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The implementation of a family-focused lifestyle programme for managing childhood obesity in the community setting in Ireland

A thesis submitted to the National University of Ireland, Cork for the degree of Doctor of Philosophy in the School of Public Health

October 2017

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LIST OF ABBREVIATIONS

ABBREVIATION	TERM
BMI	Body Mass Index
CCLaS	Cork Children's Lifestyle Study
CCSM	Closed Cohort Simulation Model
CI	Confidence Interval
COI	Cost-Of-Illness
CVD	Cardiovascular disease
DEIS	Delivering Equality of Opportunity in Schools
EST	Ecological Systems Theory
GP	General Practitioner
GUI	Growing Up in Ireland
IOTF	International obesity taskforce
NICE	The National Institute for Health and Care Excellence
PHN	Public Health Nurse
RCT	Randomised Controlled Trial
SAGO	Special Action Group on Obesity
SDS	Standard Deviation Score
UCC	University College Cork
UK	United Kingdom
WHO	World Health Organisation

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DECLARATION

I declare that this thesis has not been submitted for another degree at this or any other University. The work, upon which this thesis is based, was carried out in collaboration with a team of researchers and supervisors who are duly acknowledged in the text of the thesis. The library may lend or copy this thesis upon request.

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so far) but I promise from now on I'm all yours. I'm looking forward to raising a glass to 'The Fam' this Christmas… this one is on me!

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THESIS ABSTRACT

Background and aim

Childhood obesity is a significant public health issue. International guidelines continue to recommend family-focused, multicomponent, childhood weight management programmes despite limited evidence on their effectiveness or implementation in real-world settings. In 2014, the Irish Health Service proposed a national pilot of the *W82GO-community* programme. The overall aim of this thesis was to investigate the barriers and facilitators to the implementation of *W82GO-community* and explore the factors influencing family engagement.

Methods

W82GO-community aimed to improve nutrition, increase physical activity and facilitate behaviour change in children aged 5-7 years who measured ≥98th percentile over one year. It was piloted in two community sites by two multidisciplinary teams from April 2015 to April 2016. Firstly, a qualitative study was conducted to explore implementation from the perspective of 29 national and local level stakeholders responsible for implementing the programme including professionals from dietetics, psychology, public health nursing, physiotherapy, health promotion and administration. Framework analysis was used to identify barriers and facilitators which were mapped onto a well-known implementation framework. Secondly, a systematic review of international literature was carried out to investigate what factors influence attendance at similar community-based lifestyle programmes among families of overweight or obese children. This was followed by another qualitative study exploring public health nurses (PHNs) experiences of referring families to, and families' feelings of being referred to, *W82GO-community.* It also investigated family's motivation to participate in and complete treatment. Finally, in light of findings from the aforementioned studies a cross-sectional analysis of data collected as part of the Cork Children's Lifestyle Survey (CCLaS) was conducted to identify factors influencing parent and child misperception of child weight.

Results

For all stakeholders, barriers to the implementation of *W82GO-community* arose due to the multidisciplinary nature of the programme, including the lack of role clarity and added complexity of working in different locations. Furthermore, a lack of parental engagement, as evidenced by low enrolment and retention rates, presented a further challenge for programme implementation. Of the 121 children who were eligible for initial assessment, less than half of families accepted the invitation and of those who presented, 19 subsequently started the programme. Just eight families completed the *W82GO-community* programme. The systematic review on barriers and facilitators to family attendance and retention found that parents are largely driven to enrol because of a concern for their child's psychological health and wellbeing. However, the stigma surrounding excess weight and the denial of the issue amongst some parents presents significant barriers to enrolment. The systematic review findings also suggest that over the course of a programme, children's positive social experiences such as having fun and making friends foster the desire to continue participating

in treatment. Results from our qualitative study involving PHNs and parents who participated in *W82GO-community* found that both PHNs and parents were fearful of the referral process. They had concerns about both the practicality of making the referral and the significance of the referral on the health and wellbeing of the child, respectively. Despite these initial fears, parents concern for their child's future was a major driver behind their participation. Finally, the cross-sectional analysis of CCLaS data highlighted that 45% of parents of overweight/obese children underestimated their child's weight and this was influenced by child age and child misperception of own weight. 77% of overweight/obese children misclassified their own weight.

Conclusion

This thesis provides critical evidence on the complexities associated with implementing a multidisciplinary childhood weight management programme in real-world settings. It provides practical recommendations to guide future policy makers, programme delivery teams and researchers, in particular, when developing strategies to boost recruitment, minimise attrition and subsequently enhance effectiveness. Findings highlight the profound limitations of family-focused, community-based, weight management programmes and confirm the critical need for broader societal intervention.

Chapter 1. Thesis Summary

1.1. Introduction

The World Health Organisation (WHO) predicts that Ireland will be one of Europe's most overweight countries by 2030 [1]. With seven percent of the nation's children obese [2], childhood obesity is at an unacceptably high level [3] and the costs for children, their families and the health service remain substantial [4].

Although ambiguity surrounds the most appropriate method for treating childhood obesity, international guidelines continue to recommend family-focused programmes that combine healthy eating, physical activity and behavioural components [5-7]. In line with this, the Department of Health in Ireland proposed a national pilot of the *W82GO-community* programme. This family-focused, group-based, multidisciplinary programme aimed to improve nutrition, increase physical activity and facilitate behaviour change in children aged 5-7 years who measured ≥98th percentile over one year.

While data from efficacy and effectiveness trials are available little is known about the implementation of these programmes in *'real-life'.* End users of clinical and public health research require evidence on what will work for them and, in the case of public health interventions, their communities [8]. Implementation research offers us the opportunity to provide this evidence by adopting a pragmatic approach, taking interventions from isolated effectiveness studies and applying them more broadly in '*real-world'* settings. Understanding the processes and supports required to implement the programmes at a local level may have both economic and health benefits.

There are relatively few examples of published studies reporting on the pragmatic application of effective childhood obesity treatment programmes [9-12]. While implementation issues such as engagement, local context, staffing and funding are likely to be common across many public health interventions [10], little is documented about the experience of those implementing childhood weight management programmes and even fewer studies detail the factors influencing implementation [13]. When introduced under less-controlled conditions, insight into the factors influencing implementation is crucial.

1.2. Overall aim and objectives

The primary aim of this PhD was to conduct a pragmatic evaluation of the barriers to, and facilitators of implementing *W82GO-community*, a government-funded, multi-component childhood weight management programme, in two Irish communities an explore the factors influencing family engagement.

The objectives were to:

1. Critically examine the implementation of *W82GO-community* to identify barriers and facilitators experienced by staff involved in programme implementation;
2. Synthesise the international literature investigating the factors influencing both initial and continued attendance at community-based lifestyle programmes among families of overweight or obese children;
3. Understand PHN and parental perceptions of referring to, and being referred to, *W82GO-community,* identify the factors that motivate families to accept this referral and ascertain the factors encouraging parents and children to complete treatment;
4. Determine parent and child misperception of child weight and identify factors associated with this misperception.

1.3. Research context

In terms of previous personal experience, in 2008 the PhD candidate completed a BSc in Public Health and Health Promotion from University College Cork (UCC) and in 2010 went on to complete a Masters in Public Health, specialising in Health Protection, also from UCC. Both qualifications provided her with a deep understanding of, and skills in, research methods, epidemiology and public health. Following her MPH, the candidate was employed for three years as a human health and nutrition research fellow for UCC and *safe*food, a government body responsible for the promotion of food safety and nutrition on the island of Ireland. In this post she conducted numerous literature reviews which provided the rationale for research proposals and campaigns – most notably her work on the recent national childhood obesity campaign *"Let's take on Childhood Obesity – One small step at a time"* which instilled in her the passion to delve deeper into this important issue. Her work at *safe*food allowed her to travel across the island to work and collaborate with various research institutions, community organisations, health professionals and policy makers. Her educational achievements together with her work experience enabled her to secure a four-year scholarship on the prestigious Health Research Board PhD Scholars Programme in Population Health and Health Services Research (SPHeRE) in 2013. Therefore, for the work conducted during this PhD, the candidate was supported by the Health Research Board SPHeRE/2013/1.

