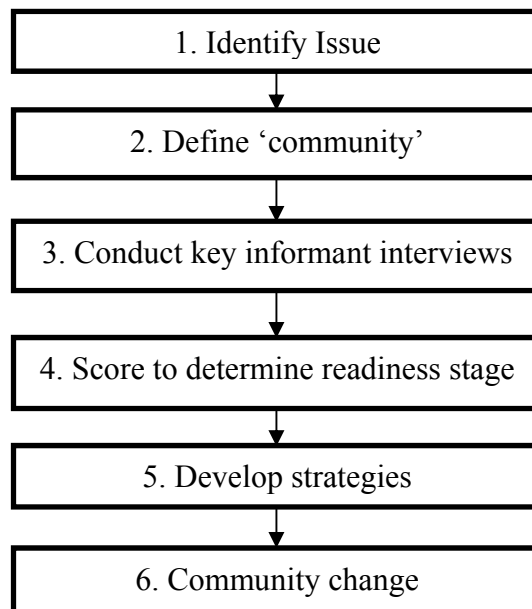


Figure 2-6 Process for using the Community Readiness Model Source: Adapted from Plested et al. 2006

Table 2-4 The six dimensions of readiness that influence a community's preparedness to take action on an issue

Dimension of Readiness	Definition
A. Community efforts	To what extent are there efforts, programmes, and policies that address the issue?
B. Community knowledge of the efforts ¹	To what extent do community members know about local efforts and their effectiveness, and are efforts accessible to all segments of the community?
C. Leadership	To what extent are appointed leaders and influential community members supportive of the issue?
D. Community climate	What is the prevailing attitude of the community toward the issue? Is it one of helplessness or one of responsibility and empowerment?
E. Community knowledge of the issues	To what extent do community members know about the causes of the problem, its consequences, and how it affects the community?
F. Resources related to the issue	To what extent are local resources - people, time, money, space, etc. - available to support efforts?

Source: Adapted from Plested et al. 2006

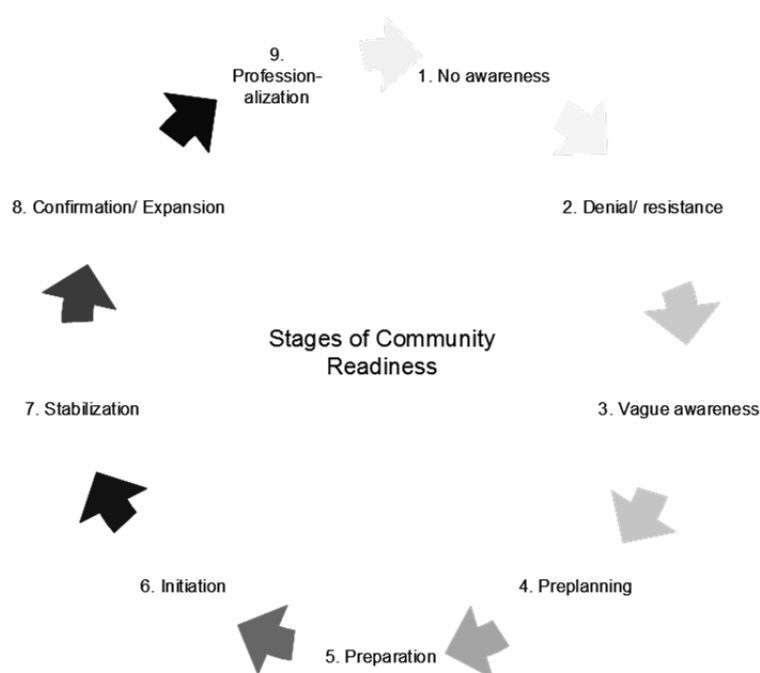


Figure 2-7 The nine stages of Community Readiness

¹ Dimension A and B share anchored rating statements

Table 2-5 Description of the nine stages of Community Readiness

Stage of Readiness	Definition
1. No awareness	Issue is not generally recognised by the community or leaders as a problem (or it may truly not be an issue).
2. Denial/ resistance	At least some community members recognise that it is a concern, but there is little recognition that it may be occurring locally.
3. Vague awareness	Most feel that there is a local concern, but there is no immediate motivation to do anything about it.
4. Pre-planning	There is clear recognition that something must be done, and there may even be a group addressing it. However, efforts are not focused or detailed.
5. Preparation	Active leaders begin planning in earnest. The community offers modest support of efforts.
6. Initiation	Enough information is available to justify efforts. Activities are underway.
7. Stabilization/Maintenance	Activities are supported by administrators or community decision makers. Staff are trained and experienced.
8. Confirmation/ Expansion	Efforts are in place. Community members feel comfortable using services, and they support expansions. Local data are regularly obtained.
9. Professionalisation/ High level of community ownership	Detailed and sophisticated knowledge exists about prevalence, causes, and consequences. Effective evaluation guides new directions. Model is applied to other issues.

Adapted from Plested et al. 2006

2.6.5 Previous uses of the CRM

The CRM was originally developed to address alcohol and drug abuse prevention (31) but can be applied to multiple community health problems such as childhood obesity and HIV/AIDS. A literature search showed that 14 studies used the CRM to address a range of different issues including: traumatic brain injury (238), abuse of inhalants and other legal products (237,239-241), childhood obesity (242-244), HIV/AIDS (245,246), breast cancer prevention (247,248), cycle helmets use (249) and intimate partner violence (250). A summary of these studies is provided in Table 2-6 **Error! Reference source not found.** These articles used the CRM in a number of ways: to assess readiness prior to intervention implementation, to inform the design of an intervention and to assess changes in readiness post intervention. A number of other studies which reviewed the CRM have been published, however they were not included in **Error! Reference source not found.** as they did not collect community readiness data (e.g. literature review) (32,251) or they did not use the

CRM proposed by Edwards et al. (2000) by reducing the stages of community readiness from 9 to 6 and reducing the anchored rating statements from 9 to 4 (252).

2.6.5.1 CRM and childhood overweight and obesity

The CRM has been applied to childhood overweight and obesity prevention in: Oregon, USA (253); 10 communities across the USA (243) and Victoria, Australia (244). Findholt (2007) used the tool to calculate a pre-intervention readiness score and implement strategies to prevent overweight and obesity (253). Key respondent interviews were conducted with school administrators, school nurses, a nutritionist, community youth programme leaders and several parents in six communities in Union County, Oregon. The scoring of key informant interviews led to a readiness assessment of 1.6 corresponding to 'No awareness'. Analysis of the key respondent interviews revealed a belief amongst some families that eating and physical activity behaviours are private issues and should not be addressed by schools, whilst other key informants believed that children would grow out of unhealthy behaviours (242). Strategies were developed to match the stage of readiness in the community (e.g. activities aimed at raising community awareness of childhood obesity). Whilst outcomes relating to the prevention of obesity were not presented, Findholt suggested that the community were surprised to learn the prevalence of obesity in children, thus awareness was raised (253). Sliwa and colleagues (2011) used the CRM to identify a community with a readiness score high enough to implement a community-based obesity prevention intervention through a competitive scheme. The average readiness score across the 10 communities was 4.2 ('Pre-planning' stage) (243). The leadership dimension produced the most variable readiness score and the community knowledge of the issue dimension was the least variable readiness score (243). Communities were excluded from the selection process if their readiness scores were too low; suggesting they did not possess the capacity to implement a successful intervention (243). Millar (2012) used the CRM for pre and post intervention assessments (244). This study defined community's as schools. Intervention schools increased their overall readiness stage whilst the control schools tended to remain stable, suggesting that the intervention improved the readiness stage. However, the community's awareness of the issue of childhood obesity did not increase after the intervention ("It's your move!"), suggesting a stage of 'denial' (244).

Table 2-6 Summary of Community Readiness studies for a range of different issues

Authors	Issue Addressed	Setting	Key informants interviewed	Number of key informants	Findings	Results
Plested et al. 1999	Drug use prevention	Samples taken from 102 United States communities. Target groups included Mexican American, American Indian and White American.	School counselor, sheriff, police, public health nurse, general practitioner, mental health worker, social workers.	Number of key informants not reported in article.	The CRM helped to identify why minority groups may be more susceptible to drug use. For example other issues experienced such as unemployment were seen as more important in the community than drug use.	The most common readiness stage in this study was vague awareness.
Engstrom et al. 2002	Preventing youth tobacco smoking	Chicago. Youth Tobacco Access Project. 11 communities.	Key informants from the police department.	Number of key informants not reported in article.	The CRM was adapted to inform and assess the effectiveness of a controlled intervention designed to prevent tobacco use in young people. It was hypothesised that higher readiness scores would be associated with greater enforcement of initiative activities.	The readiness scores across the 11 communities for sales enforcement ranged from 1.57 to 6.85 and scores for possession enforcement ranged from 1.71 to 5.86. In this study there was a positive association between readiness stages and intervention activities (compliance checks).
Brackley et al. 2003	Intimate partner violence prevention	Bexar County, Texas, USA	Interviewed key informants included “experts or providers of care in the field	26 interviews conducted.	The major finding of this study is that the community does not understand what intimate partner violence constitutes therefore	The community readiness stage in this study corresponded to Preplanning. This information was being

Authors	Issue Addressed	Setting	Key informants interviewed	Number of key informants	Findings	Results
Slater et al. 2005	Youth Substance Abuse	16 USA communities (8 intervention, 8 control)	of intimate partner violence” (pg232). Representatives from schools, law enforcement, human services and general community	At baseline 112 interviews were conducted with roughly 6 per community. Follow up, 92 interviews conducted two years later.	awareness of this issue needs to be increased. Key informant community readiness assessments can help to evaluate community-based interventions.	used to develop appropriate intervention strategies. Randomised group prevention study using community media intervention. Community media efforts significantly increased the knowledge of the issue compared with control communities. Community climate and perceived prevention leadership quality was marginally improved compared with the control community.
Borrayo, 2007	Breast health disparities amongst Latino women	4 communities in Colorado with a predominantly Latino demographic (2 urban and 2 rural).	Key members of the Latino community including representatives from the health sector, faith leaders, alternative medicine, social	19 key informant interviews.	The CRM allowed an investigation of the readiness to prevent breast cancer in Latina women.	The readiness stage of the communities assessed ranged from denial to vague awareness. This information was used to develop an education programme to increase Latina women’s involvement in breast

Authors	Issue Addressed	Setting	Key informants interviewed	Number of key informants	Findings	Results
Findholt, 2007	Childhood obesity	Union County, rural Oregon	services and elders. School administrators, school nurses, nutritionists, community youth programme leaders and parents.	15	CRM is a useful and effective tool for initiating childhood obesity prevention. The CRM stimulated interest in the issue and generated support for community-based obesity prevention efforts in children.	cancer prevention efforts. Pre-intervention community readiness score was 1.6 (No Awareness). No post intervention score.
Plested, Edwards & Thurman 2007	HIV/AIDS prevention	30 rural communities were randomly chosen from US population data. 10 White American, 10 African American, 10 Mexican American	Representatives of health professions, clergy, local government, law enforcement, and school personnel.	120 key informants interviewed (4 in each of the 30 communities).	HIV/AIDS is a sensitive topic irrespective of ethnic group. Efforts must be culturally relevant and accepted as long term in nature. The CRM builds capacity for partnering, mentoring, and networking to raise awareness of HIV/AIDS transmission.	Preplanning stage of readiness defined. Scored highest in the knowledge of community efforts dimension and lowest for the community climate dimension.
McCoy et al. 2007	HIV/AIDS intervention design.	USA Virgin Islands (3 Island communities)	Key informants interviewed were: police officers, senators, educators, social and health service providers and other community members.	12 (5 in St. Thomas, 5 in St. Croix, 2 in St. John)	Readiness scores for each dimension varied within communities. All of the communities scored the lowest for community climate suggesting intervention efforts should target community climate of HIV/AIDS.	CRM showed one community scored 3 corresponding to the vague awareness stage and the other two communities scored 4 which reflects the preplanning stage. Community

Authors	Issue Addressed	Setting	Key informants interviewed	Number of key informants	Findings	Results
Lawsin et al. 2007	Breast cancer prevention readiness amongst Latina women who historically have low involvement in clinical trials.	2 urban and 2 rural Latino communities in Colorado, USA	Community organisers, medical practitioners, public health nurses, nuns, health department representatives, teacher, community leaders	19 (4 in each community and 3 to ensure representation of an urban community)	The CRM can be used to better understand a community's perspective on breast cancer, and the under representation of Latinas in clinical trials.	collaborators used the CRM to plan strategies to increase the stage of readiness. Four communities assessed; 2 rural and 2 urban. Three were scored as at the vague awareness readiness stage and one at preplanning. The readiness stage was used to plan intervention strategies.
Ogilvie et al. 2008	Abuse of inhalants and other legal products	4 rural Alaskan communities	Representatives from groups of behavioural health workers, the court system, elders, faith organisations, families, health care workers, law enforcement, media, policy makers, retailers, schools, social services and	Amongst 13 community 'subsystems' 7-9 key informants in each community were interviewed, totaling, 32 baseline interviews and 34 post-intervention	Highlights potential for CRM assessments to serve as an integral component of a community mobilisation strategy. CRM offers meaningful feedback to communities participating in prevention research.	Community readiness score at baseline was 2.9 corresponding to the Denial/Resistance stage. At post intervention the readiness score was 3 corresponding to vague awareness.

Authors	Issue Addressed	Setting	Key informants interviewed	Number of key informants	Findings	Results
			tribal leaders.	interviews after a 20 month mobilisation strategy had been implemented.		
Stallones et al. 2008	Traumatic brain injury	4 rural counties in Colorado, USA		Unknown	CRM identified counties more likely to engage in prevention and change was observed in readiness where programmes were undertaken as well as in counties where no new programmes were initiated.	In two study counties TBI prevention activities were initiated. One county conducted a number of prevention activities and moved from the 'vague awareness' to 'pre-planning' stage. Three counties moved from 'denial' to 'vague awareness'. TBI surveillance did not capture rate changes in the counties.
Kakefuda et al. 2008	Cycle helmets use	Fort Collins Colorado	Key informant representatives from health, public safety, elected officials, bicycle retailers, elementary schools, Parent	85 key informants	Although personal use of bicycle helmets was high in the study population, community knowledge about existing efforts was low among residents and college students.	College students and community residents suggested the community readiness for bicycle helmet initiatives was at the denial or vague awareness stage. In

Authors	Issue Addressed	Setting	Key informants interviewed	Number of key informants	Findings	Results
			Teachers Organisation's, Junior and Senior High Schools, College students, Community residents and mixed affiliated.			comparison readiness score of the health and public safety representatives corresponded to the initiation or preparation stage. Many key informants considered bicycle helmet use a personal choice, not an issue for the community to address.
Sliwa et al 2011	Childhood obesity	10 Urban Communities, USA (California, Florida, Illinois, Massachusetts, New York, North Carolina, Pennsylvania, and Tennessee)		40 phone interviews	The CRM score can inform communities about their ability to undertake new programming and help identify strengths and weaknesses.	Mean score is 4.2 (Preplanning stage). Leadership was the most variable and Community Knowledge was the least variable.
Millar et al. 2012	Adolescent obesity prevention	Victoria, Australia. Community defined as schools (5 intervention, 7 Control)	School key informants, including parents, teachers, head teachers and adolescents.	Number of key informants not reported.	The CRM can be used to assess improvements in readiness post intervention.	Intervention schools tended to increase their overall readiness stage whilst the control schools tended to remain stable, although the community's awareness of the issue

Authors	Issue Addressed	Setting	Key informants interviewed	Number of key informants	Findings	Results
						of childhood obesity did not increase after the intervention (“It’s your move!”)

*Only description of community readiness assessment included, no additional methodologies used in studies presented in table above

2.6.6 Community readiness assumptions

The CRM makes several assumptions: firstly, the concept of readiness is considered specific to the issue (33). For instance, community readiness for the prevention of alcohol addiction and readiness for bicycle helmet use will not necessarily be the same. Secondly, communities are considered capable of progressing through the stages of readiness, although retrograde progress is also possible (31) and thirdly, the model assumes that the success of interventions will be specific to the stage of community readiness (32).

2.6.7 Strengths of the CRM

The CRM allows tailor made and readiness-appropriate strategies to be developed (33). CRM interventions are expected to achieve more success, effective behaviour change (31,254) and are expected to be more sustainable (33) than interventions which do not take into account the community's readiness to change. The model is multidisciplinary which means it can be applied to many diverse public health issues (33). The model itself is a simple tool with a user-friendly interview guide and scoring system (33). The interview guide is easily adapted to the issue of interest and can be repeated across different communities to compare the stage of readiness (33).

2.6.8 Limitations of the CRM

Beebe and colleagues provided a critique of the CRM (255). Firstly, they question whether individuals are capable of identifying the knowledge and awareness of an issue in the entire community (255). Similarly, the method with which the key informants are selected will affect the outcome of the model; indeed those who are most interested or involved with an issue may have a higher stage of readiness than the actual community. Therefore the readiness assessment may reflect views of a "vocal minority" (p56) (255). A further criticism is the small number of suggested interviews used to represent the views of an entire community (255). The identification, recruitment and interviewing of key informants is time and resource intensive (255). The anchored rating scale technique for scoring the transcripts provides the researcher with too much discretion (255).

Another limitation highlighted by Beebe et al. (2001), is that the CRM is based completely on qualitative reviews and therefore was not developed or evaluated using established psychometric principles (255). However, others have argued that the model is a qualitative construct which does not claim to be a quantitative or psychometric tool and that the numerical classification of qualitative data facilitates comparison between communities (243).

No assessment of external validity of this instrument to measure a community's readiness has been attempted (255). In response to this critique, the CRM authors have previously stated that construct validity cannot be assessed using this model because it is a broad scale theory, although it is possible to test hypotheses produced from these theories which would then suggest construct validity (33). These authors also point to the widespread use of the model as evidence of validity which is questionable. Achieving between-researcher consistency is a proxy measure of validity of the measure because the same interview can be coded as the same stage of readiness by two independent researchers (33). Additionally, Sliwa and colleagues suggest it would be difficult to validate a construct such as 'readiness' with objective tools (243).

Reliability of the model, the authors state, can also not be tested because a community is not in a stable state and therefore one would not expect to produce the same readiness score (33). Reliability can be loosely implied by the consistency of both the participants' reports about the community and the between-researcher consistency in scoring the transcripts. If there is an extreme opinion of the community from one key informant, then the authors suggest interviewing more people to understand how common that viewpoint is within the community (33).

A second critique of the CRM was provided by Mayer (2008) written in response to the publication from Findholt (253). Firstly, Mayer disagrees with the assumption of community responsibility for the issue; this notion disregards the social, political and economic factors limiting initiative success (256). However, the model does raise issues such as these through the section related to resources where issues to do with funding are often linked to the political and economic climate. Secondly, critics of the CRM disagree with the assumption that all communities will fit succinctly into one of the nine categories of readiness and highlight the implications of a score that lies between two stages of readiness as a concern (255,256).

The benefits of using the CRM outweigh the potential problems as long as one follows the precise sequence of questions in the CRM; is careful to identify and recruit suitable key informants; and selects an appropriate 'community'.

Summary

This concludes the overview of community-based research. A potential strategy for designing tailored community based research is offered by the Community Readiness Model. Interventions at the community level must ensure there is sufficient community engagement and empowerment.

Within the built environment, intervention targets include increasing the availability of physical activity facilities, improving the walkability of the environment, and importantly ensuring that there are positive perceptions of the environment's safety. In terms of dietary patterns the built environment should ensure that unhealthy options are not the easier choice by limiting the availability of fast-food restaurants and increasing food outlets offering affordable healthy produce.

Society level

The fifth level of the EMHP is the society consisting of the wider political systems which regulate aspects of communities' lives (24). The development of childhood overweight and obesity prevention strategies is a high government priority. Indeed in 2007, the "Healthy Weight, Healthy Lives" strategy (257) outlined the government's aim to reduce the proportion of overweight and obese children to 2000 levels by 2020 (257). Whilst a decline in prevalence levels has not been achieved, there is evidence for a stabilisation (258), perhaps suggesting government policies are having a positive impact.

The HWHL strategies were informed by research into parental attitudes (112). The marketing programme, called Change4Life (C4L), developed in response to this research aims to bring about "societal shift" that changes the behaviours that lead to people becoming overweight and obese, and seeks to recruit them to a lifestyle movement which "will speak to and for the public on issues relating to diet and activity" (p8) (112). The target for the C4L movement are families most at risk of becoming overweight or obese with children aged 0-11 years and therefore require additional support to facilitate improvements in their children's diet and physical activity levels (112). These target families were grouped into six clusters according to their attitudinal and behavioural statements (112). Family clusters 1, 2 and 3 were characterised as: "struggling parents who lack confidence, knowledge, time and money"; "young parents who lack the knowledge and parenting skills to implement healthy lifestyles"; or "affluent families, who enjoy indulging in food" (p42) (112). Common to these three high risk clusters is a failure to recognise children as overweight or obese (112). Evans and

colleagues claim that the C4L initiative alienates those who deviate from the “ideal” (p332) practices of middle class, white, families and places sole responsibility for governing child health behaviours on mothers (259). However one of the three high risk clusters consists of affluent families who over-indulge in food, so it is not the case that the C4L views the ideal as only middle class families. After one year the C4L initiative reported achievements including: more than 1 million mothers reporting making changes to their children’s health behaviours (diet and physical activity) and 413,466 families joining the initiative (260).

In May 2010 the Conservative and Liberal Democrat parties formed a coalition government. In November 2010 the coalition’s Secretary of State for Health, Andrew Lansley released the “Healthy Lives, Healthy People: Our Strategy for Public Health in England” (HLHP) (261). This new strategy outlines a ladder intervention approach (Figure 2-8) whereby the government will act in the least intrusive way to encourage individuals to take responsibility for their own health whilst simultaneously ensuring healthy choices are easier to make and unhealthy choices are difficult to make.

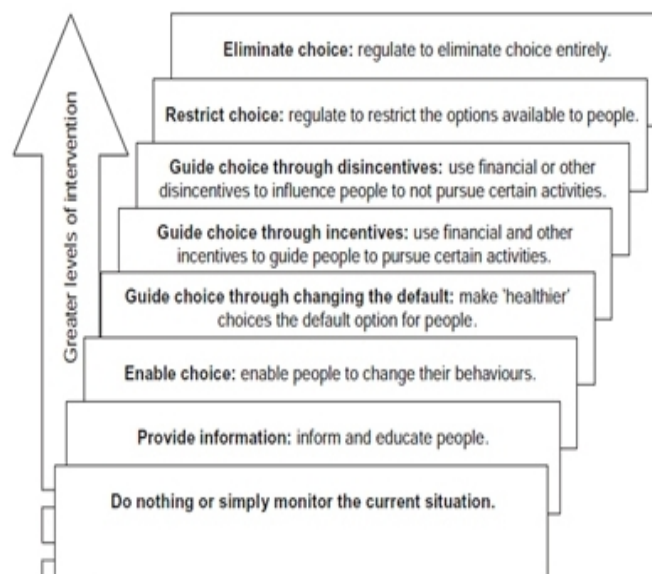


Figure 2-8 A ladder of interventions Source: Department of Health. Healthy Lives, Healthy People: Our strategy for public health in England. 2010.

The least intrusive approach is equivalent to the term ‘nudging’, defined as “any aspect of the choice architecture that alters people’s behaviour in a predictable way without forbidding any options or significantly changing their economic incentives” (p6) (262). ‘Nudging’ appeals to governments because it is conceived to be low cost, simple and avoids legislation (263). ‘Nudging’ towards unhealthy behaviours has shown some effectiveness (263). For example,

the food industry has employed nudging which appeals to the automatic system, requiring little cognitive function (264), leading to over consumption (265). However, the evidence for the effectiveness of nudging or least intrusive actions on positive health outcomes without the support from legislation is limited and what has been published shows weak effects (263).

The HLHP strategy recognises that social disadvantage accumulates over the life-course, thus the determinants of health must be addressed. It is also acknowledged that there are many predictors of health (environment, lifestyle, family, workplace, peer group and behaviour), which in turn are mediated by many factors some of which the individual cannot control (266). It is these uncontrollable factors that the government believes can be shaped by a new “Public Health Responsibility Deal” (PHRD); a partnership amongst public health, commercial and voluntary organisations. It is predicted that actions taken by these partnerships will be quicker and more cost effective than legislation from government (266). As part of this approach the government proposes to give local authorities greater decision-making powers so they can address the needs of their communities. This approach is in line with the ‘Big Society’ principle whereby individuals and communities are given greater control and responsibility for society.

Food and physical activity related pledges have been outlined by the PHRD. The food pledges outlined by the PHRD include labelling nutritional information in foods outside of the home, thus enabling consumers to make healthier choices (258). A further target for reducing salt in foods has also been developed and the final removal of all trans-fats was forecast for the end of 2011. In 2008, the average population intake of salt had reduced modestly by 0.9g since 2000/01 set against a target of a 6g decrease (267). In comparison, Finland’s legislative actions led to a decrease of 5g/day, suggesting the positive benefits of legislation (268). The physical activity pledges focus on communities and groups within communities that are particularly at risk of not engaging with physically active behaviours, through street games and community specific approaches. These pledges accept that there can be no ‘one size fits all approach’ (258).

There has been concern that if these voluntary agreements are not strongly adhered to, confidence in the strategy will be lost (269). The PHRD ignores the conflicting priorities of industry and public health. Industry is concerned primarily with revenue (270). Public health is concerned with the encouragement of healthy portion sizes and the consumption of healthy produce. Healthy produce is often more expensive to manufacture and therefore has a smaller

profit margin than less healthy products. In addition the use of voluntary, as opposed to legislative, partnerships is seen as ineffective and the only evidence so far, from tobacco initiatives, supports legislation (270).

The obesity strand of the HLHP White Paper (258) builds on and supports the HWHL white paper, particularly endorsing the HWHL's emphasis on the importance of the environment's role in facilitating individual behaviour choices. It advocates firstly, for a 'life-course' approach from pregnancy through to adulthood because there is a need to continually address obesity and the behaviours associated with its development. Secondly, a targeted local level approach is encouraged because communities will vary in their needs and characteristics therefore tailored approaches "which work best for local people" (p6) are required (258). This approach is in line with the work presented in this thesis and will depend on local government's having the resources necessary to implement these initiatives. The HLHP report proposes building local coalitions of partners across a local authority (e.g. health and social care workers) to form Health and Wellbeing Boards that will collaborate to identify the needs within their community and effect change using targeted strategies. Although there is a clear need to develop the evidence base on which these strategies will be formed, it is unclear whether these coalitions will be encouraged to go into their communities at the individual level and identify what is most important to local people. It is arguably important to address the needs of the community as viewed by its members rather than simply looking at the statistics, which can fail to pick up some of the intricacies of behaviour. Another positive aspect of this report is the emphasis that obesity is about health not appearance (258), therefore working to increase individuals recognition of the health implications of obesity rather than stigmatising groups based on their appearance is essential. Although the local, community level focus is potentially a strength of this report, the government's less intrusive approach may leave local government and other organisations feeling unsupported. For instance within schools, the government is moving away from dictating school health policies and believes that schools themselves are best placed to create initiatives for their pupils (258). However education professionals may not be equipped to deal with issues of child health and parents may find it difficult to accept policies which have been developed by a school and that may differ from those of other schools in the same area. It is important that the messages teachers present to children are appropriate and originate from a critiqued evidence base which does not detrimentally damage children's self-perceptions of their body image (137).

Summary

Whilst there have been changing governments during the period of this research, obesity prevention has remained a government priority. The original targets to reduce the prevalence rates of overweight and obesity have not been achieved, although stabilising levels are apparent. Overall, C4L appears to be a positive strategy to engage the population in behaviour change efforts. Evidence suggests that ‘nudging’ and the PHRD may be more effective with legislative controls. Finally the focus on community level strategies in HLHP is in line with the research presented in this thesis.

2.7 Literature review chapter conclusions

There is evidence for a causal association between childhood overweight and obesity and the risk factors associated with the development of chronic diseases in later life. Although the prevalence of childhood overweight and obesity may be stabilising in England, the levels are still of concern. This would suggest a need for research investigating the formation of lifestyle choices which inform energy balance behaviours in childhood. The importance of efforts aimed at pre-adolescent girls has been argued throughout this chapter. In summary, girls aged 7-11 years are at risk of decreasing physical activity levels, dietary patterns tend to be formed and maintained from childhood into adulthood and there are intergenerational implications for future mothers being overweight and obese at this age. The multiple factors influencing dietary and physical activity behaviours have been mapped onto the EMHP in this Chapter. The multiplicity of factors at each level of this model highlights the need for more ecological approaches to research in this area. Currently there is a paucity of research simultaneously addressing the influencing factors acting on children as opposed to narrowly focused research for example on families or schools. What is less clear is who pre-adolescent girls view across the levels of the EMHP as informing their health behaviours. Secondly we do not know how these key influences or ‘key informants’ exert their influence. At the time of this research a transition between governments was occurring. The ‘new’ coalition government advocated that community targeted approaches “which work best for local people” are required (p6) (258). Less is known about how these targeted approaches can be achieved in an affordable and sustainable way in the UK. In this regard this thesis is timely in its application of the CRM which could help local authorities identify appropriate actions which are acceptable to the target community because they are in line with their readiness stage. Prior to this research the CRM has not been applied in a UK setting, making this aspect of the thesis particularly novel.

Chapter 3 Systematic Literature Review

3.1.1 Introduction

The main objective of this review is to determine the effectiveness of interventions designed to prevent overweight and obesity in pre-adolescent girls focusing on physical activity, nutrition or lifestyle modification within the school, family or community setting with either a qualitative, quantitative or mixed methods approach to evaluation.

The systematic literature review has been published in Obesity Reviews (271) (APPENDIX C) and has been updated for articles published between 2010 and 2012.

3.1.2 Methods

3.1.2.1 Selection of studies

The inclusion and exclusion criteria for this review are presented in Table 3-1.

Table 3-1 Inclusion and exclusion criteria

Inclusion	Exclusion
Published 1990 onwards	Intervention designed specifically for the treatment of childhood obesity, eating disorders such as anorexia and bulimia nervosa or any other conditions specifically selected in the inclusion criteria (e.g. high blood pressure).
Minimum intervention length 3 months	Boys exclusively
Settings:	Participants exclusively <7 years of age or >12 years of age
<ul style="list-style-type: none"> • Community • Family • School • Combination of the above 	Systematic reviews, meta-analysis, editorials
Any country; must be written in English	Cross sectional studies
Study Design:	
<ul style="list-style-type: none"> • Randomised Controlled Trial • Controlled Trial • Pre-post trial 	
Primary prevention	
Intervention modifying:	
<ul style="list-style-type: none"> • Physical activity behaviours • Eating behaviours • Attitudes and knowledge towards the above • BMI or other indices of fat mass 	
Participants: Pre-adolescents (7-11 years)	
Present results separately for girls	

3.1.2.2 Literature search

The literature search was conducted in six databases (Medline, SPORTDiscus, PsycINFO, (accessed through EBSCO), Web of Science, Biological Sciences and Physical Education Index (accessed through CSA illumina) between 1990 and 17/02/2010. The full details of the search strategy used can be found in Table 3-2 **Error! Reference source not found.**

Table 3-2 Electronic search to identify studies

Search	Results
1. (MH "Body Weight") OR (MH "Body Weight Changes") OR (MH "Overweight")	151171
2. (MH "Obesity")	96567

3. (MH "Body Mass Index")	55934
4. (MH "Adolescent") OR (MH "Child")	1954105
5. pre-adolescen* or preadolescen*	7438
6. 4 or 5	1959555
7. (MH "Child Nutrition Sciences")	775
8. (MH "Nutrition Assessment")	6124
9. (MH "Feeding Behavior")	31389
10. (MH "Eating")	36215
11. (MH "Food Habits")	16154
12. (MH "Diet")	90285
13. 7 or 8 or 9 or 10 or 11 or 12	166987
14. 1 or 2 or 3	263582
15. (1 or 2 or 3) and (6 and 13 and 14)	5331
16. intervention* or control* or prevention*	4187671
17. school* or famil* or communit*	3835302
18. 15 and 16 and 17	1359
19. (MH "Exercise")	52975
20. "physical activity"	81169
21. (MH "Physical Fitness")	18218
22. 19 or 20 or 21	133533
23. (19 or 20 or 21) and (18 and 22)	577
24. female* or girl*	6025680
25. 23 and 24	453
26. "body weight" or "body size" or weight or overweight or obes* or "body mass" or bmi	678689
27. control* or prevention* or intervention*	3196322
28. child* or juvenile* or paediatric* or pediatric* or adolescen* or pre-adolescen* or preadolescen*	2035475
29. female* or girl*	3886110
30. nutrition* or eat* or diet* or feed* or food*	934930
31. "physical activit*" or exercis* or "physical training" or "physical fitness" or "activity pattern*"	387915
32. famil* or school* or communit*	3081751
33. 26 and 27 and 28 and 30 and 31 and 32	2967
34. 29 and 33	1769
35. 25 or 34	1777
36. Keyword search run in CSA illumina (Biological Sciences and Physical Education Index)	267
37. Keyword search run in Web of Science	468
38. Duplicates removed from combination of 35, 36 and 37	1917

MH=Mesh term

The searches yielded 1917 journal articles once duplicates were removed. The article titles were then assessed against the inclusion criteria, which resulted in 1604 studies being excluded. The remaining articles were firstly assessed on their abstracts (177 excluded) and secondly the whole text was evaluated (106 excluded) (Figure 3-1). The search was run by

two reviewers (JK, FP) and article assessment against the pre-defined inclusion and exclusion criteria was conducted by one reviewer (JK) with consultation amongst two other researchers (NC, PG). This review was published in Obesity Reviews (271) (APPENDIX C).

The systematic literature was updated for articles published between 2010 and 2012 (20.04.12) resulting in an additional eleven included studies (Table 3-3) Of which 4 were cohort pre-post (272-275), 3 were controlled trials (192,276,277) and 4 were Cluster RCT's (176,278-280).

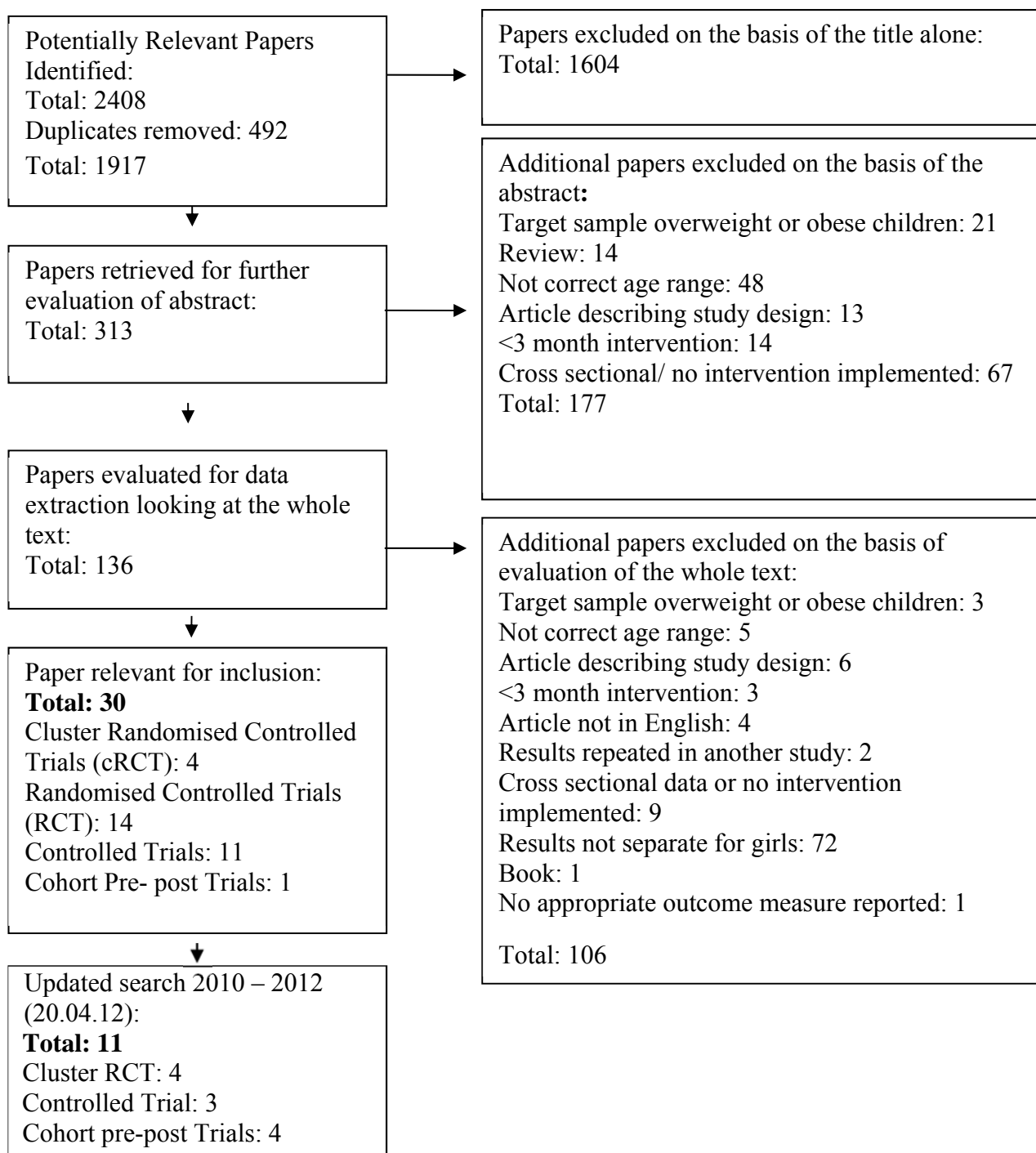


Figure 3-1. Quorum flow diagram of systematic literature search

3.1.2.3 Quality Assessment

Included studies were quality assessed using an adapted Appraisal Tool for Quantitative Research produced by the Effective Public Health Practice Project (281). The components assessed by this tool (selection bias, study design, confounders, data collection methods, withdrawals and drop-outs, intervention integrity and analyses) were categorised as either;

strong, moderate or weak and were combined to produce a global rating for each study. Originally this tool included a rating of blinding procedures, however in overweight and obesity prevention interventions it is not possible to blind children to the treatment they are receiving, thus this was replaced with a rating of the analysis, which assessed whether the statistical methods were appropriate for the study design (281).

3.1.2.4 Data Analysis

Firstly, the interventions' effectiveness was assessed as a statistically significant ($p < 0.05$) effect. Secondly, effect sizes (between/within-group effects) were calculated where study results permitted. Odds ratios were converted into Cohen's D following the methods suggested by Chinn (282) and the effect sizes were assessed according to Cohen's D classifications of no effect (< 0.2), small (0.2-0.5), medium (0.5-0.8) and large (> 0.8) effect sizes (281).

3.1.3 Results

3.1.3.1 Included studies

In total 41 studies met the inclusion criteria (Table 3-3). Within these studies there were 7 cluster randomised controlled trials (cRCT), 15 randomised controlled trials (RCT), 14 controlled trials and 5 cohort pre-post trial.