In an attempt to identify a universal weight management treatment programme the Irish Health Service Executive (HSE) planned to pilot two community-based programmes; *W82GO-community* and *Lifestyle Triple P. W82GO-community* was developed from the well-known programme *W82GO* that originated in Temple St Children's University Hospital in Dublin where it had previously demonstrated effectiveness [14]. Details of the *W82GO-community*

programme will be provided in chapter one. In summary, the programme invited children who measured above the 98th percentile and their parents to participate in a group lifestyle programme which aimed to improve nutrition, increase physical activity and facilitate behaviour change over one year [14]. It was grounded in behavioural change theory [15, 16] and modelled on best practice recommendations [6, 7]. The second programme, *Lifestyle Triple P*, was developed in Australia by Triple P International using a social learning approach whereby parents act as the main motivators for change in their children [17]. It is a parent-only programme that addresses diet, physical activity and positive parenting over 16 sessions. The effectiveness of both programmes (*W82GO-community* and *Lifestyle Triple P*) when delivered in the community setting by community-based health professionals was to be evaluated with the intention of a possible nationwide rollout should either programme demonstrate a positive impact on children's body mass index (BMI).

Unfortunately, a lack of parental engagement meant that local leads decided not to pilot *Lifestyle Triple P*. In terms of *W82GO-community,* National Health Service management decided that it would be implemented and evaluated in four pilot sites. Of these four sites, two pulled out of the pilot due to a lack of staff and resources available on the ground. Therefore, just two sites progressed to pilot the programme. Finally, issues encountered during referral to *W82GO-community* in these two pilot sites suggested that research into the effectiveness of such programmes should not be our primary concern. Programmes cannot be effective if families are not willing to participate. Therefore the focus of this PhD shifted toward programme implementation and identifying the factors influencing engagement.

1.4. Thesis outline

This thesis is comprised of four original research studies which address the aforementioned aim and objectives. These studies are illustrated in figure one and presented in chapters three to six.

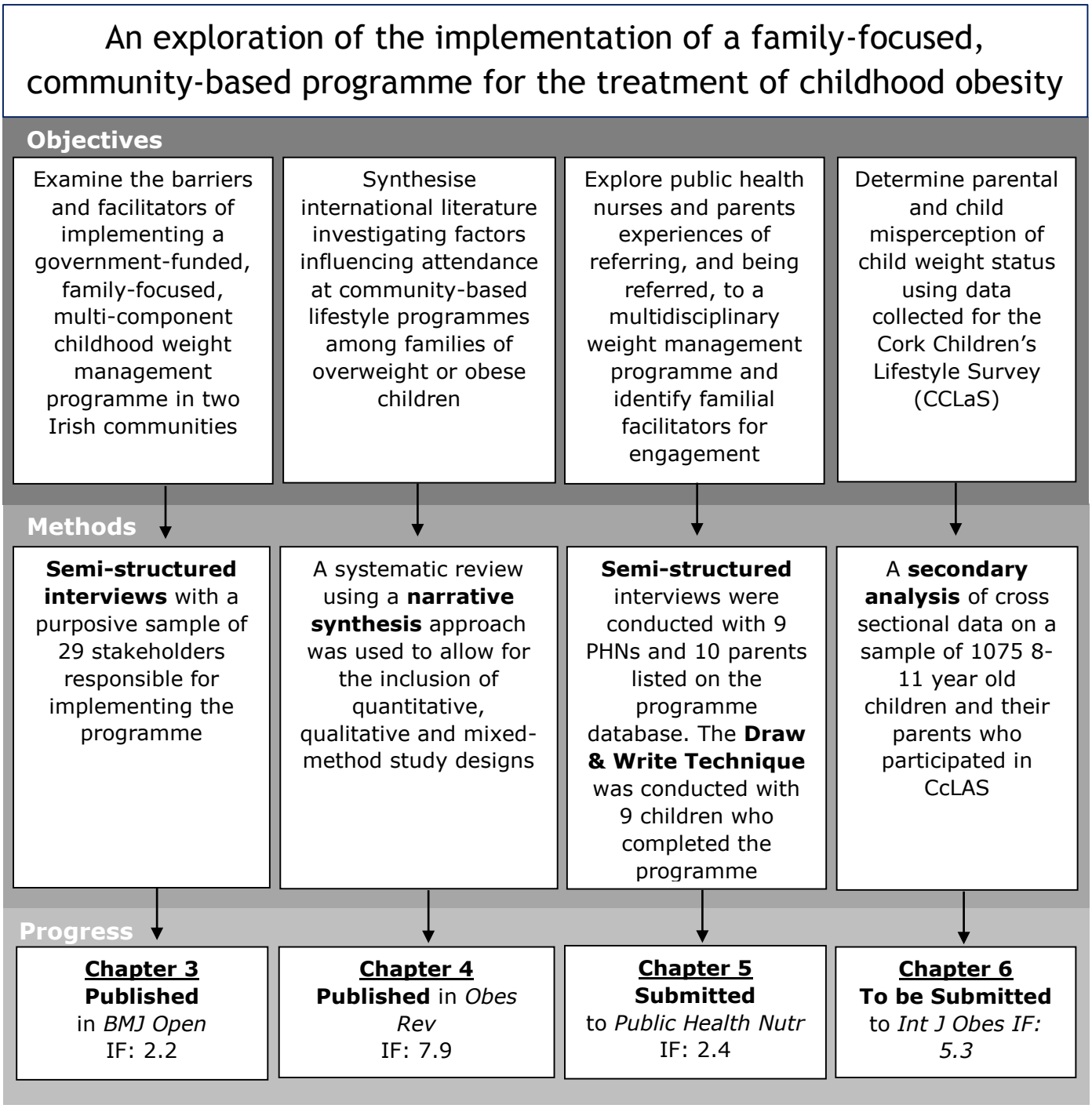

Figure 1 PhD Thesis Outline

The qualitative study presented in Chapter three was conducted to explore the barriers and facilitators experienced by those implementing *W82GO-community* - a government-funded, community-based, childhood weight management programme [18]. Framework analysis was used to identify barriers and facilitators which were mapped onto six levels of factors influencing implementation outlined by Grol and Wensing [19]: the innovation, the individual professional, the patient, the social context, the organisational context, and the external environment. Results suggest the assignment of clear roles and responsibilities, the provision of sufficient practical training and resources, and organisational support play pivotal roles in overcoming barriers to change. This study highlights the complexities associated with implementing a multidisciplinary childhood weight management programme, particularly translating such a programme to the community setting.

Chapter four presents the results of a systematic review that investigated factors influencing attendance at community-based lifestyle programmes among families of overweight or obese children [20]. A narrative synthesis approach was used to allow for the inclusion of quantitative, qualitative and mixed-method study designs. Results suggest that parents provide the impetus for programme initiation and this is driven largely by a concern for their child's psychological health and wellbeing. The denial of the issue amongst some parents as well as the stigma surrounding excess weight present barriers to enrolment and warrant further study. This chapter provides practical recommendations to guide future policy makers, programme delivery teams and researchers in developing strategies to boost recruitment and minimise attrition.

Chapter five presents the results of a qualitative study conducted to explore PHNs experiences of referring to, and families' feelings of being referred to *W82GO-community* and

provides insight into family's motivation to participate in and complete treatment. This chapter provides evidence of the difficulties of referring families to community weight management programmes in Ireland and provides practical suggestions on how to support those who refer. Findings also reveal the factors influencing uptake and completion of community weight management programmes including parental concern for child health and child's enjoyment of the programme, respectively. These motivations should be maximised by staff and decision-makers when developing similar programmes.

Unless children or their families perceive their weight status correctly, their acceptance of weight management programmes is likely to be low. The research conducted as part of this PhD revealed that parental misperception of weight was a key barrier to attendance and subsequently the successful implementation of *W82GO-community*. The cross-sectional analysis presented in Chapter six provides evidence of parent and child misperception of child weight. In accordance with the literature, the primary findings suggest that both parents and children misperceive child weight status and this misperception was greater amongst overweight and obese children. We conclude that initiatives aiming to treat and manage childhood obesity should target the subgroups identified in this chapter to increase their awareness and encourage their participation.

Finally, Chapter seven is an in-depth discussion of the findings with policy considerations and recommendations for future research. This thesis provides critical evidence on the implementation of a multi-component, family-focused, childhood weight management programme delivered by healthcare professionals in a *'real-world'* scenario where issues including staff shortages, low resources and heavy workloads are likely to impact success. Findings will be (and in some cases have been) used to inform programme developers, public

health policy makers and national and international stakeholders on the implementation of childhood weight management programmes in Ireland.

1.5. Authors contributions

The PhD candidate was the lead author of each research paper presented in Chapters three, four, five and six. This involved formulation of the research question for each chapter, conducting literature screening, data collection and analysis, and drafting each manuscript. Data collection for chapters three, four and five enabled her to work closely with the multidisciplinary team tasked with implementing the programme as well as those families who participated in the programme. A significant amount of time was spent on planning a pragmatic and timely approach to data collection to coincide with participants' hectic work and family life schedules as well as her PhD review and dissemination deadlines.