Table 3-3 Overview of included studies, study length, quality, outcome measures and significance, effect sizes

Setting and intervention focus	Study (Author, year)	Intervention	Outcome Measure	Significance alpha level (p<0.05)	Effect size (Cohen's D)
School Physical activity	Chavarro et al. 2006 **1 Randomised Controlled Trial USA	Planet Health: Aims to delay menarche through the prevention of obesity in girls. Study conducted in the US with 508 girls who were randomised to either a modified curriculum or no curricular changes for two school years. Participant age: 10-13 years	BMI (increased < control group) pre to post intervention Tricep skinfold thickness (increased < control group) pre to post intervention Screen time (decreased > control) (Validated Questionnaire) pre to post intervention Physical activity (increase > control) (Questionnaire for youths) pre to post intervention	+ + + +	-0.14 -0.13 -0.096 -0.096

	<p>MacKelvie et al. 2003**3</p> <p>Randomised Controlled Trial</p> <p>Canada</p>	<p>Aims to assess the effects of a school based exercise intervention during physical education lessons upon bone mineral content and bone area over 2 school years in girls.</p> <p>Participant age: 9-10 years</p>	<p>BMI change from baseline to 20 months compared to controls</p> <p>Lean mass change from baseline to 20 months compared to controls</p> <p>Fat mass change from baseline to 20 months compared to controls</p> <p>Long jump change from baseline to 20 months compared to controls</p> <p>Vertical jump change from baseline to 20 months compared to controls</p> <p>Average physical activity score change from baseline to 20 months compared to controls(Physical Activity Questionnaire for children)</p>	<p>-</p> <p>-</p> <p>-</p> <p>-</p> <p>-</p> <p>-</p>	<p>X</p>
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	<p>Horne et al. 2009*3</p> <p>Randomised Controlled Trial</p> <p>United Kingdom, Wales</p>	<p>Aims to assess the feasibility and acceptability of an intervention designed to increase physical activity levels over 14 weeks using a peer led, rewards and pedometer based approach.</p> <p>Participant age: 9-11 years</p>	<p>Girls mean daily step counts between and within group differences comparing baseline, during intervention and follow up (Pedometer step counts)</p>	<p>+</p>	<p>X</p>
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<p>Vizcaino et al. 2008**1</p> <p>Randomised Controlled Trial</p> <p>Spain</p>	<p>Aims to assess the effects of a physical activity intervention in children upon obesity, blood lipids and blood pressure over 1 academic year.</p> <p>Participant age: 8-10 years</p>	Girls % overweight or obesity change from baseline to follow up compared to controls	-	X
		Girls BMI change from baseline to follow up compared to controls	-	0.03
		Girls Tricep skinfold thickness change from baseline to follow up compared to controls	+	-0.08
		Girls % Body fat change from baseline to follow up compared to controls	+	-0.13
		Girls Systolic BP change from baseline to follow up compared to controls	-	-0.16
		Girls Diastolic BP change from baseline to follow up compared to controls	-	-0.17
		Girls Total Cholesterol change from baseline to follow up compared to controls	-	0.05
		Girls Apolipoprotein B change from baseline to follow up compared to controls	+	-0.24

	<p>Manios et al. 2006**1</p> <p>Controlled Trial</p> <p>Greece</p>	<p>Aims to promote healthy lifestyles in children to reduce the risk of chronic diseases. Assessment of physical activity at the end of the intervention (6 years) and 4 year follow up.</p> <p>School based intervention lasting 6 years:</p> <p>Nutrition (workbooks, teaching manuals etc)</p> <p>PE education (45 min PE classes/week)</p> <p>Participant age: 6-15 years</p>	<p>Girls MVPA between and within group comparison across baseline, post-intervention and follow up</p> <p>Girls MVPA post intervention between groups</p> <p>Girls MVPA follow up between groups</p> <p>Girls meeting recommended physical activity levels (%) between groups across baseline, post-intervention and follow up</p> <p>Girls meeting physical activity recommendations post-intervention between groups</p> <p>Girls meeting physical activity recommendations follow up between groups</p>	<p>-</p> <p>-</p> <p>-</p> <p>-</p> <p>-</p> <p>-</p>	<p></p> <p>0.16</p> <p>0.09</p> <p></p> <p>0.20</p> <p>0.16</p>
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			N.B Physical activity assessed using a Standardized Activity Interview. Effect sizes calculated from difference between intervention and control adjusted for baseline value, age and cluster.		
	Liu et al. 2007 *3 Controlled Trial Beijing	The Happy 10 programme: designed to improve physical activity, physical growth and obesity prevention in children through a classroom based programme conducted for 10 minutes every day for 1 school year. Participant age: 6-12 years	BMI (pre and post intervention within group) BMI (between group change after intervention) Girls overweight prevalence (between groups) Girls obesity prevalence (between groups)	+ - -	X

<p>Salmon et al. 2008 **1</p> <p>Cluster Randomised Controlled Trial</p> <p>Australia</p>	<p>Switch-Play: Aiming to prevent excess weight gain, reduce time spent watching TV and increase physical activity.</p>	<p>Girls adjusted BMI Baseline to post intervention (BM/FMS) compared to controls</p>	+	0.01
	<p>Two intervention groups;</p>	<p>Girls adjusted BMI Baseline to 12mth Follow up(BM/FMS) compared to controls</p>	+	-0.16
	<p>Behavioural modification (BM): self monitoring, health benefits of physical activity, sedentary behaviour environments, decision making and alternatives for sedentary activities; contracts to switch off one TV programme per week for 4 weeks</p>	<p>Girls adjusted BMI Baseline to post intervention (FMS) compared to controls</p>	-	0.14
	<p>Fundamental movement skills group (FMS)-</p>	<p>Girls adjusted BMI Baseline to 12mth Follow up(FMS) compared to controls</p>	+	-0.10
		<p>Girls adjusted BMI Baseline to post intervention (BM) compared to controls</p>	-	-0.05
		<p>Girls adjusted BMI Baseline to 12mth Follow up(BM) compared to controls</p>	-	-0.01
		<p>Girls adjusted BMI Baseline to 12mth Follow up(BM) compared to controls</p>	+	0.26

		including running and throwing.	Girls Physical activity (accelerometers) Baseline to post intervention (BM) compared to controls	+	0.26
		Combined group included behavioural modification and fundamental movements skills.	Girls Physical activity (accelerometers) Baseline to 12mth Follow up(BM) compared to controls	-	0.12
		Control group.	Girls Physical activity (accelerometers) Baseline to post intervention (FMS) compared to controls	-	0.12
		All intervention components: 19 lessons (45-50 mins) taught by the physical education teacher.	Girls Physical activity (accelerometers) Baseline to 12mth Follow up(FMS) compared to controls	-	0.02
		Participant age: 10-11 years	Girls Physical activity (accelerometers) Baseline to post intervention (BM/FMS) compared to	-	0.01

			controls Girls Physical activity (accelerometers) Baseline to 12mth Follow up(BM/FMS) compared to controls		
School Nutrition	Sichieri et al. 2009 *3 Cluster Randomised Controlled Trial Brazil	Educational programme over 7 months, aiming to reduce the consumption of sugar-sweetened beverages, by encouraging the exchange of water for sugar sweetened beverages, in an attempt to reduce excessive weight gain. Participant age: 9-12 years	Girls BMI (intervention group compared to control) in those OW at baseline	+	X
	Du et al. 2004**2 Randomised Controlled	Milk supplementation intervention aiming to	BMI (kg/m2) milk and calcium compared to control	-	

	<p>Trial</p> <p>Beijing</p>	<p>assess the impact upon growth and bone mineral increase in girls over two years.</p> <p>Participant age:10 years</p>	<p>BMI (kg/m²) milk, calcium and vitamin D compared to control</p> <p>Milk intake (g/d) milk and calcium compared to control</p> <p>Milk intake (g/d) milk, calcium and vitamin D compared to control</p> <p>Ca intake (mg/d) milk and calcium compared to control</p> <p>Ca intake (mg/d) milk, calcium and vitamin D compared to control</p> <p>P intake (mg/d) milk and calcium compared to control</p> <p>P intake (mg/d) milk, calcium and vitamin D compared to control</p> <p>Vitamin D intake (ug/d) milk and calcium compared to control</p> <p>Vitamin D intake (ug/d) milk and</p>	<p>-</p> <p>+</p> <p>+</p> <p>+</p> <p>+</p> <p>+</p> <p>-</p>	
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			calcium compared to milk, calcium and vitamin D	-	
			Vitamin D intake (ug/d) milk, calcium and vitamin D compared to control	-	
			Energy intake (KJ/d) milk and calcium compared to control		0.33
			Energy intake (KJ/d) milk, calcium and vitamin D compared to control	+	0.28
			Protein intake (g/d) milk and calcium compared to control	+	
			Protein intake (g/d) milk, calcium and vitamin D compared to control		0.28
			Height (m) milk and calcium compared to control (adjusted for baseline BMC, BA, height, weight and menstruating)	-	
			Height (m) milk, calcium and	-	

			<p>vitamin D compared to control(adjusted for baseline BMC, BA, height, weight and menstruating)</p> <p>Sitting height (m) milk and calcium compared to control(adjusted for baseline BMC, BA, height, weight and menstruating)</p> <p>Sitting height (m) milk, calcium and vitamin D compared to control</p> <p>Weight (Kg) milk and calcium compared to control(adjusted for baseline BMC, BA, height, weight and menstruating)</p> <p>Weight (Kg) milk, calcium and vitamin D compared to control(adjusted for baseline BMC, BA, height, weight and</p>	<p>-</p> <p>+</p> <p>+</p> <p>+</p> <p>+</p> <p>+</p>	0.24
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			menstruating) N.B. Dietary records taken for 7day recall at baseline and 3days at midtrial and post-intervention. Records were checked with an interview and cross checked with a questionnaire. Comparisons represent change from baseline to post intervention.	+	
Romon et al. 2008**1 Controlled Trial France	Fleurbaiz-Laventie Ville Sante (FLVS) study. School and community intervention comparing nutrition education, provided by teachers in one town to two control towns which received no nutritional education. Data presented for the years 2002, 2003 and	Intervention girls BMI change from 2002 to post intervention (adjusted for age and repeated observations) Intervention girls compared to control girls BMI compared in post intervention (adjusted for age) Intervention girls compared to control girls overweight prevalence	+ + +	X -0.31	

		Participant age: 9-11 years			
	Stevens et al. 2003**1 Randomised Controlled Trial USA	Pathways: aims to report the psychosocial changes (e.g. attitudes, knowledge and self efficacy) as a result of the Pathways physical activity and nutrition intervention in American Indian children over 3 years. Participant age: 8-11 years	Girls assessed using Knowledge Attitude and Behaviour Questionnaire: Food Self efficacy: Baseline to 1 year Baseline to 2 years Baseline to 3 years Food choice intentions: Baseline to 1 year Baseline to 2 years Baseline to 3 years Which food has more fat?	- - - + + + -	X

			Baseline to 1 year	+	
			Baseline to 2 years	-	
			Baseline to 3 years		
			Physical activity self-efficacy:	-	
			Baseline to 1 year	+	
			Baseline to 2 years	+	
			Baseline to 3 years		
			Physical activity :		
			Baseline to 1 year	+	
			Baseline to 2 years	+	
			Baseline to 3 years	+	
			Curriculum knowledge:		
			Baseline to 1 year	+	
			Baseline to 3 years	+	

			<p>Attempted weight loss:</p> <p>Baseline to 1 year +</p> <p>Baseline to 2 years -</p> <p>Baseline to 3 years -</p> <p>Healthy body size perceptions:</p> <p>Baseline to 3 years -</p> <p>N.B Comparing intervention and control group</p>		
	<p>Hollar et al. 2010**2</p> <p>Controlled Trial</p> <p>Florida, USA</p>	<p>Healthier Options for Public Schoolchildren (HOPS) intervention aiming to prevent obesity and improve blood pressure, through a school based intervention focusing upon improved nutrition and physical activity behaviours over two</p>	<p>Girls BMI Z score intervention decreased vs control from pre to post intervention (2004-2006) +</p> <p>Girls Weight Z score intervention decreased vs control from pre to post intervention (2004-2006) +</p> <p>Girls Systolic BP intervention decreased vs control from pre to post -</p>	<p>-0.22</p> <p>-0.15</p> <p>-0.15</p>	

		years. Participant age: 6-13 years	intervention (2004-2006) Girls Diastolic BP intervention decreased vs control from pre to post intervention (2004-2006) N.B Effect sizes are for post intervention	+	-0.17
	Jiang et al. 2007 **1 Randomised Controlled Trial China	The aim of this study was to evaluate the effects of a primary school intervention upon the prevalence of obesity in Beijing. Participant age: 7-9 years	BMI in girls (between group comparison at end of intervention) Intervention group < control Odds ratio of obese at end of intervention compared to controls Odds ratio of overweight at end of intervention compared to controls	+ + -	-0.66 -0.31 -0.22
	Danielzik et al. 2007 **2 Controlled Trial Germany	Kiel Obesity Prevention Study (KOPS): presents long-term experiences of preventing childhood overweight through a school	Remission of Overweight and Obesity Girls (total skinfold and waist circumference) at 4 year Follow up	+	0.50

		and family based approach. Participant age: 6-10 years	Girls four year incidence of Overweight/Obesity (BMI) (adjusted for age, SES, and BMI of the mother) Between groups intervention < control	-	-0.07
	Kain et al. 2004 *1 Controlled Trial Chile	To investigate the impact of a 6month nutrition and physical activity intervention upon physical fitness and body mass. Diet and Nutrition Intervention: Classroom nutrition education for children Parental involvement-education meetings Meetings with Kiosk owners to improve snack	BMI in girls between and within group comparison 20 Meter shuttle run(Leger) test (girls) between and within group comparison Lower back flexibility between and within group comparison N.B effect sizes use post intervention data.	- + +	0.11 0.52 0.38

		<p>provision</p> <p>Physical activity intervention:</p> <p>90 minutes of additional physical activity per week</p> <p>Active play time</p> <p>Behavioural physical activity programme.</p> <p>Used the Canadian Active Living Challenge</p> <p>Participant age: 8-13 years</p>			
	<p>Kain et al. 2009 **1</p> <p>Controlled Trial</p> <p>Chile</p>	<p>To investigate the impact of a 2 year nutrition and physical activity intervention upon physical fitness and body mass.</p>	<p>Girls BMI pre-post intervention within and between groups</p> <p>Girls BMI z score post intervention within and between control and</p>	<p>-</p> <p>+</p>	<p>-0.19</p> <p>-0.15</p>

		<p>Intervention lasted two years and included:</p> <p>Used the Canadian Active Living Challenge</p> <p>Lessons taught by teachers trained by a nutritionist</p> <p>Educational lessons for parents given by a nutritionist</p> <p>Participant age: 9-13 years</p>	<p>intervention groups</p> <p>% Girls Obese sig difference in changes between intervention and control groups over the 2 years</p> <p>Girls Waist circumference post intervention within and between control and intervention groups</p> <p>Girls Total Skinfold thickness post intervention within and between control and intervention groups</p> <p>N.B. effect sizes use post intervention data</p>	<p>+</p> <p>+</p> <p>+</p>	<p>X</p> <p>0.04</p> <p>-0.23</p>
	<p>Kipping et al. 2008 *2</p> <p>Cluster Randomised Controlled Trial</p> <p>England</p>	<p>Evaluates the effectiveness of a US adapted intervention in the UK upon time children spent watching TV, BMI and mode of transport to and from school in a 5</p>	<p>Odds of being obese between intervention and control group at follow up in girls (adjusted for baseline obesity and clustering within schools)</p>	<p>-</p>	<p>0.23</p>

		<p>month study.</p> <p>Intervention included:</p> <p>Used the Canadian Active Living Challenge</p> <p>Lessons taught by teachers trained by a nutritionist</p> <p>Educational lessons for parents given by a nutritionist</p> <p>Participant age: 9-10 years</p>			
	<p>Marcus et al. 2009 **2</p> <p>Cluster Randomised Controlled Trial</p> <p>Sweden</p>	<p>School care-based obesity prevention programme (STOPP): Aims to test the effectiveness of a 4 year school based nutrition and physical activity</p>	<p>Total physical activity (accelerometry) girls</p> <p>Prevalence of girls overweight and obese post intervention (between group comparison)</p>	-	<p>0.09</p> <p>-</p> <p>-0.05</p>

		<p>intervention attempting to reduce the prevalence of overweight and obesity. Intervention schools attempted to change school environment:</p> <p>Promoted low fat dairy products and whole grain bread as snacks.</p> <p>Removed sweets and sugary drinks.</p> <p>Physical activity levels were increased by 30 minutes per day during school</p> <p>Attempts were made to reduce sedentary afterschool behaviours.</p> <p>Newsletter distributed to</p>			
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		parents. Participant age: 6-10 years			
	Story et al.2003 **1 Randomised Controlled Trial USA	Girls Health Enrichment Study (GEMS): Aims to present the findings from a 12 week pilot afterschool obesity prevention programme. Afterschool intervention study focused upon: Increasing physical activity-watching less TV Increasing healthy eating-benefits of water, increasing fruits and vegetable consumption, eating low fat	Girls BMI Girls Waist Circumference Girls Healthy choice behavioural intentions Girls Diet knowledge Girls Availability of high fat food (parent interview) Girls % of calories from fat (2*24 hours recall) Girls Fruit, Juice, & Vegetables servings/day Girls Sweetened beverage servings/day	- - + + + - - -	0.19 0.51 1.20 1.45 X -0.19 0.1 0.26

		<p>foods, smaller portions etc</p> <p>Family component included-phone calls, family events etc.</p> <p>Sample size: 54</p> <p>Participant age: 8-10 years</p>	<p>Girls Water servings/day</p> <p>Girls Minutes of MVPA</p> <p>Girls Preference for physical activity</p> <p>N.B. Differences between intervention and control groups at follow up after adjustment for baseline levels.</p>	<p>-</p> <p>-</p> <p>+</p>	<p>0.19</p> <p>0.06</p> <p>0.19</p>
Family Nutrition	<p>Hakanen et al. 2006 **3</p> <p>Randomised Controlled Trial</p> <p>Finland</p>	<p>The aim of the study is to reduce the intake of saturated fat in children and to determine whether counselling reduced the development of overweight and obesity.</p> <p>Participant age: 7months to</p>	<p>Overweight prevalence at 10 years in girls between groups</p>	<p>+</p>	<p>X</p>

		10 years			
Family Physical and nutrition activity	Beech et al. 2003(283) *1 Randomised Controlled Trial USA	Memphis GEMS pilot study: Pilot evaluation of a family based intervention designed to prevent excess weight gain and obesity in pre-adolescent African American girls. This study was a 3 arm trial: Child targeted intervention Parent targeted intervention Comparison group focusing on self esteem The intervention groups involved highly interactive weekly group sessions with either girls (child-targeted programme) or	Girls BMI (child targeted) Girls BMI (parent targeted) Girls MVPA (child targeted intervention) (Accelerometer measures) Girls MVPA (parent targeted) (Accelerometer measures) Girls Low-fat food practice (child targeted) (questionnaire) Girls Low-fat food practice (parent targeted) (questionnaire) Girls Physical activity preference(child targeted) Girls Physical activity preference (parent targeted) N.B. Differences between	- - - - + + - - -	-0.45 -0.45 0.12 0.30 0 0.34 0.45 0.23

		<p>parents/caregivers (parent-targeted programme).</p> <p>Content focused on knowledge and behaviour change skills to promote healthy eating and increased physical activity.</p> <p>Participant age: 8-10 years</p>	<p>intervention groups (child and parent targeted) and control groups at follow up after baseline levels adjustment.</p>		
	<p>Bruss et al. 2010 **2</p> <p>Controlled trial</p> <p>USA</p>	<p>Project Familia Giya Marianas(PFGM):</p> <p>intervention using Community Based Participatory research principles focusing efforts upon primary care-givers to promote physical activity and healthy eating behaviours in children over two school years.</p>	<p>Attending 5-8 intervention lessons compared to no lessons effect upon BMI z score in girls</p>	+	X

		Participant age: 8-9 years			
Community Physical activity and Nutrition	Economos et al. 2007*2 Controlled Trial USA	Shape Up Somerville: To investigate whether an environmental change intervention could prevent an increase in BMI z-scores in children. Community based participatory research intervention aiming to increase physical activity and the availability of healthful foods within the before-, during-, after-school, home, and community environment. Participant age: 6-8 years	Girls BMI Z score intervention compared to control group 1 Girls BMI Z score intervention compared to control group 2 N.B Effect sizes were calculated using unadjusted change in BMI Z score from pre to post intervention	X	-0.079 -0.11

	<p>Baranowski et al. 2003 *1</p> <p>Randomised Controlled Trial</p> <p>USA</p>	<p>GEMS: To test the effectiveness of a 12 week summer camp intervention aiming to prevent the development of obesity in healthy African American girls.</p> <p>The intervention consisted of a:</p> <p>4-week summer day camp</p> <p>8-week home Internet intervention for the girls and their parents.</p> <p>The intervention summer camp activities included:</p> <p>Training in dance</p> <p>Educational games targeted at increasing fruit and</p>	<p>Girls BMI, kg/m2</p> <p>Girls Waist circumference (cm)</p> <p>Girls CSA, MVPA, min (Accelerometer measures)</p> <p>Girls MET adjusted GAQ-usually (Activity questionnaire)</p> <p>Girls Total kCal (24 hour dietary recall)</p> <p>Girls % kCal from fat (24 hour dietary recall)</p> <p>Girls FJV, servings (24 hour dietary recall)</p> <p>Girls Sweetened beverages, servings (24 hour dietary recall)</p> <p>Girls Water, servings (24 hour dietary recall)</p>	<p>-</p> <p>-</p> <p>-</p> <p>-</p> <p>-</p> <p>-</p> <p>-</p> <p>-</p> <p>-</p> <p>-</p>	<p>X</p>
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		vegetable intake and physical activity Snack recipe preparation Goal setting and review Sample size: 35 Participant age: 8 years	Girls Physical activity preference Girls Sweetened beverage preference N.B. Differences between intervention and control groups at follow up after baseline levels adjustment.	- -	
	French et al. 2005**1 Randomised Controlled Trial USA	Cal-Girls Study: aims to increase weight bearing physical activity and calcium intake in girl Scouts to increase bone mass over two years. Participant age: 9-11 years	BMI between groups comparison at end of intervention Fat Mass (DEXA) between groups comparison at end of intervention Lean Mass (DEXA) between groups comparison at end of intervention Calcium intake (24 hour recall) change in intervention group compared to controls over 2 years Weight bearing physical activity	X X X +	0.20 0.20 -0.19 0.20

			change in intervention group compared to controls over 2 years (Physical activity checklist interview)	-	0.098
	Robinson et al. 2003*1 Randomised Controlled Trial USA	Stanford GEMS: aims to pilot a 12 week intervention attempting to reduce TV viewing and increase physical activity through participation in culturally appropriate dance classes in African American girls aged 8-10 years. Control group received health education materials. Sample size: 61 Participant age: 8-10 years	BMI (kg/m2) Waist circumference (cm) MVPA (average minutes)(accelerometers) Self-reported previous day MVPA (minutes) TV, videotape and video game use (hrs/wk) (Self-reported) Total household TV use (0-4 scale) (Self-reported) Ate breakfast with the TV on (day/wk) (Self-reported) Ate dinner with TV on (day/wk)	- - - - - - +	0.38 0.25 0.14 0.23 0.40 0.73 0.03 0.59

			(Self-reported)		
			Total dietary calorie intake per day (kcal)	-	0.15
				-	0.05
			Percent of dietary kilocalories from fat (%)	-	0.21
			Physical activity liking (0-2 scale)	-	0.16
			Number of physical activities ever tried	+	0.60
			Over concerns with weight and body shape	-	0.09
				-	0.51
			Body shape dissatisfaction	-	0.30
			Most recent school grades		
			Self esteem		
			NB. Significance tested, using ANCOVA, as follow up of the difference between the intervention and control group adjusted for the		Provided by authors

			baseline value of the dependent variable.		
Combination Physical activity and nutrition	Vandongen et al. 1995*1 Randomised Controlled Trial Australia	Intervention aiming to improve cardiovascular health of children using 6 groups:	Girls sugar intake PF vs CG and pre to post intervention	-	-0.11
		Physical fitness (PF)	Girls sugar intake PF/SN vs CG and pre to post intervention	-	-0.03
		Physical fitness + school nutrition (PF/SN)	Girls sugar intake SN vs CG and pre to post intervention	-	0.06
		School nutrition (SN)	Girls sugar intake SN/HN vs CG and pre to post intervention	-	0.49
		School nutrition + home nutrition (SN/HN)	Girls sugar intake SN/HN vs CG and pre to post intervention	-	0.37
		Home nutrition (HN)	Girls sugar intake HN vs CG and pre to post intervention	-	-0.10
		Control group (CG)	Girls total fat intake PF vs CG and pre to post intervention	-	-0.18
			Girls total fat intake PF/SN vs CG and pre to post intervention	-	-0.04
		Participant age: 10-12 years	Girls total fat intake SN vs CG and		

			pre to post intervention		
			Girls total fat intake SN/HN vs CG and pre to post intervention	-	-0.33
			Girls total fat intake HN vs CG and pre to post intervention	+	-0.62
			Girls saturated fat intake PF vs CG and pre to post intervention	-	-0.11
			Girls saturated fat intake PF/SN vs CG and pre to post intervention	-	-0.40
			Girls saturated fat intake SN vs CG and pre to post intervention	-	-0.14
			Girls saturated fat intake SN/HN vs CG and pre to post intervention	+	-0.53
			Girls saturated fat intake SN/HN vs CG and pre to post intervention	+	-0.56
			Girls saturated fat intake HN vs CG and pre to post intervention	-	0.18
			Girls polyunsaturated: saturated fat PF vs CG pre to post intervention	-	0.35

			Girls polyunsaturated: saturated fat PF/SN vs CG pre to post intervention	-	0.34
			Girls polyunsaturated: saturated fat SN vs CG pre to post intervention		
			Girls polyunsaturated: saturated fat SN/HN vs CG pre to post intervention	+	0.35
			Girls polyunsaturated: saturated fat HN vs CG pre to post intervention	-	0.26
			Girls protein PF vs CG and pre to post intervention	-	0.31
			Girls protein PF/SN vs CG and pre to post intervention	-	0.24
			Girls protein SN vs CG and pre to post intervention	-	0.26
			Girls protein SN/HN vs CG and pre to post intervention	-	0.20
				-	0.13

			Girls protein HN vs CG and pre to post intervention	-	0.33
			Girls fibre intake PF vs CG between groups and pre to post intervention	-	-0.08
			Girls fibre intake PF/SN vs CG between groups and pre to post intervention	-	0.19
			Girls fibre intake SN vs CG and pre to post intervention	+	0.39
			Girls fibre intake SN/HN vs CG and pre to post intervention	-	0.19
			Girls fibre intake HN vs CG and pre to post intervention	+	0.27
			Girls salt PF vs CG and pre to post intervention	+	0.47
			Girls salt PF/SN vs CG and pre to post intervention	+	0.44
			Girls salt PF/SN vs CG and pre to post intervention	-	0

			Girls salt SN vs CG and pre to post intervention	-	0.15
			Girls salt SN/HN vs CG and pre to post intervention	+	0.39
			Girls salt HN vs CG and pre to post intervention	+	0.65
			Girls endurance fitness (Leger test) PF vs CG	-	0.09
			Girls endurance fitness (Leger test) PF/SN vs CG	+	0.43
			Girls endurance fitness (Leger test) SN vs CG	-	-0.23
			Girls endurance fitness (Leger test) SN/HN vs CG	-	0.07
			Girls endurance fitness (Leger test) HN vs CG	-	0.18
			Girls BMI PF vs CG	-	-0.07
				-	-0.07
				-	0.23

			Girls BMI PF/SN vs CG Girls BMI SN vs CG Girls BMI SN/HN vs CG Girls BMI HN vs CG N.B Dietary intake measured using 2 day weighed diet diaries		
	Olvera et al. 2010*2 Controlled trial USA	Behaviour Opportunities Uniting Nutrition, Counselling and Exercise (BOUNCE). Aiming to increase physical fitness in mother and daughter pairs over 12 weeks focusing upon: 3/wk 90 mins of exercise and nutrition education or counselling.	Daughter 20 meter endurance shuttle run test (Leger test) Daughter Average daily counts (accelerometer measures) Daughter MVPA (accelerometer measures) Self-report Daughter high fat foods (School Physical Activity and Nutrition Survey) Self-report Daughter sweetened beverages(School Physical Activity	+	0.78 - 0.39 + 0.75 - 0.40 - 0.36

		Participant age: 8-11 years	and Nutrition Survey) Self-report Daughter fruit and vegetables (School Physical Activity and Nutrition Survey) N.B differences between intervention and control group at 12 weeks (end of intervention)	-	0.34
	Chomitz et al. 2010**2 Cohort Pre-Post Trial USA	Healthy Living Cambridge Kids: intervention utilising community based participatory research to decrease energy intake via increased fruit and vegetable consumption, decrease sedentary behaviours and increase physical fitness over 3 years.	Girls BMI z score difference from pre to post intervention % of girls passing the fitness test (5 tests) from pre to post intervention % of girls passing the cardiovascular endurance test from pre to post intervention	+ + +	X

		Participant age: 10-11 years			
UPDATE 2010-2012					
Setting and intervention focus	Study (Author, year)	Intervention	Outcome Measure	Significance alpha level (p<0.05)	Effect size (Cohen's D)
School based Nutrition and Physical activity	Sirikulchayanonta et al. 2011*2 Pre-post intervention Thailand	Bright and Healthy Thai Kid Project:8 month Intervention utilising Participatory Action Research involving parents, teachers and children to prevent overweight and obesity. Teachers were trained to deliver educational material to children, parents and children received seminars on the health consequences	Dietary intake of normal weight children (total score) (Self-reported) from pre to post intervention Fat intake of normal weight children (Self-reported) from pre to post intervention Carbohydrate intake of normal weight children (Self-reported) from pre to post intervention Milk intake of normal weight children (Self-reported) from pre to	+ + + + -	-0.76 -0.41 -1.0 -0.51 0.07

		of obesity. Participant age: 6-12 years	post intervention Vegetables and fruit intake of normal weight children (Self-reported) from pre to post intervention		
	Gorely et al. 2011*2 Controlled Trial UK	GreatFun2Run: 20 month follow up after a 10 month school based physical activity intervention (PE lessons, running/walking events, classroom based activities) to assess whether the significantly increased physical activity levels were maintained. Some nutrition related messages were also delivered. Participant age: 7-11 years	Steps per day from baseline to 20 month follow up (pedometers and 50% of sample accelerometers) MVPA total from baseline to 20 month follow up(pedometers and 50% of sample accelerometers) MVPA bouts from baseline to 20 month follow up(pedometers and 50% of sample accelerometers) Estimated body fat percentage from baseline to 20 month follow up Sum of skinfolds from baseline to 20 month follow up	- - -	0.12 0.46 0.36 0.2 0.17 0.15

			Waist circumference from baseline to 20 month follow up		0.24
			BMI from baseline to 20 month follow up		0.18
			BMI SDS from baseline to 20 month follow up		
	Bjelland et al. 2011*1 Cluster Randomised Controlled Trial Norway	HEalth in Adolescents (HEIA): designed to assess the effectiveness of attempts to decrease consumption of sugar sweetened beverages and sedentary behaviours over 8 months midway assessment through: Lessons Posters Fruit and vegetable breaks	Sugar sweetened beverages Intervention vs control(During the week)	-	-0.11
			Sugar sweetened beverages Intervention vs control (During the weekend)	+	-0.11
			TV/DVD hours/day – week Intervention vs control (During the week)	+	-0.09
			TV/DVD hours/day – week Intervention vs control (During the	+	-0.16

		Activity breaks within classrooms	weekend) Computer/games, hours/day	+	-0.14
		Sports equipment for recreational playtime	Intervention vs control (During the week)	+	-0.22
		Educational material for parents	Computer/games, hours/day Intervention vs control (During the weekend)		
		Participant age: 11-12 years			
	Newton et al. 2010**3 Pre-post trial (Pilot study) USA	Intervention informed by Social Learning Theory where by the classroom and dining room environment was changed (supplied with physical activity equipment and changes to school menus and announcements of healthy options) and information was provided to	Sedentary time (Self-reported) Pre to post intervention % body fat (objective measurement) Pre to post intervention	+	X

		<p>teachers to increase children's health knowledge and awareness over an 18 month intervention.</p> <p>Participant age: mean age 9.26 years at baseline</p>			
<p>School based Physical activity</p>	<p>Li et al. 2010**1 Cluster Randomised Controlled Trial Beijing</p>	<p>The Happy 10 programme:1-year intervention designed to assess the effect of a physical activity intervention on body composition. Intervention included two activity cards per day with instructions for a physical activity.</p> <p>Participant age:9-11 years</p>	<p>Weight (1 year-end of intervention) pre to post</p> <p>Weight (2nd year-follow up) pre to post</p> <p>Height(1 year-end of intervention) pre to post</p> <p>Height(2nd year-follow up) pre to post</p> <p>BMI(1 year-end of intervention) pre to post</p> <p>BMI(2nd year-follow up) pre to post</p>	<p>+</p> <p>+</p> <p>-</p> <p>-</p> <p>+</p> <p>+</p>	<p>X</p>

			BMI Z Scores(1 year-end of intervention) pre to post	+	
			BMI Z Scores(2nd year-follow up) pre to post	+	
			Fat Free Mass(1 year-end of intervention) pre to post	-	
			Fat Free Mass(2nd year-follow up) pre to post	-	
			Fat Mass(1 year-end of intervention) pre to post	+	
			Fat Mass(2nd year-follow up) pre to post	+	
			Percent Body Fat (1 year-end of intervention) pre to post	-	
			Percent Body Fat(2nd year-follow up) pre to post	+	

Community based	Rosenkranz et al. 2010**2	Scouting Nutrition and Activity Program (SNAP): investigate the effectiveness of an intervention addressing girl guide meetings and family meals on the prevention of obesity over 1 year.	BMI(objectively measured) (Intervention vs control group at end of intervention (1-year))	-	0.31
Physical activity and nutrition	Cluster Randomised Controlled Trial	of an intervention addressing girl guide meetings and family meals on the prevention of obesity over 1 year.	BMI percentile (objectively measured) (Intervention vs control group at end of intervention (1-year))	-	0.10
Girl guides	USA	Participant age: 9-10 years	BMIC z-score (objectively measured) (Intervention vs control group at end of intervention (1-year))	-	0.22
		3 intervention components:	Family meals/week (Self-reported) (Intervention vs control group at end of intervention (1-year))	-	-0.29
		Guide leader led interactive educational curriculum	MVPA (accelerometry) (Intervention vs control group at end of intervention (1-year))	-	0.23
		Guide policies for during meetings	Fruit and vegetable servings/day(Self-reported) (Intervention vs control group at end	+	0.69
		Guide badges achieved at home with support from parents.			

			of intervention (1-year)		
			Eating with television scale(Self-reported) (Intervention vs control group at end of intervention (1-year)	-	-0.43
			Sugar sweetened beverages consumption/week(Self-reported) (Intervention vs control group at end of intervention (1-year)	-	0.04
	Klesges et al. 2010**2 Controlled Trial USA	Girls Health Enrichment Multi-site Studies (GEMS): 2 year intervention designed to prevent overweight and obesity development through sessions to help girls develop goals to improve healthy eating and increase physical activity levels.	BMI (differences between intervention and control at 2 years)	-	-0.05
			Waist circumference (differences between intervention and control at 2 years)	-	-0.01
			Body fat % (differences between intervention and control at 2 years)	-	-0.02
			Fat free mass (differences between intervention and control at 2 years)	-	0.13
				-	-0.10

		Participant age:8 – 10 years	Weight (differences between intervention and control at 2 years)	-	0.02
			Height (differences between intervention and control at 2 years)		-0.02
			Sweetened beverages(24 hour recall) (differences between intervention and control at 2 years)	-	-0.09
			Water, servings(24 hour recall) (differences between intervention and control at 2 years)	+	0.18
			Vegetable, servings(24 hour recall) (differences between intervention and control at 2 years)	-	X
			Fruit, servings(24 hour recall) (differences between intervention and control at 2 years)	-	X
			Total Fat, kcal %(24 hour recall) (differences between intervention	-	0.04

			and control at 2 years) Total energy, kcal (24 hour recall)(differences between intervention and control at 2 years) Physical activity (accelerometry), counts(differences between intervention and control at 2 years) Moderate to vigorous activity (accelerometry), min(differences between intervention and control at 2 years)	- - -	-0.22 0.08
Combination Physical activity and nutrition	Rush et al. 2012**3 Randomised Controlled Trial New Zealand	Project Energize: 2 year intervention led by a team of teachers or graduates with experience of exercise and nutrition. The intervention included supporting the teacher in physical activities in the	BMI Standard Deviation Score 5-7 years pre to post intervention BMI Standard Deviation Score 10-12 years pre to post intervention % body fat Standard Deviation Score 5-7 years pre to post intervention	- - -	x

		<p>curriculum, improving healthy eating within schools and offering nutrition education sessions for parents.</p> <p>Participant age: 5 or 10 years of age at baseline</p>	<p>% body fat Standard Deviation Score 10-12 years pre to post intervention</p> <p>Systolic Blood Pressure Standard Deviation Score 5-7 years pre to post intervention</p> <p>Systolic Blood Pressure Standard Deviation Score 10-12 years pre to post intervention</p> <p>Diastolic Blood Pressure Standard Deviation Score 5-7 years pre to post intervention</p> <p>Diastolic Blood Pressure Standard Deviation Score 10-12 years pre to post intervention</p>	-	
	<p>Hoelscher et al. 2010**2</p> <p>Pre-post intervention</p> <p>(Two intervention groups)</p>	<p>The Travis County CATCH Trial: to compare the effectiveness of two interventions: school based</p>	<p>Overweight BasicPlus (Pre to post intervention)</p> <p>Obesity BasicPlus(Pre to post</p>	-	X

	compared) USA	(BasicPlus) and community based (BasicPlus+Community) on the prevalence of childhood overweight and obesity over 1 year. Participant age: 10 years at baseline.	intervention) Overweight BasicPlus+Community(Pre to post intervention) Obesity BasicPlus+Community(Pre to post intervention)	+ -	
	Hollar et al. 2010**3 Controlled Trial USA	Healthier Options for Public Schoolchildren/ The OrganWise Guys (HOPS/OWG):2 year school based study aiming to reduce obesity rates in children through improved knowledge and behaviour in schools and community settings, including dietary	Systolic blood pressure Diastolic blood pressure	+ +	X

		and physical activity components. Participant age: 6-12 years			
Combination Nutrition	Shah et al. 2010* ³ Pre-post trial India	Medical education for children/adolescents for Realistic prevention of obesity and diabetes and for healthy ageing (MARG). Nutrition education provided to parents, children and teachers for 6 months. Participant age: 8-18 years	Knowledge Behaviour (Surveys)(8-11 year olds) (Pre to post comparison) Government schools Knowledge Behaviour (Surveys)(8-11 year olds) (Pre to post comparison) Private schools	+ +	-1.1 -0.80

¹ Strong Quality, ² Moderate Quality, ³ Weak Quality

* Short, <12months Intervention, ** Long, ≥12months

+ Effective intervention regarding significant difference between intervention and control groups (p<0.05)

- Ineffective intervention regarding significant difference between intervention and control groups (p<0.05)

X Effect size cannot be calculated from results

3.1.3.2 Study Quality

Table 3-3 presents the quality of the included studies. There were 9 weak, 15 moderate and 17 strong quality studies. The methodological limitations included the lack of a control group (272-275) and the failure to report withdrawals (284). The strengths of the high quality studies included the blinded randomisation of schools, measurements performed by blinded researchers (176,276,280,285,286) and regular school visits made by the researchers to ensure adherence to the proper delivery of the intervention (284,287-289). All seven cRCT's adopted appropriate statistical methods to account for the randomisation of clusters. In the school RCT's all but one randomised the schools into either intervention or control groups (290). Only half of these interventions reported taking account of the school clustering effect in the analyses (291-294).

3.1.3.3 Multifactorial Interventions

The majority of the interventions (25) included in this review were conducted in a school setting, there were 3 family-based, 6 community-based and 7 interventions combined a school and family-based setting. In total 8 studies focused on modifying physical activity behaviours alone, of which all were in schools. Nutrition focused interventions were performed in 5 studies (3 in schools, 1 in the family and 1 in combined settings). The majority (28) of studies combined physical activity and nutrition components in the intervention, which were split between school-based studies (14), family-based studies (2), community-based (6) and combined settings (6).

3.1.3.4 Intervention Effectiveness

Statistical Significance

There were 283 outcome measures with statistical significance calculations available in girls included from the reviewed articles (Table 3-3) of which 109 were physical measures (BMI, weight, height, etc.), 56 were physical activity measures (35 objective and 21 self-reported), 80 were self-reported dietary measures and 38 were knowledge and attitude related. Statistically significant results were produced in 43.1% (47 out of 109) of physical measures, 31.4% (11 out of 35) of objective physical activity measures, 42.9% (9 out of 21) of self-reported physical activity measures, 27.5% (22 out of 80) of self-reported nutrition measures and 55.3% (21 out of 38) of knowledge and attitudes measures. Table 3-3 summarises the statistically significant findings of studies according to their setting (school, family,

community or combined) and intervention focus (physical activity, nutrition, physical activity and nutrition and knowledge and attitudes).

Effect sizes

The effect sizes (Table 3-3) ranged from 0.01 to 1.45 of which 97 were less than 0.2 (no effect), 69 were categorised as low (0.2-0.5), 18 as medium (0.5-0.8) and 5 as high (>0.8). Effect sizes of less than 0.2 were produced in 62.7% (42 out of 67) of physical measures, 46.6% (28 out of 60) of nutrition measures, 45.2% (14 out of 31) of objective physical activity measures, 62.5% (10 out of 16) of self-reported physical activity measures and 26.6% (4 out of 15) of knowledge and attitude measures. Low effect sizes were produced by 73.3% (22 out of 67) of physical measures, 43.3% (13 out of 30) of objective physical activity measures, 25% (4 out of 16) of self-report physical activity measures, 42.1% (24 out of 57) of nutrition measures and 35.7% (5 out of 14) of knowledge and attitude measures. Medium effect sizes were produced in 4.5% (3 out of 67) of physical measures, 13.8% (8 out of 58) of nutrition measures, 13.3% (4 out of 30) of objective physical activity measures, 12.5% (2 out of 16) of self-reported physical activity measures, and 14.3% (2 out of 14) of knowledge and attitude measures. High effect sizes were produced in 1.7% (1 out of 57) of nutrition measures and 28.6% (4 out of 14) of knowledge and attitude measures.

3.1.3.5 Intervention length

Currently there is no agreed length of intervention required to produce long term, sustainable effective changes in behavioural and physiological variables. In this review 15 studies were considered short term (3 to 12 months) and 26 long term (≥ 12 months) (Table 3-3). The majority of strong quality studies were long term (12 out of 18).

3.1.3.6 Effectiveness of studies using only girls

There were 11 studies conducted only with girls, 5 from the GEMS study (28,276,283,286,290), one addressing the impact of an obesity prevention intervention on menarche (295), one applying a Scouting Nutrition & Activity Program (SNAP)(176), 3 studies with the primary aim of increasing bone mass and one using mother and daughter pairs (296).

The first GEMS trial (283) reported baseline BMI levels of 25.5kg/m² on average for the child targeted group, 23.0kg/m² for the parent targeted group and 22.6kg/m² in the control group (283). After the intervention the BMI levels were 24.3kg/m² (child targeted),

24.3kg/m² (parent targeted) and 24.7kg/m² (control) with no significant differences between the groups. The improvement in intervention girls BMI in the child and parent targeted group is represented by a low effect size ($d=-0.45$).

In the second GEMS intervention (290) the baseline BMI values on average were 21.9 kg/m² for the intervention and 19.5kg/m² in the control. At the end of the 12 week intervention the BMI levels were on average 21.7kg/m² (intervention) and 21.5kg/m² (controls) resulting in no significant difference in changes in BMI and a low effect size ($d= 0.19$) (Table 3-3). However, the intervention girls significantly improved their 'health choice behavioural intentions' ($d=1.20$), diet knowledge scores ($d=1.45$) and preference for physical activity compared to the controls with a large effect size.

The third Gems intervention included culturally appropriate dance classes and 5 lessons delivered in the home designed to reduce television viewing, or an active control condition (health education programme delivered in a community centre) (286). In this intervention only three statistically significant results were achieved over the 12 weeks comparing the intervention group to the controls (adjusted for baseline values) total household TV use ($d=0.73$), ate dinner with TV ($d=0.59$) and over-concerns with weight and body shape (risk factor for disordered eating patterns) ($d=0.60$). There was not a significant change in BMI levels ($d=0.38$) (Table 3-3).

The fourth GEMS pilot study recruited girls and their caregivers who were randomised to receive either the intervention or the active control condition (28). Effect sizes for this study could not be calculated because the results had not been adjusted for baseline values resulting in low standard deviations in both the intervention (0.9) and controls (1.0) waist circumference measures. No statistically significant effects were produced in any of the measurements. However, there are positive aspects in the delivery of this intervention including formative research with children and parents to determine the influences on physical activity and dietary behaviours which then informed the components of the intervention.

The GEMS trials' also found that participant self-efficacy decreased over the intervention, which they suggest could be due to individual's becoming more aware of what needs to be done before they make a change (297).

The final GEMS study, referred to as 'phase two', lasted 2 years and involved African American girls and their parents (276). Intervention components included goal setting and applying behavioural strategies (self-monitoring, problem solving skills, social support, positive reinforcement and skill building) to improve diet composition and activity levels and encourage parents to support their children through modifications to the home environment. There were no significant differences (year 1 or 2) in any physical measure including BMI ($d=-0.05$). At the end of the two year intervention the only significant increase was in reported water intake in the intervention group compared to the control group ($d=0.18$).

One study aiming to delay menarche through obesity prevention found that at follow up the intervention girls had significantly lower increases in BMI ($d=-0.14$), tricep skinfold thickness ($d=-0.13$), a greater reduction in television viewing ($d=-0.096$) and an increase in MVPA levels ($d=-0.096$) when compared to girls attending the control schools, although the effects were all small (295).

The SNAP (Scouting Nutrition & Activity Program) intervention used the principles of Social Cognitive Theory to empower girls to improve the healthfulness of their dietary behaviours (quality and quantity of family meals) and physical activity behaviours (including recreation sessions, parent and child activity encouragement and verbal encouragement from troop leaders) (176). Although there were no statistically significant changes in any measures from baseline to the end of the intervention, the fruit and vegetable servings reported were significantly higher in the intervention group compared to the controls at the end of the 1 year intervention ($d=0.69$).