Chapter 2. Background

2.1. Overview of background

This chapter provides a brief overview of childhood overweight and obesity. Firstly, it describes how BMI is defined in childhood and summarises the prevalence of childhood overweight and obesity in Ireland and worldwide. Secondly, it discusses the individual and public health consequences of excess weight in childhood and summarises best practice recommendations for the treatment of childhood obesity in the community against what is currently available in the Irish context. Finally, factors influencing the implementation of community-based weight management programmes are discussed.

2.2. Defining childhood obesity

Childhood obesity can be defined as an excess of body fat and while several methods exist for measuring this body fat, BMI is the most feasible method in practice. It remains the most commonly used and most well defined measure of childhood obesity [21]. Therefore, in this thesis, childhood obesity is defined using BMI.

2.2.1. How is BMI calculated and defined?

BMI is a valid, non-invasive, inexpensive and convenient method of determining childhood obesity [22] and is easily calculated using the formula weight (kg) divided by height $(m)^2$. It is widely used in the adult population and the cut-off points of ≥25 kg/m^2 and ≥30 kg/m^2 are recognised worldwide as definitions of adult overweight and obesity, respectively. Classification is not as straightforward in children. As children grow, their BMI changes with age and differences exist between boys and girls. As a result, age and sex-specific growth reference percentile charts and corresponding z-scores have been created [23]. Z-scores, also called BMI standard deviation scores (SDS), allow for comparisons of anthropometric

measures by standardising the measure relative to a reference population. Reporting and comparing BMI between child populations is further complicated by the availability of a number of national and international reference charts [24] which produce different estimates [25].

This thesis refers to two reference charts; the UK90 recommended cut-off points [26] currently used to define childhood overweight and obesity in Irish practice and the age and sex specific International Obesity Taskforce (IOTF) cut off points [27] which are recommended for use in research [28]. The UK90 charts ('UK90') were produced in 1995, based on data from several surveys, conducted between 1978–90 and including around 30,000 participants [26]. Using UK90, children are classified as obese if they plot ≥95th centile for population monitoring or ≥98th centile for clinical assessment. The latter cut-off (≥98th centile) is recommended by the National Institute for Health and Care Excellence (NICE) for use in clinical settings with individual children. The UK90 charts and clinical assessment cut-off for obesity (i.e. ≥98th centile) were used by the PHNs during screening and referral to *W82GO-community* and are presented in Chapter three. The IOTF thresholds, published by Cole *et al.,* in 2000, were derived from BMI data from six large, nationally representative, cross-sectional surveys from Brazil, Great Britain, Hong Kong, the Netherlands, Singapore, and the United States [27]. They were designed to correspond to the statistical distribution of adult overweight and obesity and have high specificity but low sensitivity [29]. They originally assigned children into a category of either underweight, normal weight, overweight or obese but in 2012, the cut-offs were updated and extended to allow BMI to be expressed as centile scores [30]. The IOTF thresholds were used to categorise childrens weight in the research paper presented in Chapter six of this thesis.

2.3. Childhood overweight and obesity – The current situation

Globally, it has been estimated that 170 million children are either overweight or obese [31]. While there is a multitude of work showing a slowing down and possible decline in its prevalence [32-34], the current plateau is at an unacceptably high level [3] and the costs for children, their families and health services remain substantial [4].

2.3.1. Childhood overweight and obesity in Ireland

Several studies have examined body weight status in children in Ireland during the past two decades and show that almost one in four are currently carrying excess weight [2] (Table 1). Results from the 2014 Cork Children's Lifestyle Study (CCLaS)[35] show that 20% and 6% of participating children were either overweight or obese, respectively. Nine percent of girls were categorised as obese compared to four percent of boys [3].

Table 1 Data on childhood overweight and obesity on the island of Ireland

Study	Year of collection	Age (year)	Overweight (%)		Obese (%)	
			Girls	Boys	Girls	Boys
Irish National Nutrition Survey [36]	1988-9	8-12	10 (girls & boys)		2 (girls & boys)	
North-South Nutrition Survey [37]	2002	4-16	21	17	7	6
National Children's Food Survey [38]	2003-4	5-12	20	15	9	4
National Teen's Food Survey [39]	2005-6	13-17	15	15	3	3
Growing Up in Ireland (GUI) [2, 40]	2007-8	3	19*(girls & boys)		6*(girls and boys)	
		9	22	17	8	5
WHO Obesity Surveillance Initiative [41]	2008-2010	7	19	14	8	5
		9	18	15	5	4
National Preschool Nutrition Survey [42]	2010-2011	2-4	17	13	2	3
Cork Children's Lifestyle Study (unpublished)	2012-2013	8-11	20	20	9	4

*Gender specific data has not yet been released for GUI infant cohort

2.4. Causes and consequences of childhood obesity

Obesity is caused by a chronic energy imbalance involving both dietary intake and physical activity patterns. Although the mechanism of obesity development is not fully understood, it is known that it is a multifactorial disease as a result of a dysfunctional system [4]. Familial factors, psychological factors including depression and anxiety or self-esteem, environmental factors, cultural beliefs and practices, and lifestyle preferences all play major roles in the high prevalence of obesity worldwide.

The problems of childhood obesity have been widely documented. Children who are obese are likely to remain obese through to adulthood [43] and to develop certain chronic diseases including cardiovascular disease (CVD), type two diabetes mellitus and some cancers.

Furthermore, an obese child is not only at increased risk of disease later in life but also at risk in the short term of several co-morbidities [44]. Obese children are more likely to suffer various orthopaedic and neurological conditions, breathing disorders and psycho-social problems [44]. Obesity also has wider economic consequences including health care costs [45].

2.4.1. Short term consequences

Children with obesity suffer a number of immediate health consequences (Table 2) [44, 46]. Substantial evidence supports the association of childhood obesity with multiple cardiovascular risk factors including hypertension, dyslipidaemia, chronic inflammation, increased blood clotting tendency, endothelial dysfunction as well as hyperinsulinaemia [47-51]. It has also been linked to various pulmonary complications including sleep apnoea [52], asthma [53], and exercise intolerance [54].

Table 2 Prevalence of co-morbidities in overweight and obese children, adapted from Lobstein et al., [44]

Co-morbidity	Studies	Aggregate Sample (n)	Prevalence among obese children (%)
Hypertension	17	5690	25.8
Hypercholesterolaemia	8	2030	26.7
Hyperinsulinaemia	4	938	39.8
Impaired glucose tolerance	14	2699	11.9
Type 2 diabetes mellitus	9	1851	1.5
Metabolic syndrome (three factors)	7	1540	29.2
Fatty liver (steatosis)	7	900	33.7

Results from a 2013 study of Irish primary school children (n=102) suggest that significant CVD risk factors are present in Irish children as young as ten years of age [55]. Researchers found that six per cent of the group had total cholesterol levels above the recommended cut off

point and half of these children were overweight or obese. Clustering of CVD risk factors was described as having three or more of the following risk factors: overweight/obese, elevated total cholesterol, elevated blood pressure, decreased physical activity (<1h/day) and decreased physical fitness (below the mean for gender). Authors found that 28% of children had no risk factors, 32% had one risk factor, 24% had two risk factors and 16% had three or more risk factors. Several of these risk factors are often present in the same person and this clustering is associated with an increased risk of CVD. Results of this study show that 94% of those with clustering had physical activity levels below what is recommended. Of the children who did participate in one hour of physical activity a day only two per cent showed clustering of CVD risk factors [55]. In addition to these findings, results from the 2014 CCLaS study revealed that 18% of children were hypertensive and a further 12% were prehypertensive (Keane *et. al.,* unpublished).

Obese children are also more likely to develop emotional and psychosocial problems, including low self-esteem, the associated feelings of anxiety and isolation, as well as the subsequent involvement in risky behaviours [44, 46, 56]. Of importance to this thesis, is the existence of weight-related stigma and its effect on the health and well-being of children with obesity. There is a literature base demonstrating that overweight and obese children and adolescents are targets of societal stigmatization [57]. This research suggests that overweight and obese youths are victims of bias and stereotyping by their peers [58-62], educators [63-65], as well as their own parents [66-68]. As a result they suffer psychological, social, and health-related consequences including low self-esteem, depression and body dissatisfaction [57].

2.4.2. Long term consequences

Childhood obesity also has long term consequences for health [69]. Up to 50% of obese children will become obese adults [70] and are likely to carry into adulthood any co-morbidities they suffered as a child [71, 72]. As obese adults, these children are more likely to develop certain chronic diseases including CVD, type two diabetes mellitus and certain cancers including kidney, breast and endometrium [73].

2.4.3. Economic consequences

Obesity is also associated with both direct and indirect costs at a societal level. As mentioned above, obesity is linked with higher risk for several serious health conditions and the direct medical expenditure on the diagnosis and treatment of these conditions is likely to increase. Indirectly, obesity has been linked to loss of productivity and job absenteeism [74].

The cost of adult obesity has been widely reported and in Ireland, the direct and indirect costs of overweight and obesity were estimated at €1.13 billion [75]. Of this, 35% of total costs (€398 million) represented direct healthcare costs i.e. hospital in-patient, out-patient, general practitioner (GP) and drug costs while two thirds (65%) were indirect costs in reduced or lost productivity and absenteeism and amounted to €728 million [75].

Less is known about the economic consequences of childhood obesity. Estimates from the United States report that 14.1 billion dollars is spent on outpatient costs, accident and emergency visits and prescription costs relating to child and adolescent obesity, per year [76]. Inpatient costs account for almost 240 million dollars each year [77]. A recent study conducted by Perry et al., 2017 *(unpublished*) provides the first estimates of the current and lifetime costs of childhood overweight and obesity for Ireland. The current cost estimates

incorporate direct healthcare costs whereas the lifetime costs take into account additional indirect costs such as productivity losses due to absenteeism and premature mortality, as well as income losses that are borne during adulthood. The results of this study suggest that the current annual direct healthcare costs amongst children attributable to childhood overweight and obesity for the Republic of Ireland (2015) are estimated at €1.7 million using a standard cost-of-illness (COI) analysis and €1.3 million using the Closed Cohort Simulation Model (CCSM)-based approach. The projected lifetime costs from the CCSM analyses (including indirect costs) to the year 2105 that are attributable to overweight and obesity are €4.6 billion. The indirect societal costs account for 79% of total estimated lifetime costs. For the Republic of Ireland, the estimated excess lifetime cost attributable to childhood obesity/overweight discounted to 2015 values is €16,036 per person. The findings from the CCSM suggest that a one percent and five percent reduction in population mean childhood BMI would be associated with a €270 million and €1.1 billion reduction in projected lifetime costs, respectively (unpublished). Childhood is therefore a critical time for the implementation of effective prevention and weight management initiatives.

2.5. Body weight misperception

While the prevalence of excess weight has increased steadily in recent years, there is a growing body of evidence that proposes a large proportion of the population fail to recognise themselves or their children as overweight or obese [78-83]. This can happen for a variety of reasons and may constitute an important barrier to dietary and lifestyle change.

2.5.1. Children's perception of own body weight status

Research suggests that children who correctly perceive their overweight status may be more likely to engage in healthy lifestyle behaviours or encourage their parents to get involved [84-

88]. Unfortunately, evidence suggests that children are likely to misperceive their weight status [2, 89-96], particularly those children who are overweight or obese. A recent European study of found that 43% (n=479) of overweight/obese children underestimated their weight status [94]. In Ireland, the Growing Up in Ireland Report (n= 8,081) on Overweight and Obesity Among 9-year-olds reported that of those measured as overweight, only 15% (n=1213) perceived themselves to be overweight [2]. For those measured as obese, the proportion perceiving themselves as overweight increased to 35% (n=2828), however, this meant that 65% (n=5252) saw themselves as *'about right'* or underweight [2]. Little is known of the factors influencing this misperception however one plausible explanation may be that being exposed to overweight and obesity in society makes it harder for children to recognise normal body weight [90].

2.5.2. Parents perception of child's body weight status

The majority of research into perception of child weight focuses on parents and reports that parental misperception of child weight is also common. Research shows that parents of overweight children systematically underestimate their children's weight [97]. Previous reviews report that ≥50% of parents fail to correctly identify their child as overweight [79, 81-83, 98, 99], a trend that appears to be increasing over time [81]. In Ireland, the GUI Report on Overweight and Obesity Among 9-year-olds, found that some parent's perception of child weight status disagreed significantly with BMI assessment [2]. Fifty four per cent of parents of overweight children (n=4392) and 20% of parents of obese children (n=1627) reported that they are *'about the right'* weight for their height [2]. Secondary analysis on GUI found that mothers are more accurate when classifying their child's BMI than the children themselves [78]. Furthermore, the authors reported that overweight mothers are better raters of their

child's BMI, compared with normal or underweight mothers and a child's self-perceived weight status influences the mother's ability to correctly classify the child [78].

Several studies suggest that this misperception may be due to various non-modifiable determinants of health including parental education [100-102], child age or gender [79, 102-104], lower child birth weight [105] and ethnicity [101]. However, the results of these studies have been inconsistent and where some have reported significant associations, others have not [79, 98, 99, 106-110].

Misperception may also be due to a number of potentially modifiable factors. Firstly, through qualitative research, Jain *et al.* and Rich *et al.* offered some insight into the reluctance of mothers to acknowledge overweight in their children [111]. Results suggest that a distrust of weight charts, fear of being blamed, unwillingness to label their child as overweight or believing they would grow out of it were key factors [111, 112]. Furthermore, it has been suggested that parents may not recognise overweight in their children to avoid acknowledging and taking responsibility for their own overweight [113, 114]. Furthermore, given the prevalence of overweight children worldwide it is also possible that changing social norms mean that parents simply do not recognise overweight in their children [110, 115, 116]. In a study conducted by Newson *et al.* authors suggest that denial may be partly due to the *'normalisation'* of childhood obesity within the context of today's society [117].

2.5.3. Healthcare professional's perception of child body weight status

Healthcare professionals also have an important role to play in the identification and treatment of childhood obesity. Despite this, there is limited published research on healthcare professional's assessment of children's body weight status. The available evidence suggests that GPs and paediatricians cannot accurately determine the weight status of ten

year old children just by looking at them [118, 119] or by using images of children aged three – four years [120], ten [121], or five to 18 years [122]. The ability to correctly identify the weight status of children is critical for successful management of overweight and obesity in children and warrants further research.

2.6. Childhood weight management

Researchers from various disciplines are actively searching for effective models to tackle childhood obesity [123, 124]. Before the 1970s treatment focused on a weight-reduction model. In the early 1970s the focus shifted towards structured lifestyle modification combined with behavioural strategies. There is now widespread agreement that the complex aetiology of the issue requires a multifaceted approach to treatment and international recommendations agree that initiatives to treat and manage childhood obesity should be family-focused and combine healthy eating, physical activity and behavioural components [6, 7, 125]. Further reinforcing these recommendations, the recent World Health Organisation (WHO) Report of the Commission on Ending Childhood Obesity recommends developing and supporting *"appropriate weight management services for children and adolescents who are overweight or obese that are family-based, multicomponent (including nutrition, physical activity and psychosocial support) and delivered by multi-professional teams with appropriate training and resources"* [5]. Evidence reviews show that these behavioural lifestyle interventions can lead to positive changes in weight, BMI and other measures of body fatness [7, 126, 127].

2.6.1. Family-based behavioural treatment

Generally speaking, family-based behavioural treatment programmes focus on encouraging overweight and obese children and their parents to modify the family's dietary intake and

physical activity habits. Examples of dietary modifications include reducing portion size, increasing consumption of fruit and vegetables and decreasing high-fat/high-calorie snack intake. Physical activity components usually include increasing the intensity and duration of physical exercise as well as decreasing time spent being sedentary. Behavioural strategies that cover parent modelling, goal setting and problem solving are also core components.

Given that parents play a crucial role in establishing patterns of eating and physical activity throughout childhood, parental involvement when managing obese children is vital [6, 127-130]. Most clinical guidelines recommend families as the agents of change by including both parents and children in the intervention rather than focusing on the child alone [6, 128, 129]. While some authors argue that targeting the parents alone would be less-costly, they have shown higher drop-out rates [131].

2.6.2. Group-based treatment

The format of family-focused behavioural programmes varies from group-based (where multiple families participate at one time) to individual-based (where families meet one-on-one with programme facilitators), or a combination of both. Family-based group treatments have more beneficial effects than individual treatments, due to factors such as sharing of experience and knowledge, easy problem solution, cost-effectiveness, time saving and the greater number of children per healthcare professional involved [132-136]. Garipağaoğlu and colleagues observed that the children who participated in group treatment were more interactive and communicated more with each other, their parents and trainers than children who participated in individual therapy. Moreover, in the group treatment, strong relationships and friendships were established among children and parents [132].