The three studies initially aiming to increase bone health either focused primarily upon physical activity in a school setting (288), nutrition only through milk supplementation in schools (298) and a combination of weight bearing exercise and increased calcium intake within a community setting of the Girl Scouts (177). In the RCT focused on increasing physical activity, no significant changes were produced in any physical measures or physical activity indicators over the two year intervention (288). A milk supplementation trial with two intervention arms (milk and calcium or milk, calcium and vitamin D) in Beijing achieved significant increases in height ($d=0.33$ and $d=0.28$ respectively) and body weight (milk, calcium and vitamin D group $d=0.24$) over two years compared to controls and significantly improved vitamin D intake in the intervention group (289). A study within the Girl Scouts aiming to increase bone mass through weight bearing physical activity and calcium intake

achieved significant changes in calcium intake ($d=0.20$) over the intervention period but did not significantly change weight bearing physical activity compared to controls ($d=0.098$) (177).

The BOUNCE community-based intervention recruited 46 Latino mother-daughter pairs (296) and achieved significant improvements in daughter 20 meter endurance shuttle runs ($d=0.78$) compared with controls and in MVPA levels ($d=0.75$).

3.1.3.7 Intervention effects on BMI and risk of overweight and obesity

Eight studies reported a statistically significant intervention effect on BMI levels in intervention girls compared with controls (275,284,293,295,299-303) and two significant pre-post changes (198,275).

Four studies reported short term significant changes in BMI levels (275,295,299,300). In an RCT aiming to reduce the consumption of sugar-sweetened beverages (300) girls defined as overweight at baseline significantly decreased their BMI ($p<0.009$) after the intervention (Table 3-3). Liu and colleagues reported baseline average BMI values in girls of 18.63kg/m² (intervention) and 16.42kg/m² (controls) (299). BMI in the intervention girls decreased significantly to 18.16kg/m² compared to the control girls BMI which increased significantly to 17.08kg/m² at the end of the intervention. The change in BMI was also significantly different between the intervention and control girls. The Travis CATCH study found significant reductions in the prevalence of overweight girls after one year of intervention with a community component, these changes were significantly greater than the intervention without a community component (275) although this study lacked a control group for comparison. The final short term study to effectively reduce BMI levels in girls (27) reported a mean change in BMI z-score of -0.027 in intervention girls, -0.002 in control 1, and -0.009 in control group 2. Two control groups were used in case an unplanned intervention was introduced into one of the control communities. The change in BMI for intervention girls compared to control group 1 and compared to control group 2 produced low effect sizes of $d=-0.079$ and -0.11 , respectively (27).

Long term significant decreases in BMI levels were reported by five studies. Salmon and colleagues found that girls in the fundamental movements skills group (i.e. throwing and running) (Table 3-3) and in the combined behavioural modification and fundamental movements skills group decreased their BMI levels on average by 0.07 ($p<0.01$) (301). In the

second long term study a significant difference was found in BMI values at the end of the intervention between intervention girls (18.1kg/m²) and control girls (19.9kg/m²) (293). Table 3-3 shows that the change in BMI values is represented by a medium effect size ($d=-0.66$). The HOPS school-based intervention achieved significant reductions in girls BMI over two years, although this achieved a low effect size ($d=-0.22$) (284). In a cohort pre-post trial, one of the few studies to use a combined setting with school, family and community components, after a three year intervention there was a significant difference in girls BMI z scores compared to baseline ($p<0.01$) (302). However this intervention did not have a control group for comparison. Finally a school-based nutrition education intervention achieved statistically significant within (pre to post intervention) and between group differences (post intervention) ($d=-0.31$) in girls BMI (303). Although the Happy 10 intervention lasted 1 year, at the 2 year follow up the significant reduction from baseline in BMI levels in intervention girls compared to controls was maintained (294).

Four long term studies reported a significantly reduced risk of overweight and obesity in girls post intervention (304-307). A longitudinal study found a significantly lower proportion of girls in the intervention group were overweight compared to the control girls at 10 years ($p=0.0439$), however there was a statistically significant difference between the control and intervention group at baseline measures, which were taken at age 7 months (306). Jiang and colleagues reported a significantly lower odds ratio of being obese in girls within the intervention group, compared to controls ($p=0.036$) (293). In the CATCH intervention both the intervention and control group girls had a significantly increased risk of overweight from baseline to the end of the intervention however the rate of increase was lower in the intervention girls (2%) compared to the control girls (13%) (304). Danielzik and colleagues reported a statistically significant increased remission of overweight in the intervention girls as defined using tricep skinfold measures (22.2% in controls compared to 40.9% intervention girls), $p=0.0148$ and waist circumference measures (29.3% compared to 50%), $p=0.0175$. The effect size produced for BMI and the adjusted odds of incidence and remission of overweight and obesity was $d=-0.07$ and $d=0.50$, respectively (305). Finally Kain and colleagues showed a significant difference between the proportion of obese participants in the intervention group (10.3%) compared with the control group (15.2%) (307).

One study found a significant increase in African-American girls but not boys % body fat over the intervention which the authors suggest could be due to the appropriateness of the

intervention (modifications to classroom and dining hall environment and teaching materials for teachers to deliver) for girls (273).

3.1.3.8 Intervention effects on physical activity behaviours

Improvements in girls' physical activity behaviours have been achieved in 13 out of 18 studies which reported physical activity measures in girls. Significant improvements in girls physical fitness compared to controls (where present) were shown in five studies using tests such as the 'Leger endurance 20 meter shuttle run test' (296,308,309), 'Cardiovascular endurance test' (302), and the 'yards run in 9 minutes test' (304). Both objective and self-reported measurements of habitual physical activity revealed significant changes from baseline to the end of the intervention compared to control girls (192,292,295,296,301,310). In one study the preference for physical activity was significantly different between the intervention and control group at follow up after adjustment for baseline values (290). Four studies successfully reduced the time spent engaged in sedentary pursuits, particularly screen behaviours, such as watching television ($d=0.73$ and -0.096 , respectively) (273,286,295). Of these studies, Bjelland and colleagues reported significant reductions in time spent engaging in sedentary behaviours (TV/DVD and computer/game use) in girls but not boys (278). One study measured self-reported sedentary behaviours using the 'Self-Administered Physical Activity Checklist' (273).

3.1.3.9 Intervention effects on nutrition behaviours

Significant changes to nutrition behaviours were achieved in 8 studies out of 33 studies. Dietary records were used in only two studies (289,308). The first was a milk supplementation trial evaluating the effects upon growth and bone (289). This study asked participants to complete a 7 day diet record at baseline followed by two 3 day records during the intervention and post intervention. The strength of this study is the interview conducted to go through the diet records and also the questionnaires used to cross check with the diet records. This study achieved statistically significant changes in milk, calcium and vitamin D intake compared to controls (289). The second study to use diet records (308) used five intervention groups across the school and home setting and a control group. The home nutrition group achieved statistically significant difference in total and saturated fat intake compared to controls ($d=-0.62$ and -0.56). The school nutrition and home nutrition group also achieved a significant difference in saturated fat intake and polyunsaturated to saturated fat ratio intake compared to controls ($d=-0.53$ and 0.35). Only the school physical fitness group

significantly changed their fibre intake compared to controls ($d=0.33$). All intervention groups achieved a significant difference in protein intake compared to controls. One study conducted in Bangkok (272) used a parent completed validated food frequency questionnaire to assess changes to children's diet. A strength of this study was the use of objective measures of children's school lunch consumption by measuring leftovers and interviews with teachers to help confirm parent reported changes (272). The results of this study found improvements in children's overall diet ($d=-0.76$), specifically significant pre-post improvements were shown in fat ($d=-0.41$), carbohydrate ($d=-1.0$) and milk intake ($d=-0.51$) although significant changes were not seen in fruit and vegetable intake ($d=0.07$) (272). A 24 hour recall of dietary intake was used in the Cal-Girls intervention aiming to increase calcium intake and weight bearing physical activity. This study managed to significantly increase calcium intake in the intervention compared to control group over a two year intervention ($d=0.20$) (177). Questionnaires assessing dietary behaviours produced significant results in two studies (283,286). Both these studies are from the GEMS trial and presented significant changes between the intervention and control group over the intervention period for days where dinner was eaten whilst watching TV ($d=0.59$) (286) and the practice of choosing low fat foods ($d=0.34$) (283). The HEIA, school-based study found significant decreases in reported sugar-sweetened beverages in girls at the weekend but not during weekdays at an 8 month midway assessment (278). This study applied educational lessons for children, information material for parents and education for teachers to reduce consumption of sugar sweetened beverages and time spent in sedentary pursuits (278).

3.1.3.10 Intervention effects on knowledge and attitudes

Attitudes and intentions to change behaviours were significantly improved in the intervention compared to the control group in two studies (290,292) and compared to pre-intervention in one study (274). Story and colleagues significantly increased intervention girls diet knowledge ($d=1.45$) (290) and Stevens and colleagues significantly improved food choice intentions meaning participants were more likely to opt for the lower fat option (292). The MARG intervention significantly improved knowledge and behaviour scores, measured through questionnaires, on themes relating to health, nutrition, disease, physical activity and healthy cooking practices, suggesting a positive impact of the school-based intervention (274). However this study lacked a control group for comparison.

3.1.4 Discussion

The purpose of this review was to determine the effectiveness of interventions designed to prevent overweight and obesity in pre-adolescent girls. The majority of the interventions failed to produce medium to large effect sizes over the long term in a broad range of behavioural and physical measures.

3.1.4.1 Effective intervention features

The effectiveness of interventions attempting to increase physical activity behaviours may be enhanced if the time spent doing sedentary activities (e.g. TV viewing) is reduced (311). The interventions, although limited in number, in this review which aimed to reduce TV viewing support this statement (275,285,295). In contrast, the Switch-Play project found that the intervention children significantly increased both physical activity behaviours and the time spent watching TV compared to the controls, which the authors suggest may be due to the reliability of self-reported measures (301).

An important component of the school-based interventions is the modification of school food provision, which, alongside the education components, can help facilitate healthy food choice behaviours (311). Six studies including the school setting, modified the school food provision (27,287,303-305,307,309,312). All of these studies managed to achieve significant changes to behaviour, a physical measure or both.

Cultural practices and behaviours may be associated with the development of overweight and obesity (311), therefore it is important to develop culturally appropriate interventions. In this review the GEMS trials acknowledged the cultural identity of African-American girls in relation to the importance of the family (28,276,283,286,290). The Pathways intervention (292), aimed at Native American children, included Native American games as part of the physical activity intervention component in an attempt to design a culturally relevant intervention.

3.1.4.2 Pre-adolescence

Pre-adolescence is characterised by a disassociation from parents and an increased connection with peer groups (161), therefore there is a need to develop a formative understanding of the context within which children make decisions regarding health choices. This literature may support the use of school-based interventions which utilise the peer group (165). Two studies in this review mentioned peer support as part of the theories (Social

Cognitive Theory and Social Learning Theory) which informed the design of their intervention (176,273) but did not detail how these components were applied. The Happy 10 study (294,299) described children modelling the physical activity exercises in front of the class. The only intervention in this review to describe in detail the incorporation of peer modelling in their study design was a pedometer based intervention which used fictional peer role models “Fit n fun dudes” to encourage physical activity throughout the intervention (310). This study significantly changed mean daily step counts compared to control participants over the study period, however the effects of these peer role models cannot be separated from the use of rewards for meeting step targets (310). Future studies should consider the role of the peer group in the success of interventions designed to target this age group, either as part of the intervention or in formative research (297).

3.1.4.3 Effect sizes

The majority of results failed to produce medium to large effect sizes. This is a similar finding to a meta-analysis of school-based obesity prevention (313). Those that did produce large effect sizes were over the short term (283) or produced large effects in health knowledge and attitudes (290) rather than physical measures of overweight and obesity prevention. The RCT implemented in China achieved the largest effect sizes for BMI in girls over the long term (3 years) (293). However this study included children who were overweight and obese and resulted in weight loss which may have increased the effect of the intervention above that of interventions with exclusively normal weight children who would not have been expected to lose weight as a result of the intervention. The focus of this intervention was the school but parents were also involved, suggesting the inclusion of the family and school is beneficial. Although the majority of effect sizes were small, the clinical relevance of the interventions reviewed should not be ignored as over half of the measures produced statistically significant changes between the control and intervention group.

3.1.4.4 Intervention length

Forty-one percent of the interventions in this review were defined as short term. A Cochrane Collaboration review of all childhood obesity prevention interventions concluded that short-term interventions are unlikely to produce sustained behaviour change or significant weight reductions in children, due to the length of time required to alter weight status (22). Many of the effective short term studies in this review were described as pilots, thus the sustainability of these studies needs to be investigated further. It has been acknowledged that the pilot

GEMS interventions were too short to achieve changes in BMI (297), although the long term GEMS trial also didn't achieve significant changes in BMI (276). Only four out of 41 interventions collected follow up data. Salmon and colleagues followed up 6 months and 12 months after the intervention had finished, Manios and colleagues collected data four years after the intervention had ended, Gorely and colleagues collected follow up data 18-20 months after the intervention ended and Li and colleagues had a 1 year follow up period (294,301,314). Although Gorely and colleagues found that all study participants increased their physical activity levels from baseline to 20 month follow up, the differences between the intervention and control groups were not statistically significant (192). The lack of follow up data in the majority of studies limits the ability to comment on the sustainability of intervention effectiveness.

3.1.4.5 Intervention setting

The development of overweight and obesity is a complex social issue which may be best tackled holistically. The majority of the studies in this review utilised school-based settings, however the risk factors associated with overweight and obesity are not exclusively found within schools (75). The Cochrane Collaboration review supported a multifactorial approach addressing environmental factors, community resources and individual behaviour change (22). Studies failing to produce significant obesity preventing effects tended to focus on changing aspects of the environment or the individual separately, producing changes only in the variables manipulated (e.g. environmental modification resulted in changes to the environment but not behaviour changes at the individual level) (22).

The reason for this could be that efforts focused on one setting (such as the school) may be inhibited by the failure to address another setting (such as the family) (75,76). Approaches which encompass the wider social environment, including the family, community and school may be more effective. However in this review it is difficult to substantiate this claim with low numbers of studies combining research settings.

The majority of school-based interventions reported a family component including written information specifically for parents, meetings for parents with educational material and advice, instructing parents not to bring unhealthy treats into schools for celebrations and teaching physical activity games with a family element. The involvement of parents in school-based interventions has been described as crucial (315) and in the GEMS interventions, parents were viewed as mediating daughter's participation in the intervention

(297). Sichieri et al. propose that a lack of parental involvement may have resulted in limited intervention effects in their intervention (300).

Davison and Birch suggest that the risk factors associated with the development of overweight and obesity in children originate from the family, thus this is an important setting to investigate in research (92). However, this review found only three interventions set exclusively in the family (200,283,306). All of these studies included counselling or educational meetings involving both parents and children. Involving parents and children to facilitate family-based change may help to remove barriers to change, such as low parental knowledge.

3.1.4.6 Limitations

The conclusions drawn specifically for girls are limited to those studies which present results separately for girls. As with any review of the published literature, it is possible that a more favourable view of intervention effects is presented due to publication bias (316). A further limitation to this review is the focus upon pre-adolescents aged 7-11 years. This age group may include girls who are post-menarcheal which may impact upon weight status. Only two interventions in this review presented information on menarche thus this effect cannot be measured (289,295).

3.1.4.7 Recommendations

The heterogeneity of the studies in this review makes it difficult to make simple recommendations for best practice. However, it can be suggested that the effectiveness of interventions is increased by reducing the time spent on sedentary behaviours, modifying school food provision when possible, and ensuring that interventions are culturally appropriate. Interventions should include a broader range of social settings than the school and family and recognise age and gender differences in responses to intervention. Finally, to succeed in producing sustainable, effective changes it is important to invest not only in the development of long term interventions but also to fund the follow up of interventions.

3.1.5 Conclusions

This review confirms the potential effectiveness and sustainability of approaches which focus on community settings to make behavioural changes associated with overweight and obesity.

The non-systematic and systematic literature review proposes that the community level of the ecological model, (encompassing the individual, interpersonal and organisational levels), is potentially the most appropriate and wide-reaching level at which to focus behaviour change interventions attempting to prevent overweight and obesity in pre-adolescent girls. Given the potential importance of the community and environmental factors that contribute to behaviour change the CRM may be an effective means of developing community-level behaviour change interventions.

Chapter 4 Methodology and Methods

4.1 Introduction

A paradigm is a set of beliefs, framework or theory of knowledge in which researchers operate (317). All research and the knowledge required to answer research questions are informed by theoretical assumptions about the world. Paradigms are inherent in both qualitative and quantitative methods, although researchers often fail to make these assumptions explicit (318). Paradigms and methods are inter-related (319). Frances Baum (1995) stated that method and epistemology are often confused in public health research (320). This confusion potentially contributes to the divide between social science and more traditional biomedical science (320). Instead, he argues there is a place for all methods and epistemological stand points and they can work together (320). Methods must be capable of answering the research question posed (320). This section will indicate to which paradigm this research most adhered.

This research has taken what Punch (2009) terms a ‘pragmatic approach’, beginning with research questions and then choosing methods that can answer these questions whilst acknowledging that some paradigms may inform these methods more than others (319). The primary aim of this research is to understand the readiness of the pre-adolescent girls’ community to adopt changes which can prevent its development. Therefore the research questions being asked are: How? Why? What?, not How many? How much? Etc. This means that a qualitative approach is appropriate (318). Baum (1995) put forward three main uses of qualitative methods in public health: “to study and explain the economic, political, social and cultural factors which influence health and disease; to gain an understanding of how communities and individuals within them interpret health and disease; and to study interactions between the various players who are relevant to any given public health issue” (p464) (320). These uses match the research aim and objectives being explored in this study.

The paradigm to which this research adhered most closely was the ‘interpretative’ approach (321). Whereas most biomedical scientists take a ‘positivist approach’ of searching for natural laws to explain phenomena and striving to be objective, humans do not behave in a predictable manner and so we can only attempt to understand behaviour not explain it (318).

O'Donoghue proposes that those adopting an 'interpretative' approach are interested in, "revealing perspectives behind empirical observations, the actions people take in light of their perspectives and the patterns which develop through the interaction of perspectives and actions over particular periods of time"(p20)(321). From an interpretative approach, individuals and the society in which they exist are inseparable, therefore to understand the former is to understand the latter (321). Human action, constructed by autonomy, interaction and negotiation, has interpretable meanings which can help develop an understanding of the social world (321). In this approach, we cannot find the truth about the world and can only attempt to understand people's interpretations or perspectives and experiences within that world (318,319,321). 'Interpretative' approaches also acknowledge that behaviour is contextual. Therefore the researcher must attempt to view the world from the participants' point of view, whilst acknowledging that the presence of the researcher and who they are as a person, will have an impact on the data produced (318). It is important that the researcher reflects on the impact of their own presence and the broader context in which the research is conducted. In the same way that quantitative researchers seek to be rigorous in their approach, qualitative researchers must do the same. Their work must be repeatable by others and they must attempt to create a critical distance from the data and avoid finding only what they hoped to find in the data (318).

4.2 Methods

4.2.1 Introduction

The remaining sections of the Methods Chapter presents a rationale for each method adopted in this thesis and describes in detail how they were applied. The methods employed in this study were qualitative.

The fieldwork presented in this thesis consisted of two substantial studies. The first study used 13 focus groups with 56 girls aged 6 to 11 years in 8 schools within the Charnwood Borough, Leicestershire. The second study applied the Community Readiness Model which involved conducting 33 one-to-one semi-structured interviews with key informants. This Chapter is split into two sections to enable the methods for the two studies to be described separately.

In the first section, this chapter outlines the considerations that must be made when conducting research with children. The use of qualitative methods with children in general is

discussed. The focus group method itself is then described in detail. Lastly, the study setting, design and procedures are discussed.

The second section details the first four steps of the CRM, which are to: 1) identify the issue; 2) identify the ‘community’ most relevant to the issue; 3) determine the community’s stage of readiness to address the issue and, lastly, 4) analyse the interview data to generate a readiness score. Within each step the methods and procedures used in this thesis will be introduced.

4.3 Study one: Focus Groups with pre-adolescent girls

4.3.1 Research with children

4.3.1.1 The New Paradigm

In the past, research examining childhood ignored the opinions of children; this was refuted by a “new” paradigm which advocated giving children a voice (25). The “new” paradigm recognised children as social actors who actively participate in their own lives and experiences (322,323). This corresponds with the UN Convention on the Rights of the Child which advocates allowing children the right to “challenge decisions made on their behalf” (p91) (324). Morrow and Richards (1996) note that there has been a transition away from investigating the adults’ who children will become towards a focus on the experiences children have during childhood (324). Similarly, Boyden and Ennew (1997) describe the need for research which brings children to the foreground to explore the meanings children attribute to their experiences (325). However, this doesn’t mean that research should exclusively focus on children, because children are embedded within their social environment (325). Thus focusing on the institutions within which children interact can also be considered in line with the “new” paradigm.

In practice the “new” paradigm’s recommendations are difficult to apply because children’s “lives are almost always determined and/ or constrained in large measure by adults” (p28) (25). Therefore, if adult gatekeepers, such as parents, do not allow researchers to have access to children, the researcher cannot provide children with the voice to which they are entitled. In addition, others have questioned whether research exploring children’s experiences, should be framed around what children find important even if those factors are not on the agenda of an adult researcher (326).

Qualitative research has the potential to achieve the aims of the “new” paradigm.

4.3.1.2 Qualitative methods for researching children's lives

Holloway (1997) defines qualitative research as a “form of social inquiry that focuses on the way people interpret and make sense of their experiences and the world in which they live” (p1) (327). The benefit of using qualitative research with children is its ability to give an in-depth insight into the experiences of the “researched”, which with children, can be difficult to access with quantitative methods (190,325,328). Boyden and Ennew (325) describe quantitative methods as inappropriate for children because they do not take into account children's “ideas and language” (p16). Although with the help of appropriate adults, the use of quantitative methods with children is appropriate for research questions which seek to quantify a behaviour rather than understand the experience of that behaviour from the participants' point of view. Others have argued that multiple methods, utilising both verbal skills and non-verbal skills will be more accessible for children because they do not rely on young people having the confidence in, and possession of, sufficient verbal skills to participate in focus groups (329).

The findings of qualitative research are restricted to the social context in which they occur (330), thus generalising findings beyond the sample, (which is often small), is complex (320). This could also be argued to be a strength of the qualitative approach because the findings are unique to those involved. In contrast, quantitative methods do not provide a context from which the data has been derived (325).

Collective methods

There are several qualitative methods which can be used with children, including one-to-one interviews, observations and focus groups. Collective methods are particularly suitable for children because they are expected to feel more confident in a group situation, similar to the school setting with which they are familiar, and they are given the opportunity to build on each other's comments (325). It is for this reason that focus groups were chosen as the primary method of data collection for use with children in this research.

Focus Groups

Definition

Focus groups are defined as a “purposeful, facilitated discussion between a group of respondents with similar characteristics” (p129) (325). Focus groups are not simply the “sum

of separate individual interviews” (p139) (331), rather group interaction is a key feature of focus groups (332).

Group size

The recommended focus group size with children is between 5 and 8 participants (333-335). This recommendation has been developed by researchers’ experience rather than through empirical research (335). Firstly, this number optimizes the likelihood that at least three participants will want to join in with the focus group process and speak during the interview (334). Secondly, this group size is thought to create an environment in which the researcher can manage the number of children in the group, for example if any behavioural or emotional issues arise. Lastly, limiting groups to a maximum of 8 participants is expected to help maintain the attention of the participants (333). With larger groups of children it may be difficult to achieve in-depth answers because the interviewer is consciously trying to allow every group member to participate equally (331).

In the research presented in this thesis, a larger group size of 7 children appeared to result in a lower level of participant interaction, possibly because the facilitator felt compelled to break up discussions and allow those who had not spoken the opportunity to respond. This may have resulted in a less natural discussion. In contrast, the smaller groups of approximately 4-5 children were easier to facilitate and allowed all the children a greater opportunity to contribute.

Focus group composition

The choice of group composition can influence the responses elicited from a focus group. A diverse group may produce divergent ideas, whereas a homogenous group has the benefit of familiarity and common experiences (332). A pre-existing social group, such as friendship groups, who are familiar with each other and are at ease in a group situation may be able to express their opinions more freely (335). Focus groups are considered appropriate for children aged 6 years and older (336). Prior to 6 years of age children have not developed the necessary language and comprehension skills (336).

Number of focus groups

The number of focus groups that should be conducted in research is not prescribed in the qualitative literature. However, some suggest that between 3 to 12 groups will allow a comprehensive examination of the issue under study (337). Qualitative methods are more

flexible with regards to sample size than quantitative methods, because they are more sensitive to the research setting and context and as a result cannot be ‘powered’ based on previous findings. Predicting, a priori, how many groups will be needed before all the possible ideas or narratives have been elicited, is therefore impossible. In contrast to quantitative methods, the intention of qualitative methods is not to gain access to a sample that is statistically representative of the population (318).

Focus groups, as with other qualitative data collection methods, are often performed until ‘theoretical saturation’, the state when “no additional data are being found” (p61), has been achieved (338). ‘Theoretical saturation’ was developed by Glaser and Strauss, the founders of Grounded Theory (a process used to produce theory from data inductively), to provide criteria to indicate when data collection should cease (338). This approach is dependent on the researcher’s interpretation and is subject to some error. Indeed some argue that the process of trying to reach saturation could be endless (318). The lack of clear guidelines for sample size and group number means it is even more important to be open in publications about how the number of groups was decided. Often research using focus groups fails to provide a clear rationale for the number of groups they conduct (339). In a review of studies using focus groups, most studies did not explain the reasoning behind their number of groups and the use of ‘saturation’ without a description of how it was reached, was often reported (339). As Carlsen and Glenton (2011) note, although achieving saturation is useful, it is important to balance quantity of data with the quality of the analysis (339). The more data there is the more difficult it is to produce a detailed analysis (339).

Focus group length

Because children’ have lower concentration spans than adults, the length of focus group interviews with children should be shorter than with adults. In a review of “paediatric health care” studies using focus groups with children (<18 years), most focus groups lasted between 30 to 90 minutes (335). Vaughn, Schumm and Sinagub (1996) recommend that focus group interviews should last up to 45 minutes for children aged 10 years or younger and up to approximately 60 minutes for 10-14 year olds (336).

Advantages of Focus Groups

When comparing focus groups to questionnaires, research has suggested that focus groups can achieve a greater depth of information whereas questionnaires have been described as providing a greater breadth of information (331,340). Research with adults comparing

individual interviews with focus groups found that the number of ideas produced in focus groups was less than in individual interviews (341) possibly due to the time taken to discuss each point raised in a group setting. However, arguably the number of ideas is not as important as the content of the ideas.

Hennessy and Heary (2005) discuss the advantages of using focus groups with children; these include the low pressure on participants to respond (333). This is beneficial to researchers because, in the event that one individual does not want to speak, the interview does not have to be terminated, unlike individual interviews (333). Equally since one response may trigger similar or opposing views in another respondent, group situations can stimulate conversation and debate (325,333).

The advantage of using focus groups with children in particular is the construction of a safe, supportive environment in which the imbalance of power between adults and children is redressed by the ratio of adults to children (333). Children are familiar and comfortable communicating with adults and each other in a group because this is similar to the classroom setting experienced at school (342). Boyden and Ennew (325) believe children have increased confidence when accompanied by their peer group and as a result groups are more likely to run smoothly (342). Finally, this method allows children to be viewed as the experts in their experiences (337) which is in agreement with the “new” paradigm (25).

Disadvantages of Focus Groups

The disadvantages of focus groups include the possibility that group members may be intimidated by one another and, consequently, may be inhibited from speaking freely (333). Alternatively, intense discussions or disagreements amongst group members may cause upset (333,335). Participants may also express what they perceive to be socially desirable answers or what they believe the researcher wishes to hear. Socially desirable responses in children may be due to the power imbalance between the adult researcher and the researched (190). De-Pian and colleagues (2008) experienced this and referred to it as “compliance” (p10)(190). Alternatively, children may be less susceptible to giving socially desirable answers when compared to adults because they are less aware of what is considered socially desirable (336).

In a group situation there is the possibility of “disclosure” (p76) whereby children express sensitive information by accident which is of concern in front of the peer group (333,335). This is an issue with potentially sensitive topics such as health (190). Disclosure may be less

likely in group situations compared to individual interviews, because in adults at least, individuals have reported feeling more anonymous in individual interviews (341). Morgan (1996) suggests that some topics may be inappropriate to discuss in a group situation (e.g. sexual health) but suggests that this is at the discretion of the researcher (331).

Sim (1998) questions whether comparisons between focus groups can or should be made, because responses are arguably the reflection of a specific social situation (343). In the research presented in this thesis, themes relevant across all the focus groups were intuitively generated from the focus groups which suggests that comparisons between groups were appropriate. In addition, analysis of whether group consensus has been met can be masked by “thought leaders” (p468) who censor contradictory views by dominating the discussion (344), resulting in the minority not wanting to disagree with the majority (343,345). This thesis agrees with the notion that the absence of divergence does not indicate consensus and acknowledges that in groups which were dominated by one member, the views of this participant were likely to be amplified by others (343). In the present study this may have occurred a couple of times. For instance in a group discussion about body image in the media, the conversation was led by a couple of “thought leaders”. This does not mean that other groups did not have this opinion but that this opinion was simply not raised in such a strong way in those groups. This research has attempted to avoid the problem of themes being portrayed as stronger than they are by not over-coding or over-representing the quotes of individuals repeating the same views, as recommended in the literature (345).

Focus Group Facilitation

It is the role of the facilitator or interviewer to optimise the strengths of focus groups and minimise the limitations. There are two styles of facilitation: “structured” and “less structured” (p145) (331). “Structured facilitation” involves a group which is highly controlled by the facilitator whereas “less structured” facilitation allows the group to shape the direction of the discussion and allows members to participate in as much or as little of the group as they wish (331). With children it is advisable to be fairly structured because this is what children will be accustomed to at school, therefore this was the approach taken in the research presented in this thesis. The facilitator has control over what is discussed (331). Therefore it is the facilitator’s role to ensure that the group discussion remains focused around the topics specified at the beginning to prevent discussions of topics not related to the research question (333).

Boyden and Ennew offer guidance on the role of the facilitator in focus groups with children (325). The facilitator is responsible for ensuring that all participants are given the opportunity to contribute and to encourage clear and understandable responses by checking the participants' intended meanings (325). During the focus groups in this research, the focus group participants' statements sometimes required clarification by the facilitator whereby the researcher attempted to present an interpretation of what the participants had said back to them, this often resulted in a monosyllabic affirmation from the participant. There are two issues with this; firstly, the quotes explaining the statement are made by the facilitator and thus are not presented in the results and, secondly, the children may have agreed with the researcher because they saw the facilitator as an adult in a position of authority rather than because the facilitator was accurately representing their opinions.

At the beginning of the group, the facilitator should build a rapport with the participants and put them at ease by explaining the procedure (325). It is important for the power relationship between children and adults to be equalised. This is difficult but can be achieved by the use of a non-patronising voice, minimal domination of the group by the researcher and conscious efforts not to act like an authority figure (325). The latter can be achieved in a number of ways: by not correcting children's comments; by stating at the beginning that the facilitator is not a teacher (325); by thinking about the formality of the clothes worn by the facilitator; and by encouraging the use of the facilitator's first name (333).

Focus group questions

The design of the focus group questions can be either standardised meaning the same questioning route is used for every group or based on "emergence" (p142) - meaning the questions are allowed to change as a result of what has been said in previous focus groups (331). The advantage of standardising the questions is the ability to compare across groups whereas using the "emergence" technique acknowledges that every group is unique (331).

In this research "standardised" (p142) focus group questions were employed (331**Error! Reference source not found.**). Firstly, to ensure all groups were asked the same questions, although follow up questions were specific to each group, and, secondly, to ensure the interviews were focused on the topics of interest.

4.3.1.3 Study Setting

This research was conducted in the Charnwood Borough of Leicestershire, within the East Midlands Region of the United Kingdom. The Charnwood Borough is located south of Nottingham and north of Leicester. There are several villages and towns in the Borough (

Figure 4-1). The largest town is Loughborough which in 2004 had an estimated population of 57,560 (p6) (346).

In the 2011 census population estimates, the Borough had approximately 166,100 inhabitants (347). On average 92.5% of the Borough's inhabitants are 'White British' ranging from 68.6 to 99.3% across the small area levels. The presence of 'Asian' or 'Asian British' groups in the Borough was on average 5.4% and ranged from 0.2 to 29.5%. Other ethnic groups represented less than 1% of the population (348). Using the Index of Multiple Deprivation (IMD) to indicate the level of deprivation within the Borough, the median rank compared to the rest of England is approximately 9627.63 whereby 1 represents the most multiply deprived and 28960.78 is the least deprived (349). The IMD is a relative measure of deprivation comprised of 7 domains: income; employment; health deprivation and disability; education; skills and training; crime and living environment (349). Each is measured at the small area level (LSOA) (349). The percentage of children living in poverty within Charnwood in 2009 was 14.2% (350). The percentage of primary school pupils (5-11 years) who are eligible for and claiming free school meals in the academic year 2011-2012 across the small area level of the Borough is on average 11.6% (ranging from 0 to 43%) (351) compared to 18.5% of pupils in maintained nursery and primary schools in England (2010) who are eligible and taking up free school meals (352). In 2010/11, the Charnwood Borough's prevalence of overweight in 10-11 year old girls was similar to the rest of England (26.9% and 31.8% respectively) however the prevalence of obesity was lower (13.9% and 17.4%) (353). The proportion of physically active children (boys and girls) who participated in at least three hours of high quality P.E. and school sport, per week, within state maintained schools and Further Education Colleges (16 years plus), assessed through the Annual Survey of School Sport Partnerships in the Charnwood Borough and England was 43.8% and 49.62% respectively (354).

The most feasible way to access a sample of girls is to recruit from a sample of schools. Highlighted on Figure 4-1 are the locations of the 8 schools in which the focus groups were conducted.



Figure 4-1 Map of the Charnwood Borough. The stars indicate the areas where focus groups were conducted.

4.3.1.4 Study Design

Aim: to identify who or what pre-adolescent girls view as influencing their performance of health behaviours (namely physical activity and healthy eating).

Prior to school recruitment Dr Nadine Geddes (Institute of Youth Sport) created a database of information regarding schools in the Charnwood Borough using various Internet-based sources. This database included: the school name and addresses and head teachers names; the 2007 IMD for the school's area; rural and urban classification; the number of lone parent households; the number of pupils; pupil age range and ethnicity and sporting facilities in each Lower Super Output Area (LSOA) (areas with between approximately 1000 and 3000 residents) and items about the built environment (road-square metres, green space).

Stratified random samples of schools were selected according to the size of the school (small and large) and the IMD score (least, medium and most) for the school area. The IMD scores for all schools in the Charnwood Borough were divided into tertiles to produce low (least deprived), medium and high (most deprived) classifications. Using the IMD was expected to achieve a representative sample of schools from across the Charnwood Borough, although it is noted that the area level of IMD does not necessarily correspond with the individual level of IMD of the participating children. However, this research was concerned with the community context rather than the individual level, which is why a community focused measure of deprivation, was used for selection. Secondly, the 2007 IMD values may be less reflective of area deprivation levels in 2010 when these data were collected. The IMD scores have, however, been used to sample schools previously (13,165).

School size (large and small) was defined by calculating the median number of pupils in all the schools in the Charnwood Borough (n=212) using data from 2009 presented on the Department for Education's website (351) and dividing schools into those above the median (large school) and those below (small school). School size was used as a marker of the availability of physical activity facilities and equipment.

Within each of the five stratified categories (deprivation level [least, medium and most] and school size [small and large]) two schools were invited to participate. If a school declined, another school within that category was approached. Assuming successful recruitment of 12 schools, one focus group per school, and a group size of between 5-8 participants the intended sample size was between 60 and 96. The actual sample size was less than this because theoretical saturation was reached after 13 focus groups, from 8 schools with 56 participants.

'Theoretical saturation' was assessed iteratively using thematic analysis of each transcript in sequence to detect whether any additional themes were present by comparison with the previous transcript. Thus saturation was reached when no new ideas or themes were contributed by the last transcript. The process of collecting, transcribing and then thematically analysing the interview data was conducted simultaneously where possible, as recommended in Grounded Theory (338). However, resource limitations meant that the majority of the analysis was conducted, after data collection had finished. In addition, the researcher (who was also the facilitator of the groups), felt confident that saturation had been

reached because she was unconsciously pre-empting what the participants were going to say and using reduced probing as the comments made by other focus groups were being echoed.

4.3.1.5 Considerations of age

Consent

Gaining consent from children is generally not achievable because research suggests that children can struggle to focus on more than one dimension of an issue (355). However, it is generally accepted that children aged between 7 to 11 years are capable of understanding the implication of participating in research as they have reached Piaget's stage of concrete operations (356). This means they are able to consider more than one aspect of a situation (no longer thinking only of themselves egocentrically) (355). Thus it is ethical to involve children of this age in research, once assent from the child and consent from the parent or guardian is given (355).

4.3.1.6 Participant recruitment

Letters with details of the study were posted to randomly selected schools within each selection category (APPENDIX E). Follow up telephone calls were then made to each school to ascertain their interest in the study. When one declined to participate another school within the same category was selected using a random number generator. Table 4-1 displays the reasons 13 schools refused to participate.

The researcher met with the head teachers who were interested in the study. After the head teacher had agreed to allow the research to take place within their school, all girls in Key Stage 2 (School Years 3-6, aged 7-11 years) were invited to participate. To recruit the focus group participants, and at the discretion of the individual head teachers, the researcher either directly spoke with the girls in Key Stage 2 and then sent information letters (APPENDIX E) and consent/assent forms home to parents and children or only handed out information letters and consent/assent forms for parents and children to sign. In one school, recruitment letters were given to the school receptionist and the researcher did not meet the head teacher. This resulted in limited recruitment success with the smallest number of participants recruited in this school (n=2). In contrast, two head teachers were enthusiastic about the study and one produced a cover letter to go with the recruitment letters and spoke to the girls personally to encourage their participation. These schools recruited the largest number of girls (n=12 and 13).

Prior to participation parents and pupils provided written consent and assent respectively. No additional demographic information was obtained from participants and their parents. The ethical advisory committee at Loughborough University approved this research project (R10-P10) on the 24/03/2010.

Table 4-1 Reasons for schools not participating

Reasons	Number of schools giving this reason
Refusal to give a reason	4
Too busy:	
Time of year (e.g. Exam period)	3
Head teacher unavailable to discuss participating	5
Redundancy issues within the school	1

4.3.1.7 Procedure

The focus groups took place between May 2010 and July 2010, at a time and place convenient to the school and its pupils. In most cases this was in a quiet area outside of the main classroom. However, some groups were subject to interruptions because of limited space in schools, e.g. noise from piano lessons and adjacent noisy classrooms. Occasionally groups were interrupted by teachers walking in and out of the room to access resources.

Prior to facilitating the focus groups JK completed a Criminal Records Bureau check. Before focus groups commenced the researcher obtained permission from the participants to use an audio recorder (Digital Voice Recorder, Olympus, VN-2100PC) during the group discussions and to use anonymised excerpts in publications.

After each focus group the researcher reflected on the interview and recorded any thoughts or issues which arose in a research log. If the researcher was unclear about how a situation should have been dealt with, she consulted two independent researchers. For instance, in the first focus group, a participant expressed boredom during the interview. The researcher was unsure whether she should have reminded the participant that she could leave at any point. In discussing this with the independent researchers after the event, it was decided that this option should have been offered and would be offered in subsequent groups.

The focus group sessions were conducted by JK who attended a training course about focus group facilitation at the University of Surrey (357). As with many research methods the

researchers' gender, ethnicity, age and cultural values will influence the interview process, for instance their ability to demonstrate empathy. It was anticipated that because the researcher was female, it would be possible to build a rapport with the female participants, as she would have had, and been expected by the participants to have had, similar experiences to them. The focus group interviews lasted between 30 and 55 minutes and the group size ranged between 2 and 7 participants. Most of these group sizes were in accordance with recommendations in the literature for children of this age (334,358), but due to problems recruiting children from one school, one group was conducted as a paired interview with two participants to avoid disappointing the two girls who had agreed to participate. Having two in a group was difficult because once an idea was expressed thinking time was reduced for the other participant to think of responses compared with a larger group. As a result, they seemed to run out of ideas more quickly than larger groups.

Focus group questions

To begin the focus groups the participants were asked to say their name and their favourite colour. The purpose of this was to help the children feel comfortable speaking to the entire group by allowing them to share a simple and uncontroversial piece of information. The researcher also used this process to aid the recognition of the participants' voices when transcribing, although even with this information it was not always possible to identify voices. This is because some girls sounded very similar on the audio recordings, especially when there was other background noise.

The first question explored the participants' definition of a 'community', including who they viewed as part of their community (APPENDIX D **Error! Reference source not found.**). As discussed in the Background and Literature Review Chapter, this research was interested in delineating the concept of 'community' (Objective 1). It was thus anticipated that by asking the participants what the term meant to them, it could be further clarified for this study population. It also prevented the researcher presupposing what the participants would understand by the term and valued the perspectives of young people. Asking the participants to describe their community helped to set the scene of what was to be discussed subsequently. This was emphasised by the researcher who linked this question to the next one by stating "so now we have thought about what a community might be, we are going to think about the things we do within our community."

The second section of the interview assessed the participants' perception of what it means to be healthy, specifically healthy eating and physical activity (APPENDIX D **Error! Reference source not found.**). To facilitate this discussion, the questions were also reversed, by asking what is not healthy eating and physical activity. The aim of this section was to investigate the girls' awareness and knowledge of key health messages.

To introduce the idea of what influences health behaviours, the next section of the focus group utilised the 'sentence completion technique' (p14) which has been suggested to maintain young people's attention (333). The children were asked to finish off the sentences presented in APPENDIX D **Error! Reference source not found.** **Error! Reference source not found.** These questions were designed to help the participants think about whom they are with when they perform health behaviours. To give the participants an illustration of the sentence completion technique, the researcher gave the example of "I am most happy when I am with...my best friend." An example that was not relevant to the interviews was used so that the participants' responses were not shaped by the researcher's views.

Next the focus groups discussed who the participants thought influenced their performance of physical activity behaviours and their healthy eating patterns. To begin this task a large sheet of card was laid out on the table in front of the participants. At the top of the sheet the researcher placed two cards with illustrations of a cricket ball (symbolising physical activity) and a carrot (symbolising healthy eating) (Figure 4-2). As the participants' indicated who or what they viewed as influencing these behaviours, the researcher wrote a summary on a colourful post-it note (Figure 4-3) and stuck it under the appropriate heading.