2.6.3. Community-based treatment

Community-based obesity treatment programmes have become an important response in addressing childhood obesity [17, 137-139]. They offer the opportunity to provide care closer to home and therefore may be more accessible, resulting in a greater proportion of specific target groups being reached [7]. Furthermore, community-based interventions allow for the wealth of resources available in every community including local sports clubs etc. to be employed [140].

There are many existing community-based treatment programmes worldwide [9, 137, 138], however, to give an example of one well-known programme closer to home is the *Mind, Exercise, Nutrition, Do it* (MEND) [137] programme. The MEND 7–13 programme was established in the United Kingdom as a family-based weight management programme for families of children aged 7–13 years affected by overweight or obesity. It is a multicomponent programme that addresses diet and physical activity through education, skills training and motivational enhancement [137]. MEND was developed to be delivered in community settings, such as schools or leisure centres, by a wide range of specialist and non-specialist health, physical activity and social care professionals. It has demonstrated effectiveness in reducing the BMI of children with obesity when tested via a randomized-controlled trial [137]. Furthermore, when implemented under normal service conditions it was associated with an improvement in BMI and psychosocial outcomes [141]. MEND has also been found to be scalable when translated to populations in other countries [9, 11].

2.6.4. Childhood obesity treatment in Irish communities

Currently, in Ireland, treatment options for children who are obese are severely limited. While the *W82GO* programme [14] is available in the Temple St Children's University Hospital in

Dublin there is no standardised weight management programme available in the community setting. Community programmes are usually provided on an *ad hoc* basis and are rarely evaluated or sustained. Examples of available community treatment programmes are available in Appendix 1 of this thesis.

2.6.5. *W82GO-community*

In an attempt to identify a universal treatment programme the HSE proposed to pilot *W82GO-community* in two communities in the South and West of Ireland. *W82GO-community* involved an initial individual assessment to ascertain family eligibility. Families were eligible for the programme if the child was between five and seven years old; was obese (BMI ≥98th centile); had no limitations to engaging in physical activity; was not taking medication known to affect body weight; and had at least one parent/carer who was able to attend each of the programme sessions. Individual assessment was followed by two phases; phase one involved an initial intensive phase consisting of six weekly group sessions for both the child and his/her parent/carer. These sessions lasted approximately one and a half to two hours and incorporated educational and practical sessions to increase physical activity, improve nutrition and increase sleep. Upon completion of phase one, children returned with their parents/care-givers for three booster group sessions at three, six and nine months. These sessions aimed to encourage the family to continue with their lifestyle change and to manage any barriers to change. Siblings were also welcome to attend these sessions. Finally, at 12 months, the children and their parents/care-givers returned for a final individual assessment to document any changes and to make plans for sustainment.

W82GO-community was implemented in two community sites (Site A and Site B) from April 2015 for 12 months. Both sites were chosen as they were part of a national pilot growth

measurement programme and included a mix of rural and urban towns in the west and south of Ireland. Similarities and differences between both sites are presented in Table three below. Initial assessments took place in community healthcare offices while subsequent group sessions were delivered on weekdays in the afternoon at a local sports or community centre. The programme was offered free of charge and was delivered by existing community health professionals including dietitians, psychologists, public health nurses, physiotherapists, health promotion officers, area medical officers and administrators. These health professionals were brought together as a team and asked to deliver this programme as part of their existing roles. All staff were invited to take part in a training programme prior to programme commencement. Training included a needs assessment, a one-day educational training course and two days of clinical shadowing with an experienced *W82GO* programme practitioner at Temple St Children's University Hospital where the programme was developed. Each community practitioner was supplied with a user manual which outlined the programme and detailed the content for both phases. In terms of the context for this PhD it's also important to know that staff in Site A received motivational interviewing (MI) training which was not part of the training protocol for the *W82GO-community* pilot. More specific programme details of the programme are available in the Template for Intervention Description and Replication (TIDieR) checklist [142] which was used to specify the details of programme delivery in Appendix 2.

Table 3 Similarities and differences between pilot sites

	Site A	Site B
Staff	**n=21** Local Manager: 1 Physiotherapists: 2 Dietitians: 3 Psychologists: 1 PHNs: 8 Area Medical Officers: 2 Health Promotion Officers: 3 Administrators: 1	**n=12** Local Manager: 1 Physiotherapists: 1 Dietitians: 1 Psychologists: 1 PHNs: 5 Area Medical Officers: 2 Health Promotion Officers: 1 Administrators: N/A
Training	National *W82GO-community* training. Motivational interviewing training (separate to *W82GO-community)*	National training *W82GO-community.*
Programme recruitment	PHNs responsible for measuring children in school and referring children to *W82GO-community* initial assessment.	PHNs responsible for measuring children in school and referring children to *W82GO-community* initial assessment.
Adherence to programme manual	Staff adapted the programme to include more interactive sessions. Staff made the decision to split children and parents at the beginning of each session. Therefore while parents received educational session in one room, children did physical activity in another.	Delivered programme as intended i.e. staff used PowerPoint slides provided during training and parents and children received educational session for first hour and were split for the second.
Facilities	Initial assessments took place in a local health centre. Group sessions took place in community-based leisure centre. Access to large gym hall for childrens physical activity sessions.	Initial assessments took place in a local health centre. Group sessions took place in a family-resource community centre. Access to small room for children's physical activity.

2.7. Recommendations from National Policy

In Ireland, a number of policy documents have reinforced the urgency attached to addressing Ireland's obesity crisis (Figure 2). Additionally, the Special Action Group on Obesity (SAGO) was established to examine and progress a number of issues to address obesity including how best to support healthy eating choices, publishing calorie counts on menus in restaurants, the

supply of healthy food products in school vending machines as well as the detection and treatment of obesity [143]. SAGO comprises of representatives from the Departments of Health, Children and Youth Affairs, Education and Skills, the Health Service Executive, the Food Safety Authority of Ireland, *safe*food as well as other key stakeholders.

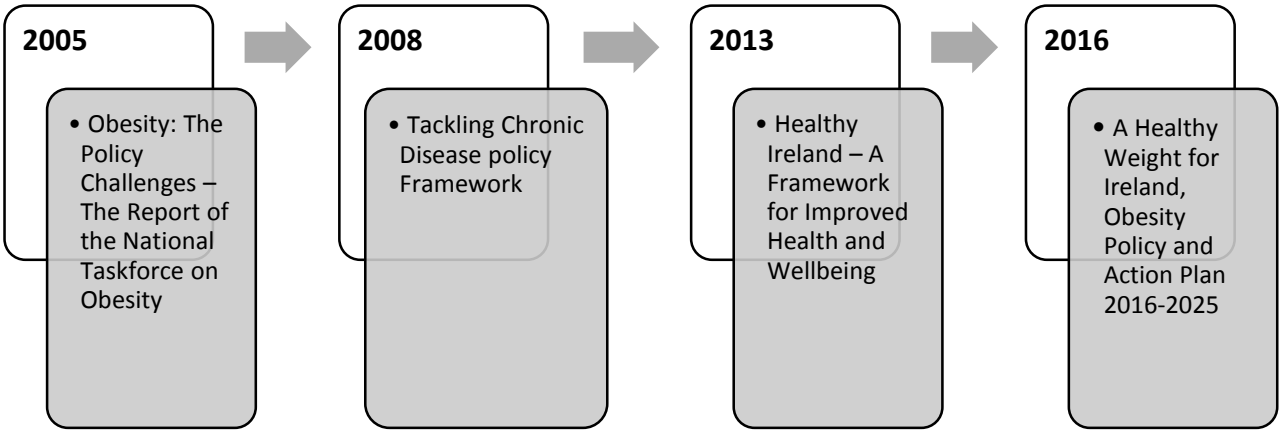

Figure 2 Key Policy Documents 2005-2016

National Obesity Taskforce [144]

In 2005 the *"Report of the National Taskforce on Obesity"* was published. This report recognised that many forces were actively impeding lifestyle change and realised the need for a shift in attitudes and practices around food consumption. It made over 80 recommendations, relating to actions across six broad sectors: high-level government; education; social and community; health; food, commodities, production and supply; and the physical environment. Furthermore, it included the development and implementation of an education and training programme for health professionals in the management of obesity. Unfortunately, responsibility for its implementation was not clearly set out and less than a

fifth of the recommendations were implemented [145]. Despite this, the report became a building block for subsequent policy frameworks.

Tackling Chronic Disease policy Framework [146]

The next relevant policy framework was published in 2008 and highlighted the importance of developing disease management programmes to treat and delay the onset of complications for patients with a chronic condition. Furthermore, it recommended models of shared care between primary care and specialised services which to date have also not materialised.

Healthy Ireland Framework 2013-2015 [147]

The major theme of the Healthy Ireland Framework is a *"whole-government"* and *"whole-society"* approach to address risk factors and social determinants of health and reduce health inequalities. While it does not address the clinical treatment or management of obesity it highlights an important step in recognising the need for a multi-sectoral approach.

A Healthy Weight for Ireland, Obesity Policy and Action Plan 2016-2025 [148]

The most recent policy document, *"A Healthy Weight for Ireland, Obesity Policy and Action Plan 2016-2025"*, was published by the Department of Health in 2016. It aims to increase the number of people with a healthy weight and set Ireland on a course whereby healthy weight becomes the norm. The policy proposes *'Ten Steps Forward'* that will be taken and, recognising that the solutions require action across a range of sectors and at different levels, it outlines additional actions required to support these 10 steps. Of particular relevance to this PhD are steps four and six. Step four of the policy highlights the importance of communication in enhancing awareness of being a healthy weight and the subsequent alteration of perceptions to reduce the stigma surrounding obesity and associated treatment

programmes. Actions identified under step six focus on enhancing the accessibility, appropriateness and quality of a range of services that work to promote the maintenance of a healthy weight and to support people who are currently overweight to achieve a healthier weight. The main goal of the policy is to intervene early and while acknowledging the limited number of community weight management initiatives, it recognises the need for greater capacity across the range of overweight and obesity services throughout the community.

2.8. Implementation

There are several types of evidence that are important to consider in obesity treatment [149]. The first defines the causes, the prevalence and the preventability or treatability of obesity-related risk factors. It suggests that *'something should be done'* about the obesity epidemic [150]. The second type of evidence describes the relative impact of specific interventions that address obesity. For example, evidence from the Cochrane Collaboration summarises a range of interventions for promoting physical activity, improving diet and facilitating behaviour change [7]. The last type of evidence, of which we have the least, examines how and under what contextual conditions interventions were implemented and how they were received, thus informing *'how something should be done'* [149, 151]. To date, studies have overemphasized internal validity (e.g. randomised controlled efficacy trials) while giving little attention to external validity (e.g. the degree to which findings can be generalizable to, and relevant for, various populations or settings) [152-155]. Implementation research bridges this gap between research evidence and everyday practice. Through implementation research we now know that it is not evidence-based programs that are effective, but it is *well-implemented* evidenced-based programs that are effective [156].

Implementation can be defined as the process of putting a plan or decision into effect. Implementation science is defined as the study of methods to promote the adoption and integration of these plans or decisions into routine public health practice [151]. In public health, once interventions have demonstrated efficacy through randomised controlled trial designs the next step is to translate the research through replication in *'real-world'* settings [11, 157]. Implementation research offers us a way of examining the often bumpy interface between what can be achieved in theory and what happens in practice. Rychetnik and colleagues have highlighted the importance of implementation research for progressing public health and translating evidence from efficacy trials into practice [158].

The evidence generated through implementation research informs policy makers and programme delivery teams on programme strengths, weaknesses and areas that need improvement. Implementation issues often arise as a result of contextual factors such as societal norms or characteristics of the target population or health service that policy-makers and health system managers may not have considered when designing or selecting programmes but which are of critical importance to programme success. For example, research suggests that certain individual and organizational issues (e.g. skills, leadership, and management support) may be particularly important in understanding the adoption and implementation of evidence-based approaches within areas with high chronic disease disparities [159, 160]. In obesity prevention, implementation research shows how workforce capacity for program delivery and administration presents a challenge [161] while community factors including patients' social and cultural characteristics (religion, financial resources, etc.) and mass-media messages are likely to hamper efforts in translating primary prevention and health promotion activities in primary care [162].

There is a need for pragmatic, *'real-world'* evaluations of interventions to understand the generalisability and applicability of the interventions across everyday practice [163-165]. Unfortunately, there are relatively few examples of published studies reporting on the pragmatic application of effective childhood obesity treatment programmes [9, 10]. While implementation issues such as engagement, local context, staffing and funding are likely to be common across many public health interventions [10], little is documented about the experience of those implementing childhood weight management programmes and even fewer studies detail the factors influencing implementation [13]. For example, a lack of providers trained in evidence-based care for childhood obesity was listed by delegates attending a recent conference in the United States as a major barrier to treatment implementation [166]. Another example is the aforementioned UK community-based child obesity treatment intervention, MEND, which was designed to be scalable and delivered by a range of health professionals [12, 137, 167, 168]. Implementation research on translating the MEND programme to an Australian community setting revealed that while it did reach predominantly obese children, boys and aboriginal children were less likely to enrol [9].

When introduced under less-controlled conditions, insight into the factors influencing implementation is crucial. Therefore, the overall aim of this PhD was to explore the barriers and facilitators to implementing a government-funded, multi-component childhood weight management programme *(W82GO-community)* in two Irish communities with a particular focus on family engagement. Evidence generated from this pragmatic evaluation will inform their eventual scale up.

2.9. Framework to evaluate the implementation of *W82GO-community*

The theoretical foundations for this PhD are based on the Ecological Systems Theory (EST) proposed by Bronfenbrenner [169], which suggests a complex model of interacting factors impacting human development. The application of EST by Davison and Birch describes an interplay of risk factors in the development of childhood overweight occurring at a number of ecological levels [170]. In relation to this PhD, EST offers a framework to consider the implementation of a childhood weight management programme and describe factors influencing the realms of familial, community and greater social environments (Figure 3). Studies and participants for this PhD were chosen to reflect each level and thus included children (individual), parents (familial) and stakeholders from the community. Children were invited to participate in the research to explore their experiences and views of attending *W82GO-community.* Parents were invited to take part in interviews to understand their experiences and motivations to enrol and complete the programme and finally members of the community-based multi-disciplinary teams were invited to participate in an effort to capture and examine their views and experiences of implementing the programme.

Figure 3 Contextual influences on childhood obesity derived from the Davison and Birch conceptual model for understanding childhood obesity [170]

2.10. Summary

Childhood obesity is a significant public health issue posing a threat to children, their families and the health service. Although trends appear to be stabilising in Ireland the prevalence of childhood obesity remains high [3]. International recommendations agree that initiatives to treat and manage childhood obesity should be family-focused and combine healthy eating, physical activity and behavioural components. While data exist on the effectiveness or efficacy of these types of programmes little is known about their implementation in the real-world. Understanding the processes and supports required to implement the programmes on the ground at a local level is likely to have both economic and health benefits [171].

This thesis utilises a socio-ecological model to examine the successes and failures of implementing a government-funded, multi-component childhood weight management programme in the community in Ireland, with a particular focus on family engagement. The thesis aims to address the dearth of knowledge available on childhood weight management programmes in Ireland, provide evidence on barriers and facilitators to implementation for policy makers and stakeholders involved in the roll-out of these programmes, and inform their further development and implementation.

Chapter 3. Barriers and facilitators to the implementation of a community-based, multidisciplinary, family-focused childhood weight management programme in Ireland: A qualitative study

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3.1. Abstract

Objective: To explore the barriers and facilitators experienced by those implementing a government-funded, community-based, childhood weight management programme.

Design: Qualitative using semi-structured interviews.

Setting: Two geographical regions in the south and west of the Republic of Ireland.

Participants: 29 national and local level stakeholders responsible for implementing the programme including professionals from dietetics, psychology, public health nursing, physiotherapy, health promotion and administration.

Methods: Framework analysis was used to identify barriers and facilitators which were mapped onto six levels of factors influencing implementation outlined by Grol and Wensing: the innovation, the individual professional, the patient, the social context, the organisational context, and the external environment.

Results: Most barriers occurred at the level of the organisational context. For all stakeholders, barriers arose due to the multidisciplinary nature of the programme, including the lack of role clarity and added complexity of working in different locations. Health professionals' low-perceived self-efficacy in approaching the subject of weight with parents and parental resistance to hearing about their child's weight status were barriers to programme implementation at the individual professional and patient levels, respectively. The main facilitators of implementation, occurring at the level of the health professional, included stakeholders' recognition of the need for a weight management programme and personal interest in the area of childhood obesity. Having a local lead and supportive colleagues were further implementation drivers.