Once this discussion had come to a natural conclusion the post-it notes were all removed to the side of the sheet of card. The children enjoyed helping with this process. The two cards at the top of the sheet were then replaced with three cards (Figure 4-4) containing the phrases 'no say', 'some say' and 'a lot of say'. These cards were colour coded with traffic light colours to emphasise the cards meaning. This last task was designed to encourage the participants to discuss and debate the perceived degree of influence of those they identified as informing their performance of health behaviours. This technique is called a Decision Making Chart (322) and allows children to express how much control people have over the decisions they make (322). Thus this research aimed to go beyond who influences behavioural choices and investigate how these people exert their influence and to what extent children adopt their suggestions. For each post-it note the group were encouraged to discuss

and decide which heading was most appropriate. During the first few focus groups the researcher decided the sequence in which the post-it notes were discussed, however as the groups went on the participants were encouraged to choose the order. This procedure gave the children control over the experience and helped to redress the imbalance of power between the adult researcher and child participants. Each key informant could only be placed under one heading per focus group, and as a result the discussion sometimes led to the creation of another two headings ‘between no and some say’ and ‘between some and a lot of say’.

The younger children were sometimes confused by the concept of ‘say’. They interpreted this as people verbally telling them what to do therefore they believed inanimate objects such as the television and the idea of food looking appealing couldn’t have any ‘say’. When this situation arose the researcher attempted to explain the intended meaning further, below is an example of this:

“R: So let’s do one more then, we will look at ‘food looking nice’ because that’s a completely different one. (...)

P2: no say. Because it can’t talk.

R: ...food looking good. That’s true but if a food looks really nice would you want to eat it more?

P1: Yes. A lot of say.”

Least deprived, small school, 9 and 8 years

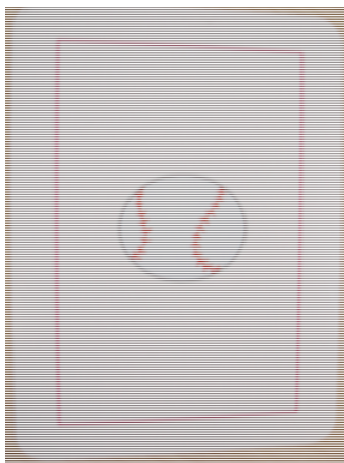


Figure 4-2 Cards used in the focus groups to discuss who influences the performance of physical activity behaviours and healthy eating

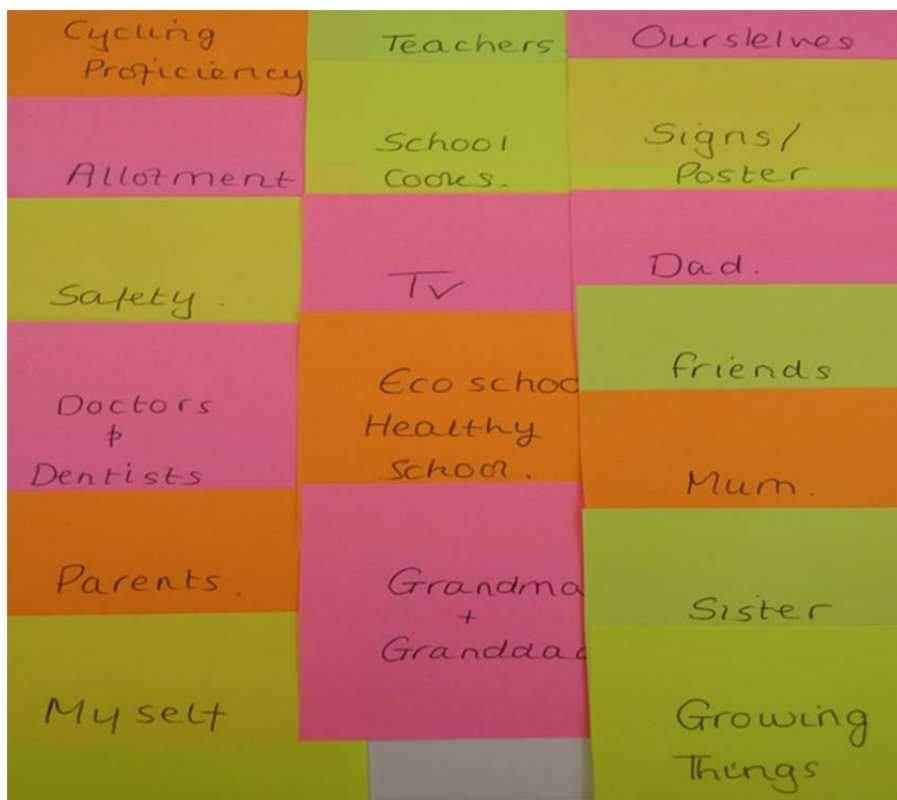


Figure 4-3 Example post-it notes illustrating the influences on pre-adolescent girls' health behaviours produced by focus group participants



Figure 4-4 Decision Making Chart Cards

Pilot focus group

The questions were piloted with a group of children from a large school with medium deprivation levels. All apart from one participant in the pilot focus group were the daughters of Loughborough University lecturers who responded to a University email request for participants. Therefore the pilot focus group participants were biased towards those with a high socio-economic status background. The pilot focus group was observed by a second researcher (PG) who gave feedback to the researcher at the end of the group. This feedback

included: highlighting an instance where the researcher failed to address a participant's question; illustrating to the researcher good examples of her use of probing questions; and instances where the researcher should have tried to minimize irrelevant comments. The observer also noted that a participant asked the researcher to explain what was meant by 'encouraged'. During piloting the researcher noticed a tendency for children to want to put their hand up prior to speaking and a focus on responding directly to the researcher's question as opposed to responses from other participants. The researcher felt this limited the interaction amongst group members and as a result produced a set of 'group guidelines' to explain what was expected of the participants. These guidelines were read out before every group and emphasised: that the interview was not a school lesson, the children should be respectful of each other's opinions; they may talk to each other during the focus group when answering questions; there are no right or wrong answers and their participation was voluntary meaning they could leave at any time (APPENDIX F). After the pilot focus group the only changes made to the questions were to add alternatives to the wording of questions which allowed explanations of any unclear terms (e.g. 'encourage'). As only minimal alterations were made it was deemed acceptable to include the results from this focus group in the analysis of the overall study.

Data Analysis

The focus group discussions were transcribed verbatim by the same researcher (JK) who conducted the focus groups and subsequently analysed the transcripts. This was seen as important because transcription is a form of analysis (359) and helps to familiarise the researcher with the key themes present in the transcripts. To protect anonymity all names were replaced with ID numbers in the transcripts.

The transcripts were analysed using the thematic analysis approach outlined by Braun and Clarke (2006) (360). This approach was chosen because it is a flexible method, applicable for a variety of theoretical stand-points including the 'interpretative' approach, allows comparisons of similarities, differences and relationships within the data (359) and its authors clearly delineated the process of thematic analysis (360). In providing guidelines for thematic analysis, Braun and Clarke make the analysis of qualitative data more explicit, replicable and open to scrutiny (360). The analysis of the focus group transcripts intended to go beyond description of what was said (semantic approach) to discover the meaning behind what was said (latent approach) (360).

The analysis procedure involved six phases (Table 4-2). Phase one, becoming familiar with the data, consisted of repeated readings or immersion within the text, to develop an in-depth understanding of its content (360).

Phase two required each focus group's transcript to be grouped into initial codes or basic "features of the data" (p89) (360). This procedure was completed by hand on paper copies of the transcripts. The initial coding process was completed systematically (line by line), allowing the themes to be produced by induction rather than by applying themes developed a priori (338,359,361) and to reduce the bias of the analysis (345). Inductive themes are expected to fit the data better than themes which the researcher tries to find evidence for in the data (338). However the interview questions did lend themselves to certain responses, and, as such, the themes reflected the questioning topics to some extent.

Phase three took the initial codes and grouped them and the data which falls within these codes, into meaningful themes which "capture something important about the data in relation to the research question" (p82) (360). At this stage some initial codes may be labelled as themes, subthemes or may even be removed (360). To help with this process, Braun and Clarke recommend visually mapping the themes produced (APPENDIX G).

Phase four, "reviewing the themes", was conducted by re-coding the transcripts by hand. There were two stages to this phase; firstly, reading the coded data within each theme and checking their coherence with it. If some of the data did not seem to fit the theme, then the theme might have needed to be changed or the data coded as something else. Secondly, the themes were compared to the complete dataset to see whether it accurately reflected and depicted the data as a whole. All codes were reviewed by JK and the PhD supervisory team (NC and PG), leading to the fifth phase of "defining and naming themes" (p87). This phase used QSR N-Vivo 8 to test the consistency of the codes across all the transcripts. The EMHP (24) was used as a framework for organising the themes (please see Literature Review chapter for more details of this model).

Analysis was performed separately for healthy eating and physical activity factors. Using QSR N-Vivo coding queries, the themes were compared across IMD categories and school size to assess whether there were any differences in responses associated with these variables. A second researcher, blinded to the coding produced by JK, coded the physical activity content of one focus group and the healthy eating content of another focus group to check the

percentage agreement of coding between two researchers (inter-rater reliability) which was on average 99.6%. Thus there can be confidence in the coding system and the logic of the themes. However, this agreement may have been inflated by the second researcher using the code book produced by the first researcher.

The last phase identified by Braun and Clarke (2006) is “producing the report” (p87) (360) whereby the story of the data is brought together and exemplified using quotes. The write up should convince the reader that the analysis was conducted with appropriate rigour (360).

Table 4-2 Phases of thematic analysis. Source: Adapted from Braun and Clarke, 2006

Phase
1. Immerse and become familiar with the data
2. Produce initial codes of interesting sections of the data
3. Search for themes by grouping the initial codes into meaningful themes
4. Refine themes to produce definitions and names
5. Write up the themes
6. Producing the report

4.4 Study two: Community Readiness Model (CRM)

Aim: key informant interviews were used to assess the stage of community readiness to prevent overweight and obesity in pre-adolescent girls.

4.4.1 Application of the CRM

There are six steps in the CRM which are applied to address a specific issue within a community (please refer to the Literature Review Chapter for more detailed information about the CRM). The following section will relate the steps of the CRM to the methods employed in this research. A justification of this process will also be provided.

4.4.1.1 Step one: identify the issue

As previously indicated this research was concerned with the promotion of pre-adolescent girls’ health behaviours known to be associated with the prevention of overweight and obesity. It was decided that rather than discuss the prevention of overweight and obesity (an emotive term for many people) as the defined ‘issue’, the focus of the interview questions should be behaviours which would need to be performed to prevent overweight and obesity. In addition the emphasis was on health promotion rather than on reducing unhealthy behaviours, the latter would make an assumption that unhealthy behaviours are being performed and might cause the key informants to become defensive of their community.

4.4.1.2 Step two: define the ‘community’ with specific reference to the issue

The Charnwood Borough (Figure 4-5) was selected as the geographical community for this study because: it has not previously engaged in a similar community-based programme; it is geographically contained; and the researcher is sufficiently acquainted with the community to be able to gain access and undertake the project. Charnwood is an appropriate size for conducting community research as it is neither so large that there is no sense of community nor so small that a successful intervention would have little wider public health implications. However, it is arguable that there are several separate communities within the Charnwood Borough (e.g. school, family, religious communities etc.). It is also the same community in which the focus groups were conducted thus the key informants are, geographically at least, members of the pre-adolescent girls community. Figure 4-5 has been marked with the different areas the recruited key informants either lived or worked, although four key informants worked across the entire Borough.



Figure 4-5 Map of the Charnwood Borough. Stars indicate the areas in which the key informants either lived or worked

4.4.1.3 Step 3: determine the community’s stage of readiness to address the issue

This step was completed by conducting a community readiness assessment using semi-structured key informant interviews. Semi-structured interviews follow an interview guide

produced by the researcher but allow participants to shape the direction of the interview depending on their responses (362) (APPENDIX H). The interviewer can also deviate from the topic guide in order to elicit more information around a particular area. Many of the principles discussed regarding focus groups (e.g. the role of the researcher) can be applied to one-on-one interviews. As with focus groups, it is important that rapport and a sense of trust are built between the researcher and the participant. The researcher can achieve this by displaying genuine interest in the participant's responses (318).

The benefit of using one-on-one interview techniques for the key informant interviews is the ability to access marginal views which are less likely to be expressed using group methods (318). An example of this arose in one parent interview where the participant described her friends (other parents) as not being able to recognise their children as overweight and asserted that they did not associate their child's weight status with their unhealthy behaviours. It is unlikely that this participant would have made these comments if she had been interviewed with a group of her parent peers. Therefore because this research was trying to elicit the key informants' impression of the behaviour of other members of their community, it was advantageous that other members of that community were not being interviewed at the same time. In addition although a community readiness survey has been developed (255), it was felt that the ability to probe for more detail within interviews made this method more appealing. A survey approach is useful where resources are limited and, arguably, the participant burden is lower. However if greater resources are available then the CRM can be considered a more valid option than the survey approach given that it has been validated for use with childhood obesity. Although the CRM suggests interviews can be conducted over the phone or in person, all interviews in this study were conducted in person as this was expected to create a greater rapport between the researcher and the interviewee (31). The CRM also proposes avoiding a detailed discussion with the participant regarding their responses, although clarification should be requested when necessary (33). Although the researcher attempted to adhere to this advice, some participants gave lengthy and detailed responses and these were not stopped by the researcher because they provided a depth of information that was useful to the research question being addressed.

The CRM interview guide has six sections that address: community efforts (initiatives addressing the issue); community knowledge of efforts (awareness of these initiatives); leadership (influential community members support for initiatives); community climate

(attitude of the community towards the issue); community knowledge of the issues (understanding about their causes) and resources related to the issues (local resources available to support the issues).

The developers of the CRM encourage adaptation of the model to suit the purpose of the research (33). Firstly, in the research presented in this thesis, an introduction was added to the interview guide explaining that the key informants had been identified as key members of the Charnwood Borough community, through discussion groups with girls aged 7 to 11, in relation to girls' physical activity and healthy eating and drinking behaviours. The definition of what was meant by a key member (key informant) was explained as an individual with experience, knowledge and information regarding local issues, and the ability to suggest appropriate actions to promote healthy behaviours within the Charnwood Borough community. The aim of the interview was presented as exploring: what local people know and feel about the importance of healthy eating and drinking and physical activity behaviours in girls aged 7 to 11 years; what is available locally for these girls to promote healthy eating and drinking and physical activity behaviours; who is providing these opportunities; and how available and well-funded these opportunities are in the Charnwood Borough. The terms healthy eating and drinking were used instead of dietary intake because it was felt that this would encourage a discussion of drinking behaviours as well as eating. The participants were asked to limit their responses to the discussion of 7 to 11 year old girls rather than children in general. The format of the interview was explained in the introduction including the use of a ten-point rating scale used to rate the community's stage of concern about unhealthy eating or low physical activity behaviours in girls aged 7 to 11 years with 'One' indicating 'no concern' and 'Ten' indicating 'great concern'.

Physical activity and healthy eating were considered to be two distinct behaviours with different factors influencing whether individuals perform them. There were also expected to be varying attitudes towards these behaviours (i.e. the community may be very keen on healthy eating and at the same time not value the importance of physical activity). Therefore the interview questions were repeated once for physical activity and once for healthy eating. This ensured that it was easy to ascertain to which behaviour the responses related and was expected to make the focus of the questions clearer to the key informant. In analysing the transcripts it was also possible to assess the community readiness for healthy eating and physical activity separately.

It was necessary to modify the language of the interview script to ensure the questions were accessible to an audience from the United Kingdom as the model was developed in the USA. For instance the term 'leaders' was changed to 'important, influential or key people' because this could mean anybody who was seen as important not just those who are employed to perform certain behaviours.

The concept of 'community' can be defined in many ways, which some argue has meant the term has lost its meaning (87). This is one of the main issues with applying the CRM interview guide as every question refers to the key informant's 'community'. At the beginning of the interview the researcher asked the respondent "How would you describe the community you operate in/ are part of/work in as a <insert occupation>/parent?" to clarify the term 'community' for both participant and researcher. This question was then followed by a probe; "Who would you say is part of your community?" Thus the participant was encouraged to give their own definition of their community because it was felt that if the researcher imposed a definition it would be unclear whether the participant was responding using the same definition.

The CRM interview guide does not state to whom you are specifically referring to with regards to the issue. The primary interest in this research was pre-adolescent girls (7-11 years old), thus this was stipulated in every question and in the introduction for clarity.

Finally, it can be argued that the important constructs of the CRM are key informants as well as the community of which they are part. Originally the CRM interview guide asked the key informants to give an impression of the community at large without inquiring about their own opinions as a key informant. This research added questions specific to each key informant to the end of the interview (APPENDIX H). For instance, parents were asked about the influence of siblings, the peer group and pets on their child's health behaviours, and how safe they found the local environment for children to play unsupervised because these were issues which had arisen in the focus groups and could not be addressed using the CRM. Therefore this approach helped to triangulate the focus group and key informant interviews findings (363) and develop an in-depth understanding of the community situation.

Design

Key informant identification

As previously described, the identification of key informants, who influence physical activity and healthy eating behaviours in pre-adolescent girls, was accomplished using focus groups with pre-adolescent girls. The key informants highlighted by the focus groups are displayed in Table 4-3. After the focus groups were analysed there were three categories of key informants produced: those who could be recruited for interviews; those who could not be recruited for interviews and other influences that were not individuals. The key informants who were not considered eligible for interviews were the children themselves, siblings, the peer group and dentists and doctors. Saturation of information from the pre-adolescent girls themselves was achieved through the focus groups, thus the children themselves and the peer group did not need to be interviewed. In relation to the siblings described as key informants, it was considered too difficult for children to answer the CRM interview questions and too difficult to recruit older siblings. Instead, it was decided to include questions in the interview guide which addressed the influence of siblings, friends and the other influences that were not individuals, such as pets and the media, on which other key informant family members could comment. It was decided that doctors and dentists would not be interviewed because it was considered to be more relevant to keep the focus on community members rather than community health professionals.

Table 4-3 Identified Key informants (recruited, not recruited or other influences) separated by healthy eating and physical activity influences

Level of the Ecological Model of Health Promotion	Physical activity key informants that could be recruited	Physical activity key informants that could not be recruited	Other physical activity influences
Individual Level		Children	
Interpersonal Level	Parents Grandparents	Siblings Friends Neighbours	Pets
Organisational Level	Head teacher/Deputy Head teacher Teachers/teaching assistants		Media
Community Level	Shop keepers Sports Coaches Brownie and Girl Guides Leaders		Weather Built Environment
Society Level	Government initiative leaders		Media and technology Change 4 Life
	Healthy eating key informants that could be recruited	Healthy eating key informants that could not be recruited	Other healthy eating influences
Individual Level		Children	
Interpersonal Level	Parents Grandparents	Friends Siblings Neighbours	Pets
Organisational Level	Head teacher/ Deputy Head teacher Dinner staff School Cooks Teachers/ teaching assistants		
Community Level		Doctors and Dentists	
Society Level	Shop keepers Government initiative leaders		Allotments Media and technology Change 4 Life

Recruitment

The CRM's authors (33) suggest that interviewing 4-6 key informants would achieve an understanding of the issue in that community. The authors' rationale for this number of participants is that each key informant is asked to talk about the wider community context and what they think others in the community know. Thus their views are taken to reflect the community situation and so a 'representative' sample is not required (Edwards, 2010 personal communication). However, typically within qualitative research, investigators aim to reach a point of 'theoretical saturation' whereby no new concepts or ideas are gained by conducting more interviews. The CRM unfortunately fails to acknowledge the value of this approach. This research sought to achieve 'theoretical saturation' and as a result recruited more than the suggested number of key informants. The recruitment strategies employed depended on the key informant. To begin recruitment, all the schools that had participated in the focus group study were invited to participate in the second stage of the research (applying the CRM). Five out of the original eight agreed to participate in the second stage. Schools were approached by letters (APPENDIX I), followed up with telephone calls to the school's office staff and head teacher. This approach was problematic because, firstly, the letters were often either not received or not read and, secondly, it was difficult to speak directly with the head teachers. Several head teachers had reservations about participating in the study as a result of factors such as: the time commitment; unease about what the research was investigating; unwillingness to participate in another research project perceived as resulting from the coincidence of being situated near to a university; the fact that teachers were winding down as the end of term approached and a feeling that school staff would be unwilling/unable to answer the questions. These issues were also experienced during focus group recruitment. Those head teachers who did agree to their school's participation were given information letters (APPENDIX I), consent forms and contact detail sheets to hand out to: the head teacher; parents; key stage two teachers (teach 7 to 11 year olds); teaching assistants; school cooks; and school dinner staff. The researcher then returned to the school at an agreed later date to collect any returned contact detail forms and then contacted the individual directly to arrange an interview. On some occasions where a low response rate occurred and the school permitted it, reminder letters were sent out.

For those outside the school setting, information letters were handed out, emails were sent and telephone calls were made. On two occasions, sampling followed a snowball technique whereby after or during the interview another possible key informant was mentioned. When

this occurred the researcher asked for the name and contact details of the new key informant and followed this up.

During the initial interviews with parents the researcher felt that the participants were mainly from medium to least deprived backgrounds, although the IMD of the area in which the schools were located indicated otherwise. In order to recruit representatives from most deprived groups a second round of school recruitment then focused on recruiting schools in most deprived areas. This approach recruited a further three parents. The school key informants were classified by IMD level of the school area. However for parents, the National Statistics-Socio-economic Classification (NC-SEC) (364), produced through self-reported assessment of occupation, was also included. The reason for using the NC-SEC is that both the area and the individual socio-economic classification are likely to be important in influencing parenting practices.

Prior to the interview the participant's consent was sought, their permission for the interview to be recorded using a digital voice recorder (Olympus, VN-2100PC) and for anonymised excerpts to be used in publications was obtained and the participants were verbally told that they could withdraw from the study at any time. The interviews were either conducted within the researcher's institution, at the participant's work place or within the participants' home. The setting in which interviews were conducted may have affected the interviewee's responses. Those interviewed in their work place, (especially when asked about their employers policies), may have felt restricted in their responses compared to those interviewed in a neutral setting. In addition, interviews conducted within a research institution may elicit different responses in some participants. Although the participant may have been most relaxed in their home, distractions were more likely to occur in this setting (e.g. from children, pets and telephone calls). As with the focus groups, the researcher kept a research log to record her impressions of the research setting and any extraneous factors which may have influenced the interview process.

This research originally sought to achieve saturation for each key informant (e.g. teachers, parents etc.). Unfortunately, recruitment problems were encountered which forced the researchers to take a more 'opportunistic' approach to sampling (318), particularly in the school setting where teachers appeared reluctant to participate. The reasons for this are unclear as gaining direct access to key informants was restricted by school gatekeepers (office

staff and head teachers). It is possible that the time pressure on teachers was a contributing factor to non-participation.

Although we encountered recruitment problems, it can be suggested that those who are truly key informants of children's health behaviours were most likely to have taken part. In addition saturation at the Charnwood Borough community level rather than the key informant level is arguably more appropriate in community-focused research. We are satisfied that the key informants interviewed are an adequate reflection of the Charnwood Borough community and that saturation at the community level was achieved.

There have been no interviews with school cooks or head teachers. However an interview with the School Food Advisor who oversees the School Meal Support service across the Charnwood Borough was considered to present, to some extent, a voice for the school cooks. The School Food Advisor actively sought to help recruit school cooks for this research. She did this by handing out information letters in person to all the cooks and spoke directly with them about the study. She also offered to drive the cooks to the interview venue. According to the School Food Advisor, the cooks were unwilling to participate because during working hours they could not have time off to do the interview and immediately after work they had childcare commitments.

Analysis

4.4.1.4 Step four: post community readiness assessment, analyse both the assessment and interview data to generate a score for each of the six readiness dimensions and an overall community readiness stage

The interviews were transcribed verbatim by the same researcher who conducted the interviews (JK). All names were anonymised during the transcription process. Analysis was firstly conducted using the same thematic analysis procedure as described for the focus groups (360).

The thematic analysis was completed in the first instance to familiarise the researcher with the transcripts, secondly, to determine whether theoretical saturation had been achieved and, thirdly, to develop an in-depth understanding of the key informants experiences, views and attitudes. A comparison was made between healthy eating and physical activity themes as well as differences between key informants.

Secondly, the transcripts were scored using the assessment guidelines produced by the CRM authors (33). For each dimension in the interview guide there are 9 anchored rating statements (APPENDIX B). The transcripts were systematically read to compare each anchored statement to the transcripts. The transcripts had to be analysed in their entirety for each anchored rating statement because there were instances where information relating to one dimension occurred in a different section. If there was evidence pointing to the interview transcript meeting the first statement the researcher moved to the next statement and began highlighting relevant features of the text which related to that statement. This process continued until an anchored rating statement was reached which was not reflected in the transcripts. The previous statement's number was then recorded and the next dimension's statements were analysed. For example, in response to the interview question "How long have these programmes or activities been going on in your community?", one Teaching assistant replied: *"I've been here, since 2006 so for as long as I've been here, there's always been activities available"*, this would be coded as meeting the anchored rating statement: Efforts have been running for several years, corresponding to the score 7. Once all of the dimensions for every interview transcript had an anchored rating score, an average was taken by calculating the total for each dimension across all the interviews and dividing by the number of interviews (33). The average ratings for each dimension were then added together and divided by the number of dimensions (6) to produce an overall community readiness score. The authors of the analysis guidelines suggest that rounding down rather than up is preferable (33). In situations where the scorer was unsure about how to code a statement, discussions were held with a second researcher (PG) to resolve the issue.

4.4.1.5 Step five: develop strategies that are tailored to the community's readiness stage

This research has made recommendations for appropriate strategies which could be implemented in accordance with the CRM guidelines (33).

It is not within the scope of the research to complete step six which attempts to evaluate the effectiveness of the implemented strategies after they have been in the field for a period of time by repeating stages three and four to recalculate a new community readiness score.

4.5 Methods chapter summary

The methods outlined in this Chapter were suitable for addressing the research objectives. Focus groups and key informant interviews were utilised to define what is understood by the term community (Objective 1). Focus groups were employed firstly to address to identify the key informants (ecological influences) within the pre-adolescent girls' community that influence physical activity and healthy eating behaviours (Objective 2). Secondly the focus groups intended to understand the extent of that ecological influence and outline how that ecological influence can be channelled into designing sustainable interventions to reduce the risk of overweight and obesity. Semi-structured key informant interviews, firstly, applied the CRM to investigate the Charnwood Borough community's knowledge, awareness and readiness to take action against behaviours linked to the development of overweight and obesity in pre-adolescent girls (Objective 3). Secondly, these interviews helped evaluate the CRM's suitability for understanding community readiness and designing overweight and obesity prevention interventions (Objective 4). And lastly these interviews were used to contribute recommendations for interventions designed to prevent overweight and obesity in pre-adolescent girls in a community (Objective 5).

Chapter 5 Focus group's with pre-adolescent girls results

5.1 Introduction

This Chapter presents findings from focus group interviews conducted with pre-adolescent girls aged 6 to 11 years between May and July 2010 (Objective 2). To provide a context to the focus groups, a description of the participants and the schools in which they attended is given. The results are presented in the order of the interview topics (see Methods Chapter for an in depth description of the interview topics). In brief, the topics were as follows: community, physical activity and healthy eating definitions; identification of 'key informants' and other influences perceived to inform physical activity and healthy eating behaviours and the perceived degree of this influence. The levels of the Ecological Model of Health Promotion (EMHP) are used to organise the identified influences (24) (see Literature Review Chapter and Methods Chapter for more detail). To demonstrate support for the themes derived from the data, excerpts from the transcripts are provided. In these excerpts 'R' refers to the researcher who facilitated the interview and 'P' stands for interview participant. The number differentiates different participants. Finally a discussion of the focus group findings will be related to previous research literature.

Findings from this Chapter have been presented at the Research School of Health & Life Sciences - Research Student Conference: oral and poster presentation (14th March 2011) and the Society for the Study of Human Biology- Proffered papers meeting (25th May 2011) (Winner of best student oral presentation prize) .

Selected research in this Chapter is in draft at the time of submission.

5.1.1 Focus group composition

A representative sample of schools were recruited, from across the Charnwood Borough, stratified according to size and IMD levels, which allowed a comparison across different types of school setting (

Figure 4-1 in the Methods Chapter). At least one school was recruited from each school selection criteria for IMD scores (least, medium and most deprived) and school size (small and large) (Table 5-1). In total 56 female participants aged between 6-11 years were recruited from 8 out of 48 primary schools in the Charnwood Borough, Leicestershire (UK). Within the recruited schools there were 4 small and 4 large schools and 3 least, 3 medium and 2 most deprived schools. Overall, 13 focus groups with group sizes ranging between 2 to 7 participants were performed.

To assess the appropriateness of using an area level of IMD (2007), the percentage of children on free school meals in the sampled schools was assessed. This measure was seen as reflecting the socio-economic status of the children attending the schools. On average, in 2011, the uptake of free school meals was 5.7% in the least deprived schools, 9.3% in the medium and 10.3% in the most deprived schools (351). Using the proportion of children receiving free school meals as a proxy measure of socio-economic status at the individual level suggests that on average there was less difference in the deprivation levels between the medium and most deprived classified schools. Thus, the IMD of the school area may not be the most sensitive measure of differences between medium and most deprived schools, compared to differences between the least and most deprived.

Across the schools there were comparable numbers of participants in each age group (Table 5-1) and in each school category (except in the small and most deprived school where recruitment problems resulted in only one focus group being conducted with a sample size of two). Although the inclusion criteria was initially ages 7 to 11, in total 4 participants were aged 6 at the time of the focus groups. This is because some classes given recruitment letters mixed Key Stage 2 girls (ages 7-11 years in the UK education system) with children aged 6 who were nearly 7. The 6-year old girls recruited were in the same class as girls who were already aged 7. It was deemed inappropriate to exclude them from participation in the

research given that the whole class had received information about the research project before consenting to participate.

Table 5-1 Focus group participant characteristics

School size (Small/Large)/ Least deprived, Medium IMD, Most deprived)	Number of Schools	Number of Focus Groups	Number of participants	Number of participants at each age (years) Mean age (years)
Small/ Least	2	3	9	8 years=2 9 years=2 10 years=2 11 years=3 Mean age 9.6
Small/Medium	1	2	13	6 years=3 7 years=4 8 years=1 9 years=2 10 years=3 Mean age 7.8
Small/Most	1	1	2	10 years=1 11 years=1 Mean age 10.5
Large/Least	1	2	10	8 years=4 9 years=5 10 years=1 Mean age 8.7
Large/Medium	2	2	10	6 years=1 7 years=1 8 years=2 9 years=2 10 years=2 11 years=1 Unknown=1 Mean age 8.6
Large/ Most	1	3	12	8 years=2 9 years=3 10 years=5

				11 years=2
				Mean age 9.6
TOTAL	8	13	56	

5.1.2 Community definition

“What does the word ‘community’ mean to you?”

As discussed in the Literature Review and Methods Chapter this research was interested in clarifying what is understood by the term ‘community’. The participants deconstructed the term to its smallest component, consisting of the people and groups of people required to make a community; and to the largest components (i.e. geographical area), the different characteristics of communities (i.e. geographical area; where people reside; buildings; institutions and the size of the community). Finally, the purpose of a community was expressed as a sense of belonging and the attempt to improve the community for its members. Below is a description of the four themes produced and illustrative quotes to highlight these themes as the participants expressed them.

5.1.2.1 People and groups

The smallest unit of the participant’s community was thought of as the people they see and talk to everyday (*“I think that a community is like my whole family (...)”² Because, like, we always see each other...*” Large School, Most Deprived, 8 years).

The participants categorised these people by their social groups, for instance family, school, emergency services, the council or people in general (*“...like groups, like of MPs and stuff, they are a community.”* Large School, Medium Deprived, 10 years). In one focus group, seeing one parent less than the other as a result of parental separation, indicated that there are several variations of social groups which can constitute a community:

“R: all of your friends yes P5, P1 who do you see and talk to everyday?”

P1: my Mum. Not always your Dad though because (...), you can’t always talk to your Mum and Dad like every day because they might have moved out of your house or something...

P4: it’s different for me because my Dad’s moved out.”

² (...) has been inserted to replace repeated text, speech dis-fluency (e.g. um, ah, hmm), the researchers affirmations and irrelevant text in relation to the meaning of the quote.

These comments suggest that community members are not necessarily those who you see daily. These participants may categorise their fathers as part of their community although they do not see them every day.

The focus group members also talked about the general public and neighbours who they see every day but do not necessarily talk to, in this sense the children were saying that community members could be described as everyone around them (*“like your next door neighbour. Or someone who lives down the road.”* Small School, Least Deprived, 11 years).

5.1.2.2 Characteristics

The theme ‘characteristics’ includes the: geographical area; where people reside; buildings; institutions and the size of the community.

According to some of the focus group participants, to be classified as a community there needed to be a shared geographical area (*“Pretty much anyone who lives near-ish the same place...”* Small School, Most Deprived, 10 years).

The physical features of communities were defined by the focus group participants as buildings and institutions including community centres, council offices and schools (*“...a school could be a community because it’s a lot of children together helping each other to make it better.”* Small School, Least Deprived, 11 years). Not only does this quote suggest that the school building is a physical part of a community, it also suggests that schools can be a community in their own right. The church was only mentioned as a central community feature by one focus group member who attended a Catholic primary school.

In the majority of focus group discussions, communities were described as something to which you belong, both through a sense of connection and by physically residing in a particular area (*“... because it’s our community, ‘cos we live in xxx (town): it’s pretty much our community.”* Large School, Most Deprived, 10 years).

The focus group participants indicated that communities can be of varying sizes. The smallest communities were perceived to be immediate families and could extend to the local area where the children reside, to the borough, county, country and the world:

“...you can widen out your community to XXXX (a local city) or XXX (the town where the focus group took place) or shorten it down to say your street or your family.”

Small School, Medium Deprived, 10 years

Purpose

The main purpose of a community was to work together to improve the lives of its members, (*“... a group of people that get together and think of ideas about how they can improve our little community.”* Large School, Least Deprived, 11 years), either by making it a safer (e.g. crime rates) or cleaner environment or by completing functional activities. The local council was viewed as responsible for maintaining communities:

“R: what do you think the council do?”

P3: ... they name the roads, they do housing and health, there's the mayor and (...) they do lots of things for xxx (town). They collect the bins, if rubbish is everywhere (...), if the bin keeps falling over they collect, do new ones and organise things.”

Large School, Medium Deprived, 8 years

An important component of a community was a sense of belonging, formed through friendships and collective morals and values:

“R: Why do we need communities? P4?”

P4: Because otherwise you might feel like you are on your own.

R: You are on your own (...)

P4: and lonely.

R: Lonely so what do communities do?

P: it's like a big family.

P1: they stick together.”

Large School, Most Deprived, 10 years, Unknown Speaker³ and 11 years

These extracts suggest that social inclusion and community cohesion can be created through participating and being an active member of a community. The purpose of a community was also described as the creation of a civilised society:

³ Unknown speaker, speaker's voice was unidentifiable through the audio recordings.

“I think if we didn’t have communities, then we would be a very uncivilised world because we need to stick together and, like basically, who cares if you are black, white, or Chinese, we are all the same we have the same like heart and the same everything so really we just need to stick together.”

Small School, Least Deprived, 11 years

To conclude, the next quote is the most succinct definition of a community, which brings together all four themes expressed in the focus groups:

“Community means like an area, (...) or a group of people, who care for each other and look after each other and help each other to like do things. So like a street could be a community because they all look out for each other and help each other. A school could be a community because it’s a lot of children together helping each other to make it better. The family is a community even though there might be five or eight people in it, or even three, it doesn’t matter, they all look out for each other, they look after each other and they protect each other.”

Small School, Least Deprived, 11 years

Summary

The community definition produced by the focus groups illustrates the complexity of the concept and the importance of understanding this definition from community member’s perspectives if research is going to use ‘community’ as a unit within which to implement behaviour change.

5.1.3 Physical activity definition

“What does it mean to be physically active?”

The definition of physical activity provided by the focus group participants incorporated three main themes including the: most basic unit (movement); types of physical activity; and the (psychological, physiological and health related) effects of physical activity (**Error! Reference source not found.**).

5.1.3.1 Basic Unit

The fundamental unit of physical activity was defined as movement:

“R: So what does it mean to be physically active? P4?”

P4: Is it like P.E and sports?”

R: Why are P.E and sports being physically active?

P4: Because you are moving around.”

Large School, Most Deprived, 10 years

The focus group participants reasoned that inactive behaviours were the opposite of physical activity and gave examples of types of sedentary behaviours:

“R: So what does it mean to be physically active? P2?

P2: to do like exercise and (...) clubs and to keep healthy and things like that.

R: Excellent. Do you agree?

P4: Yes I agree and if it's not physical it's like say you're on the computer and you are on a game where you have to run it's not that you are actually doing it physically.

(...)

P4:[Physical activity is] when you are actually doing something instead of just sitting still like being a couch potato.”

Large School, Most Deprived, 10 & 9 years

5.1.3.2 Types

To illustrate what physical activity means the children offered some examples:

“P1: Well doing lots of sports and being fit and that.

P2: You could like go swimming or just have a walk.

P3: You could go jogging or go to like netball.

P6: Being physically active you could do something like on the Wii [video game console].”

Small School, Medium Deprived, 9, 9, 10 and 7 years

The types of activities defined above can be categorised as “leisure time physical activity” (sport and exercise) (102). This extract also provides some insight into the activities with which the focus group participants engage. One participant described a timetable of different activities she completed over a one week period:

“P3: (...) you could put yourself in for like a timetable like on Monday you could just (...) have just a relax; on Tuesday you could play, do music; Wednesday's you could do gymnastics, that is what my daily schedule, (and) Thursday's you do P.E; and Fridays you do

P.E as well and then on Saturday's you do dancing and then on Sunday's you do swimming."

Large School, Medium Deprived, 8 years

Another leisure time mode of physical activity described was unstructured play. This was a key feature of the participants' described activity performed with the peer group, in the school or home setting:

"We do at play time (...) we do lots of running around and playing games."

Small School, Least Deprived, 8 years

Physical activities for transportation purposes such as walking were also described:

"... If you are walking to the shops, just walking to the shops. That's active."

Small School, Least Deprived, 11 years

This section illustrates that, several types of activities are defined by children as physical activity, ranging from: informal, unstructured activity such as walking, which may have a functional purpose; to unstructured recreational play; to more structured competitive sport.

5.1.3.3 Effects of physical activity

The effects of physical activity were discussed as: psychological; physiological or health related. The emotional enjoyment of being physically active was the main psychological effect according to the focus group participants (*"...I feel happy because I like sports because it feels good."* Small School, Medium Deprived, 9 years).

Physiologically, the focus groups discussed feeling hot, tired, out of breath and that their heart begins to beat faster as a result of being physically active. Some participants understood that an increased heart rate was the result of the body pumping more blood round the body to meet the increased energy demand:

"P1: You might be feeling hot.

R: Hot. So when you exercise do you get hotter and hotter and what else do you feel?

P3: Your heart gets faster.

(...)

P2: You get really out of breath as well."

Small School, Least Deprived, 9, 8, 8 years

The relationship between physical activity and health was raised by focus group participants:

“P4: It means you are really strong and you are going for a walk and you don’t get tired.”

Small School, Medium Deprived, 7 years

This example illustrates an association between physical activity and physical fitness specifically: strength and endurance. Being physically active was proposed as a means to influence body composition and prevent children becoming overweight:

“P2: ... if you don’t do exercise and if you just sit around all day you become fat and unhealthy but if you do (...) some exercise, even it’s like walking home from school or something like that, you stay healthy.”

Large School, Most Deprived, 10 years

This example suggests an understanding of the ‘energy balance’ equation and highlights travel as another type of physical activity. General health was also related to physical activity by the focus group participants:

“P3: I think being active is you’re doing something that is keeping you healthy and fit.”

Large School, Most Deprived, 8 years

The notion of physical activity as a component of a healthy lifestyle was highlighted by the focus group participants. It was understood that physical activity was specific to the individual and could be incorporated across the day:

“You don’t have to just keep on one certain (...) activity (...) like for an hour or so because you can be doing something all-round the day but different sort of activities.”

Large School, Medium Deprived, 11 years

Another participant described the importance of taking a ‘little and often’ approach to physical activity for a healthy lifestyle rather than doing short bursts of activity and then giving up:

“P1: You’ve got to have a lot of exercise and as P2 said you can’t just stop, leave it and then try again after like a month or so you’ve got to do it regularly.”

Small School, Most Deprived, 11 years

5.1.3.4 Relationship between physical activity and nutrition

Although the focus group participants were asked separately about the meaning of healthy eating and physical activity they occasionally provided answers which combined both:

“P3: ...when I’m sitting watching the telly ‘cos when, you(’re) probably quite relaxed then, but I think when you are like out doing stuff it doesn’t mean you are bored, when you sit and watch the telly you get bored and you get hungry and you get hungry because you are bored. Whereas if you are out and about playing with your friends, like yesterday I stayed out for four hours just biking around with my friends, it wasn’t anything major to me or to them but it was giving us a lot of exercise.”

Small School, Least Deprived, 11 years

In this quote the participant describes sedentary activities as related to boredom and subsequently an increased appetite. She also suggests a degree of independence to be active without parental supervision.

The ‘energy balance’ equation was described by some participants as physical activity cancelling out the effects of unhealthy snack consumption:

“P2: (...) well sometimes if you eat crisps and all of that, you will get fat and sometimes you have to go out and exercise because your body needs to burn it off.”

Small School, Least Deprived, 8 years

In this example the suggestion is that physical activity can compensate for unhealthy energy intake. The reverse of this ‘energy balance’ equation, whereby energy intake was needed to replenish energy stores after physical activity, was also described:

“R: ... that’s good. So why are you getting tired?”

P2: Because you are using up all your energy and you are like...

P3: Then you need like protein or something to get your energy back up.”

Small School, Least Deprived, 10 & 11 years

These quotes demonstrate the connection participants’ made between physical activity and healthy eating behaviours.

Summary

The focus group participants demonstrated a good understanding of physical activity, its importance in relation to physical and mental wellbeing and its role in the ‘energy balance’ equation.

5.1.4 Healthy eating definition

“What does healthy eating mean to you?”

The focus groups highlighted a number of components of a healthy diet including: balance and moderation; variation; beverages; government recommendations (such as ‘5-A-Day’) and the reason healthy diets are important in relation to health and weight status (**Error! Reference source not found.**).

5.1.4.1 Balance and moderation

The concept of a balanced diet was used to define healthy eating in two distinct ways. Firstly, it was suggested that a balance should be achieved between healthy and unhealthy food:

“P3: You need a balanced diet.

R: A balanced diet. What’s a balanced diet, P4?

P4: Where you have something unhealthy with something healthy at the same time.

P3: Just healthy is a bit bigger.”

Large School, Medium Deprived, 8 & 9 years

This quote illustrates a distinction between healthy and unhealthy dietary components and at the end of this dialogue there is a comment about the ratio of healthy food to unhealthy food. Generally, the participants talked about the importance of eating predominately healthy food with occasional ‘treats’ of unhealthy foods. In this sense there was a contradiction between unhealthy foods being described as bad for your health, against the description of unhealthy foods as a ‘treat’, which has positive connotations (i.e. being rewarded with something which is known to be bad for your health):

“You can have chips like once for a treat but not every day, if you had chips every day you would either be large or not happy.”