Conclusions: This study highlights the complexities associated with implementing a multidisciplinary childhood weight management programme, particularly translating such a programme to the community setting. Our results suggest the assignment of clear roles and responsibilities, the provision of sufficient practical training and resources, and organisational support play pivotal roles in overcoming barriers to change. This evidence can be used to develop an implementation plan to support the translation of interventions into real world settings.

3.2. Introduction

Childhood obesity is a worldwide public health concern and there is now widespread agreement that the complex aetiology of the issue requires a multifaceted approach to treatment [7, 166, 172]. International recommendations agree that initiatives to reduce and manage childhood obesity should be family-focused and combine healthy eating, physical activity and behavioural components [5-7]. In 2016, the World Health Organisation published their report of the commission on ending childhood obesity within which they echo these recommendations but also add that they should be delivered by "*multi-professional teams with appropriate training and resources"* [5]pg.11. These recommendations, however, have been largely based on small-scale studies conducted in controlled settings with specialised staff, thus limiting their applicability and generalizability to 'real-world' settings such as communities or hospitals [7].

In public health, once interventions have undergone innovation testing and demonstrated efficacy the next steps include replication and 'scale-up' to larger populations in 'real-world' settings [157]. There are relatively few examples of published studies reporting on the pragmatic application of effective childhood obesity treatment programmes [9, 10]. While implementation issues such as engagement, local context, staffing and funding are likely to be common across many public health interventions [10], little is documented about the experience of those implementing childhood weight management programmes and even fewer studies detail the factors influencing implementation [13]. For example, a lack of providers trained in evidence-based care for childhood obesity was listed by delegates attending a recent conference in the United States as a major barrier to treatment implementation [166]. Furthermore, with the majority of families declining referral and up to

75% of families discontinuing care, poor engagement with families has proven to be a significant challenge facing teams tasked with implementing such programmes [20, 173].

When introduced under less-controlled conditions, insight into the factors influencing implementation is crucial. Therefore, the aim of this study was to explore and categorise the barriers and facilitators experienced by those implementing a government-funded, community-based, multi-component childhood weight management pilot programme to inform its eventual scale up.

3.3. Methods

3.3.1. Intervention and Context

Although trends appear to be stabilising in Ireland, prevalence of childhood obesity remains high [3]. Currently, in Ireland, almost one in four children are either overweight or obese [2] and there is no standardised community-based weight management programme available to those children with obesity. Community programmes are usually provided on an ad-hoc basis and are rarely evaluated or sustained. In an attempt to identify a universal treatment the Irish Health Service Executive planned to pilot the *W82GO-community* programme in two communities. This programme had previously demonstrated effectiveness when delivered in the hospital setting [14]. Its effectiveness in the community setting was to be assessed with the intention of nationwide rollout should the programme demonstrate a positive impact on BMI. The Template for Intervention Description and Replication (TIDieR) checklist [142] was used to specify the details of programme delivery and is included in Appendix 2.

In summary, *W82GO-community* was developed from the well-known *W82GO* programme which aimed to improve nutrition, increase physical activity and facilitate behaviour change

over one year [14]. *W82GO* was designed as a hospital-based, family-focused, multidisciplinary programme grounded in behavioural change theory and was modelled on best practice recommendations [5, 7, 174]. The primary goal was a reduction in BMI SDS [14].

The programme involves an initial individual assessment to ascertain family eligibility followed by two phases. Phase one involved an initial intensive phase consisting of six weekly group sessions for both the child and his/her parent/carer. These sessions lasted approximately one and a half to two hours and incorporated educational and practical sessions to increase physical activity, improve nutrition and increase sleep. Upon completion of phase one, children returned with their parents/care-givers for three booster group sessions at three, six and nine months. These sessions aimed to encourage the family to continue with lifestyle change and to manage any barriers to change. Finally, at 12 months, the children and their parents/care-givers returned for a final individual assessment to document any changes and make plans for sustainment.

For the current study, *W82GO* was adapted and implemented in two community sites (Site A and Site B) from April 2015 for 12 months and subsequently renamed *W82GO-community*. Both sites were chosen as they were part of a national pilot growth measurement programme and included a mix of rural and urban towns in the west and south of Ireland. Initial assessments took place in community healthcare offices while subsequent group sessions were delivered on weekdays in the afternoon at a local sports or community centre. For this community pilot families were eligible for the programme if the child was between 5-7 years old; was obese (BMI ≥98th centile); had no limitations to engaging in physical activity; was not taking medication known to affect body weight; and had at least one parent/carer who was able to attend each of the programme sessions. Siblings were also welcome to attend the

sessions. The programme was offered free of charge and was delivered by existing community health professionals including dietitians, psychologists, public health nurses, physiotherapists, health promotion officers, area medical officers and administrators. These health professionals were brought together as a team and asked to deliver this programme as part of their existing roles. Table 4 outlines their specific responsibilities during programme implementation. All staff were invited to take part in a training programme prior to programme commencement. Training included a needs assessment, a one day educational training course and two days of clinical shadowing with an experienced *W82GO* programme practitioner at the Temple St Children's University Hospital where *W82GO* was originally developed. Each community practitioner was supplied with a user manual which outlined the programme and detailed the content for both phases.

Table 4 Health professional roles during the implementation of W82GO-community

Health Professional	Role in implementation of *W82GO-community*
National Manager (n=1)	Overseeing implementation of *W82GO-community* in both community sites
Local Manager (n=2)	Overseeing implementation of *W82GO-community* at local level. Local manager in Site B was also involved in referring to the programme
Physiotherapists (n=4)	Involved in initial assessments and delivering programme material
Dietitians (n=4)	Involved in initial assessments and delivering programme material
Psychologists (n=3)	Involved in initial assessments and delivering programme material
Public Health Nurses (n=13)	Involved in referral to the programme
Area Medical Officers (n=4)	Involved in initial assessments
Health Promotion Officers (n=4)	Involved in delivering programme material
Administration (n=2)	Involved in contacting parents about programme sessions

3.3.2. Study Design and Sample

A qualitative approach using semi-structured interviews was utilised. We adopted a purposive approach to sampling, inviting stakeholders with knowledge and experience of planning, coordinating or delivering *W82GO-community*. To ensure representation from each stakeholder group and given the small number of individuals in each, we invited all stakeholders to participate (n=37, Table 4). All stakeholders were contacted by email in the first instance and followed up by telephone contact during which the researcher outlined the study aims and methodology.

3.3.3. Data Collection

All participants were invited to take part in face-to-face interviews. However, due to time and scheduling difficulties a mixture of telephone and face-to-face interviews were conducted between August 2015 and February 2016 (during programme implementation). To ensure consistency all interviews were conducted by a single trained qualitative researcher (EK), using a semi structured topic guide. Participants knew the interviewer as an independent programme evaluator conducting this research as part of her PhD training. The topic guide was developed based on relevant literature and focused on seven issues: (1) awareness of the issue of childhood obesity and existing healthy lifestyle programmes, (2) perceived value of and interest in community evidence-based treatment programmes, (3) communication of the *W82GO-community* pilot programme; (4) specific role in implementing *W82GO-community*; (5) barriers and enablers to implementation; (6) perceived successes and challenges experienced and finally (7) recommendations for the future roll-out of childhood weight management programmes in Irish communities. Core topics were the same across stakeholders and particular probes were added for specific stakeholder groups depending on

their role during the programme. For example public health nurses were specifically asked to report on the barriers and facilitators to referral. Prompts and probes were used throughout the interviews to stimulate discussion. A copy of the topic guide is available in Appendix 2 of this thesis. Prior to each interview, participants were informed about the purpose of the study, that participation was voluntary and that they could terminate the interview at any stage for any reason. Signed informed consent was obtained before each interview, which lasted on average 45 minutes. Interviews were digitally recorded and transcribed verbatim. Data collection and analysis was iterative. Data saturation was judged to have been reached between interviews 20 and 25 [175]. However, during recruitment, other stakeholders had expressed an interest in sharing their experience and so were given the opportunity to participate. The data from these interviews overlapped with the existing coding framework and thus contributed to the main themes. Ethical approval was granted by the Clinical Research Ethics Committee of the Cork Teaching Hospitals.