Small School, Medium Deprived, 6 years

Unhealthy dietary rewards for good behaviour were described, in one participant’s words:

“(…) I have my treats at the weekend because I have been good all week.”

Small School, Medium Deprived, 9 years

Energy-dense snack foods (for example chocolate and crisps) were the primary examples of unhealthy foods. Fast-food restaurants such as McDonald's® were mentioned as examples of unhealthy eating settings (P3: *“Well say if you were, you always had something like a takeaway, like McDonald's® or something. (...) That would be, that would risk getting heart disease, I think it is.”* Small School Least Deprived, 8 years).

In one focus group there was a debate about the role of sugar in energy provision. Some participants believed sugary foods were a good source of quickly-released energy which allowed them to be physically active, whereas others believed the energy gained from sugar was short lasting:

“P3: (...) Having a lot of sugar in you, (...) I think that makes you (...) a bit more active because it's giving you more energy.”

R: so sugar gives you energy?

P1: I don't think that.

R: you don't think. So why don't you think so?

P2: Nooo, it slows you down.

R: slows you down.

P1: it makes you feel like you are really, really fit and stuff, but you are not.

P2: Yea 'cos, (...) if you're running yea and then you go (breathes out) and then you just drop on the floor.”

Large School, Most Deprived, 8, 10, 8 years

The second definition of balance and moderation described healthy eating as a balance between specific food groups:

“R: Balanced diet, what does a balanced diet mean?”

P4: (...) it means like you have the correct amount of like every food.”

Large School, Most Deprived, 9 years

Further detail of the food groups was also provided, indicating an understanding of the components of healthy and unhealthy foods:

“Having the right amount of meat and fish, carbohydrates and vegetables and you do need a bit of sugar.”

Small School, Most Deprived, 10 years

Here the language used suggests that sugar is viewed as a potentially unhealthy dietary component unless consumed in small quantities. A healthy diet consisted of specific quantities and ratios of food groups, and moderation was highlighted as important:

“P1: ... not like too much, loads and loads of fruit and vegetables and instead of having like meat, loads of meat, have like a little bit of meat, mostly vegetables and some fruit and maybe a little snack and something dairy.”

Large School, Least Deprived, 9 years

The individual food groups were also discussed in relation to their function within the body.

“... it means basically instead of having all junk all the time and getting take-aways or making food which is like you know already made which you put in the microwave or something, that isn't very healthy at all you've gotta have fruit, veg, protein, carbohydrates and many other things to keep your body healthy, (...) you need fats just to clean your system out...”

Small School, Least Deprived, 11 years

This excerpt also suggests that achieving a healthy composition of the food groups meant the restriction of unhealthy foods such as fast-foods. At the end of this participant's comment there is some suggestion of miscomprehension regarding the role of dietary fats being capable of 'cleaning' the digestive tract. There was also a discussion about the frequency with which unhealthy things could be consumed:

“P3: (...) some people eat really healthy stuff and some people eat a balance like me and some people eat unhealthy stuff. But like I was saying I eat a balance like...”

R: so you are in the middle...

P3: yea I do eat chocolate, but not every day. I do eat chips and chicken and that, but not every day.”

Large School, Least Deprived, 9 & 9 years

5.1.4.2 Variation

A varied diet was described as an important contributor to a healthy diet:

“P3: if you eat too much, say you eat too much broccoli, even though it's good for you, it's still not good for you.”

P4: yea it's a bit like P3 said if you eat too much broccoli you think it's good for you but it's actually not because you've got to eat different things."

Large School, Most Deprived, 10 & 9 years

In this quote the participants illustrate the need for variation in the diet by suggesting that too much of something which is seen as healthy can become unhealthy if it is not accompanied by other food groups.

5.1.4.3 Beverages

Although the majority of definitions of healthy eating, understandably, described food, some participants recognised the importance of hydration and drinks consumption:

"P4: where you have your fruit and vegetables and have around (...) 8 glasses of water a day.

R: glasses of water, why do you need glasses of water?

P1: (...) to keep your body (...), it's got water in, so that you don't get dehydrated."

Large School, Most Deprived, 10 & 11 years

In addition sugar-sweetened beverages (or fizzy drinks) were viewed as unhealthy and bad for children's teeth, although in moderation and balanced with the consumption of water they were viewed as acceptable:

"P2: Well some fizzy drinks aren't that good but if you have them all the time like. If you have them all the time like but it's alright to have them at the odd tea time but then have something else for the rest of the day. If you have them every time it might like get your teeth to fall out."

Small School, Least Deprived, 8 years

5.1.4.4 Government messages

There was a moderate level of awareness of government guidelines encouraging the consumption of five fruit and vegetables a day amongst focus group participants.

"R: 5-A-Day. What does 5-A-Day mean?

P3: it means you have to have 5 fruits and veg.

R: yep is that hard to do?

P2: No because it's in mainly everything that you eat."

Large School, Most Deprived, 10 & 9 years

The suggestion at the end of this quote is that the '5-A-Day' initiative is easy to achieve. In total 6 out of 13 focus groups explicitly talked about the '5-A-Day' initiative suggesting this message has permeated fairly well into healthy eating knowledge.

5.1.4.5 Health

The health effects of dietary intake were mentioned including: bone and dental health; future health, growth and weight status.

Dental and bone health was associated with the consumption of calcium and with future growth:

"P2: (...) Well you have to look after your teeth and that would make you healthy because they are the strongest thing in your body and you need them for the rest of your life. So if you kept eating sugar then your teeth would fall out."

Small School, Least Deprived, 8 years

"P2: (...) you know how P3 was talking about yoghurts, they've got Calcium in them and Vitamin D, which helps your bones to grow."

Large School, Least Deprived, 10 years

Healthy eating was related to future health, including chronic diseases such as heart disease. One focus group participant's comments are distinctive from the other participants because she describes herself as active and having considerable social support and as a result it is worth distinguishing her remarks from those of others by applying a pseudonym ('Sally'). Sally presented her perception that there is a link between behaviour and the risk of health outcomes in later life: *"...the other day I went to go pick up some chocolate and then I thought do you really want to have this, you know, do you really want to make myself have cancer or heart disease?"* Small School, Least Deprived, 11 years). This perception may be interpreted as a positive finding if it is seen as illustrating that, in general, extreme levels of consistently unhealthy behaviours are perceived to be associated with negative health consequences. Another interpretation might be that Sally has taken this message too literally.

When asked what it means to eat healthily, physical strength was suggested (P3: *"(...) I know it means you're going to be strong, strong, strong when you grow up."* Small School,

Medium Deprived, 6 years) and finally longevity was related to a healthy diet (*P1: “you can live longer”* Large School, Medium Deprived, 6 years).

Becoming overweight and obese was associated with eating unhealthy foods regularly:

“Unknown: You can’t have (...) pizza very much otherwise you will (...) get very fat.

P3 and unknown: fat. You will get fat.

P2: No don’t say fat, big and round!”

Small School, Medium Deprived, 6 & 7 years

The comment made about not saying ‘fat’ suggests there is perhaps some recognised social stigma surrounding this term. A discussion of overweight and obesity also occurred when the groups were asked about unhealthy eating.

“R: So what is not healthy eating?”

P3: it’s something where say you (...) would keep, (...) eating loads of chips and crisps and things and you get fatter and fatter (giggles)”

Small School, Least Deprived, 8 years

Becoming overweight and obese was perceived to be a consequence of eating too much of what are considered unhealthy foods. A suggestion that some people may not understand the link between unhealthy dietary habits and the development of overweight and obese was raised:

“P2: some people, (...) they don’t like think that if they eat like anything sweet they’re like going to become fat.”

Large School, Most Deprived, 10 years

Summary

It is clear that the pre-adolescent girls display a good knowledge of the components and importance of a healthy diet. However there may be some misperceptions surrounding the definition of a ‘balanced diet’ as the balance between healthy and unhealthy foods and the tendency to view unhealthy foods, even in small quantities, as bad for their health.

5.1.5 Key informants and other ecological influences of pre-adolescent girls’ physical activity and healthy eating

“Who encourages you to be active?” / “Who wants you to eat and drink healthily?” / “How do these people encourage you to do this?”

The following section will describe the key informants and other ecological influences, identified as capable of informing the performance of physical activity and healthy eating and drinking behaviours in girls aged 7-11 years.

Fifteen key informant types were identified as informing the physical activity and healthy eating and drinking behaviours of pre-adolescent girls. The results section profiles the key informant's identity (in order of how much 'say' [perceived degree of influence] they are perceived to hold by the majority of focus groups) and presents themes elucidating how participants perceived each key informant to shape their behaviours. Lastly, factors which influence pre-adolescent girls health behaviours that are not defined as key informants are presented. These include: child autonomy; pets; the weather and the built environment.

A lot of Say

Parents

The majority of groups categorised parents as having 'a lot of say' (1 group – 'some say', 4 groups – 'between some say and a lot of say', 8 groups – 'a lot of say'). The central channel of parental influence was through cohabitation (*“ if you lived on your own you might just watch TV all day...”* Large School, Medium-deprived, 9 years). A key theme was parental concerns regarding child health in adulthood, longevity and the possibility of children becoming overweight (*“Parents want children to grow up as a nice healthy, child person and then so you're not like all fat and horrible.”* Small School, Least-deprived, 10 years/*“Well they [parents] always say (...) to have a good life you've got to eat certain foods that are healthy for you.”* Small School, Least-deprived, 11 years). Some family members were reported to struggle with their own weight which resulted in concerns that the child did not also become overweight (*“ ...my mum does because my daddy's very, very fat and she doesn't want me to become like him, so she keeps encouraging me to (...) do lots of activities.”* Small School, Least-deprived, 8 years). Mothers were reported as having a greater influence, involvement and concern for child health and diet than fathers (*“I'm not sure why but it doesn't seem, my dad's more, he doesn't seem to encourage me as much to eat fruit. I don't know why, my mum seems to think about it a lot more.”* Large School, Most-deprived, 10 years). In contrast, fathers were more likely to be described as participating in PA with

children than mothers (*“With my Dad because I go swimming [with] him and we go biking.”* Small School, Medium-deprived, 9 years), although this was not consistently reported across groups (*“...when I am with my dad he just sits there and I want to go outside and bounce the ball around (...) My dad likes to do everything the lazy way.”* Large School, Least-deprived, 10 years).

Parenting practices

The least-deprived groups discussed the influence of parenting practices most frequently.

Physical Activity

Parenting practices described as influencing the focus group participants' PA behaviours included: parental participation and facilitating activities. Parental participation in activities with children (*“When I am with my daddy and mummy I go to the [inaudible] and play football and I eat lots of fruit.”* Large School, Medium-deprived, 6 years), mainly described by the least and medium-deprived groups, reflects to some extent parents' own enjoyment and experience of physical activities.

“P3: I know my dad is very active because he used to play for a football team in.

P4: oh my dad still does.”

Large School, Least Deprived, 9 & 9 years

The theme facilitate activities relates to the parental role in: child transportation (active or inactive) to physical activities (*“My mum and my sister, usually if she takes us somewhere we usually walk to places.”* Small School, Medium-deprived, 7 years); purchasing PA equipment (reported only by the least and medium-deprived groups) and joining the Change4Life initiative (a social marketing campaign within the UK designed to help families be more physically active and consume a healthier diet):

“P2: (...) my brother got that we (...) got this thing, my mum signed off for it, (...) to tell to you how healthy your children are (...). And like she had these cards and it tells you like healthy things you can have, healthy things you can do. It's like on one side there's like a snack, then the other side it like tells you about a snack (...). Like one of them tells you how to make like a fruity healthy snack (...) one of them could be like about an obstacle course or like going to the park or something (...).”

Small School, Least-deprived, 10 years

Parent networks were reported to help facilitate PA with friends mainly by focus groups conducted in most-deprived school areas within large schools (*“My dad encourages me to play with my friends.”* Large School, Most-deprived, 10 years). One parent also used pets to encourage her child to increase her activity levels by providing financial incentives and verbal encouragement to walk both hers and her grandmother’s dogs (*“I like to take my dogs for walks for two reasons, they’re getting healthy and I’m getting healthy and I get extra pocket money.”* Small School, Least-deprived, 11 years). In a minority of cases parents of children in the most and medium-deprived schools reportedly restricted children’s unsupervised PA in the local environment due to safety concerns (*“I am not allowed to go near to the park near XXX [convenience shop] ‘cos my dad got hurt [attacked] there...”* Large School, Most-deprived, 11 years).

Further to this comment this participant acknowledged that her peer group think the safety of the park has improved, however, her fear of what could happen, was still strong:

“I don’t think it’s [the park] quite safe (...), even though my friend xxx says ‘oh it’s changed’ and I’ve been there and nothing’s changed but it goes in my head that I might get raped.”

Large School, Most Deprived, 11 years

Diet

The focus group participants described the following parenting practises as influencing their dietary behaviours: verbal encouragement; provision of food; making healthy food fun; disciplinary behaviours and rewards. Verbal encouragement from parents to support healthy dietary behaviours included the use of praise when a desired behaviour, such as trying new foods, was completed.

Provision of food refers to parents purchasing and providing food for children (*“Because they cook your dinner, you don’t really have any choice. They just give you healthy food and you’ve got to (...) have it and then eventually you start liking it.”* Small School, Most-deprived, 11 years). Making healthy food fun was a strategy reportedly used by parents to encourage children to consume healthy foods without forcing them (*“Sometimes they like make fruit into fun things, like they might use an apple and they might use all kinds of other things and they might make it into a flat apple person.”* Small School, Medium-deprived, 7

years). The focus group participants described parents as using disciplinary behaviours to encourage the consumption of a healthy diet (“...*They decide what you eat because they give it to you and if you don't like it they can say, (...) 'if you don't have this, you can't have your pudding' or tell you off ...*” Small School, Most-deprived, 11 years). Parental rewards for consuming a healthy food often involved an unhealthy food. This type of reward could also be related to completing a physically active behaviour. Not all rewards described were foods, in two large, most-deprived schools, two children talked about receiving certificates from their parents for consuming healthy foods (“*Every time I like have (...) something to do with (...) fruit like my five a day or something, then she [mother] would like give me a certificate with a car on it because I like cars.*” Large School, Most-deprived, 9 years). Parents were reported to occasionally allow unhealthy behaviours reflecting variable parenting practices (“*I think some say because sometimes (...) she [mother] allows you to eat unhealthy stuff and sometimes she doesn't.*” Large School, Medium Deprived, Unknown age).

Doctors and Dentists

Only one out of two groups that identified doctors and dentists as key informants discussed their perceived degree of influence and categorised them as having a ‘a lot of say’. The focus group participants made less descriptive statements regarding doctors, compared with dentists who were reported to provide dietary recommendations by five participants across two focus groups (“...*My dentist tells me like 'only eat sweets on like a Saturday, like one day a week' and the doctors sometimes will tell you that as well.*” Small School, Least-deprived, 10 years).

Some to a lot of say

Teachers

Teachers tended to be categorised as either ‘some say’ or ‘a lot of say’ (5 groups – ‘a lot of say’, 8 groups – ‘some say’, 1 group – ‘between no and some say’). It was reasoned, by the focus group participants, that the influence of teachers was restricted to when they were at school.

Physical activity

The major influence teachers had on PA behaviours was perceived to be through: time teachers and pupils spend together; P.E lessons when some teachers were reported to verbally encourage the children and school events and policies (e.g. morning stretching exercises;

encouragement of active transportation to school; cycling proficiency lessons; school discos; sports day; disciplinary actions; selecting girls for PA events).

“This week we are taking part in (...) bike week...and then if you come on your bike or your scooter you are allowed to have this, like, special prize.”

Large School, Most Deprived, 9 years

One focus group participant described how teachers were able to use disciplinary actions when they forgot their P.E kit (*“...our teacher Mr xx if you don't bring your P.E kit he makes us write lines.”* Large School, Most-deprived, 10 years). Teachers selected children to take part in school PA events which acted to increase the girls' self-confidence:

“P4: (...) if like a club, as I said, (...) say they're one person short they'll go 'oh you're a fast runner you should...’

P1: 'try it'

P4: ... 'try it out' yea.”

Large School, Most-deprived, 10 & 11 years

Not all teachers were described as having the same positive influence on PA; this reflects the theme of inter-teacher variability reported by two large, most-deprived schools.

“P3: We have two teachers Mr x and Mrs x and (...), whenever we do P.E say if we have a boring game he always makes it fun. I'm not trying to be mean but when we play with, when we play say we play a different game with um Mrs x she doesn't make it as much fun as he does because he is more active and things.”

Large School, Most-deprived, 10 & 10 years

Diet

The major influence teachers had on dietary behaviours was perceived to be through: peer-led schemes; rewards for healthy packed lunches; confiscating and restricting unhealthy foods; exam period policies (e.g. consuming fruit as snacks during this period); subsidising the cost of fruit; allotments and unhealthy treats for special occasions. One focus group in a large school described a school food policy involving 'food detectives', in which children acted as

monitors of their peers' lunches, giving stickers as rewards. This strategy was designed to encourage children to consume healthy lunches, but was perceived to be unsuccessful because children would hide their unhealthy food and stickers were given out on the basis of friendship rather than according to the actual content of the lunch.

"...when the food detectives come some people like hide all their unhealthy stuff and just keep all the healthy stuff there and they just don't know that you've hidden it. And (...), some food detectives they just give you one [sticker] even if you've got it [unhealthy foods]."

Large School, Medium-deprived, 8 & 11 years

Some comments suggested a degree of conflict between the messages delivered at home and in school. For example, unhealthy foods had been restricted or prohibited in school but at home these items may be available (*"...you get home and you're so hungry and the teachers have said not to eat too much of this stuff but 'oh well I am hungry, there's nothing else in the fridge'."* Large School, Most-deprived, 11 years). Although children from all schools reported some level of school encouragement to consume healthy foods, there was variability in how the policies were enforced. For instance, unhealthy treats to celebrate special events (e.g. birthdays) were described. Some participants reported becoming saturated with or overexposed to school health messages, particularly messages relating to dietary consumption, and felt that they were not learning anything new (*"...the teachers do go on and on and on about the vegetables in lessons. Sometimes we just think we've heard this before and I sort of don't want to listen anymore ..."* Small School, Medium-deprived, 10 years).

Grandparents

The influence of grandparents was discussed by nine groups in total and was categorised as predominantly being 'between some and a lot of say' (2 groups – 'between some and a lot of say', 1 group – 'some say') by the three groups who discussed their perceived degree of influence. This influence was dependent on the time grandparents spent with the participants.

Physical activity

Where children did spend time with grandparents they were described as positively influencing PA behaviours through: role modelling; grandparental participation in PA; verbal encouragement and facilitating PA.

“...we often go walking out with him [granddad] to look for birds.”

Large School, Least-deprived, 9 years

“(...) In the World War, she was on the farm working quite a bit so I think she is trying to encourage me to work more and exercise more.”

Large School, Most-deprived, 8 years

Although childcare from a grandparent may provide an opportunity for PA behaviours, some participants described the negative impact of a grandparent's age which led to restricted movement and a sense that they could not perform physical activities together (*“I'm probably least active when I am with my grandparents because they are quite old, they are 72 now and 80 ... my granddad just sits in a chair doing nothing.”* Large School, Most Deprived, 8 years).

Diet

Grandparents' childhood experiences were perceived to increase children's knowledge about how to perform certain dietary behaviours in some cases. For instance one participant, from a large school in a most-deprived area, indicated that her grandmother talked about her childhood during the war. This participant went on to say that her grandmother helped her appreciate the food she was given. *“P3: (...) my grandma does sort of because when she was in the World War she had to eat healthy stuff and eat what she had yea (...) whether she liked it or not, so she's like encouraging me to eat the food and not waste it because you couldn't do that in the olden days.”* Large School, Most-deprived, 8 years

Whilst caring for children, grandparents were reported to provide both healthy and unhealthy food (*“My grandma lets me eat sweets.”* Large School, Most-deprived, 10 years) and some were reported to teach children how to cook (*“My grandma teaches me how to cook healthy food and advises me to have healthy food.”* Small School, Least-deprived, 11 years).

Government

One focus group discussed the government's influence. The government was described as being in charge of: imports and exports; food labelling and the provision and contents of school lunches (*“P3: They [government] actually announced that Britain is one of the most obese countries....”/ “...they [government] always try to make you eat like healthy stuff like they changed the school dinners not so long ago back like Jamie Oliver did.”* (Small School,

Least-deprived, 10 & 11 years). There was some debate about how much direct influence (or ‘say’) the government has with some commenting on the perceived low visibility of the governments efforts and others suggesting that the government works through indirect means for example through Change4Life, before a final decision was made to rate it ‘between a lot and some say’.

“R: (...) P2 why do you think a lot of say?”

P2: because (...) they sometimes pick what goes into the country so like they pick if we have lots of fatty foods or...

P3: yes but they hardly say anything about it.

P2: I think that’s why they have like groups...

P3: yea that’s why they have other people like...Change4Life. That’s why they have these people instead. So Change4Life are basically doing it.

P2: but Change4Life are part of the government.

R: yes that’s true P2. Change4Life are part of the government aren’t they? Why do you think some say P1?

P1: (...) ‘cos like because the government (...) put things on packaging as you say, but they don’t as P3 [said] they don’t put a lot on they only put like a little bit.”

Small School, Least-deprived, 10, 10, 11 years

Some Say

Peer group

The peer group was discussed by every focus group and was predominantly categorised as having ‘some say’ (2 groups – ‘between no and some influence’, 8 groups – ‘some say’, 1 group – ‘between some and a lot of influence’, 1 group – ‘all levels of influence’, 1 group did not have time to categorise the peer group).

Physical activity

The themes relating to the influence of the peer group included: time spent together; role models; not in charge of each other; PA performed together; verbal encouragement;

competitiveness and sedentary activities. PA was mostly performed with the peer group, suggesting that friendships formed with those sharing common interests are important predictors of PA (*"Because sometimes at playtime you play games with them [friends] that involve loads of running around and jumping."* Small School, Least-deprived School, 8 years). However the participants also felt that friends are not in control of each other's behaviours (*"[Friends] can't tell you what to do, (...), they do encourage you a little bit..."* Large School, Least-deprived, 9 years). Older girls in both large and small schools talked about playing outside with friends as a form of socialising which could involve PA, although one focus group in a large most-deprived school, described such interaction as also being inactive (e.g. talking to friends) (*"P4: ... sometimes when I am like outside, sometimes it gets a bit boring 'cos (...) we end up just standing there talking to the boys."* Large School, Most Deprived, 10 years). Most comments about playing in the local area with friends were made by the most-deprived groups, whereas the least and medium level deprivation groups were more likely to discuss playing at friends' homes and participating in more structured sporting activities.

Diet

The primary themes elicited from the focus groups regarding the influence of the peer group on dietary behaviours were: time spent together; role modelling; trying novel foods; sharing and swapping foods. An influential factor in relation to the peer group is the time children spend with each other leading to friends becoming role models and encouraging each other to try different foods, both at school and at each other's houses (*"... if you don't like something they'll say 'try it and then just leave it' and that's what you do and you will suddenly find out that you do like it and then you'll have to thank your friends for encouraging you to try it."* Small School, Least-deprived, 8 years). The participants reported developing similar food preferences to their peer group and sharing or swapping both healthy and unhealthy foods at school, particularly in large schools (*"A lot of the time I have grapes in my lunch box and I (...) never really want to eat them that much and so I always offer them to my friends..."* Large School, Most-deprived, 10 years).

Head-teacher

All three groups which discussed head-teachers categorised their influence as 'some say'. Head-teachers were described as having a role in deciding how much time should be

dedicated to physical activities (“R: ... *does she [head-teacher] have a lot of power or control over what you eat and what you do? P5: Well [the head-teacher has power over] what we do sometimes. But not what we always eat.*” Large School, Medium-deprived, 11 years) and in three schools (Large, Least-deprived, Small, Most-deprived and Large Medium-deprived Schools) the pre-adolescent girls were aware that school food policies were regulated and led by the head-teacher. The different approaches or styles of head-teachers, were elicited by the transcript analysis as: ‘informative’, ‘preacher’ and ‘nice’. ‘Informative’ head-teachers taught children about healthy eating principles, for instance leading assemblies about school health policies:

“P1: well (...) Miss x, our head-teacher (...) sometimes like in (...) school meetings, well she got this like scanner thing and she put a box underneath it (...)and then she put some healthy and unhealthy stuff in and we had to put our thumbs up or thumbs down to say whether it was healthy or not.”

Large School, Least-deprived, 8 years

‘Preacher’ head-teacher’s were described as authoritarian figures viewed as enforcing healthy eating policies in a strict manner for example by confiscating food:

“P2: ...And sometimes like when the head-teacher sort of says ‘now we are starting to eat healthily’ even though you’ve got like a really healthy lunch box and at one point I think she was actually going around lunch boxes and like checking the calories and stuff.

P1: she confiscated a chocolate bar (...), off me. (...) She’s saying that we are not allowed any chocolate and then we, me and my friends we saw her at break scoffing some Maltesers® (chocolate snack).”

Small School, Most-deprived, 10 & 11 years

Lastly, ‘nice’ head-teachers were considered perhaps too lenient on children who do not abide by school health policies:

“P5: The reason I don’t think as well because, that she [head-teacher] doesn’t really do anything, is because there’s people at school that when it’s not on Friday [day unhealthy snack is allowed] they just eat anything they like. So someone’s got like a massive bag of crisps and loads of chocolate anything they like and she says she looks around, but she doesn’t because there’s loads of people eating unhealthy stuff ‘cos she doesn’t...”

P2: (...) sometimes Mrs xxx does things that, like the healthy lunch box thing some people thought that she was actually trying to encourage us by doing that and some people didn't really think it encouraged them that much.

P3: it's because she's too kind."

Large School, Medium-deprived, 8, 11, 10 & 10 years

Sports coaches

The degree of influence of sports coaches was described by 4 out of 11 groups who identified them, as predominantly having 'some say' (3 groups – 'some say', 1 group – 'a lot of say'). The coaches at sports clubs influenced children by using: verbal encouragement which acted to increase the participants confidence in their abilities; modelling behaviours ("*... sometimes she [swimming teacher] comes in to help us and it (...) makes us get active.*" Small School, Medium-deprived, 6 years); setting goals ("*my swimming teacher because (...) we had 16 minutes to do 16 (...) lengths (...) and she say's like 'carry on cos you've only got this many left.'*" Large School, Least-deprived, 9 years) and creating a good team spirit in which children felt confident to try new skills ("*They [coaches] encourage me (...) because like they want me to do well and (...), they always say 'oh you are a very successful swimmer you always try really hard'...*" Small School, Least-deprived, 11 years).

The most-deprived groups were less likely to report engaging in organised sporting activities and thus made few comments about sports clubs and coaches compared to the least and medium-deprived groups. These focus group participants could be taking part in more informal activity with their friends in the local area (as discussed previously).

Siblings'

Siblings were predominantly categorised as having 'some say' by the five groups who discussed their perceived degree of influence (1 group – 'no say', 3 groups – 'some say', 1 group – 'between no and some say') out of a total of 10. The main influence of siblings on dietary behaviours appears to stem from cohabitation which reflects the effect of spending time together in which siblings can model both healthy and unhealthy behaviours.

Physical activity

Siblings encouraged PA through verbal encouragement (“...well like say I’m sitting on the sofa and then he [brother] comes up to me and says ‘shall we go outside and play tig?’...” Large School, Least Deprived, Unknown Speaker). The participants discussed being physically active with their siblings through unstructured play. Sibling influences were mediated by the age of the siblings for example by informing whether the child was likely to copy the modelled behaviour. Younger siblings were described as having both a positive and a negative influence on PA participation. Positive because they could be active role models and have preferences for active pursuits. But also negative because they were described as too immature to directly encourage the participants to be active (“If they’re younger I would say no say. Because like they are younger and they don’t understand.” Small School, Least-deprived, 8 years). Older siblings appeared to have a greater influence on children’s PA behaviours because they had a higher level of authority and as a result were able to tell younger siblings what to do (“They [older siblings] can actually tell you what to do a bit. But they can’t tell you as much as parents.” Small School, Least-deprived, 9 years). However older siblings were also referred to as a negative influence as they sometimes lacked shared interests (“...let’s say I want to go on the trampoline and be active and play football, my [older] brother would just say ‘oh we’ll do that in a bit I want to watch TV.’” Large School, Least Deprived, 9 years).

Diet

Brothers were perceived to be less concerned about the participants’ dietary choices than sisters (particularly older ones). In one focus group conducted in a most-deprived school, an older sister was reported to talk to a participant about behaviours related to weight status and another participant described wanting to consume vegetables because her step-sister disliked them.

“Well (...) I’ve got an older sister but she lives with her mum most of the time and (...) she doesn’t like vegetables so whenever I eat them (...), she doesn’t like it. And so that makes me want to keep eating them more.”

Small School, Least-deprived, 8 years

In one small school in a least-deprived area, older siblings were reported to be given a caring role by parents, for instance looking after children without adult supervision. Within this caring role, older siblings were able to instruct younger siblings to consume food.

“...they [parents] might leave your older brother or sister, only if they are over 14, and ask them if they can look after you and then they will have the right to decide what they can eat.”

Small School, Least-deprived, 8 years

School cooks

School cooks were categorised as having ‘some say’ by two out of five groups who discussed the degree of their influence. School cooks were discussed in relation to the theme hot food provision and the following subcategories: food options, contents and unhealthy school meals compared to packed lunches. Although the hot school meals were perceived to have healthy components, some children, viewed the contents of meals as sending mixed messages by providing children with unhealthy options (*“Well there’s cooks in our school who say ‘well you can have the healthy option or the unhealthy option’. It’s like they are (...) saying ‘deal or no deal!’”* Large School, Medium-deprived, 9 years). There was a contrast in two schools (Small School, Most-deprived and Large School, Medium-deprived) between the perception of school hot meals and packed lunches (brought from home). In these two schools where healthy packed lunches were being encouraged, the participants explained that similar rules were not applied to school provided hot meals which were perceived to be unhealthy.

“P2: and it’s sort of mean on the sandwiches [people who bring packed lunches] because they [the people who eat school hot meals] have loads of sugary stuff on most days and they [the people who eat school hot meals] have chocolate sponge as well.

P1: do you see how much vinegar and salt they put on the chips? They get it and drench it in loads of vinegar and then they use two whole pots of salt.

P2: and then when you’re sandwiches maybe you [have] something that has hardly got any calories in but you’ve got something with maybe a bit of chocolate in, they will say ‘that’s a bit naughty, that’s got a lot of sugar in.’”

Small School, Most-deprived, 11 years

“I don’t really understand school dinners because they [the school] are trying to encourage healthy eating so much (...), yet school dinners, you get like pizza and cake and they are trying to get us to eat healthily, but this isn’t healthy.”

Small School, Most-deprived, 9 years

The focus groups conducted in school areas defined as ‘least-deprived’ made no comments about the school hot dinners compared to packed lunches.

Neighbours

Only one out of five groups which identified neighbours discussed the perceived degree of their influence and categorised them as having ‘some say’. Neighbours were described as people with a variable influence who may influence PA and healthy dietary behaviours. They could encourage PA by either performing PA behaviours with the children or by providing children with access to PA equipment (e.g. trampolines) (“*My next door neighbour because they often take me like to farms and this last weekend I went to the farm and we were rolling down the hills ...*” Large School, Least-deprived, 9 years). Some children, from large schools, reported learning how to grow vegetables from their neighbours and being able to share the produce of their neighbour’s allotments.

‘No to Some Say’

Dinner-staff

Dinner-staff were categorised as having ‘between no and some say’ by two out of six groups who discussed the degree of their influence. Dinner-staff, were responsible for monitoring lunch consumption and were reported to encourage children to consume all or most of their lunch (“*Yea sometimes (...) you don’t really eat much of one thing and when sometimes they [dinner staff] are like over where you have to put your dinner tray and they say ‘can you go back and eat some more.’*” Large School, Least-deprived, 8 years). In one small school, dinner-staff were reported to confiscate certain foods, perceived to be unhealthy. This was disapproved of by the focus group participants who firstly, felt that they were being punished for behaviours which were controlled by their parents and secondly, reasoned that what was being confiscated was part of a balanced diet.

“They tried to confiscate chocolate bars and stuff off you...and I said ‘look I’ve got loads of fruit and stuff but that’s my treat for the day’ and she said ‘no you are not having it back until the end of the day.’”

Small School, Least-deprived, 11 years

A key theme which has the potential to resolve this identified conflict between dinner-staff and children at lunch-times is the relationship between the school and parents. Communication between the school and parents regarding school food policies reportedly involved letters or text messages not face-to-face communication. One participant also described parents who didn't agree with school food policies, illustrating the conflicting messages children receive regarding healthy eating (*"Sometimes your mum doesn't agree with what the [school], they say and you trust your mum more than school."* Large School, Medium-deprived, 9 years).

Perceived degree of influence not discussed

Due to time limitations, shop-keepers, girl-guide leaders and celebrities were not categorised in terms of their perceived degree of influence, although these influences were all identified as having some level of influence on pre-adolescent girls dietary and physical activity behaviours during the focus group discussions.

Shop-keepers

In one focus group in a large, most-deprived school, the children reported that the shop-keeper was a family friend who was able to give the children advice and who cares about their health choices and food consumption (*"...if we get too many sweets the shop-keeper knows us, knows our mums and he says 'put that down.'"* Large School, Most-deprived, 10 years). And in a large, medium-deprived school, one focus group participant described being warned by a shop-keeper that consuming chocolate bars increased her risk of becoming overweight (P2: *"(...) when I went (...) shopping I bought a chocolate bar, (...) the person at the till said that if I eat it I might have a chance of getting fat."* Large school, Medium-deprived, 8 years). The local market stall-owners were described as verbally encouraging people to buy their produce (*"the market keeper with all the fruit and veg, because he goes 'get your nice fresh bananas' and 'get your apples, juicy apples' and he encourages you to eat healthy stuff"*). Large School, Medium-deprived, 8 years).

Girl-Guide leaders

When attending the Girl-Guides, a community-based voluntary organisation for girls, leaders were reported to set goals, for instance the ‘agility badge’. Girl-Guide leaders were only reported by one focus group from a large, medium-deprived school.

“R: Guides and Brownie’s how do they do that?”

Unknown: (...) because you run around a lot and play a lot of games.

P1: and sometimes (...), they make you do the agility badge or something like that... which includes a 20 minute walk in guides.”

Large School, Medium Deprived, Unknown Speaker and 10 years

Celebrities

The participants from three focus groups (small, least-deprived, large, least-deprived and large, most-deprived) described sportsmen and women they saw on the TV as role models who inspired them to be physically active. In Sally’s words: *“[Local female Olympic Swimmer] is an amazing swimmer, I’ve written a (...) letter to her (...) I want her to (...) pick it up and find out how much she inspires me...”* Small School, Least-deprived, 11 years.

Other influencing factors

During the focus groups, participants commented that they had the autonomy to choose the physical activities in which they participated and to control their dietary behaviours:

“Because you can choose if you want to be sporty, if I just wanted to chill out and watch TV, I wouldn’t be very sporty and I wouldn’t really do anything exciting and fun, but if, (...) you just make that decision to change and maybe be a bit sporty, you could end up doing long marathons and coming first.”

Large School, Least Deprived, 9 years

This excerpt also highlights the competing influence of sedentary and active pursuits. The availability of sedentary activities, such as watching television, reading or playing video games, were sometimes seen as more attractive than physical activity behaviours.

Related to physical activity autonomy are the factors suggested to motivate the participants to be physically active, including: enjoyment; making family members proud; and future sporting ambitions (described only by those in the least-deprived groups).

The choices made by the focus group participants, were reported to be influenced by the participants' preferences for certain activities and interest in being active.

“Well I encourage myself because it’s very fun doing all tennis and baseball and all that.”

Small School, Medium Deprived, 7 years

Most children commented that physical activity was enjoyable; however one participant reported a personal dislike and another participant described a friend's dislike for these pursuits:

“Sometimes it’s like hard to do what you don’t like (...) and if you are like me and you don’t even like sports...”

Small School, Most Deprived, 10 years

In a minority of cases, such as this, there was a feeling that physical activity was not enjoyable and although there was a high level of understanding of the health reasons for physical activity, the preference for sedentary pursuits and low intrinsic motivation, may prevent children from achieving guideline physical activity levels.

Sally described training as a tri-athlete, having good familial support, a competitive nature and ambitions to become an athlete in the future, in the hope that she could make her family proud of her:

“I encourage myself for a couple of reasons, one because I want to make my parents proud, another because I want to make me proud and to show that the family who have died but have encouraged me when I first started and I want to prove it for them and I want to like become good. To me I, like, everything I do, I always want to be the best at it. And be the very best I can be.”

Small School, Least Deprived, 11 years

In every focus group that was conducted, the participants also discussed their healthy eating autonomy (*“I guess it’s ourselves that actually choose what we eat.”* Large School, Most

deprived, 11 years). The participants acknowledged that they are aware of the healthiest options and that they often consciously consider their decisions and behaviour before performing them (“*yea well if you open the fridge, you are like, ‘hmmm what shall I eat?’*”/“*yea and your eyes, like you automatically go for the sugary stuff, but you like (...) think, I should go for like the fruit salad...*” Large School, Most Deprived, 11 & 10 years).

Some children described their ability to access food when they wanted. One participant described having access to a cupboard designated for crisps:

“My sister as soon as we get in the door, this is the door here and we have like crisp cupboards along here, the crisp cupboard is there. As soon as we are in the door chuck your shoes off, in the cupboard.”

Large School, Most Deprived, 10 years

The children also described their ability to moderate and influence their parents’ dietary choices:

“Unless you go shopping with your Mum or Dad and then you can pretty much beg for what you want.”

Small School, Most Deprived, 10 years

Health benefits

At the individual level, the health benefits of being active and consuming a healthy diet were described as influential. The health benefits of physical activity are exemplified in the quote below:

“... when I was younger I used to (...) like not run around as much, well I used to run around, but now I am getting older I understand how you have to keep healthy...”

Large School, Most Deprived, 11 years

When making decisions the girls considered both their current and future health (“*Because you want to stay healthy and fit and not get like spotty and fat.*” Large School, Medium IMD, 8 years). Relating to health considerations, one participant, reported that she looked at the calories on food packaging to help inform her choices:

“Look on the bottom [of packaging], you say ‘ooh that’s got lots of calories in it’ and then you walk up a little bit more and then you see maybe this really healthy thing like a smoothie and you are thinking, oh that’s going to be loaded with sugar and then you look at it and it’s got like 0.5 grams of sugar in it and then you are like ‘oh it’s got only a tiny, tiny, little bit’.”

Small School, Most Deprived, 10 years

In contrast, some participants, also from small schools, reported making food choices based on the visual appeal of food

Weight status

The participants said that the risk of becoming overweight from eating unhealthily and being physically inactive influenced their behaviours. This theme is typified by the following: *“Yourself, because (...), you’ve heard and seen about people becoming fat because (...) they haven’t eaten things properly and they haven’t exercised properly and you think to yourself well I don’t want to be like those people. I’m going to follow the advice that keeps me healthy.”* Small School, Medium Deprived, 7 years. Weight status was mainly discussed by girls from the most deprived groups in large schools. Most comments made about weight status were in relation to healthy eating and suggested a perceived social stigma towards certain body types (*“I don’t want to be really fat, so I am trying to get really thin.”* Large, Medium Deprived, 7 years).

Name-calling by boys was described, possibly indicating the perceived importance of being seen as attractive to the opposite sex (*“...yea she [a girl in their class] thinks she is fat because one of the boys calls her fat. And she thinks she is fat”* Large School, Most Deprived, 11 years). This discussion prompted the recall by one of the participants of a school lesson where the children had to weigh themselves. This participant’s friend reacted to the process by saying: *“oh my god, I’m overweight, I’m over 40 [kg]”* (Large School, Most Deprived, 10 years). She reported that this resulted in the teacher stopping the class and explaining that they are all normal weight and should not worry.

Comments made about dieting and weight status were rarely discussed in relation to the individual participants, instead there were discussions about the media’s encouragement of dieting, the peer group and family members. In support of the negative social stigma attached to overweight and obesity, one focus group participant laughed during the discussion below

and suggested that people who were overweight would be less likely to encourage healthy behaviours in others:

“P3: not a big fat oaf, a big fat oaf wouldn’t encourage you...”

R: not what?

P3: not a big fat oaf, a big fat oaf wouldn’t (giggles)

P2: that’s like my Daddy.”

Small School, Least Deprived, 8 & 8 years

The use of the negative and derogatory word ‘oaf’ again highlights a perceived social stigma regarding overweight and obese people.

Pets

A discussion of the influence of pets occurred in almost every focus group in relation to physical activity. Pets were referred to as encouraging physical activity:

“Well if you’ve got a dog or something they (...) like paw at the door and they want a walk (...) so then you walk them and then they always want more so they are kind of encouraging you...”

Small School, Most Deprived, 11 years

The children recognised that physical activity performed with pets had reciprocal benefits for the children and the pets. In ‘Sally’s’ words: *“...I like to take my dogs for walks for two reasons, they’re getting healthy and I’m getting healthy.”* Small School, Least Deprived, 11 years.

Weather

The physical activities talked about by this sample of girls often involved being outside. As a result the weather could act as a promoter (*“Because like the weather persuades you to come out...”* Small School, Least Deprived, 10 years) or a barrier (*“...it starts raining so then it [weather] persuades you to go back in.”* Small School, Least Deprived, 10 years) to physical activity. Thus, when the weather was nice, participants reported, firstly, being more motivated to be active outside and secondly, that their parents encouraged them to go outside:

“...They [parents] encourage me to run a lot so they say ‘right you, because it’s very sunny you need to go outside and do a bit of running or play some football with the boys.’”

Small School, Medium Deprived, 6 years

Built Environment

Participants identified components of the built environment (defined on p38) that can either facilitate or prevent children from healthy behaviours. The proximity to amenities was reported by participants to contribute to whether the children reported engaging in active ways to travel which were also influenced by parents and time constraints.

“My Mum helps me because (...) she says you have to go for walks. And (...) where we live there’s a nearby farm so we can walk round there and there’s lots of walking paths.”

Large School, Medium Deprived, 8 years

A fear of bullying by strangers, or older children, and road safety for cycling, made children unsure about playing in the area near their homes without an adult particularly in the evening (*“something could happen to you if you go at a later time, they could jump out at you.”* Large School, Most Deprived, 11 years). The same participant who was restricted from accessing the park was also apprehensive of cycling on roads as a result of past experiences:

“... once I was playing out with my friends sister with my friend and I was just on my bike and she suddenly stopped, because there was a car coming (...) and she was coming onto the curb so she was moving (...) and she suddenly stopped and I hurt my knee and fell on my foot and I had like it was all scratched up.”

Large School, Most Deprived, 11 years

Shops

The main themes relating to the influence of shops are: Fair Trade produce; packaging and labelling; market stalls; restaurants; and resultant activity. Shops allowed the participants to access healthy and unhealthy foods. The focus group participants (particularly the older girls) reported going to the local convenience shop unsupervised (*“A bit like what P1 said whenever, (...) I have a sweetie day, on a Monday, and me and my friend go into the shop, the corner shop...”* Large School, Most Deprived, 10 years).

One participant was aware of Fair Trade produce and believed these products tasted better (“... sometimes in shops, they are like putting stuff to encourage you to eat the fruit, so they are like saying this fruit is good because of this reason. Like at Sainsbury’s® [supermarket] they are saying all the Banana’s are Fair Trade... which is kind of an influence that these bananas are tasty.” Small School, Medium Deprived, 7 years).

The general appearance (including packaging and labelling) of food could act to encourage consumption (“food might encourage you to eat it (...) if it is nice yea, it makes you want to eat.” Small School, Least Deprived, 8 years).

The town market was talked about particularly by the school closest to the town centre, suggesting that the proximity to facilities has an effect. The market was described in terms of access to fresh fruit and vegetables and the market stall owners’ verbal encouragement to buy the produce (“the market keeper with all the fruit and veg, because he goes ‘get your nice fresh bananas’ and ‘get your apples, juicy apples’ and he encourages you to eat healthy stuff.” Large School, Medium Deprived, 8 years). Fast-food restaurants were viewed as a treat, and, although they were perceived to be unhealthy, they could have elements which were healthy such as salad bars and carrot sticks:

“Like Pizza Hut® where people were telling me about they’d have like a salad table where you can pick your own salads.

Small School, Least Deprived, 10 years

One focus group participant, commented on the resultant activity accumulated from walking around shops and others discussed physical activity equipment that could be purchased within shops.

Allotments are another built environment influence which were perceived to affect children’s eating behaviours. Allotments could involve children growing vegetables at home or at school and resulted in a sense of personal achievement. Getting involved in looking after allotments was reported to be fun and acted as positive reinforcement to consume vegetables:

“P1: If you grow it yourself, you’re like, ‘oh I can’t wait to pick it up and eat it.’”

Large School, Most Deprived, 11 years

5.2 Focus groups discussion

5.2.1 Introduction

This section presents a discussion of the focus group findings following the first five levels of the EMHP (24) (individual, interpersonal, organisational, community and society level). This discussion is being presented separately to the main discussion as there are several findings relating solely to the focus groups which warrant discussion.

5.2.1.1 ‘Community’ definition

In response to the interview question, “What does the word ‘community’ mean to you?” the following themes were developed: people and groups of people; characteristics; sense of belonging and the attempt to improve the community for its members. To the authors’ knowledge, this thesis is the first study in the UK to explicitly ask pre-adolescent girls what the term ‘community’ means to them, therefore there is no other age-matched comparison.

The focus group themes are consistent with those found globally in children and adolescents (230,365,366) as well as a previous community definition produced by Israel and colleagues (234) which draws together the work of three others (231-233), comprising six components: “1) membership-a sense of identity and belonging; 2) common symbol systems-similar language, rituals, ceremonies; 3) shared values and norms; 4) mutual influence-community members have influence and are influenced by each another; 5) shared needs and commitment to meeting them; and 6) shared emotional connection-members share common history, experiences, and mutual support” (p151) (234).

Previous research with 15-year-old adolescents from South Africa, used a drawing exercise to elicit community definitions and also found similar themes to the current focus group study: “varying boundaries”; “social networks (e.g. friend and relatives’ houses)”; “facilities (e.g. parks, sports grounds, churches, and shops)”; “infrastructure (e.g. road and bus networks)”; “health”; “problems in their communities (e.g. crime etc)” and “community spirit” (365). The theme “varying boundaries” relates to the current study’s theme “size of the community” in that the community can be the family, the borough, county, country and the world. Similarly, the adolescents in the South African study stated that community boundaries range from single houses to wide geographical areas. Unlike the pre-adolescent girls, these South African adolescents experienced a high level of crime within their community; the result of which was a sense of “community spirit”. This concept relates to the pre-adolescent girls description of a sense of belonging in this study.

In the UK, research conducted for the Health Education Authority, with 12-13 year olds and 14-15 year olds, aimed to elicit young people's identity and sense of belonging within their neighbourhoods and communities. In discussing her findings, Morrow supports the findings of this thesis by noting, children identify with a variety of community's including the school, family, neighbourhood and communities of interests (e.g. sports clubs). Definable geographical community's may be less relevant to children who appear to exist in "a 'virtual' community of friends based around school, town centre and street, friends' and relatives' houses, and sometimes two homes" (366).

5.2.1.2 'Physical activity' definition

The focus group participants delineated the term physical activity using the following themes: movement; types of physical activity and effects of physical activity. The main types of physical activity described were: sport; exercise; unstructured play; and travel. There was a tendency for the focus groups participants to associate physical activity with sport, although there was also a less prominent mention of other forms of physical activity. A similar perception of physical activity as sport has been found in a previous focus group study with 9-10 year old children in the UK (367). Another type of physical activity children from this study engaged in was unstructured play. Unstructured play has been previously highlighted as enjoyable particularly when performed with friends and has been identified as a component of children's physical activity during school play times (368).

The perceived health related benefits (e.g. fitness) of physical activity identified by the girls in this study have been noted by 7-8 and 10-11 year olds elsewhere (369). The participants in Hesketh and colleagues study also postulated that physical activity was related to "fat reduction" (369), however the pre-adolescent girls in the current research appeared to only associate their weight status with dietary intake. A similar finding that children associate diet more than physical activity with health outcomes has been shown elsewhere (370). The wellbeing benefits of physical activity highlighted by the focus group participants have also been described before (368). Similar benefits of physical activity have been proposed by young people aged 7 to 17 years including: social; psychological; cognitive factors; a positive physical feeling; sports performance and coping strategies (135).

5.2.1.3 Healthy eating definition

The focus group participants highlighted a number of components of healthy eating including: balance and moderation; variation; beverages; government recommendations and the reason healthy diets are important in relation to health and weight status.

Similar definitions of healthy eating incorporating “balance and variety” (134,369,371) and “moderation” (371) have been shown elsewhere in the UK in children aged 10-11 years (371) and 11-12 years (134) and in Australia with a sample of 7-8 year olds and 10-11 year olds (369). McKinley and colleagues also found that children view a balanced diet as a balance between healthy and unhealthy foods (134). As with the participants in the McKinley study, the pre-adolescent girls also interpreted a balanced diet as the balancing of specific food groups. In contrast to this and the McKinley study, others suggest that young people have a limited understanding of what constitutes healthy eating, focusing primarily on fruit and vegetables as the primary components (134,372).

In agreement with the pre-adolescent girls in this study, previous studies have found that children associate healthy eating with their health (135), specifically their growth (371). Some of the reasons for consuming healthy foods given by children aged 7 to 17 years in Australia match those of the current pre-adolescent girls, including: appearance; energy replenishment; weight control; future health (135). However some reasons identified in other studies differed from the current study including: cognitive function; physical performance; psychological factors (e.g. wellbeing) and physical feelings (135). The differences between O’Dea (2003) and the findings from the pre-adolescent girls could be due to the different age range.

When discussing the government recommendation of ‘5-A-Day’ (five portions of fruit and vegetables per day), there was some suggestion by the pre-adolescent girls in this study that this recommendation is easy to achieve. However, the HSE has shown that only 21% of boys and 22% of girls (5-15 year olds) met this recommendation in 2009 (373). This suggests that further research is needed to understand the link between children’s perceptions of this guideline and actual behaviour.

The suggestions made by participants in this study, that single instances of consuming chocolate and other unhealthy foods may lead to chronic disease indicates the necessity for public health officials to ensure that people have correct information about health risks without producing an unhealthy fear of foods. Despite this, the C4L advertisement campaign

has been criticised for perpetuating these same oversimplified ideas, for instance depicting a girl eating a cupcake being associated with premature death (374). In girls of this age, a preoccupation with defining food as either 'healthy' or 'unhealthy' could lead to the development of unhealthy attitudes towards foods (134). Alternatively, pre-adolescent girls believing that unhealthy behaviours will lead to poor health outcomes may be a positive finding because others have found unrealistic optimism regarding perceived health outcomes in young people (219). An optimistic bias (perception that others are more likely to experience negative health related and non-health related issues than oneself) has been found in children aged between 8-9 years (219). In the Albery (2005) study, compared to girls, boys were characterised as significantly more optimistic in both health and non-health related issues (219). In the current study it could also be argued that the pre-adolescent girls were expressing an unrealistic pessimism.

Whilst the interview questions addressed the definition of healthy eating and physical activity separately, the participants responses to these questions suggest that they are aware that energy balance behaviours were related and should both be performed to maintain health. This has also been found by others carrying out focus group research with young people (134).

5.2.1.4 Individual level

Analysis of the focus group transcripts produced three main themes at the individual level: autonomy; health and weight concerns.

Autonomy

Consistent with previous research (367), the participants talked about their physical activity autonomy (ability to choose the physical activities in which they participated). And the majority of focus group participants in this thesis reported some autonomy regarding what they ate apart from the 7 year old children who did not express this. However what they ate was mostly provided by parents (which has been acknowledged by others (135,372)).

The theme autonomy can be related to the Health Locus of Control theory which postulates that individuals tend to view their health as either controllable (internal locus of control (LOC) or uncontrollable (external locus of control) (217). An internal locus of control or high level of perceived autonomy in pre-adolescence may be beneficial for long-term health. The 1970 British Cohort Study found a significant relationship between an internal LOC at 10 years

and a reduced risk of overweight and obesity, psychological distress, and likelihood of rating their health as poor at age 30 (375). The authors of this study conclude that fostering a stronger perception of individual control over children's own lives may have positive health implications in adulthood (375).

When choosing their activities the pre-adolescent girls in this study highlighted the competing influence of sedentary and active pursuits. Studies addressing the health effects of sedentary behaviour, independent of physical activity, are becoming more prevalent (113) and recent physical activity guidelines for children (5-18 years) recommend limiting the performance of sedentary behaviours (101). The present study highlighted some sedentary behaviour's (e.g. reading, watching educational television programmes and computer use for homework tasks) which in moderation are beneficial for children. In line with this study, others have found that sedentary behaviours are difficult to classify as unhealthy because there are times when children need to be sedentary to do developmentally beneficial tasks such as reading (369).

In a minority of cases, physical activity and competitive sports were perceived as not enjoyable. This was also suggested as potentially important in a study of children's physical activity typologies which concluded that the causes of low physical activity and high levels of sedentary behaviours should be addressed, for instance through considering the level of physical activity enjoyment (118). Indeed this finding indicates that more individually tailored physical activity programmes in schools may be necessary and that one-size-fits-all approaches fail to account for the personal preferences of children. For example one participant (Small School, Most Deprived, 10 years) commented that she dislikes "sporty things" but likes "playing tag", thus individual preferences for non-competitive activities are important to consider. Beyond the school it is important that there are a broad range of accessible (in terms of financial costs and proximity to children) activities which suit varying interests and personalities. Adults have been reported as citing positive childhood experiences of physical activity and parental encouragement as affecting their own physical activity as adults (376). Thus it is important that children have positive experiences of physical activity at a young age.

Weight status

Although the words 'overweight' and 'obese' were not used in the interview questions, the children in this study discussed the need to perform healthy behaviours to prevent excess

body fat accumulation and related health conditions. Similar to findings with an adult sample, the pre-adolescent girls associated individual behaviour attributes (within the individual's control), such as diet and physical activity, with weight status rather than with factors which are beyond the individual's control such as genetic attributes (216). These attributes may have contributed to the participants' reports of a negative social stigma surrounding overweight and obesity, which has also been shown previously in 10-11 year olds in the UK (371). This social stigma is in line with a review which found that children were likely to associate becoming overweight as negatively affecting social aspects of their lives (377-379). One of the focus groups described a school lesson where they were weighed as causing a girl to become distressed about her weight, this led to the teacher addressing the issue and reassuring the girls that they did not need to worry. This situation highlights the need for schools to act sensitively when weighing children which also occurs as part of the NCMP. To avoid children becoming preoccupied by their body size, there needs to be a continued emphasis on the health problems occurring inside the body as a result of poor nutrition and low physical activity rather than on the size and appearance of individuals (380). This approach has been advocated by the Department of Health in the C4L initiative (380) and is especially important for girls of this age, where body image is becoming increasingly important (134).

Throughout the focus group results, the comments of one participant, given the pseudonym 'Sally', were highlighted. Understanding the motivations and experiences of a child describing herself as 'active' is important for health promotion because researchers can work towards understanding and promoting those factors which support and encourage this child in the general population. For example, Sally describes having a supportive family as a motivating factor suggesting efforts could be made to involve members of other families in children's achievements to foster this same sense of social support.

5.2.1.5 Interpersonal level

The interpersonal level refers to the relationships children form with those who influence their behaviours. In the USA, others have shown that the key influences on health behaviours identified by 12-14 year olds are: parents; teachers; and school influences (372). And in a sample of 8 to 12 year old children the following people were defined as influential: parents; grandparents; other family members; close friends; teachers; coaches and celebrity athletes (370). The current focus group study with pre-adolescent girls found the same interpersonal

influences were identified as the previous study as well as additional key informants: dinner staff; doctors and dentists; neighbours; school cooks; shop keepers and Girl Guide leaders.

Parents

Parents were identified, by the pre-adolescent girls, as having the most influence (say) over children's health behaviours through the following main themes: child health concerns; maternal and paternal role; cohabitation; and parenting practices.

Child health concerns

The pre-adolescent girls in this study suggested that parents could influence the participants' weight status views in a negative way by overemphasising the importance of not being overweight rather than performing healthy behaviours, suggesting, as others have (371) that 'significant others' can model unhealthy attitudes towards weight status.

Maternal and paternal role

As a result of the findings of the focus groups in this study, there may be a need to address the reported lesser role of fathers because although fathers were highlighted as positive physical activity role models in many cases, they had a perceived lesser role in encouraging healthy dietary behaviours in the pre-adolescent girls. Support from the entire family may provide the family unit with the motivation to change lifestyle habits. Longitudinal, nationally representative data from Australia has shown that having an overweight or obese father and a normal weight mother significantly increased the risk of offspring being obese four years later but the reverse scenario of a healthy weight father and an overweight or obese mother was not a significant predictor of child weight status (381). Despite these associations, this is an area which has not been addressed in the UK context and in which few interventions elsewhere have been applied (382). Indeed, the majority of research addressing parenting factors and child eating behaviours have tended to focus on mothers rather than the entire family unit or fathers specifically (142,153).

Parenting practices

The parenting practices adopted to influence children's physical activity levels included: parental participation; verbal encouragement and facilitating activities. SLT and SCT propose that new behaviours are learnt through the observation of others' behaviour and the consequences of these actions (221). In this sense, parents are important role models and mediators of children's dietary (139,142) and physical activity behaviours.

The use of verbal encouragement and positive reinforcement, can act to increase the likelihood of healthy behaviours being repeated (222). For example the pre-adolescent focus group participants talked about family members verbal encouragement increasing children's confidence or self-efficacy in their abilities (222,224).

The focus group theme 'facilitate activities' illustrates the parental role in child transportation (active or inactive) to and from activities and facilitating play with friends. Parents financial support for children's physical activities was implied by the focus group participants (e.g. children talked about attending sports clubs which would require parent financial support). This has also been suggested by others researching children's perspectives of their local environment in relation to their healthy eating and physical activity habits (329).

Parenting practices relating to healthy eating included: provision of food; making healthy/new food fun; disciplinary behaviours; rewards for reinforcement; verbal encouragement; and variable parenting practices.

The focus group participants indicated that sometimes parents allow them to eat unhealthy foods as a "treat". This practice has been identified in children and parents in a study in Australia (369). The parenting practice of using the prospect of an unhealthy dessert to encourage children to eat their main meal was also discussed by focus group participants. This practice, used repeatedly, may create a stronger desire for unhealthy foods than for the meal they are being asked to eat before receiving the reward (138). In addition, the practice of rewarding children with unhealthy foods may encourage generalized expectancies (217) that healthy foods or good behaviours are always accompanied by unhealthy foods.

Parenting practices can be related to certain parenting styles. For instance in one focus group, participants made reference to their parents as being either 'soft' or 'strict'. Authoritative parenting styles have been positively associated with the practice of: making fruit and vegetables available for children; attempts to feed children dairy; fruit and vegetables and children's consumption of these foods (149). Therefore although it may be easier to modify parenting practices because these things are actions (e.g. rewarding children with fruit or stickers instead of sugary, high fat products), the style with which a practice is implemented is also important and may be more difficult to change because these may be related to a parents personality and may have been developed over a long time period.

Siblings

The main focus group themes depicting sibling influences were: cohabitation; sibling participation and modelling; verbal encouragement; age and gender.

Younger siblings were described as either inactive because of their immature developmental stage or very active, whilst older siblings were either active role models or sedentary, negative role models. In support of younger siblings' negative influence, Jose and colleagues (2011) reported that having younger siblings in childhood was negatively associated with being persistently active in young adulthood (124). Similarly a study interviewing parents found that children's different interests, reflecting different ages amongst siblings, represented a barrier to families performing physical activity together (383). The potentially positive influence of siblings on healthy dietary practices has been recognised in a review of the association between family factors and child weight status, diet and physical activity (384). In this review healthy dietary intake in children and adolescents was associated with siblings consuming a healthy diet (384). Findings from this and previous studies suggest that interventions involving the entire family should exploit the positive influence of siblings (e.g. role modelling) and minimise the negative influence of siblings (e.g. different preferences) by ensuring that age appropriate activities are provided and family meals are encouraged.

Peer group

The peer group's influence is incorporated into the following themes: time spent together; role models; not in charge of each other; physical activity performed together; verbal encouragement; competitiveness; sedentary activities; trying new foods; having similar food preferences; and swapping foods.

This study's findings support those of previous studies showing a connection between the peer group and physical activity behaviours, suggesting that involving the peer group in interventions may enhance their success. For example a high frequency of participation in physical activity with named 'best friends' has been positively associated with minutes of MVPA per day (166). Jago and colleagues (2011) also suggest that engaging in physical activity with friends in social settings such as the local neighbourhood, or in the home rather than only in the school is positively associated with higher physical activity levels (166). Children whose parents encourage and facilitate physical activity with friends may be likely to achieve higher physical activity levels. Qualitatively, social interaction with the peer group has been offered as a reason to be physically active by children (385). In the current research with pre-adolescent girls, the influence of the peer group was not viewed as exclusively

positive with some participants postulating that they prefer to perform sedentary behaviours with their friends such as talking, this has been shown by others (368).

Similar peer group influences on dietary behaviours in this study, including trying new foods (134) and sharing or swapping foods have been identified previously (369).

Pets

Pet ownership was discussed as a positive influence on physical activity behaviours. Pet ownership may characterise a family who enjoys being physically active or a family who wants to improve their activity levels by getting a pet. Dog ownership has been found to be cross-sectionally associated with higher levels of objectively measured physical activity levels in children aged 9-10 years in the Child Heart and Health Study in England study (CHASE) (386). The positive association between dog ownership and physical activity levels remained significant in the CHASE study after adjustment for gender, age, season, ethnicity, socio-economic status and a school random effect (387). Further longitudinal, quantitative research addressing the impact of pets on children's objectively measured physical activity levels is necessary to further validate the current qualitative findings and help elucidate the direction of causality in this relationship.

Given the importance of interpersonal relationships on physical activity and healthy eating behaviours, identified by the pre-adolescent girls and by others (367,370,372), it is conceivable that community-based programmes with family (parents and siblings) as well as peer groups could have some success in influencing healthy diet and physical activity behaviours.

5.2.1.6 Organisational level

The school is the only social setting in which children are obliged to take part in physical activity (e.g. P.E lessons, afterschool clubs and two play-times per school day) and thus has an opportunity to normalise physical activity and provide inspiration for children to engage in lifelong physical activity. In addition, during a school day at least one meal will be consumed, marking the school as a setting in which dietary intake may be influenced.

The school was the central organisation identified in the focus groups as promoting health awareness, knowledge and behaviours in the participants of this study.

Two focus groups suggested that there may be inter-teacher variation in the provision of physical education. In primary level education (in the UK) one teacher covers every subject within the curriculum including P.E. The strength of this approach is the bond between pupil and teacher allowing the effective encouragement of physical activity adoption and enjoyment (188). The negative aspect of this approach is that primary school teachers are often not specialists in P.E and in some cases have been given insufficient training (189) and time to develop an understanding of the subject, thus increasing the risk of low confidence in their teaching abilities (188,189). Low teacher enthusiasm for P.E may negatively affect pupils' engagement and enjoyment of the subject. Thus enhancing the teaching skills of non-specialist primary school teachers through low cost in-house training in collaboration with a network of schools, particularly secondary schools with specialist P.E teachers or bringing in external specialist physical activity educators to work in collaboration with teachers may be beneficial (188,189,388). One approach, which is becoming increasingly common in England, for improving the provision of P.E in primary schools, is the employment of external sports coaches. These coaches can help to raise the expertise of primary school teachers through lesson observations and the provision of lesson plans.

In terms of school food policies, initiatives such as 'food detectives' were viewed as unsuccessful by the focus group participants, suggesting schools should attempt to evaluate initiative effectiveness. A survey of primary and secondary schools, conducted by Ofsted, supports this finding and found that the monitoring of the impact of school food initiatives was weak (389). In addition, Ofsted suggested that the monitoring of school food provision was poor. This is in line with the focus group participants' comments about the content of school meals being viewed as unhealthy. In contrast, however, Ofsted suggest that 15 out of 17 primary schools surveyed were close to or fully compliant with the school nutrient and food-based standards (389). In two focus groups, participants were not happy with the discrepancy between the school meal and packed lunch policies. For example packed lunches were viewed as restricting unhealthy food and drinks whilst school meals appeared to serve unhealthy foods. Previous research suggests that only 5 out of 17 primary schools surveyed clearly referred to packed lunches in their whole school food policies although most of the other schools provided parents with information about what foods should not be brought into school (389). To reduce the contradictory messages regarding school meals and packed lunches (which potentially undermine school food policies), schools should incorporate policies regarding packed lunches into their whole school food policies and should emphasise

foods that can be brought into school rather than those which cannot (389). In addition to ease the perceived tension between schools, children and their parents, also identified in this study, Ofsted firstly recommends effectively involving children in school food policy development, through school councils (389). Secondly, to ensure parents are supportive of school food policies, Ofsted recommend involving parents in policy development (389).

Whilst others have suggested that schools are a key setting for developing children's knowledge of health (371), in some focus groups there was a feeling that the pre-adolescent girls had been over-exposed to health messages. This is important because if children feel they understand the appropriate health messages and the associated healthful behaviours, but do not or cannot perform them, then the knowledge gained through the education is not effective. This may also mean that messages aimed at children themselves are ineffective without support from the other ecological influences. Perhaps a future intervention should focus on encouraging children to put their knowledge into practise.

In contrast only one school's focus group appeared aware that their school had achieved National Healthy School Status, although all the school's had achieved this status (390), suggesting that the children's awareness of this initiative could be improved. However it is difficult to confirm this statement given the small number of schools and the lack of interview questions regarding this initiative.

5.2.1.7 Community level

The focus group participants perceived the following community level influences to act on their health behaviours: weather; the built environment and health professionals.

Weather

The weather was discussed as influencing pre-adolescent girl's physical activity behaviours. Weather restrictions during the winter months have been raised as a barrier to being active in a previous qualitative study (329). In addition, a school-based study found that the weather (specifically rainfall) is related to objectively-measured physical activity levels both over the whole day and at lunch time, with rainfall resulting in overall higher sedentary time, and lower MVPA counts per minute in 9-10 year old children (391). Weather effects can be moderated by school play-time policies (368,391), highlighting the need for suitable indoor space for poor weather conditions both in the school and in the family setting. Ideas for indoor activities may also be useful for parents, especially those in low income groups where

the cost of formal, organised indoor activities may represent a barrier to participation. A previous study suggested that the weather tended to act primarily as an enabling factor for physical activity (367).

Built environment

The current study, along with others (369), has illustrated that aspects of the physical environment (e.g. garden size, proximity to facilities and availability of paths) are perceived to influence physical activity behaviours.

Previous study findings of a negative relationship between the number of physical activity facilities and the odds of being overweight (206) support the importance of the built environment in helping to reduce the prevalence of overweight and obesity.

In the present study, built environment factors relating to healthy eating and drinking such as allotments, market stalls, fast-food restaurants, local shops and their staff, were reported to affect dietary behaviours. Some of the focus group participants reported being able to go to local shops without parental supervision to buy sweets, which implies that the proximity to shops is important and the parenting practice of providing children with money specifically to buy unhealthy snacks has a potentially negative health affect. However, the quantity of sweets bought and consumed was not elicited during the focus groups so it is difficult to assess the exact influence of this behaviour. Others have stated that the availability of unhealthy foods in convenience shops which children can access both before and after school act as a barrier to healthy eating behaviours in young people (199).

A previous qualitative study supports the finding that proximity to food outlets can inform children's dietary choices (329). Skidmore and colleagues found that the distance children lived from food outlets and the density of food outlets had a small effect on children's food choices in the UK (213). Residing further away from convenience shops was associated with lower consumption of unhealthy confectionary (chocolate and crisps) and white bread (213). The density of supermarkets produced mixed associations with higher vegetable intake and breakfast cereal and higher unhealthy foods such as sugary drinks, sweets and white bread (213).

Safety

Some pre-adolescent girls in the focus groups expressed the view that parental perceptions of the safety of the local area may limit children's use of outdoor facilities. This suggests that regardless of the facilities available, perception of safety is an important mediator of usage.

Safety concerns (e.g. stranger danger, traffic, and abductions) regarding outdoor activities in the local neighbourhood have been reported as a barrier to children's physical activity levels elsewhere (138,139,144,145,162,192,367,369,385) with parents reporting that indoor sedentary activities represent a safer option (138). Neighbourhood safety has previously been studied in relation to youth physical activity in Chicago, USA (210) with reported negative associations between neighbourhood perceived safety and physical activity (210).

In the Bristol 3 P's study, 'permissive' parenting styles were associated with girls achieving a greater amount of MVPA than 'authoritarian' parents (148). Therefore if parents adopt an 'authoritarian' style and restrict opportunities for children to be active in the local area, in response to perceived safety concerns, this may negatively impact on child physical activity levels.

The attitudes expressed at 7-11 years may track into later life and predict the usage of outdoor areas for physical activity into adolescence and even adulthood. The same participant (Large School, Most Deprived, 11 years) who was restricted from accessing the local park was also apprehensive of cycling on roads as a result of past experiences. The comments made by this participant in particular indicate that negative previous experience may predict willingness to repeat behaviours in the future. This relates to outcome expectancies, a construct of SCT, an important predictor of behaviour. Before attempting a behaviour, individuals consider the predicted outcomes which are often informed by previous experience (222). Therefore because this participant had negative previous experiences of cycling on roads and playing in parks, she may have negative 'outcome expectancies' and be less likely to repeat these behaviours.

Once the variables which mediate the relationship between children and their propensity to be physically active (e.g. safety perceptions) are identified it is not always clear how they can be modified (78). Others have suggested that to improve the perception of safety, community cohesion may need to be addressed (202,203). For example, community projects working with older youths, which act to increase their communication and interaction with the wider community, may be successful in reducing child and parental fears (162). Schools could

provide training for older children to become physical activity ‘leaders’ or young ‘Neighbourhood Watch’ members who can demonstrate and facilitate activities within the local area whilst being vigilant of anti-social behaviour. Further research to quantify the effect of safety perceptions and how this can be addressed in interventions targeting physical activity behaviours in children is necessary.

The concerns which arose about the local areas safety and suitability as an active space for children are key areas for initiatives and public health policy to address.

Health Professionals

At the community level, dentists were reported to provide dietary recommendations whereas more general comments were made about doctors. This could be due to the situation in which children visit the doctor compared to the dentist. Children are usually unwell when they visit the doctor which may mean that their immediate illness is addressed rather than general health messages. In contrast, visits to the dentist mostly happen when the child has no other health issue to be addressed other than their dental health. Regular visits to the dentist may provide an opportunity for a healthy lifestyle intervention and could offer a potential community-based route for overweight and obesity prevention, especially because children often visit the dentist with at least one parent thus enabling the parent to be included in the sharing of the intervention messages. Only one study has been found that developed a healthy weight intervention protocol for children in a dental setting (392).

In a study using focus groups with parents to investigate their knowledge of healthy eating and factors which may limit their compliance with this knowledge base, parents described valuing the advice of medical physicians however they commented that physicians rarely mentioned dietary practices (152). This suggests a key area for future initiatives could be practitioner based dietary advice. However these practitioners have hectic schedules and using their time is costly when compared to other potential interventions.

5.2.1.8 Society level

There were three main societal themes put forward by the focus group participants: the government’s influence; the media and C4L.

Government influence

The government was described by one focus group as in charge of: imports and exports; food labelling and the provision and contents of school lunches.

In the current study the pre-adolescent girls commented on the appearance and packaging of food as influencing their desirability however they did not specifically relate appearance to either healthy or unhealthy products. The appearance and packaging of foods has been proposed as a barrier (marketing of unhealthy produce) (134) and facilitator (a good reference of information) (369) to consuming a healthy diet. The comments made relating to children consulting packaging for nutritional information may suggest that the Traffic Light System of labelling (Red-foods that should be limited to occasional consumption, Amber-foods suitable to consume most of the time and Green represents the healthiest choice because it is low in salt, saturated fat or sugar) (393) may be a useful strategy to help children make informed and potentially healthier choices. Currently, under the UK coalition government's PHRD (a voluntary partnership amongst public health, commercial and voluntary organisations) the Traffic Light System does not have to be taken up by industry, thus the opportunity to give children consistent nutritional information on packaging has not been fulfilled in the UK.

Media

The pre-adolescent girl focus group participants reported having access to four main media sources: television; internet; video games; celebrities; posters and books.

The high profile of the 2012 London Olympic Games, may have increased the participants' awareness of the Games. The focus group participant girls identified athletes as role models of their physical activity (particularly sporting) behaviours. In contrast, a previous study in the UK found that girls (10-11 years) reported celebrities, who may not model healthy behaviours, as role models (371).

Television advertisements were viewed as promoting both healthy and unhealthy food consumption by the girls in this study, although the majority of adverts were perceived to be for unhealthy products and used promotional offers to encourage consumption. The Broadcast Committee of Advertising Practice (BCAP) has outlined rules for advertising to children including the following: "Advertisements must avoid anything likely to condone or encourage poor nutritional habits or an unhealthy lifestyle, especially in children." (p64)

(394). Therefore it is concerning that the focus group participants felt the media was encouraging the consumption of unhealthy foods.

The media can also shape children's ideas about what are socially desirable body shapes. The stereotypical role model for girls has been suggested as "beautiful and thin" (p833) (385). Nevertheless, the pre-adolescent girls in the focus groups recognised that the media's portrayal of slimming adverts could give a false impression to young people and may lead to children thinking they should be thinner than they are.

Change 4 Life

The high level of awareness of the C4L programme (including TV adverts, advice cards and snack swappers) in this research, illustrates the programme's ability to inform the attitudes of a group of young people.

5.2.1.9 Strengths

This study had strengths and limitations which should be noted. A representative sample of schools was recruited, which allowed a comparison across different types of school settings. This study conducted focus groups until saturation of ideas was achieved which resulted in a relatively large number of focus groups and a large sample size. The focus groups were conducted in a standardised manner by the same researcher who also transcribed and analysed the data. The reliability of coding was checked independently. To reduce the bias of the analysis, the coding was conducted systematically line by line (345).

The decision-making chart facilitated discussions about how much influence each key informant exerts.

5.2.1.10 Limitations

The focus group sample may be biased towards children of parents with a greater level of interest in health. Because study recruitment relied on participants to volunteer, the focus group sample may be biased towards the children of parents with a greater level of interest in health. Indeed one participant, from a small and least deprived school, given the pseudonym 'Sally', reported being very active which could suggest the focus groups were attractive to those who were consciously trying to be healthy and active. As an aside, when the researcher commented on how active Sally appeared to be to the school secretary, she said that another less vocal focus group participant was also very active; therefore she may have been

intimidated by Sally. Sally is an example of what Henderson refers to as a ‘thought leader’ shaping the focus group and giving the researcher an impression that she is more active than the others in her focus group (344)(343)(344).

A limitation of using IMD measures at the school level is that this may not reflect the individual child’s social position. However, this research was interested in community level factors which inform health behaviours therefore IMD at the school area level can be viewed as appropriate for this research. Influences which the focus group participants are unaware of will not have been reported, although the triangulation of the pre-adolescent girl and key informant views should help to alleviate this weakness to some extent. Analysis could not produce a broad substantive theory because there were too many themes produced due to the perceived multiple influences, therefore the analysis was more discussional than propositional (338). However, elements of formal theory which can be extracted to different contexts have been attempted (338).

Conclusions

The focus group participants’ responses suggest that young people are not passive entities that are simply moulded by those around them. This acknowledgement should be made in research that utilises young people by considering and being sympathetic to their views and opinions. A caveat to this conclusion is that although qualitative methods provide an insight into the context of behaviour, they cannot predict the pre-adolescent girls’ behaviour without objective measurements. Despite this realisation, if young people, as in this case, are aware of the most appropriate behaviours to perform for optimum health but do not or cannot perform them, then we must look to the key informants of their health behaviours in all the ecological settings to act. This means that we need to move away from research focusing on one area of influence and acknowledge that to change an individual’s behaviour the individual and the multiple environments they exist in must be targeted simultaneously (23,85). These sentiments are echoed by the conclusions of the systematic literature review.

Focussing on one of the factors outlined in this chapter without considering other areas of influence may result in a failure to translate knowledge and awareness into optimal behaviour in relation to improving healthy eating practices in 7-11 year old girls. In addition, prior to developing an initiative to prevent overweight and obesity, it is necessary to assess the readiness of the key informants and the community to promote behavioural change in pre-adolescents (33).

Chapter 6 Key informant interview results

6.1 Introduction

This Chapter details the findings from the key informant interviews conducted between February and November 2011. These interviews applied the Community Readiness Model (CRM) to determine the Charnwood Borough community's knowledge and awareness of and readiness to take action against behaviours linked to the development of overweight and obesity in pre-adolescent girls. The first section of this chapter presents a profile of the key informants who participated in this study. The next section relates to how these key informants define their community. The community readiness score is then outlined separately for healthy eating and drinking and physical activity. The subsequent sections follow the dimensions of the CRM interview guide (Community efforts, Community knowledge of the efforts, Leadership, Community climate, Community knowledge of the issue and Resources related to the issue) (See Methodology and Methods Chapter for more details). For each readiness dimension the qualitative evidence which illuminates the key issues relating to the score are presented. Lastly, findings relating to the social gradient of health from both the focus groups and key informant interviews are delineated.

The results from this chapter have been presented at the International Society for Behavioral Nutrition and Physical Activity in an oral presentation and at the 19th European Congress on Obesity in an oral presentation.

6.1.1 Participant profile

In total, 33 key informant interviews were conducted (Table 6-1). The interview length ranged from 19 minutes to 1 hour and 35 minutes. One interview was conducted as a paired interview with two parents at the participants' request.

Ten parents (2 male) were recruited from six schools. Although no parents from schools within the least deprived category were recruited, the parents who participated are considered representative of a diverse range of socio-economic groups as determined by the National Statistics Socio-economic Classification derived from self-reported occupations (Table 6-1) (3 unemployed, 3 managerial and professional occupations, 4 part-time occupations). Only one mother was non-white (South Asian). The teachers and teaching assistants who agreed to participate worked within schools in the least (n=1), medium (n=3) and most deprived (n=2) school areas within the Charnwood Borough. Only one dinner staff member was recruited, although two teaching assistants in another school also supervised lunchtimes.

Two local government key informants were interviewed. The Healthy Schools Advisor (HSA) responsible for supporting and monitoring schools once they have achieved the National Healthy School Status. This UK government initiative was launched in October 1999 (183) and focuses on four key areas: Personal Social, Health and Economic Education; Healthy Eating; Physical Activity and Emotional Health and Wellbeing. The School Food Advisor (SFA) is part of the School Food Support service which ensures school meals comply with nutrient and food based standards across primary schools in the Charnwood Borough.

Table 6-1 Key informant participant characteristics

Key Informant	Subcategory (number of schools)	Total	Subcategory (NS-SEC)*	Total	Overall Total
Parents	Least deprived school	0	Managerial and professional occupations	2	10
	Medium deprived school (2)	2	Intermediate occupations	3	
			Small employers and own account workers	1	
Most deprived school (4)	8	Lower supervisory and technical occupations	0		
		Semi-routine and routine occupations	1		
		Unemployed	3		
Teachers and Teaching assistants**	Least deprived school (1)	1			6
	Medium deprived school (3)	3			
	Most deprived school (1)	2			
Dinner staff	Most deprived school	1			1
Government initiative leaders	Healthy Schools Advisor (HSA)	1			2
	School Food Advisor (SFA)	1			
Shop-keepers	Urban area	1			2
	Rural area	1			
Girl Guide leaders		6			6
Sports Coaches	Sports Development Officers (SDOs)	2			6
	Football Development Officer (FDOs)	1			
	Gymnastics Coach	1			
	Community Sports Coach (CSC)/Play Ranger	1			
	School Sports Coach (SSP)	1			
TOTAL N:					33

*National Statistics Socio-economic Classification (364) derived from Self Coded method of self-reported occupation into one of five classes.

**Two of the teaching assistants were also dinner staff.

6.1.2 ‘Community’ Definition

“How would you describe the ‘community’ that you operate in as a?”

Although the geographical community for this research was the Charnwood Borough, Leicestershire (Figure 4-5) there were several communities identified within this area.

School key informants tended to identify most with the school community of: school staff; pupils; parents and the Local Education Authority. Those using this definition were most aware of what occurred at school. The School Sports Coach (SSC) identified two distinct communities in which she works. The first community was situated in an affluent area, pupils attending this school had no problems with cost in relation to accessing school physical activity initiatives, the school had an effective mechanism for communicating what is available and parents were very keen to get involved. The second community was more deprived, had fewer efforts in place, poor knowledge of these efforts, low motivation to improve the efforts amongst the leaders, less appropriate outdoor space and low awareness of the issue generally in the community. The SSC provided two responses to each interview question comparing between these communities because the communities were seen as separate rather than one community.

“XX school is quite an affluent area, they’re all middle class children so there are some really nice parks around that I know the kids go and play on (...). A lot of kids from there do come to like the gym[nastics] club (...). But then on the other side of my job, I work at xx (...). They’ve been marked as a red area, where there’s a lot of obese children and girls (...). The recreation facilities around or community support, it’s not as good as it is sort of around [the affluent area]⁴. (...) it’s there if they want it (...) and it’s up to them if they want to do it and up to the parents to like say ‘yeah go to that club’ or ‘do this’ and if they’re going to pay for it, which most of them do so, all my afterschool clubs are full...”

SSC

One participant repeated that she is part of a community of parents who encourage children to be active and to eat healthily and felt that low physical activity and unhealthy dietary habits were not of concern in her community. She acknowledged that within the school there are

⁴ [inserted text] has been inserted to aid the understanding of the quote because a word has been omitted by the speaker.

other communities of parents that might have different opinions that she is less familiar with i.e. the school has sub-communities of parents.

“R: right so in terms of the school (...) healthy lunch box policy, do you think there’s any barriers with parents not wanting to do that or I don’t know not being able to provide a healthy lunch?”

P: But you’re talking about in my community. I can’t speak (...) I have heard of people who complained about that (...). I heard that somebody was complaining because their child had (...) an unhealthy lunch box but I don’t know that person, she’s not in my community.”

Parent, Most Deprived School

Key informants representing the School Food Support, National Healthy Schools, Sports Development and the Local Council worked across the Charnwood Borough. These key informants commented on the diversity, in relation to deprivation levels, across the Charnwood Borough, which illustrates the multiple communities that exist within the borough.

“...you go out to the villages (...) and they’re quite affluent areas, then you come into town and there are some schools where children are quite deprived...”

SFA

A minority of key informants felt unable to identify the knowledge and awareness of an issue in the entire community. These key informants tended to present their own opinions rather than discussing the community context (e.g. some parents made comments about their own child’s behaviour rather than all children in the community).

“...I can’t answer on behalf of the rest of the community”

Parent, Most Deprived School

Although encouraging the key informants to define their own community provided clarity about the community context within which their opinions sit, the variability and diversity of these definitions makes interpretation of the overall community situation complex.

6.1.3 Community Readiness Model Scores

The average physical activity readiness score was 6.08 which corresponds to the 'Initiation Stage' (Table 6-2). This stage is reached when enough information is available to justify efforts and activities are underway. The average healthy eating and drinking readiness score was 5.74, corresponding to the 'Preparation Stage'. At this stage active community leaders have begun planning efforts by deciding what to do and who will do it and the community offers modest support of efforts. The readiness scores for community efforts were the highest of all the dimensions for both healthy eating and drinking and physical activity (Table 6-2). The resources score is the lowest for the healthy eating and drinking behaviours and the second lowest readiness score for physical activity suggesting initiatives are limited by the available resources. The lowest readiness score concerning physical activity is in the dimension community knowledge of the issue. The highest healthy eating and drinking readiness score (score =7.67) was obtained from the average of the two government initiative leaders (HSA and SFA) (APPENDIX C Systematic Literature Review

APPENDIX D Focus group questioning route

Topic	Questions	Probe questions
Community	What does the word community mean to you?	What things do you find in a community? Who is part of your community? Who do you see and talk to daily?
Physical Activity definition	What does it mean to be physically active?	Are we being physically active now? What activities do you do at school? What activities do you do out of school?
Healthy Eating definition	What is healthy eating?	What is not healthy eating?
People children are physically active with	I am most physically active when I am with my... I am most physically active when I go to... I am least physically active when I am with my... I am least physically active when I am at...	
Physical activity influences	Who encourages you to be active?	Who helps you to be active? How do these people encourage you to do this? Can you tell me about a time when these people encourage you to be physically active? Are these people different at different times of the day or week?
Healthy eating influences	Who wants you to eat and drink healthily?	Who encourages you to eat healthy foods? How do these people encourage you to do this?
Decision Making Chart	How much say do you think each person has?	In what way do some people have more say than others? How does this person have this much say? Can you tell me about a time when this person has this much say?

APPENDIX E Information letter for Head teachers regarding focus group study

Dear,

You will be aware that there is general concern in the UK regarding the dietary intake and physical activity levels of young people. In particular the lifestyle behaviours of pre-adolescent girls are now viewed as critical in predicting future health and wellbeing. We are interested in the people who exert major influence on the choices made by girls aged 7-11 years although very few studies have attempted to identify these key figures and the nature of their influence. We have now designed such a study and are writing to invite your school to take part in this study which will investigate which community members influence the lifestyle choices of girls aged 7-11 years. Your school is one of twelve within the Charnwood Borough to be selected based on its size and other demographic characteristics.

Who is doing this research and why?

The School of Sport, Exercise and Health Sciences at Loughborough University is conducting this research project. This study will be carried out by Joanna Kesten, a PhD student, as part of a research project funded by Loughborough University. Joanna Kesten will be under the supervision of Professor Noël Cameron and Dr Paula Griffiths throughout the study period. The Ethical Advisory Committee at Loughborough University has approved this research project.

What will be involved?

Using focus groups with girls aged 7-11 years we will identify which community members influence their lifestyle choices. We would like to conduct one or two focus groups in your school with groups of between 5-9 girls in Years 3, 4, 5 and 6. We would also like the same girls and their parent or guardian to complete a questionnaire assessing their physical activity levels and normal eating behaviours.

This research will strive to generate minimal disruption to the curriculum, teacher's time and resources. We would like to conduct our focus groups in the Summer Term at a time and place most convenient to your school and pupils. The focus groups will last approximately 45 minutes and will be conducted by a CRB checked, female researcher from Loughborough University.

At the end of the project we would like to return to your school to explain what we have found.

Why is this research important?

Research suggests that the lifestyle behaviours girls form during their primary school years may be related to health outcomes in later life. Understanding how these lifestyle choices are made will allow the development of sustainable initiatives capable of preventing habitual behaviours linked with poor health outcomes. We know that establishing good healthy lifestyles is easier than changing habits once they have been formed and we believe that the most appropriate approach is to use preventive measures.

Following the focus groups we will conduct interviews with the influential figures identified by the girls to explore the level of their awareness of the lifestyle choices made by 7-11 year old girls. We believe that these community based efforts represent the best approach for improving the health of young girls.

Focus groups can be a very enjoyable experience for young people allowing them to express their opinions in a friendly atmosphere. This research values the opinions of young people and believes the best way to tackle health issues is to ask the group of interest what matters most to them.

We will contact you by telephone shortly to discuss whether your school would be willing to take part in this study.

Thank you for taking the time to read this letter.

Yours sincerely,

Professor Noël Cameron

Dr Paula Griffiths

Joanna Kesten

Information letter for parents regarding focus group study

Dear Parent/Guardian,

We are writing to invite you and your child to take part in an important study to investigate which community members influence your child's lifestyle choices. Research suggests that the lifestyle choices girls adopt during their primary school years may be related to health outcomes in later life. Understanding how these lifestyle choices are made will allow the development of projects to promote healthy lifestyles. Using group discussions we will talk to 7-11 year old girls to find out which community members are more likely to influence their lifestyle choices.

Following on from the group discussions we will undertake interviews with the key community members who influence the lifestyles of the girls. We believe that working with the community is the best approach for improving the health of young girls.

Who is doing this research and why?

The School of Sport, Exercise and Health Sciences at Loughborough University is conducting this research project. This study will be carried out by Joanna Kesten, a PhD student, as part of a research project funded by Loughborough University. Joanna Kesten will be under the supervision of Professor Noel Cameron and Dr Paula Griffiths throughout the study period.

Are there any inclusion criteria?

Only girls aged between 7-11 years of age will be given the opportunity to take part in the discussion groups for this study.

Once I give consent for my child to take part in the study, can I or my child change our minds?

Yes! After you have read this information and asked any questions you may have we will ask you to complete an Informed Consent Form. However if at any time, before, during or after the discussion groups you wish to withdraw your child from the study please just contact Joanna Kesten using the contact details at the bottom of this letter. Your child can withdraw at any time, for any reason and you or your child will not be asked to explain your reasons for your child's withdrawing.

Will I be required to attend any sessions and where will these be?

The discussion groups will be held within your child's school during the school day. Parents/guardians will not be required to attend, although we would like you to complete two questionnaires at home regarding your child's food and drink patterns and physical activity

levels. At the end of the study a final report will be sent home to you explaining the study findings if you or your child request to receive this information.

How long will it take?

You and your child will be asked to complete two questionnaires which should take no longer than 20 minutes. Your child will be asked to participate in only one group discussion, which will last approximately 45 minutes.

Is there anything I or my child need to do before the sessions?

Please read and discuss with your child this information sheet and the information leaflet given to your child. Your child can only take part in this research study if you give your consent (permission). Once this has been attained we will separately seek your child's willingness (assent) to take part. Your child will not be approached if you have not given consent for her to take part. Both your consent and your child's assent are needed before your child can take part.

Is there anything my child needs to bring with her?

No. Your child will not need to bring anything with them.

What will my child and I be asked to do?

If you are happy for your child to take part in the study and return the informed consent form to your child's school, the following will occur:

At an introductory session your child will be asked to listen to a short talk about the aims of the study and will be given a leaflet to take home and discuss with you.

At the start of the study an individual code will be assigned to your child and will replace your child's name on all documents (apart from on consent forms which will be kept separately). This method is designed to protect your child's confidentiality and if you or your child wishes to withdraw from the study all information collected can be removed and destroyed using this code.

Your child and a group of 4-8 others will be asked to have a group discussion about the people who inform their eating and physical activity choices.

We will send home two questionnaires for you to fill out with your child. The first will assess food and drink intake and the second will assess your child's physical activity levels. These questionnaires will be anonymised and used for informative purposes only. No judgements will be made regarding the quality of a child's diet or level of activities.

What personal information will be required from myself or my child?

We will only ask for you and your child's name and your child's age. No physical measurements will be taken from your child.

Are there any risks in participating?

There are no known risks associated with taking part in this study, however if at any point your child feels uncomfortable and does not wish to take part in the discussion they are welcome to leave the group.

Will taking part in this study be kept confidential?

All willingness to participate and consent forms with full names will be kept locked away in a secure place. To protect children's identity they will be assigned an individual code at the beginning of the study. These codes will be used to identify the speakers during analysis and for any publications. The researcher will explain to the children that all discussions will be kept confidential and only if the researcher becomes worried about a child's safety would anyone else be told about the discussions. The information provided by you and your child will be stored for a maximum of ten years, after which it will be destroyed. At any point during or after the study you or your child may request that all data collected from them be destroyed.

What will happen to the results of the study?

The audio recordings from the group discussions will be transcribed. The research team will then analyse the discussions to pick out the key themes and key informants (people highlighted as most important to the children). The identified key informants will then be contacted and interviewed to discover the level of community knowledge and awareness. The results will form part of a PhD thesis and may be used in academic publications. Individual children will not be identified in any thesis or publication arising from the research.

What does my child get for participating?

Refreshments suitable for your child's dietary requirements will be provided during the group discussions and a certificate for taking part in Loughborough University research will be awarded to every child. Taking part in research can be very exciting for young people and allows your child the opportunity to inform a research project's future direction.

What if you are not happy with how the research was conducted?

The University has a policy relating to Research Misconduct and Whistle Blowing which is available online at: [http://www.lboro.ac.uk/admin/committees/ethical/Whistleblowing\(2\).htm](http://www.lboro.ac.uk/admin/committees/ethical/Whistleblowing(2).htm).

If you have any questions please feel free to contact Joanna Kesten either via email j.m.kesten@lboro.ac.uk or by telephone 01509 221859.

Thank you for taking the time to read this information.

Kind Regards,

Joanna Kesten

APPENDIX F Group guidelines for the focus group participants

This is not a school lesson.

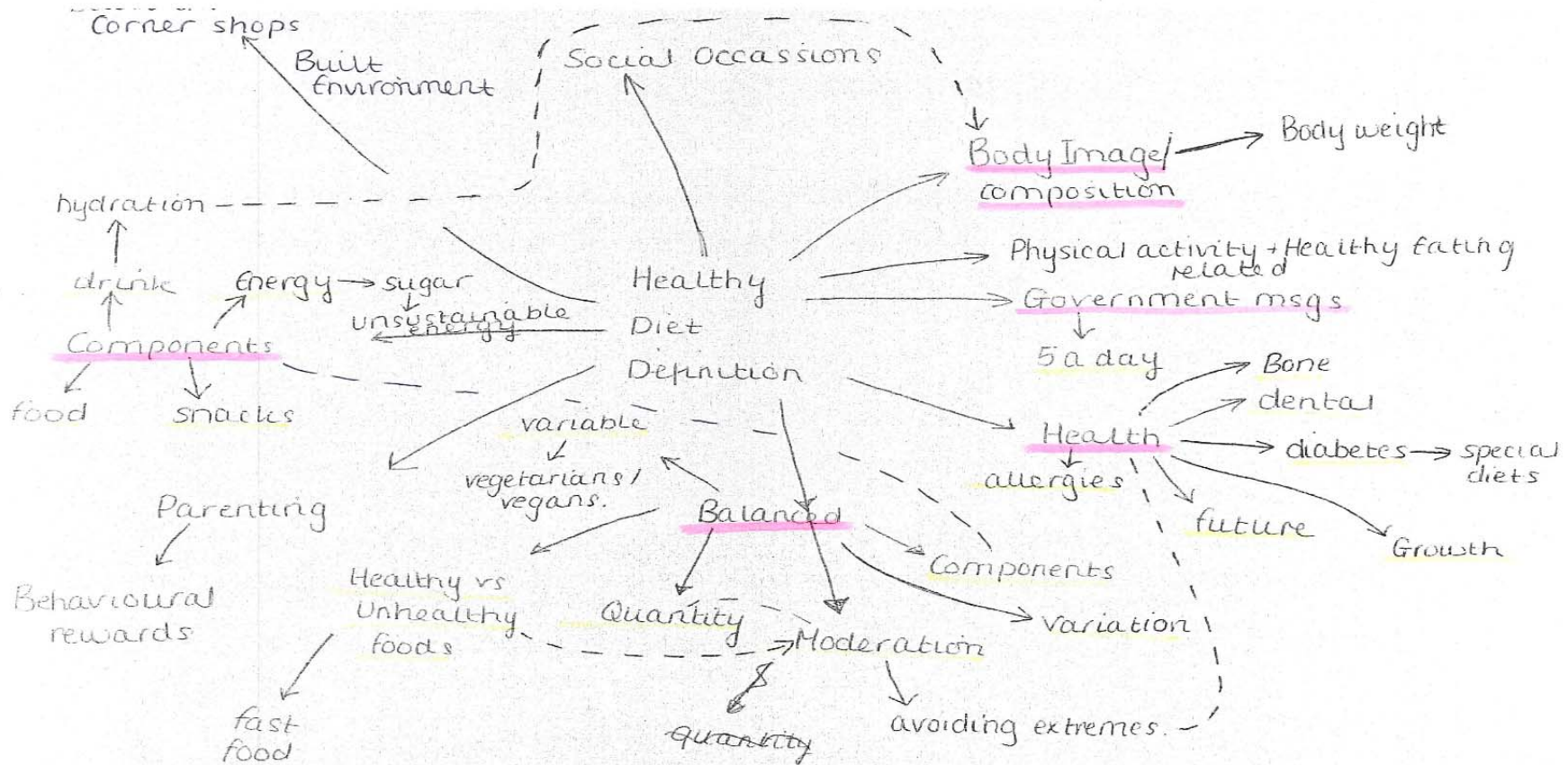
Please be respectful of each other and be careful not to say or do anything which may upset another group member.

There are no right or wrong answers. I am interested in your opinions.

Please feel free to talk to each other during the group when answering the questions.

Taking part in this group is voluntary which means you can leave at any time.

APPENDIX G Example of maps of themes produced from the focus group analysis of healthy eating definition as recommended by Braun and Clarke, 2006 (360)



APPENDIX H Community Readiness Model Interview questioning route

(N.B. Questions highlighted in bold are those which must be asked for scoring purposes).

INTRODUCTION

Through discussion groups with 7-11 year old girls you were identified as a key member of the Charnwood Borough community in relation to girls' physical activity and eating behaviours through your role as a _____. This means that you have been identified as having experience, knowledge and information regarding local issues, and you are able to suggest appropriate actions to promote healthy behaviours within the Charnwood Borough community.

In this interview I will ask you about what local people know and feel about the importance of healthy dietary and physical activity behaviours in girls aged 7-11 years, what is available locally for these girls to promote healthily dietary and physical activity behaviours, who is providing these opportunities, and how available and well funded these opportunities are in the Charnwood Borough and your local area. Please try to answer the questions focusing upon girls aged 7-11 years rather than children in general if you can.

In some questions I will ask you to provide a rating along a scale between 1 and 10. Please use these cards as reminders that one corresponds to low and ten to high. For each question I will ask you separately about healthy eating and drinking and then physical activity.

COMMUNITY DEFINITION

What is your occupation?

1. How would you describe the community that you operate in as a _____?

PROBE: Who is part of your community?

I would like you to respond to the following questions using this definition of your community please. So when I say 'community' I mean the community that you work in as a _____.

A. COMMUNITY PROGRAMMES (programmes, activities, policies, etc.)

AND

B. COMMUNITY KNOWLEDGE OF PROGRAMMES

1a. Using a scale from 1-10, how much of a concern are unhealthy eating and drinking in girls aged 7-11 years in your community?

Please expand.

1b. Using a scale from 1-10, how much of a concern are low physical activity behaviours in girls aged 7-11 years in your community?

Please expand.

2a. Are you aware of any programmes/ efforts/ activities/clubs that are available in your community to promote healthy and drinking behaviours in girls aged 7-11 years in your community?

PROMPT: at school, in the local shops or leisure facilities.

If yes, could you describe these programmes or activities?

2b. Are you aware of any programmes/ efforts/ activities/clubs that are available in your community to promote physical activity in girls aged 7-11 years in your community?

PROMPT: at school, in the local shops or leisure facilities.

If yes, could you describe these programmes or activities?

(If NO, move to question 10)

3. How long have these programmes or activities been going on in your community? (if many programmes mentioned ask for top three most important programmes to be discussed)

4. Using a scale from 1-10, how aware are people in your community of these programmes or activities?

(1 being "no awareness" and 10 being "very aware")

Please expand.

5. How have people in the community become aware of these physical activity programmes or activities?

5. How have people in the community become aware of these healthy and drinking programmes or activities?

6. What are the strengths of the physical activity programmes or activities?

7. What are the weaknesses of these healthy and drinking programmes or activities?

8. Would there be any segments or people within the community who may find these programmes aimed at girls aged 7-11 years inaccessible?

PROMPT: For example certain ethnicities, income behaviours, geographic regions.

9. Is there a need to expand these programmes?

If not, why not?

10a. Are there any plans for new programmes in your community promoting healthy and drinking behaviours in girls aged 7-11 years?

If yes, please expand.

10b. Are there any plans for new programmes in your community promoting physical activity behaviours in girls aged 7-11 years?

If yes, please expand.

C. LEADERSHIP

11a. Who are the influential, important or key people working to promote physical activity behaviours in girls aged 7-11 years in your community?

11b. Who are the influential, important or key people working to promote healthy and drinking behaviours in girls aged 7-11 years in your community?

12a. Using a scale from 1 to 10, how much of a concern are low levels of physical activity to the important people in your community (1 being “not at all” and 10 being “of great concern”)?

Please expand.

12b. Using a scale from 1 to 10, how much of a concern are healthy and drinking behaviours to the important people in your community

(1 being “not at all” and 10 being “of great concern”)?

Please expand.

13a. How are these important people involved in programmes or activities which promote healthy and drinking behaviours in girls aged 7-11 years?

Please expand.

PROMPT: Are they involved in a committee?

13b. How are these important people involved in programmes or activities which promote physical activity behaviours in girls aged 7-11 years?

Please expand.

PROMPT: Are they involved in a committee? How often do they meet?

14. Would the important people support additional programmes? Please expand.

D. COMMUNITY CLIMATE

15a. Are there any circumstances in which members of your community might think that unhealthy eating and drinking behaviours in girls aged 7-11 years should be tolerated? Please expand.

15b. Are there any circumstances in which members of your community might think that low physical activity behaviours in girls aged 7-11 years should be tolerated? Please expand.

16a. How does the community support programmes promoting healthy eating and drinking behaviours in girls aged 7-11 years?

16b. How does the community support the programmes promoting physical activity behaviours in girls aged 7-11 years?

17a. What are the main barriers for programmes or activities promoting healthy eating and drinking behaviours in girls aged 7-11 years in your community?

17b. What are the main barriers for programmes or activities promoting physical activity behaviours in girls aged 7-11 years in your community?

18a. Based on the answers that you have provided so far, what do you think is the overall feeling among community members regarding the encouragement of healthy eating and drinking behaviours amongst girls aged 7-11 years?

18b. Based on the answers that you have provided so far, what do you think is the overall feeling among community members regarding the encouragement of physical activity behaviours amongst girls aged 7-11 years?

E. KNOWLEDGE ABOUT THE ISSUE

19a. How knowledgeable are members of your community about what constitutes healthy eating and drinking behaviours in girls aged 7-11 years?

Please expand.

19b. How knowledgeable are members of your community about what constitutes healthy levels of physical activity in girls aged 7-11 years?

Please expand.

20a. What type of information is available in your community regarding the promotion of healthy eating and drinking behaviours for girls aged 7-11 years?

20b. What type of information is available in your community regarding the promotion of physical activity behaviours for girls aged 7-11 years?

21a. What local data or statistics or information are available on physical activity behaviours in girls aged 7-11 years?

21b. What local data or statistics or information are available on healthy eating and drinking behaviours in girls aged 7-11 years?

22. How do people obtain this information in your community?

F. RESOURCES FOR PREVENTION PROGRAMMES (time, money, people, space, etc.)

23a. To whom would a girl aged 7-11 years who wants to increase their physical activity behaviours first turn to for help?

23b. To whom would a girl aged 7-11 years who wants to improve their healthy eating and drinking behaviours first turn to for help?

24a. On a scale from 1 to 10, what is the level of expertise and training among those working to promote healthy eating and drinking behaviours in girls aged 7-11 years (with 1 being “very low” and 10 being “very high”)?

Please expand.

24b. On a scale from 1 to 10, what is the level of expertise and training among those working to promote physical activity behaviours in girls aged 7-11 years (with 1 being “very low” and 10 being “very high”)?

Please expand.

25a. Do programmes that promote healthy eating and drinking behaviours in girls aged 7-11 years have a broad base of volunteers?

25b. Do programmes that promote physical activity behaviours in girls aged 7-11 years have a broad base of volunteers?

26a. What do you think is the local business' attitude about supporting programmes to promote healthy eating and drinking behaviours in girls aged 7-11 years?

PROBE: People volunteering time, making financial donations, and/or providing space?

26b. What do you think is the local business' attitude about supporting programmes to promote physical activity behaviours in girls aged 7-11 years?

PROBE: People volunteering time, making financial donations, and/or providing space?

27. How are current programmes funded? Please expand.

28a. Are you aware of any new proposals that have been submitted for funding to promote healthy eating and drinking behaviours in girls aged 7-11 years in your community?

If yes, please expand.

28b. Are you aware of any new proposals that have been submitted for funding to promote physical activity behaviours in girls aged 7-11 years in your community?

If yes, please expand.

29a. Do you know if there is any evaluation of programmes that promote healthy eating and drinking behaviours in girls aged 7-11 years in your community?

Please expand.

29b. Do you know if there is any evaluation of programmes that promote physical activity behaviours in girls aged 7-11 years in your community?

Please expand.

If no, move to specific key informant topics.

30. Are the evaluation results being used to make changes in programmes, activities, or policies or to start new ones?

Specific Key informant Topics:

Introduction:

Up until now I have been asking you about what is going on in the Charnwood Borough community. The next section is concerned with your views and opinions as a parent.

Parents

Who or what are the main influences upon you as parents in relation to trying to raising healthy children?

Who or what are the main influences upon your child in relation to maintaining a healthy lifestyle?

Who do you think is most responsible for children's healthy dietary and physical activity behaviours?

Does the media positively or negatively influence your child's dietary and physical activity behaviours at all? If yes, how?

Do sibling interactions affect child health behaviours? (Can you give any examples?)

How safe do you feel the local environment is for children to play outside unsupervised?

Do pets positively or negatively influence your child's physical activity behaviours?

What influence do you think your child's friends have upon their dietary and physical activity behaviours?

How effective do you think the school-parent relationship is in relation to school health policies within your school?

Who do you think should have the most responsibility for child health?

Sports Coaches

Do you think sports coaches have a role to play in children's nutrition (either directly or indirectly)?

What role do you think sports coaches have in improving children's physical health?

What factors do you believe influence whether pre-adolescent girls maintain sporting activities or drop out of clubs such as yours?

Who do you think should have the most responsibility for child health?

Head teachers/ teachers

From looking at your school's website I can see you have these school health policies... (i.e. school food rules, Sports Day, Cycling Proficiency, Healthy Schools, Eco-schools)

Do you have other health policies other than ones I've mentioned?

On a scale of 1-10 how effective do you think these policies are? What are the barriers and facilitating factors for these school health policies?

How effective do you think the Healthy Schools/ Eco Schools initiative is in improving children's knowledge of health and ultimately their health behaviour?

How effective do you think the school-parent relationship is in relation to school health policies within your school?

(Probe: Do you ever experience any resistance from parents regarding health initiatives in school? How is this overcome?)

Who do you think should have the most responsibility for child health?

(Probe: do you think it is the schools responsibility to override decisions made by parents if they are perceived to be unhealthy? (I.e. providing unhealthy food in packed lunches).

Can you describe any problem within your school of poor nutrition and low physical activity levels?

School Cooks and Dinner staff

Who decides what food children should be served within your school (council, suppliers)? What is your involvement as a school cook in deciding the school food? Has your school opted out of local government regulation of school meals?

Are portion sizes and food choices made by children monitored or controlled within your school?

What are the key school food policies, both within your school at the moment and at a wider government level? What is your involvement as a school cook in deciding the school food?

What is your schools policy if children repeatedly bring unhealthy food for lunch?

What are the lunch time food rules within your school?

To what extent do you believe the school meals you provide meet the school food guidelines?

What is your overall impression of the healthiness of the foods provided within the school?

How healthy do you believe packed lunches are within your school?

Who do you think should have the most responsibility for child health?

Government

Can you briefly describe the health policies currently available in relation to physical activity and healthy eating in pre-adolescent girls?

How much do you think safety in the local environment is a barrier to physical activity in pre-adolescent girls?

How successful do you think the Change 4 Life campaign has been within Charnwood?

How effective do you think the Healthy Schools/ Eco Schools initiative is within Charnwood?

Do you think services designed to increase pre-adolescent girl's participation in sport are currently successful?

(Probe: What do you think could be done to improve uptake of these facilities by a broad cross-section of pre-adolescent girls from diverse backgrounds? How affordable do you think physical activity services are within Charnwood?)

What kinds of legislation is presently in force regarding advertisements directed towards children?

What do you think the impact of nutritional information on food labels has been?

Who do you think should have the most responsibility for child health?

Guides and Brownie Leaders

What factors do you believe influence whether pre-adolescent girls maintain activities such as being a Brownie or a girls guide or drop out of clubs?

Who or what are the main influences upon pre-adolescent girls in relation to maintaining a healthy lifestyle?

Who do you think should have the most responsibility for child health?

APPENDIX I Information letter for Head teachers regarding Community Readiness Model study

Dear,

We are writing to express our gratitude for your co-operation with the research conducted by Loughborough University in your school during the Summer Term of 2010. We would like to take this opportunity to share with you what we have found to date and to tell you about the second stage of this research.

The study was a great success with 56 girls from 8 schools across the Charnwood Borough taking part. The study aimed to identify who children perceive to exert a major influence upon their health choices, specifically relating to physical activity and healthy eating.

In brief this study found a broad range of influential people were highlighted by pre-adolescent girls. At the individual level the children discussed their own health behaviour control, which was also influenced by family members' and particularly maternal influences. The peer group was described as a role model capable of encouraging the performance of positive and negative health behaviours. School health policies, encompassing school meals and physical activity lessons were highlighted as a strong influence. Wider social influences e.g. the media, government initiatives, such as Change4Life, and environmental factors such as the proximity and availability of physical activity facilities and the perceived safety of these facilities, were also discussed.

We have enclosed a poster summarising the findings of this study which we hope you will display for all your children and parents to see. The poster also includes information for those wishing to take part in the next part of this study. If you would prefer to have a version of the poster without this information please contact Jo Kesten. If you wish to make copies of the poster or put it on your schools website, an electronic version can be sent to you. Please email Jo Kesten (J.M.Kesten@lboro.ac.uk).

What is next?

We would like to invite your school to take part in the second stage of this research. Following the focus groups, the second stage of this research will involve conducting interviews with the influential people identified by the girls. These interviews will explore in more detail the lifestyle choices made by 7-11 year old girls and the factors influencing them in the Charnwood Borough community.

Who is doing this research and why?

The School of Sport, Exercise and Health Sciences at Loughborough University is conducting this research project. This study will be carried out by Joanna Kesten, a PhD

student, as part of a research project funded by Loughborough University. Joanna Kesten will be under the supervision of Professor Noël Cameron and Dr Paula Griffiths throughout the study period. The Ethical Advisory Committee at Loughborough University has approved this research project.

What will be involved?

Using one to one interviews, lasting between 30-60 minutes, we will ask about things that influence the Charnwood Borough community's willingness to improve health related lifestyle choices made by 7-11 year old girls.

If your school would like to take part we are interested in talking to:

- Key Stage 2 Teachers
- School cooks
- Dinner staff
- Parents

This research will strive to generate minimal disruption. In particular we do not need to speak to Year 6 teachers as we are aware of how busy these teachers are around SATS. We would like to conduct our interviews at a time and place most convenient to your school. We will share research findings with interested schools at the end of the second stage of the project.

Why is this research important?

Research suggests that the lifestyle behaviours girls form during their primary school years may be related to health outcomes in later life. Understanding how these lifestyle choices are made will allow the development of sustainable initiatives capable of preventing habitual behaviours linked with poor health outcomes. We know that establishing good healthy lifestyles is easier than changing habits once they have been formed and we believe that the most appropriate approach is to use preventive measures.

We believe that community based efforts represent the best approach for improving the health of young girls. It is important to understand the knowledge of local people and their readiness to make changes to improve the levels of physical activity and healthy eating in pre-adolescent girls before implementing these changes in the Charnwood Borough community.

We will contact you by telephone shortly to discuss whether your school would be willing to take part in this second study.

Thank you for taking the time to read this letter and if your school has any questions about the findings of this research please contact Joanna Kesten on the contact information at the top of this letter.

Yours sincerely,

Professor Noël Cameron

Dr Paula Griffiths

Joanna Kesten

Information letter for key informants regarding Community Readiness

Model study



Dear,

We are writing to invite you to participate in an important study to investigate the level of community willingness in the Charnwood Borough to promote healthy lifestyle choices made by girls aged 7-11 years. Research suggests that the lifestyle choices girls adopt during their primary school years may be related to health outcomes in later life. Understanding how these lifestyle choices are made will allow the development of projects to promote healthy lifestyles. We believe that working with the community in the Charnwood Borough is the best approach for improving the health of young girls.

Through discussion groups with 7-11 year old girls you were identified as a key member of the Charnwood Borough community in relation to girls' physical activity and eating behaviours. This means that you have been identified as having experience, knowledge and information regarding local issues, and you are able to suggest appropriate actions to promote healthy behaviours within the Charnwood Borough community.

Who is doing this research and why?

The School of Sport, Exercise and Health Sciences at Loughborough University is conducting this research project. This study will be conducted by Joanna Kesten, a PhD student from Loughborough University as part of a research project funded by Loughborough University. Joanna Kesten will be under the supervision of Professor Noel Cameron and Dr Paula Griffiths throughout the study period.

Once I take part, can I change my mind?

Yes! After you have read this information and asked any questions you may have we will ask you to complete an Informed Consent Form, however if at any time, before, during or after the sessions you wish to withdraw from the study please just contact Joanna Kesten using the details at the top of the page. You can withdraw at any time, for any reason and you will not be asked to explain your reasons for withdrawing.

Will I be required to attend any sessions and where will these be?

Yes. I would like to conduct an interview with you either in person or over the phone at a place convenient to you.

How long will it take?

The interview should last approximately 30 minutes.

What will I be asked to do?

You will be asked about what local people know and feel about the importance of healthy eating and drinking and physical activity behaviours in girls aged 7-11 years. For instance,

you will be asked about what is available locally for these girls to promote healthily eating and drinking and physical activity behaviours, who is providing these opportunities, and how available and well funded these opportunities are in the Charnwood Borough and your local area.

What personal information will be required from me?

We will ask you for your name, occupation and a method for contacting you.

Will my taking part in this study be kept confidential?

Yes you will be assigned a code and all information matching this code will be kept locked away, and accessible only to the researchers. Your Informed Consent Forms and interview transcripts will be kept locked away in a secure place. This information will be kept for a maximum of ten years at which point it will be destroyed. You may request to have your data destroyed at any point during or after the study.

What will happen to the results of the study?

The results from all the interviews will be used to produce a score about your community's willingness to help girls 7-11 years become healthier. The intention is that after this study we will design an appropriate strategy to attempt to promote healthy lifestyle behaviours in 7-11 year old girls.

I have some more questions who should I contact?

If you have any questions please contact via email j.m.kesten@lboro.ac.uk or by telephone on 01509 228159.

What if I am not happy with how the research was conducted?

The University has a policy relating to Research Misconduct and Whistle Blowing which is available online at [http://www.lboro.ac.uk/admin/committees/ethical/Whistleblowing\(2\).htm](http://www.lboro.ac.uk/admin/committees/ethical/Whistleblowing(2).htm).

Thank you for taking the time to read this information and for considering to participate.

APPENDIX). The lowest readiness score was produced from the shop-keepers (score = 2.92).The highest physical activity community readiness score was achieved by the sports coach category of key informants (score = 6.55). The lowest readiness score came from the dinner staff key informant (score = 4.8).

Table 6-2 Community Readiness Scores

	Dimensions ⁵						
	Sample n	A	B	C	D	E	F
Physical Activity							
Total	33	235	188	226	178	163	177
Mean (Standard Deviation)		7.34 (0.97)	5.88 (1.44)	7.06 (1.19)	5.56 (1.76)	5.13 (1.21)	5.53 (0.97)
Overall readiness stage	6.08 (INITIATION STAGE)						
Healthy eating and drinking							
Total	33	229	187	214	181	168	143
Mean (Standard Deviation)		6.94 (1.43)	5.67 (1.73)	6.48 (2.14)	5.48 (2.06)	5.09 (1.13)	4.77 (0.42)
Readiness score	5.74						
Overall readiness stage	5.74 (PREPARATION STAGE)						

6.1.4 Interpretation of the Community Readiness Scores

6.1.4.1 Community efforts

The community efforts identified by the key informants are presented in **Error! Not a valid bookmark self-reference.** Generally, the initiatives had been in place for many years. Schools involved in this study varied in their approach to healthy eating and drinking policies. Whilst some prohibited unhealthy snacks except for one ‘treat day’ a week, others allowed a small unhealthy snack every lunch time. One school was considering implementing efforts and was in consultation with parents and another school was unsure whether it should tell parents what to do:

“There (...) is quite a concern about whether we [school] have any right to start telling people [parents] what they should and shouldn’t be putting in their children’s lunch boxes.”

Deputy Head Teacher, Least Deprived School

⁵ A=Community Efforts, B=Knowledge of Community Efforts, C=Leadership, D=Community Climate, E=Knowledge of the Issue, F=Resources

The readiness score for community efforts could be increased for healthy eating and drinking by implementing initiatives in settings which promote physical activity. For example, the contradiction of having vending machines stocked with unhealthy food in a community leisure service which promotes physical activity:

“There’s the big vending machines with chocolate in for them, when you’ve gone swimming, which seems a little silly.”

Parent, Most Deprived School

However, the SDO who worked in this leisure centre was reluctant to develop healthy eating and drinking efforts because he felt that *“we can give advice but then giving advice can lead to law suits.”*

To ensure school healthy eating and drinking policies are complied with, re-iteration of their importance and reminders for parents were viewed as necessary, particularly after school holidays:

“P: We promote [in schools] the healthy eating and we do (...) particularly for the younger children, we do give stickers out.

R: ok so that’s every lunch time?

P: It’s up in the air again at the minute because it’s after half term again and parents [think], ‘oh shove this chocolate in, you’ll be fine (...) have these crisps”

Teaching Assistant, Medium Deprived School

Whilst some parents disliked constant reminders from schools, others appreciated the compulsory nature of the school policies because it alleviated pressure on parents to provide children with unhealthy items. Unsuccessful school healthy eating and drinking efforts were explained by the perception that it is easier to give children what they like, which was perceived to be unhealthy food.

“It’s easier for parents to push rubbish into their box than think about it.”

Teaching Assistant, Medium Deprived School

In addition, the time and effort it takes to prepare healthy food and drink was perceived to be longer than for unhealthy items.

Exposure to physical activity and healthy eating and drinking efforts was perceived to influence the success of community efforts. Within the guiding movement, the groups tend to meet once per week and as a result there was a feeling that the messages delivered may have little impact on behaviours performed at home:

“We [girl guides] don’t have enough influence because if we are only there for an hour a week there’s not a lot you could do really.”

Girl Guide Leader

Improving the physical activity community efforts could begin by targeting those children who tend not to attend them and *“engender[ing] more participation”*. The sports coaches commented that the same children repeatedly attend community efforts. These children were perceived to be generally more active than those who do not attend and the Community Sports Coach (CSC) suggested efforts should be tailored to the needs of the least active children. Working parents may have limited time to transport children to different activities, reflecting support for activities which occur immediately after school:

“[There’s a] number of children who actually don’t get the chance to participate just because they haven’t got the transport or parents are working.”

Deputy Head Teacher, Least Deprived School

It is important to consider individual preferences for different physical activities, for example the FDO described offering football which he suspected might not be the preferred activity in which girls would want to take part and others described girls particularly enjoying dance:

“It’s about really knowing whether [we’re] offering the right things because obviously we’re offering football to them (...) but again is that one of the major things they [girls] want to play?”

The dinner staff key informant described the problem of girls being inactive at break time and added that if she said to the girls, *“right you can go in [to] school, put some music on and you can dance, they would do it.”* Enabling girls of this age to make their own choices was viewed as important for the development of preferences for physically active pursuits. However, the lack of resources prevented this approach: *“but there’s nobody in there to supervise them so they can’t”* Dinner Staff, Most Deprived School.

Table 6-3. Community initiatives

Type of initiative	Name	Description
Community based	<p>Family Lifestyle Club (FLIC)</p> <p>Girl Girl Guide: -Healthy Heart Badge -Cookery Change 4 Life</p> <p>Food labelling Holiday physical activity programmes Adopt a school</p>	<p>Eight-week targeted intervention for families with an overweight or obese child or those that would benefit from additional support identified through GP practices (395).</p> <p><i>“...those yellow leaflets from the government (...), which have the advert on the tele”</i></p> <p>Parent, Most Deprived School</p> <p><i>“We work with xxx primary school. And what they do is, we offer them the leisure centre, for free of charge (...) twice a week, I’d say two hours a week (...) because they haven’t got a sports hall, they come down and use our sports hall, so they’ll do activities so (...) we’ve done football, cricket, basketball, badminton, tennis, (...) and what we do is I get a coach to coach the first term (...) so (...) they bring in year 4, year 5 and year 6 they’re the three age groups that come down at some point during the term, they pick different classes. So let’s take year 5, they’ll come down and they’ll come down for two terms, I will coach, no they come down for one term, I will coach for the first 6 weeks (...) and I will teach the children say football, (...) and (...) I’ll tell the teacher, I’ll go through what I’m</i></p>

<p>Wild Card</p> <p>Dance classes Girls' football Cheerleading Sports clubs Equipment for sports Real Planning</p>	<p><i>going to do on my 6 weeks lesson plan, (...), these are the skills we do this is how we're going to do it (...) and then the following six weeks, I clear off and I let the teacher then, carry it on (...) so the idea is not only are we providing professional coaching for the children for them to do but we're up skilling the teachers"</i></p> <p>SDO</p> <p><i>"If you live in the Charnwood Borough and you're aged between 5 and 16 you can apply for a Wild Card. It gives you discounts in certain places it's not just sport but (...) the cinema (...) and I should think for a while if you held a Wild Card you could get into the swimming pools free but I think that's finished now (...)"</i></p> <p>Parent, Most Deprived School</p> <p><i>"(...) graffiti'd (...) swear words all over the walls so parents are refusing to take their kids there [park], (...) so that will be one of the things that the (...) [real planning leaders] are going to (...) to get cleaned off (...)."</i></p> <p>SSC</p>
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Family Based	Cook and Eat session:	<p><i>“(...) the lady from the Adult Learning Service she demonstrated cooking and preparing (...) a healthy meal which they then had to do at the same time and that was brilliant (...). We have had parents who would never engage with school before who were like ‘oh yeah I’ll come and do that.’”</i></p> <p>Teaching Assistant, Medium Deprived school</p>
School based	<p>Breakfast club Fruit tasting Cook and Eat Life buses</p> <p>Rewards for healthy packed lunches Food detectives (see Focus Group Results chapter)</p> <p>Cookery clubs Gardening club Food 4 Life (cooking bus) Allotments School fruit scheme School food policy</p>	<p>The Life Bus came to schools and covered a range of issues relating to health including diet (396).</p> <p><i>“We did food detectives (...) so (...) some of the year 6 children, the older children, were (...) coming into the hall when the younger ones were eating (...) and looking what was in their lunch box.(...) well sort of delving through it or whatever (...) and checking that they’d got a healthy lunch box and then they were giving out stickers.”</i></p> <p><i>“We went down a route of saying ‘ok at break if they bring an unhealthy snack, they will be asked to have it at lunch time’ with their lunch (...) ‘it’s saying to them that it’s ok</i></p>

School Food Support
Playtime physical activity

Afterschool clubs
School Sports Partnership

School trips
Curriculum
Cycling proficiency
Multi-sports
Physical Education
Little Leaders

to have it sometimes during the day and you know a moderate (...) amount of it but not all the time (...) So yes there was quite a lot of opposition to that.” Deputy Head Teacher, Medium Deprived School

Timetable of activities was used to make the most of limited playground space and equipment. However, this system appeared to not suit the older children for example, *“we found the Year 6 were acting silly with the stuff, so we had to ban them off that.”*

“(…) Over the last 5 years they’ve put a huge amount of money into school sports and P.E. and you know they’ve had a very good training programme as well you know the (...) know Partnership Development Managers, School Sports Co-ordinators and the PLTs have all been (...) given (...) a significant amount of opportunities.”

“We’ve got little leaders (...) that come into the playground the older children, year 6 children (...) and they do activities with the Key Stage 1 children (...) so they come and do sporty, (...) obstacle races and all sorts of things they come and do. (...) So they’re all trained up, someone comes in and gives them some training on how to talk to the little ones and you can’t push them in the line”

School active policies
Sports day
Star Walker (walk to school schemes)
Trim Trail (wooden climbing frame)
Equipment for sports
Curriculum
Life bus

National healthy school status

Teaching Assistant , Medium Deprived School

“The Healthy Schools programme is like the umbrella really (...) that brings everything [health policies] together”

6.1.4.2 Community knowledge of the efforts

The majority of key informants reported high community awareness of the efforts. However, those working in either healthy eating and drinking or physical activity areas seemed to have limited awareness of the efforts in the other area. Physical Education (P.E) has been within the curriculum for many years and was seen as a way of maintaining the community's awareness of the importance of physical activity, whereas healthy eating and drinking was believed to require promotion:

“P.E. is part of the curriculum, (...) it's just what they've been brought up with (...), it's inherent in them, (...) but with the healthy eating, it is by promoting it. As a school we have to promote it and by promoting it, the children become aware of it.”

Teaching Assistant, Medium Deprived School

Low parental engagement with schools was identified as barrier to community knowledge of the efforts. This may explain the need for written information to be sent to parents. However, sending letters to parents, detailing the available activities, was not always effective:

“Obviously through school, they get letters, so it's every child gets a letter, it's whether it makes it home (...). I've not always read all of them I think parents are guilty of that.”

Parent, Most Deprived School

Four word-of-mouth methods for communicating information were identified: 'parent networks' (*“I suppose its word of mouth really, yeah if a couple of the children go there then parents hear about it and they think oh that's a good idea”*), 'child to child' (*“The kids talking as well”* Parent, Most Deprived School), 'child to parent' (*“[daughter's name] will actually say to me, 'I have to take some fruit, otherwise I might get told (...) that I've got an unhealthy lunch box.’”* Parent, Most Deprived School), and 'school to parent via the child' (*“Can you tell mummy not to send it [unhealthy snack] again and can you take that home and eat it [unhealthy snack]?”* Dinner Staff, Most Deprived School). One deputy head teacher commented that children may be able to educate parents via the latter communication method:

“Children (...) will take the messages that you've given about healthy eating or smoking (...) home to parents and say 'look, (...) this is what we've learnt' and nag (...) at the parent and that is part of schools' role and I think sometimes that's the best way to approach it without getting parents' backs up.”

Deputy Head Teacher, Medium Deprived School

Some parents discussed disapproval of this method of communication:

“Friends of mine had (...) comments on the children’s lunch box when maybe just once they’ve put in a piece of birthday cake from a family member and it’s been frowned upon (...) and they felt a little bit judged that maybe you know that they always do things like that.”

R: ... how is that addressed, do teachers speak to the parents?

P: I think that’s one of the bug-bears (...) that people have said that the children have had the odd comment and the parents have been cross that they haven’t been spoken to about it.”

Parent, Most Deprived School

Personal responsibility to find information about community efforts was also advocated by key informants:

“You know there’s so much going on, you have to either really read the paper or talk to somebody and there’s a little bit of onus to actually go and seek these things out.”

Parent, Most Deprived School

The CSC felt that awareness of efforts varied depending on the community and discussed the relationship between awareness and participation:

“There’s some areas which have probably (...), if they knew about it they wouldn’t go anyway. (...) It’s a massive difference between communities and areas.”

CSC/Play Ranger

There was also variability in the awareness of what the National Healthy School Status and National Child Measurement Programme (NCMP) involved:

“R: how did the school get it [National Healthy School Status]?”

P: I think they’re awarded it (...) and I guess there is some sort of information that is submitted about lunchboxes and things like that (...) I guess it might be re-evaluated (...) a few years later to know whether they’ve still got that but I don’t know actually and I’m one of the governors at the school.”

Parent, Most Deprived School

“R: And could you get your child’s [NCMP] information?”

P: (...) I can’t really remember I think we just signed to say that we would give permission for her to be weighed and measured but I think it was on an anonymous basis.”

Parent, Most Deprived School

Finally, too much information about efforts was identified as a concern:

“I think people got a bit sick of hearing about it, so I think there’s a danger of over kill if we do much more.”

HSA

6.1.4.3 Leadership

The appointed leaders or influential people were predominantly supportive of physical activity and healthy eating and drinking behaviours in the community.

Two parents from the same, most deprived school both described the importance of the head teacher in effectively implementing school healthy eating and drinking policies:

“The healthy eating has been promoted much more aggressively since we had a new head teacher and she’s been in post three years the school did talk about healthy eating before but not to the extent that they do now.”

Parent, Most Deprived School

However, in the school where the head teacher was described in parent interviews as being particularly enthusiastic about healthy eating and drinking the focus group participants were the most upset about the school packed lunch policies:

“P1: they tried to confiscate chocolate bars and stuff off you (...) they’ve done it to me before, (...) I actually said to her ‘(...) I’m really sorry to be rude but do you mind, that is my food, my parents choose what I eat’...”

Small School, Least Deprived, 11 years

When discussing those to whom young people might turn for help to improve their healthy eating and drinking behaviours, teaching assistants were considered more approachable:

“[teaching assistants] tend to have a slightly different kind of relationship with the children, they’re more cosy.”

Small School, Least deprived

School councils consisted of a group of children consisting of “two representatives from every year” (Dinner Staff), which tended to be girls who “...seem more keen, more interested” than boys (SFA). Within School Council meetings the children “discuss what they would like to see promoted under healthy eating” they were also encouraged to conduct their own research such as a “survey of (...) the contents of a packed lunch” (Teaching Assistant,

Medium Deprived School) to inform recommendations for school food policy which was believed to be better received by parents and children because it was informed by what children wanted.

The SFA key informant reported working with Head Teachers and School Councils to improve the lunch time experiences. The SFA key informant also raised the role of the dietician with whom she worked. This dietician was reported to offer parents advice on children's dietary habits, particularly those with special diets.

At lunch times, within school, dinner staff and teaching assistants monitored children's dietary consumption to ensure they were not eating things which were against the school food policy, that they ate a sufficient amount and gave verbal reinforcement for trying different foods in their packed lunches. The dinner staff key informant also described informing teachers of instances where children had not eaten very much lunch so that parents could be informed:

“The ladies that serve the hot meals. If a child comes up and says, “I don't want that, I don't want that, I don't want that” they will encourage the child, they will put some on the plate and they will say ‘try it’ (...) and they really encourage them to try the meals.”

Dinner Staff

School nurses had three roles. The first was to advise *“the staff at school what they should be doing.”* Parent, Medium Deprived School. Secondly, the school nurse was identified as conducting *“height and weight checks so any issues would always be brought up by the school nurses and then if there was an issue with obesity or children who are underweight then it would be taken up and it will be addressed.”* Teaching Assistant, Medium Deprived School. Thirdly, the school nurse directly talked to the pre-adolescent girls about health issues *“I think within sex education talk as well, they talk about healthy eating and promoting that.”* Teaching Assistant, Medium Deprived School.

One mother viewed the media as pressurising individuals to consume healthy diets to avoid becoming overweight. Messages through the media could be healthy or unhealthy, for example advertisements between children's television programmes were perceived to include, *“just (...) junk mainly.”* (Parent, Medium Deprived School) or were *“trying to make it fun about ‘5-A-Day’ and all that sort of thing.”* (Parent, Most Deprived School).

The majority of the seven key informants, who talked about Jamie Oliver, saw him as an important influence who acted as a good source of information in relation to school dinners. A Jamie Oliver television programme about school meals was also used to illustrate parental disagreements with school food policies:

“I know Jamie Oliver had a sort of a massive influence at the time sort of getting these (...), new meals into schools and the healthy eating, (...) I know there are a lot of his work still going on.”

FDO

However the SFA key informant who previously talked about the danger of over-exposure to information about healthy eating and drinking, used Jamie Oliver as an example of too much information: *“Jamie Oliver (...) programmes didn’t do us an awful lot of good I have to say, probably more harm than good. And I think people got a bit sick of hearing about it.”*

Leadership support for physical activity could be improved. One deputy head teacher commented that his community lacked key leaders for PA promotion:

“People of my age are the people who seem to be carrying sport on rather than younger people who are coming into the [teaching] profession and my worry is that (...) in 10 or 12 years’ time I don’t see a natural successor to take on the role that I take on across other schools. (...) And if it wasn’t for me constantly sending out emails and things (...), I don’t see anyone else in that group who’d do it.”

Deputy Head Teacher, Most Deprived School

An explanation for this lack of leadership could be the increasing demands on teachers’ time which meant that they had less time available to run afterschool clubs; and when they did give their time to these activities they resented the low child participation:

“There is that feeling, sometimes, of you put on a club and only 5 kids want to come along, is it worth your giving up 45 minutes of your time? Which means those 45 minutes have got to be found at another time to catch up with what you’ve missed.”

Primary school teachers were not always very enthusiastic or confident about teaching P.E, although this was not a universal opinion:

“There’s no P.E. teachers in particular [who are] specialists in primary schools which I think is a massive problem (...) so the quality varies massively (...), some teachers are really enthusiastic and some (...) just go through the motions.”

CSC/Play ranger

The SSC role within schools was to “*provide either PPA [teacher’s planning time] cover or actually (...), do the P.E. lesson.*” The SSC believed coaches and teachers took different approaches to teaching P.E. lessons.

“Teachers just don’t want to put that bit extra into it, (...), they’ve got like a check list, (...) ‘we’ve got to get them doing, this, this and this in order to meet national curriculum level 4.’ (...). Whereas I think coaches, which is definitely a positive of the sports coaches, (...), because I’m always telling them ‘yep that was better because you got (...) a better swing on that, that’s why the ball went further’. (...) So we can pick at those technical points and give them that to feed on (...).”

SSC

Although the SSC offered teachers an opportunity to gain additional expertise, those with whom she worked often would not assist her and would leave the room.

“I don’t think they really enjoy doing P.E. I get that feeling, (...) they’re just like ‘yeah you take them.’”

SSC

However, concern about the expertise of external coaches was expressed:

“I worry with people we’ve had come in to deliver some of the programme in school, (...) outside agencies, I don’t think they really (...) understand what is required. (...) and I think that often you get somebody in and then you end up with a person in who’s here to get the money and they don’t understand how to deal with kids of that age. It leads to discipline problems and we have to pick up afterwards.”

Deputy Head Teacher, Least Deprived School

6.1.4.4 Community Climate

Whilst most key informants reported that the community would not tolerate inactivity unless a child was unwell, low physical fitness in girls was felt to indicate a degree of tolerance:

“I’d say there should not be [situations where physical inactivity is tolerated] but I think there clearly are (...) the majority of children are, I would say grossly unfit, (...) can’t take part in sustained exercise for very long at all.”

Deputy Head teacher, Least Deprived School

A preference for convenience was also perceived to mean inactivity was tolerated:

“They’ve [primary school] set up this park and stride. You park at the church and walk up. The last hundred yards. Not many people use it (...) because they’re too lazy because that would be walking that little bit further.”

Parent, Medium Deprived School

Inactivity tolerance within schools was justified for two reasons: the weather (meaning teachers do not want to supervise children outside) and the national curriculum (resulting in pressures on academic performance and a tendency to value curriculum subjects included in national assessments):

“It’s a bit cold today we won’t go out, or we’re a bit busy, or we’ll carry on with this for a bit longer and so things start to get a little bit shrunk.”

Deputy Head teacher, Least Deprived School

Some girls in the community, develop a negative self-perception of their abilities in physical activity and become reluctant to participate:

“I think maybe some have a negative perception of what sport is and actually (...), they don’t perceive themselves as a (...) sporty person so they don’t really want to take part in sport because (...) they’re worried what other people might think.”

FDO

In addition, some girls, particularly as they reach 10 to 11 years of age, were felt to view physical activity as not being “*particularly cool*” (Girl Guide Leader):

“Year 6 [10-11 year olds] girls in particular will just sit around, because it’s like they’re too cool for that school now (...) so they are in a transition stage. All they do is sit on a bench (...) and chat.”

Teaching Assistant, Medium Deprived School

Unhealthy dietary consumption was reported as a ‘reward’ or ‘treat’ and acceptable as long as it is a small component of children’s diet or the consequence of time restrictions:

“R: (...) Do they come in after school on their way home to get a couple of bags of...

P: (...) Yes that’s probably our sort of busiest time, they get treated, some of them do, to a bag of sweeties if they’ve been good.”

Shop-keeper

The move away from traditional nuclear families towards a situation where children potentially spend less time with individual family members was seen as contributing to changes in practices related to healthy eating and drinking:

“I think it’s become more acceptable (...) that if they see a parent once a week, (...) ‘I’ll treat you to McDonalds’. (...) It’s a treat to eat unhealthily but if you do that three or four times a week (...). It’s just it comes into the (...), general life.”

SDO

The convenience of unhealthy finger foods was seen as contributing to unhealthy dietary consumption as demonstrated by children’s inability to use knives and forks:

“It’s quicker to give them something that comes out the microwave or take them to a fast-food place. (...) One of the really surprising things over the last few years is the number of children who actually don’t know how to use a knife and fork (...) I think this (...) gives a picture of what, (...) might be going on at home the fact they don’t actually sit down and eat properly very often, a lot of it is finger food.”

Deputy Head Teacher, Least Deprived School

The SFA defended the school meal’s tolerance of desserts because they were providing a nutritionally balanced diet:

“But desserts aren’t necessarily unhealthy no, so everything that’s on the school menu, it’s balanced over the fortnight’s menu so there aren’t too many sugars in there. There aren’t too many fats.”

SFA

In contrast children bringing packed lunches were banned from consuming any unhealthy snacks.

The SFA described situations where parents had been angry about school healthy eating and drinking policies. The HSA believed that parents did not object to children eating healthily, but that they objected to the child’s school dictating to them:

“There are some parents who don’t want to be told you know what they should be giving their children to eat in their packed lunch. So I get quite a few phone calls from irate parents.”

HSA

School healthy eating and drinking policies appeared to have been developed without consultation with parents:

“I don’t know whether they ask very much for the views of parents (...) The lunch boxes that was just sort of announced that this is what we’re going to do so it’s not always as collaborative as maybe it could be.”

Parent, Most Deprived School

6.1.4.5 Community knowledge about the issue

There was mixed awareness amongst community members about the causes and consequences of unhealthy eating and drinking and low physical activity. There appeared to be two categories of parental knowledge. The first described performing healthy behaviours with their family and as a result perceived messages to promote child health as not directed at them:

“I don’t necessarily take an awful lot of note of what the government are saying because I think, (...) the government aren’t necessarily talking to me.”

Parent, Most Deprived School

The second category reported that parental knowledge of healthy eating and drinking was poor:

“If you look at our school there are a lot of overweight girls (...) and I don’t think always there is the knowledge and the association between healthy eating and the size that these children are. I think there’s sometimes the perception that the children are just like that because that’s how they’re built.”

Parent, Most Deprived School.

This study found that both ‘experts’ and parents found it hard to understand the physical activity guidelines because they were perceived to be constantly changing:

“The government keep changing, (...) so they’ll say that a child of that age needs to be active, they need to [do] moderate activity, half-an-hour a day and then they’ll change it to one hour every week.”

SDO

The interpretation of guidelines was problematic because individuals were unsure how to assess different intensities of activities without the use of physical activity monitors:

“What constitutes moderate and what constitutes severe activity? (...) Say if you slightly raise your heart rate? What do I tell a kid, ‘have you slightly raised your heart rate?’”

SDO

Others had no awareness of the recommended levels of physical activity and instead adopted a ‘common sense approach’ to monitoring children’s physical activity (e.g. tiring children out).

The knowledge and awareness of the prevalence of physical activity and healthy eating and drinking behaviours in pre-adolescent girls was considered to be limited in the community:

“P: I have never looked, again I guess if you go on I don’t know, Leicestershire County Council websites I’m sure they’ve got stats about comparing schools, activity, comparing against the National Average (...) I don’t know to be totally honest”

Parent, Most Deprived School

The local authority key informants described having statistics relating to these behaviours but did not disseminate or publicise these to the public beyond placing information on websites.

6.1.4.6 Resources

Resources in this community were available to support healthy eating and drinking and physical activity efforts but were subject to political priorities.

Funding for programmes is predominantly “cyclical” (CSC, Play Ranger). The SDO described the funding priorities as changing target age group.

“The older [funding bid] one used to run from (...) 5 to 16 year olds. The new pot runs from 14 to 25 year olds.”

A change in government resulted in funding priorities shifting towards schools taking responsibility for their own National Healthy School status:

“The next stage, which is Healthy Schools Enhancement, (...) is about focusing on a school priority, (...) that’s particularly pertinent for their school and actually do some work in a little bit more depth to actually achieve some meaningful outcomes around health and wellbeing priorities. (...) Quite a few schools for example have chosen things like obesity so you know, (...), working towards achieving some meaningful outcomes around physical activity and also healthy eating in order that they can actually do their bit to (...) you know trying to prevent (...) obesity.”

Government funding cuts resulted in a feeling of resentment from the HSA:

“We’ve gone from a situation (...) where we have the Every Child Matters agenda which is basically about children’s wellbeing (...), to a very kind of like sort traditional, (...) idea about, (...) the main things that are important are (...) passing exams (...) and discipline in

the classroom. So I'm just hoping that schools will be able to sort of resist you know (...) letting (...) health and wellbeing fall off the agenda (...)"

Some key informants reported evaluating the community efforts they provided although publicising these findings was limited. For example, the holiday physical activity efforts, provided by the local authority were evaluated and the results of this evaluation were used to make improvements:

"We had (...) an evaluation session after the summer about how we [coaches] thought the programme had gone with the kids and what we thought worked well (...). So they are getting everyone's opinions, because we sent out a poll to parents as well."

Gymnastics Coach

However, the results from this evaluation were then displayed in an area not often seen by the community.

One SDO reported evaluating the geographical areas from which children who attended activities had come from.

"We send all the postcodes where the kids have been from (...) to Charnwood Borough Council. We then try and map where the people have come from. (...) So you look at the areas and go right there's no one coming from this bit. Have we not marketed to them, if so why didn't it work?"

In some instances relatively little evaluation had been applied, although one key informant considered evaluation a good idea for the future. Where no evaluation was conducted, low participation in community efforts resulted in a sense of helplessness because the reasons for non-attendance could not be elicited. Time restraints, particularly for voluntary organisations, were given as a reason for not performing in-depth evaluation of initiatives:

"I don't do it [child and teacher evaluations] anymore because (...) it takes too long, by the time I've processed everything. (...) It's a totally voluntary organisation that (...) people do and, at the end of the day, (...) I, (...) want to encourage, rather than discourage."

Deputy Head Teacher, Least Deprived School

Several community members were identified as volunteering to help run and support community efforts, including: parents; teachers; sports leaders (high school students who received training to become qualified coaches) and Girl Guide Leaders. The main barriers for volunteers were: Criminal Records Bureau checks and time restrictions. Volunteers for

healthy eating and drinking initiatives were reportedly less common than for physical activity programmes.

There was a general agreement that businesses such as local convenience shops were unconcerned about promoting healthy eating and drinking behaviours because they were most concerned about making a profit: *“I would say as long as they’re making their profit, they’re not, (...) particularly bothered about what people are buying”* Parent, Most Deprived School. The shop-keepers interviewed reiterated this and also said they provide what consumers demand and if consumers demanded healthier options then they would provide it: *“...we supply the demand of whatever it is they want”* Shop-keeper.

The availability of unhealthy food and drinks through local businesses was discussed as a facilitator of unhealthy dietary consumption by the majority of key informants: *“Unhealthy food is available, so if you take for example our shops, you’ve got (...) a fish and chip shop, a pizza place and then a bread shop and (...) a sweet shop (...) and then a butcher’s which has a shelf with fruit and veg’ about that big on it. So if you actually went down our shop section you would probably find 80% of it is relatively unhealthy (...). So (...) I think sometimes the easy availability of junk food is a worry.”* Girl Guide Leader/Parent.

One teaching assistant from a medium deprived school commented on the different resources available to large compared to small businesses:

“I mean the big companies, usually promote it because it’s all over the supermarkets, because they’re wanting to sell their fruit and vegetables obviously but the smaller companies haven’t got the means to promote it.”

Additional support for the positive role of large businesses such as supermarkets in promoting health behaviours is shown below:

“When you say healthy eating and drinking you usually think of the supermarkets don’t you? With the tokens that they do and schools certainly collect all the tokens from Sainsbury’s® had the sporting kit. Morrison’s® had the ‘grow your own vegetables’ thing they used that. (...)”

Parent Most Deprived School

Neither of the shop-keepers recognised that they had a role within the community in relation to girls' health behaviours and they were unaware of the wider community's attitude towards health or the available initiatives promoting healthy behaviours. For example when asked, *"do you see yourself as an influence upon children's eating?"* one shop-keeper laughed as he responded; *"oh I don't know about that, we do try and point them in the right direction sometimes."* Previous experience had taught shop-keepers that fresh produce had a short shelf life and was not purchased. This was explained by shopping habits where convenience shops were not used to buy an entire week's food supply. In one of the shop-keeper's view, shopping practices were perceived to be shifting towards healthier choices, *"We sell more still drinks now than we used to"* although predominantly the choices were still unhealthy, *"but we still sell a lot more fizzy drinks than still drinks."*

When asked what the attitude of local businesses was in terms of supporting physical activity programmes there were two types of responses. Firstly, some said businesses might have sponsored sports clubs, although this was described as a contradiction in that fast-food restaurants might sponsor a sports team and this wasn't viewed as the best health promotion message:

"(...) I know one of the teams have a big deal from Frankie and Benny's® [restaurant] (...) I know it's contradictory with playing football or a team sport and then you're being sponsored by I don't know, lard company or something like that, you know (...) [Laughs] but it's the way sponsorship works I'm afraid. It's not, you know in an ideal world we would want it to be ethically right in terms of (...) healthy eating and that sort of thing but in reality it's who's got the money (...)."

CSC/Play Ranger

A positive example of local businesses collaborating with a primary school in the Charnwood Borough community is detailed below:

"The only time we have something to do with businesses is when we are doing a charity event for the school, to raise money for the school but we did actually put in a (...) 'Trim Trail' in school last year. So we did actually get help locally actually as well because (...), we asked all local companies if we raised so much would they help in matching that so a few local companies did."

Teaching Assistant, Medium Deprived School

6.1.4.7 Social gradient in health

Considerable social disparities in health have been documented (see Literature Review Chapter). It is often difficult to reach those in the lowest social positions with health promotion initiatives, therefore it is essential that research such as this, which is concerned with community attitudes and conditions, attempts to access those in all social positions. In this section the findings relating to the social gradient in health from the focus groups and key informant interviews are presented. In the focus groups, a comparison of themes was conducted across deprivation categories. The majority of themes relating to healthy eating and drinking behaviours did not display any differences according to deprivation level; however there was some variation in themes relating to physical activity. In the key informant interviews, the views of two unemployed parents exemplify the characteristics of a deprived community. These findings are supported by the comments of other key informants, including the views of the only participant from an ethnic minority group.

Focus groups

At the individual level, the focus groups conducted in the least deprived schools tended to refer to external encouragement (e.g. the Olympics) to be active more than the other groups. Only girls in the least deprived groups reported that fulfilling future sporting ambitions and self-determination were motivations for being active. The parents of the least and medium level deprivation groups were more likely to be described as having been active in their childhood. Similarly, the majority of quotes regarding parental participation in children's activities were made by the least and medium level deprivation groups. The most deprived groups reported parent networks as a positive influence on their activity levels more than the least and medium level deprivation groups. Children in the most deprived groups could be taking part in more informal activity and therefore have more opportunities to be active with friends which would require parent networks. In support of this, most comments about playing in the local area with friends were made by the most deprived groups, whereas the medium level deprivation groups were more likely to report playing at friends' homes. The most deprived groups were less likely to report engaging in organised sporting activities and thus made few comments about sports clubs and coaches compared to the least and medium level deprivation groups. The least and medium level deprivation groups were the only groups to report parents buying them physical activity equipment. The least deprived group made no comments about safety concerns, whereas the most deprived group had concerns

about traffic, public houses, bullies and one participant had been prohibited from the local play park due to parental concerns about safety.

“P4: There’s like a pub across the road and like when the footballs on you can hear them shouting and...”

P1: yea that’s annoying, that’s annoying sometimes, when you are trying to sleep.

P4: and there’s this man, you might have seen him, he’s like in a blue jacket, and he’s a dwarf and XXXX and he swears and it scares you.”

Large School, Most Deprived, 10, 11 & 10 years

The least deprived groups also made the majority of comments about the limitations of poor weather conditions in relation to being physically active and their parents were likely to use good weather as a tool to encourage activity. One of the four most deprived groups commented on the importance of physical activity for maintaining a desirable body shape. Similarly one of the most deprived groups described siblings talking about not becoming overweight. The most deprived groups were the only groups to discuss gender portrayals within the media and the different use of men and women in advertisements for slimming products (women only) and physical fitness machines (men only). The most deprived groups made less mention of the C4L initiative compared to the other groups. This may mean that this group were less aware of this health campaign than the least and medium deprived groups. One of the least deprived groups was the only group to discuss active compared to inactive transportation to school and the time constraints in taking active transport. Finally, only the most deprived group reported inter-teacher variability in encouraging P.E.

Key informants

Community characteristics

The characteristics of the community depicted by two unemployed, obese (self-defined) parents living in what they termed a ‘deprived area’ are presented in Figure 6-1 and exemplified in the quote below:

“I think it’s [education] a big thing, because of the poverty in the area and I think a lot of the children come from families that don’t work and so I think it is a big [thing], poor education more [in] the parents.”

A lack of motivation and mental health conditions within this community were thought to contribute to low activity levels:

“A lot of people in this area have got depression so to actually get out and do something with their children is hard for them.”

This couple commented that there are *“a lot of obese people on this estate”* and complained that the pharmacist in the chemist offered inadequate weight loss advice through a slimming club:

“She doesn’t actually have a qualification in dietician, (...) you know healthy living basically.”

In line with this statement, when asked about the influential, important or key people working to promote physical activity behaviours in girls aged 7-11 years within this community these participants responded:

“Especially in this community, there’s not many at all.”

Although unemployed, this couple were both actively seeking work and as part of this endeavour were volunteering for a youth group within their own community. As part of this role, the couple were very keen to find some outdoor space they could take the younger age group to be active:

“P: (...) with us as a community group, we’ve looked into the possibility or could we use the school playing field, one weekend to do something with the kids and they’re [local primary school] not interested are they?”

It is common and understandable for community groups, particularly those who may feel as though they exist on the fringes of society, to want to do things for themselves. The quote above also relates to the poor relationship between parents and the school in this deprived area:

“I think they’ve [teachers] got a very snobbish attitude towards parents in this area .”

The main method of making the community aware of this youth group was through word-of-mouth communication, indicating that it is essential that the youth group leaders are members of the community in which they are running the group. Although being a member of the community was an advantage because of the ability to talk to other members about the youth

group, the cliques within this community made communication with the whole community difficult:

“There’s a lot of divide between families as well (...) they’ve got little pockets where they stop in and it’s all cliquy and you know (...) it’s quite intimidating when people come into a setting like that.”

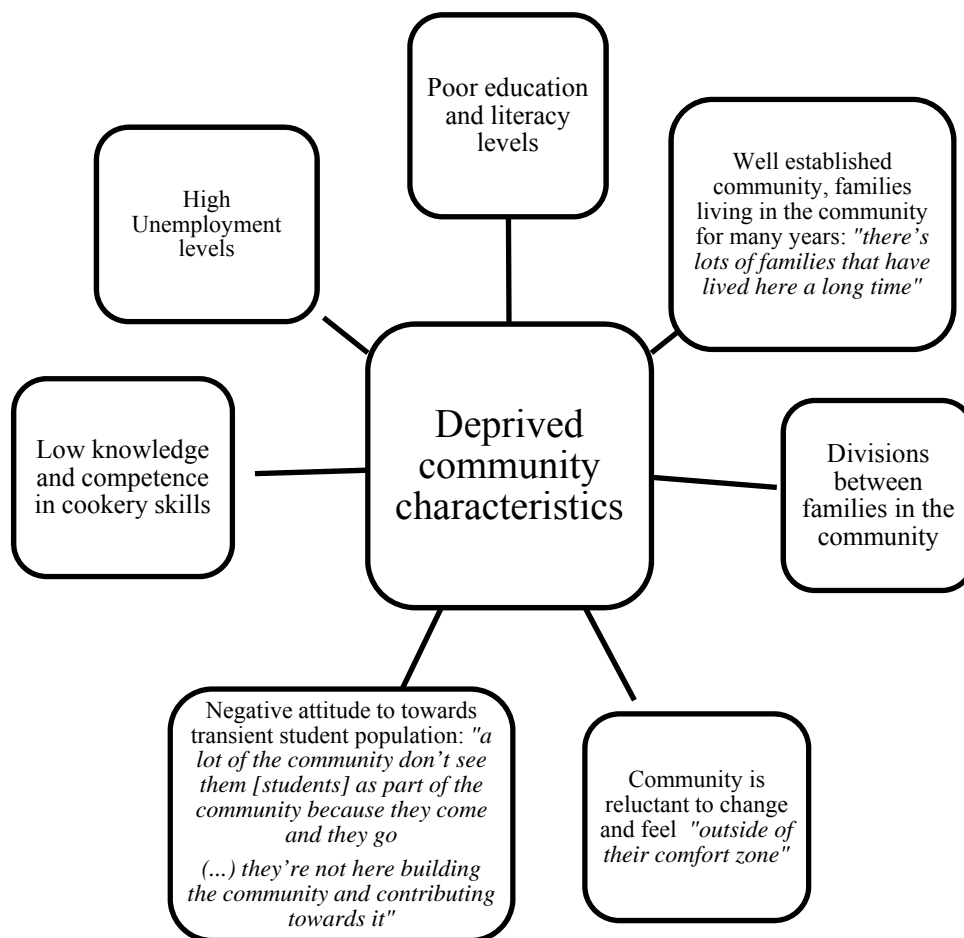


Figure 6-1 Characteristics of a deprived community

Access to physical activity efforts

The SDO highlighted the difficulty of providing accessible initiatives which can reach those in the lowest social positions:

“Some different communities and ethnic groups don’t ... understand what their Leisure Centre is and what they offer.”

Co-ordinated efforts between this SDO, Youth Services and local schools were in place to improve the awareness of the Leisure Centre amongst ethnic minority groups. The SDO working in this area viewed parents as important predictors of child engagement with the Leisure Centre because *“most of the kids that come in to our activity clubs are from the parents who use the Centre”*, therefore, *“if you can’t engage with them [parents], then you’re not going to engage with the child.”* Efforts to engage the parents of ethnic minority children were seen as important. These efforts included working with a school that has a high ethnic minority population:

“We did a bit of work over half term with, like, a multi sports. We had about 5 or 6 girls turn up to that was much better in a way of engaging with them. But still it’s all about educating the parents.”

SDO

Another example of the attempt to engage with Bangladeshi parents was the Leisure Centre closing the swimming pool to men to allow Bangladeshi women to use the facilities:

“We get some of the Bangladeshi ladies to come in and do some swimming, like privately ‘cos obviously, like, they can’t swim with males.”

SDO

It is not only ethnic minority groups who were believed to perceive the Leisure Centre as inaccessible. The *“priority neighbourhoods”* surrounding the other large Leisure Centre in the Charnwood Borough were described as viewing the Leisure Centre as not for them:

“(…) they see it as a big shiny building that has been put up in their local area, that’s not for them because the people that use here, you’ve got people from [affluent villages] that are quite wealthy and they’ll come here and people who are in the local area don’t feel like they can come here so, from our point of view, that is a big barrier and we do try and break that down but cost is a massive issue.”

SDO

Therefore perceptions about who services are designed for, may prevent not only ethnic minority groups but also lower social position groups from accessing facilities.

Proximity to initiatives was also fundamental for involvement. There was a clear need for efforts to be brought to low social position communities because the cost and time involved in transportation limited the mobility of these communities:

“(…) they’ll [children] bring a leaflet home for holiday activities and it’s in xx or xxx [two large city’s approximately 20-40 minutes’ drive away] and obviously we don’t drive and also it’s probably 25, 30 pound for the week which when you’re on benefits is an awful lot of money.”

Unemployed parents, Most Deprived School

This perception of inaccessibility can be contrasted with the opinion of physical activity providers. For instance the HSA was quite confident that the whole community could access the physical activity opportunities:

“I think the main strength you know is participation and that you know everybody can participate because I think there’s literally something for everybody.”

This perception suggests a lack of awareness of the need to improve accessibility for those in lower social positions.

Whilst the play ranger and CSC role within this community involved bringing efforts to disadvantaged areas (as described below) there was a perception amongst the two unemployed parents that this scheme involved crafts rather than physical activity.

“So it’s just playing with the kids, it’s a great job you know and we also do creative play sessions with them in areas like the xxx, round there (…) we go to xxx difficult areas in (large town) xxxx trying to engage the parents and children from an early age.

R: So is it particularly in areas where there might be, they might not be engaging in sport?

P: Not necessarily, the remit is it’s funded by Big Lottery and the remit is to go into targeted areas (…) deprivation or social problems and also rural areas.”

CSC/Play Ranger

The cost of activities, exacerbated by the number of siblings particularly within families, was an important determinant of whether children could participate and even the providers of initiatives considered them to be expensive:

“...one of our courses is three pound ninety for a session and it’s an hour session, so it is quite a lot of money for the parents when, say, if they’ve got two, three kids...”

SDO

In agreement with this statement, unemployed or low income households with large families, reportedly could not afford expensive activities which meant that access to physical activity opportunities was perceived to be limited within this community:

“...cost is a big thing especially in this area ‘cos some of them have got like four children, (...) and like we say, if our daughter goes [to afterschool clubs] three or four times that’s three pound to us, but to them that’s like £12 if they’ve got four children you know which is a lot out of your budget. I know you get money from social and whatever but it’s still a lot out your budget.”

The cost of physical activities was also a perceived barrier for the Hindu mother who commented that even when children can go swimming for free the adult still has to pay:

“(...) Leisure Centre they say under 16 children is swimming is free but if we go my with adult one, to have another one in the class yeah my money, so end of the day nothing is free.”

Access to suitable, safe, play areas in the ‘deprived’ community was limited:

“...the parks not very good

R: what do you mean it’s not very good?

P: a lot of people won’t go down there because there’s a lot of glass round there and the council do their best to clean it up, because we’re always complaining about it but it’s just, I don’t let my daughter down there. Teenagers use it, they hang out, smoke and drink so we take our daughter to the parks outside the area rather than inside the area”

Unemployed parent, Most deprived school

Subsidised efforts

The SDO key informant considered universal initiatives such as the WILD card as problematic because not everyone needs the price of initiatives to be discounted:

“...You want to make sure that people can afford to do it, but then also you don’t want to be seen to be benefiting a group that probably could afford it and (...) you’re stopping people who can’t afford it at all.”

SDO

However, as one key informant proposed, it is likely that some family groups almost qualify for the subsidisation of initiatives. Those families also lack resources but cannot receive subsidised initiatives:

“(...) I think there are some (...) families that are caught between that though, they (...) don’t qualify for the opportunities fund, they don’t see themselves as being particularly well off, so they will very much have to make choices about which activities they do.”

Girl Guide Leader

Within the Girl Guides those who could not afford to attend were offered subsidised rates. However a barrier to the provision of subsidised activities was a perceived reluctance amongst families to request additional support.

One Girl Guide leader suggested that children from families in lower social positions are more likely to experience the barrier of poor family organisation e.g. problems with organising childcare to transport children to activities.

“...lower sort of (...) income family where there’s less organisation going on. Just in the way they sort of get through the week. Those girls will sometimes miss out on activities (...) and you know why but it’s quite difficult to intervene and prevent that, you know you can ring up and say ‘well she said she wanted to come and she’s not here.’”

Girl Guide Leader

Access to healthy eating and drinking efforts

There were many opportunities to engage in unhealthy dietary practices and limited opportunities to engage in healthy behaviours within lower social position communities:

P: (...) they need to make it so that the fresh food is more available as well (...) we’ve got a chip shop, Chinese, we’ve got a convenience store (...) the post office sells sweets and chocolate and biscuits (...), but doesn’t sell fresh fruit, the convenience store, the fresh fruit is never very fresh and not very nice, the veg is even worse and it’s very expensive (...) and then we’ve got the Spa [convenience shop] (...) which sometimes the Spa does do offers (...) which is pretty good (...) and I say to people ‘oh they’re doing an offer in the Spa, you know.’”

Unemployed, Most Deprived Parent

Cost

The cost of healthy produce, relative to the cost of unhealthy produce was also commented on as a barrier to healthy eating and drinking:

“(...) something’s got to come from the government to change food laws (...), I was talking to a friend the other day about apples, we used to pay 79pence for 6 apples (...) now when we buy some apples they’re £1.69 (...) how big a difference is that, that is ridiculous (...)but you can go and buy a packet of biscuits for sixes, for 30p (...). They can educate us all they want but (...) when it comes down to it we walk into a shop(...).”

Unemployed, Most Deprived Parent

This quote highlights the greater influence of price compared to the knowledge of healthy dietary practices.

Poor cooking skills

One of the unemployed parents, from the most deprived community had previously worked within a different community teaching cookery skills to parents, she was keen to set this programme up in the community youth group and was waiting to hear whether she had passed her food hygiene qualification:

“They’re [youth group members] saying they want to do cakes and biscuits and stuff like that whereas I want to do basic eating with them and basically the healthier option, you know still sweet stuff but (...) also teach them to have a proper meal, rather than going for the sweets and the chocolate and the crisps, teaching them to cook something basic.”

This parent also suggested that parents could benefit from an educational programme teaching cookery skills as this had been missing from parents’ education:

“I think it’s more parents, because they tend to do more in schools now about healthy eating, [but] there was a big gap (...) where the parents they stop learning at school, the healthy eating side and the cooking and things and I think that needs to come back to the parents now to gain that knowledge again.”

Despite this recognised need for education and behaviour change, the willingness to change was seen as a barrier in this community:

“Some of them will go ‘oh I can’t change and they don’t want to change now.’”

Awareness of community efforts

School key informants discussed low parental engagement with schools, particularly those families who might need extra support. Low parental engagement with the school may explain the need for written information to be sent home because face-to-face communication may be impractical. Alternatively, poor engagement with school from those with low literacy levels and language barriers could be explained by the use of ineffective written communication:

“My bugbear is there’s low literacy skills (...) in this area so that’s not always easy, a parent that can’t read will just put that to one side or chuck it in the bin.”

Unemployed mother, Most Deprived School

The SFA key informant believed the community had adapted well to communicating with families where the parents could speak limited English by using children to translate:

“P: Language barrier sometimes, because we have parents from other cultures that don’t speak particularly good English the children speak fantastic English but the parents don’t so often we’ll say we’re always open to people coming to see us and the children will interpret, fantastic (...) I think [largest town in the Charnwood Borough] great for dealing with, (...) any barrier like that because there are so many organisations around and so many teachers and head teachers are used to dealing with people that don’t speak particularly good English.”

SFA

Efforts were made in one school to encourage engagement with priority groups through initiatives run by a children’s mentor who “(...) does often contact the parents directly and try to get [them] involved.” (Teacher, Medium Deprived School). Similarly, in two interviews, the Family Outreach Worker, who worked with vulnerable families, was mentioned. This role involved working with vulnerable families to ensure child health and wellbeing:

“It is making sure that the parents have got access to all the services that are out there. Parents might come to me directly or schools might say there is an issue and I’ll take it up or school nurse might come and (...) yeah it might be quite complex and there might be (...) you know the multi-agency forums where all of the agencies, health, police, social services you know occasionally I have to take some things there as well so we all make sure I think as a whole around you know we do look after the children.”

Teaching Assistant/Family Outreach Worker, Medium Deprived

Religion and culture

The mother who described herself as Hindu offered some insights into the values and opinions of this community. This participant described making healthy offerings to the gods which meant that her community's diet must also be healthy to reflect what is offered:

"(...) we offer the gods very healthy food like you know like I said Chapattis, rice and things like that so we not offer the god meat and drinks (...). So we don't eat that way (...)"

Within this community their religious beliefs advocated a healthy mind and body in children and adults which they believed were achieved through prayer and dietary consumption:

"They're children, growing healthily, makes their brain and thoughts (...). We're taught the food is main importance how to cook, how to say a pray and eat because that affects your mind and thinking and emotions (...) we are [inaudible] vegetarian in our home and nobody drink, smoke (...)."

Religious festivals were occasions when unhealthy diets were tolerated. These festivals were not only limited to the Hindu religion:

"(...) like festivals and things come, sweets yeah, dessert and yeah fried things and oily, (...). We've got lots of festivals come and [inaudible] recipes and food even in English cakes and things, Christmas celebrate and, like, Easter coming, so we giving children Easter eggs (...)."

Although these occasions were described as exceptions to the rule: *"But we do certain, but we keep an eye, not always on these things."*

This key informant reported that her community members were increasingly aware of the association between diet and the development of chronic disease and the intergenerational transmission of these diseases as a result of changes to diet patterns and lifestyle:

"(...) the whole community nowadays is more conscious about the healthy food because everybody's parents, your grandparents, their in-laws, yeah, somebody got diabetes, blood pressure, high cholesterol some is running in the family (...). So people are more yeah nowadays more conscious about the food and healthy eating's and in our custom men can kill what we eat you know but in here [this country] we can't. And now more people are conscious, not eating much ghee and oily things."

In ethnic minority groups, it may be particularly important to acknowledge the central role of mothers within this community with regards to food provision:

"She [mother] more involved with the children (...), so mother is the most (...) so if mother is more aware and information she counts so the whole family is beneficial. Daddy also is need

to know, but mother is cooking, mother is preparing dinner, mother is giving child you know to eat (...)

R: (...) so would you say mother's are more important or more influential than fathers? In terms of health, for children?

P: Yeah because father is sometimes works from morning to night, they not cook and not preparing dinner but yeah, (...) so mother is more, you know, with the child, their whole, more time spent with children so mother. Parents also, yeah, I mean father's also know everything yeah, but their part is little, mother is the main one."

Hindu mother, Most Deprived School

This mother suggested that children from ethnic minority groups may feel different to other children with regards to diet, physical activity, appearance and cultural values:

"(...) some might be children who are too good in some activity and some not, you know they're getting frustrated and like going down and you know their self-confidence and persistence is going yeah I think and sometimes (...) I say [laughs] (...) if it's not (...) similar background you know? Origins. (...)"

This participant was the only key informant to comment on the association between time spent being physically active and academic achievements. Academically, children were felt to benefit from physical activity as it may help them to concentrate more on their school work. This was important to this parent who stated:

"They're more concentrate, work and things, they're not lazy."

However this same parent also commented that too much time spent being physically active would leave less time for academic activities: *"(...) [If] they going every day after school you know. Out, out, out. Then come home and eat and bedtime, no study their work is suffer."*

One teaching assistant commented on the different cultures within her school:

"We had at one stage (...) some of the Philippino children used to just bring a Madeira cake. A full Madeira cake that was their lunch. (...) The thing is you don't know whether they've perhaps had a late breakfast so it's just a snack as it were at lunch time (...) because they know they're going to eat later on in the day (...) so you know, it's different cultures as well (...) it comes down to cultures."

The same teacher discussed religious festivals and related cultural practices which had to be accommodated and supported by schools:

“A lot of it comes down to culture. If it’s Eid they can’t eat between, is it sunrise and sunset? (...) It’s just cultures, different cultures and basically it’s just falling in with everyone’s culture. You’re not pushing onto someone [something] that they really know themselves that they shouldn’t do.”

Teaching Assistant, Medium Deprived School

This key informant was commenting on the importance of acceptance and tolerance of different cultural practices which was also seen as important across generations within families in minority groups:

“Perhaps some of the grandparents [say], ‘no you can’t do that, because it’s not the done thing’. So perhaps the younger parents are thinking, ‘well grandma says that no they can’t do that’ but it could be adapted, that yes they can have a try and no they’ve not got to strip off and do it in their vest and pants as it were. Yes they can do it in the clothes that they need to keep on but it can be adapted to fit the child and the situation.”

Teaching Assistant, Medium Deprived School

The flexibility to modify active pursuits to suit different cultural views may help contribute towards the acceptability of and participation in physical activity by minority groups. In addition, as highlighted here, it is crucial to understand who the community gatekeepers are within different cultures and what their views are towards different initiatives. For example, if the grandparents in some ethnic minority groups are the key to engendering participation in physical activity amongst young children then initiatives aimed at understanding their beliefs are necessary.

6.2 Key informant interview results chapter summary

The purpose of this chapter was to present the findings of the key informant interviews using the Community Readiness Model. In this community, readiness appears to be slightly higher for Physical Activity (6.08) behaviours than for healthy eating and drinking (5.74) behaviours. This can be partially explained by the following: the length of time physical activity has been a part of the community’s culture; the limited dietary initiatives operating beyond the school setting and; the disagreements between schools and parents regarding school food policies. It would seem the general consensus suggests that dietary initiatives are more contentious than physical activity initiatives in pre-adolescent girls in this community.

Chapter 7 Community Readiness Model Discussion

7.1 Introduction

This Chapter firstly presents a discussion of the key informant interviews. Secondly, Throughout this discussion Chapter, connections between the focus groups and key informant interviews are identified. this Chapter discusses the strengths and limitations of the CRM in relation to its application in a UK setting. Finally the results from both the focus groups with pre-adolescent girls and the key informant interviews are used to formulate recommendations for a tailored, community intervention designed to prevent overweight and obesity in pre-adolescent girls.

7.1.1 Community Readiness Score

The overall CRM stage achieved for healthy eating and drinking (5.74) was the ‘Preparation Stage’ and the physical activity score (6.53) reached the ‘Initiation Stage’. It is recommended that communities at these stages of readiness should be approached with the strategies displayed in Box 7-1 (33).

Preparation Stage

Goal: Gather existing information with which to plan strategies

- Conduct community surveys.
- Sponsor a community event to begin the initiative.
- Conduct public forums to develop strategies from the bottom up.
- Utilise influential people to speak to groups and participate in local media events.
- Plan how to evaluate the effectiveness of the initiatives.

Initiation Stage

Goal: Provide community-specific information

- Conduct in-service training on Community Readiness for those involved in the study.
- Plan publicity efforts associated with start-up of initiatives.
- Attend meetings to provide updates on progress of the initiatives.
- Conduct interviews with community members to identify gaps in the initiatives, improve existing initiatives and identify key places to post information.
- Begin research for additional resources and potential funding.
- Begin some basic evaluation efforts.

Adapted from Plested et al. 2006. Community Readiness: A Handbook for Successful Change (p26)

Box 7-1 Strategies related to the Preparation and Initiation Stage of Readiness

It is important to make recommendations based on: the overall readiness stage; the scores of key informant subgroups (e.g. teachers, dinner staff, parents etc.); the variability of these scores; and the scores for each dimension (e.g. Community Efforts etc.). Indeed the authors’ state that community readiness should be at approximately the same stage for every dimension before overall efforts can be successful (33). Efforts therefore should be focused initially on the lowest scoring dimensions as well as the lowest scoring key informants.

7.1.1.1 Subgroup analysis: readiness scores for key informant categories

The highest healthy eating and drinking readiness score was achieved by the government initiative leaders (HSA and SFA) (APPENDIX C Systematic Literature Review

APPENDIX D Focus group questioning route

Topic	Questions	Probe questions
Community	What does the word community mean to you?	What things do you find in a community? Who is part of your community? Who do you see and talk to daily?
Physical Activity definition	What does it mean to be physically active?	Are we being physically active now? What activities do you do at school? What activities do you do out of school?