3.3.4. Data Analysis

Framework analysis was used to analyse the data [176]. This approach enabled the investigation of *a priori* objectives while also allowing new themes to emerge from the data. One researcher (EK) transcribed and coded each transcript while another (SMH) undertook initial coding of a selection of transcripts. Similarities and differences between the coding labels and definitions were discussed and the coding framework was refined and applied to the remaining interviews. While this process was conducted at an early stage of the analysis, the coding process was iterative; emergent codes were added to the framework and contributed to the development of themes across the interviews. Codes were synthesised and grouped according to the dominant emergent themes. Themes were also analysed across

stakeholder groups to identify similarities and differences across disciplines and positions. These themes were mapped onto a framework developed by Grol and Wensing (2004) which specifies six levels of factors that facilitate or impede implementation success: the innovation; the individual professional, the patient; the social context; the organisational context; and the economic and political environment [19]. Mapping emergent themes to the framework at this stage of the analysis ensured that we did not impose a predefined structure or terminology on participants' accounts. This well-established framework (Table 5) was chosen because it describes how barriers and facilitators can be identified, categorised, and used for the development of tailor-based implementation strategies to facilitate desired change [19], in this instance implementing the *W82GO-community* programme. Discrepancies on the mapping of themes were discussed until consensus was reached. NVivo (QSR v10) was used to manage data analysis.

Table 5 Barriers to and incentives for change at different levels of healthcare[a]

Level	Barriers / Incentives
Innovation	Advantages in practice, feasibility, credibility, attractiveness, accessibility
Individual Practitioner	Awareness, knowledge, attitude, motivation to change, behavioural routines
Patient	Knowledge, skills, attitude, compliance
Social Context	Opinion of colleagues, culture of the network, collaboration, leadership
Organisational Context	Organisation of care processes, staff, capacities, resources, structures
Economic and Political Context	Financial arrangements, regulations, policies

[a]Grol and Wensing's multilevel model[19]

3.4. Results

Participant Characteristics

We contacted 37 stakeholders and recruited 29 interviewees (7 face-to-face, 22 telephone) from a range of disciplines and professions, yielding a response rate of 78% (Table 6). The majority of interviewees were female (97%, n=28).

Table 6 Stakeholder characteristics

	Site A	Site B	National	Total
National Manager	NA	NA	1	1
Local Manager	1	1	x	2
Physiotherapists	2	1	1	4
Dietitians	3	x	x	3
Psychologists	1	1	x	2
Public Health Nurses	6	3	x	9
Area Medical Officers	x	2	x	2
Health Promotion Officers	3	1	x	4
Administration	1	x	1	2
Total	17	9	3	29

Barriers and Facilitators

For all participants, barriers arose due to the multidisciplinary nature of the programme, including the lack of understanding of other disciplines, lack of role clarity as well as the added complexities of working in different locations. Participants' recognition of the need for a childhood obesity programme and their own personal interest in the area were the main drivers of implementation while the presence of a local lead and supportive colleagues were

further enabling factors. Views on the main barriers and facilitators to implementation were consistent across stakeholders; despite different disciplinary backgrounds, they had common experiences as implementers adding to the authority of the findings. Table 7 presents the perceived barriers and facilitators from the perspective of the stakeholders mapped onto the six implementation levels with quotations to illustrate each level.

Table 7 Perceived barriers and facilitators to the implementation of *W82GO-community*

Levels	Quotations to illustrate the identified levels
The Innovation	
Credibility	(+) *"I suppose because it was attached to an acute hospital and because there was a consultant paediatrician and you had a lot of disciplines and a lot of very competent professionals involved, and that it had been successful when delivered there. That was the main reason I believed in the programme I suppose",* W82GO003
Attractiveness (i.e. Multidisciplinary nature, group approach)	(+) *"I do think the MDT approach was superb. I think that if you're going to do something for a child who is obese then you need it."* W82GO018 (+) *"I think it had everything I wanted to see in a programme. It was a really good approach. I think it's holistic, its client-centred and I believe it would be long-term effective"* W82GO007 (+) *"The group approach was ideal. Others in the group are having similar experiences, they can empathise, and it's a different relationship than you would have with a professional. They can receive mutual support and it's probably more cost-effective in the long-run",* W82GO006
Transferability (i.e. different population, different resource issues)	(-) *"You are talking about a different cohort of families. Families who are already in the system. They are used to going in for appointments. You're talking about a group who've already had difficulties identified by their GP or whoever so by the time they are going for the group they are already sold, they are used to it and they are used to that sort of setting which is very kind of fast and quick-paced and very focused"*, W82GO002 (-) *"We were taking a programme that was from an acute setting into the community - that possibly was where the breakdown happened because you didn't have the same services. You didn't have people on site. There was travel, there was all these other logistics that weren't thought about when they were moving an acute programme to the community",* W82GO021

	(-) *"The families we are dealing with are very different to those presenting at the hospital programme. The children we see aren't affected by obesity yet, they were quite young and they were all like free living and healthy and they didn't have any problems. You know they hadn't been admitted for asthma or bad gaits or not being able to like, their mobility. Most of those children are fine you know? They're out playing like. There is no issue so I think that is a huge thing for parents to get their head around in the community",* W82GO004. (-) *"The families we met were not at that stage of change or had that readiness because in hospital you have older kids who are already presenting with medical problems whether its sleep apnoea or whatever it is so they are showing symptoms. So that's a very different place for parents to be in. My child is showing this, they developed diabetes, they've whatever it is and we need to tackle it. Whereas a 5 year old who is running around enjoying themselves, parents won't think about it",* W82GO009 (-) *"You've a very different kind of child coming into the hospital than you do in the general community. You've a very different kind of parent. Even if you had a parent who was resistant to hearing about their child being overweight, if they are attending hospital appointments regularly they are obviously already engaged about their child's health... so I believe that's a major barrier straight away that they possibly didn't have to face in the hospital you know?",* W82GO010. (-) "The setting is different. In some ways we share a lot of the same resource issues but in the community there's more politics involved, there may be more disciplinary power struggles", W82GO022
Relevance (e.g. too medicalised)	(-) *"I think the area medical officer, the medical input I think is probably optional or at least part-time. It's of less importance. It medicalised this community programme a bit too much",* W82GO021 (-) *"For me, my overall picture was how obesity was completely medicalised",* W82GO005 (-) *"For me, it was very medicalised, very individualised, I suppose that was the piece that was missing from a lot of it... people didn't have experience of behaviour change. I suppose the clinicians are very hands on you know and outcome orientated... you go to them to have your eyes checked and there's an outcome, you're told that you need glasses or you must go and see and eye specialist. Changing behaviour is very much a talking therapy so I suppose we work in a different way and yeah i think that was a huge challenge",* W82GO028

The Individual Professional	
Awareness of the problem / Recognition of need	(+) *"It is a problem, most definitely. I think it's a time bomb that went off over the past 10 years and that we are behind it, way behind it, and the sooner we get going and get doing something the better",* W82GO013 (+) *"I embraced it (the programme), because I think it's a huge problem out there in the community",* W82GO002 (+) *"It is something we need to absolutely tackle... there is no doubt about that. I suppose with 1 in 4 in Ireland overweight or obese it is a public health crisis really",* W82GO009 (+) *"I see it every day, regularly in schools and I think it's a big problem and it's only getting worse",* W82GO015 (+) *"Something needs to be done. It's a very important child health issue and you know we have a lot of information now about the size of the problem and the prevalence of the problem but nothing to tackle it",* W82GO021 (+) *"I suppose in my role because I have a particular interest in this area I saw the need and I saw that it would have such an impact on families and the cycle of change",* W82GO003 (+) *"We definitely need some intervention around this whole area so I suppose I saw this as an avenue to address the issue in my area",* W82GO020.
Personal interest and motivation	(+) *"So that enthusiasm and that dedication made it happen, it was key to its success",* W82GO011 (+) *"I think it's very important and I suppose because I've had an interest in public health and health promotion I suppose it's an area where I always try and keep up to date on",* W82GO001 (+) *"I put myself forward for this. I was interested in doing it and to become a part of it. I mean I'm interested in this area. I would have seen a lot of childhood obesity in my role previously and there wasn't much you could do about it",* W82GO013 (+) *"It was very worrisome so when W82GO came on board I was very happy to get on board. I have an interest in health promotion myself",* W82GO022 (+) *"I volunteered because of my own interest. Because of my own interest and I was very happy that something was being done about the problem",* W82GO027 (+) *"We were really lucky I mean because the people (staff) that came on board were very interested and they were all brilliant. It's very important in this area that staff are interested genuinely in it because it's so sensitive an area and so easy to get wrong that it's vital",* W82GO026
Low self-efficacy	(-) *"I wouldn't be especially skilled in assessing children you know with obesity and that kind of thing... Or talking to parents about it… I was concerned about my own ability to, to get up to speed fairly quickly",* W82GO015

Attitudes (i.e. multidisciplinary perspectives)	(-) *"I'm not qualified to work with this age group. That's not what we were trained to do so in some ways we were doing something that was quite alien and that worried me",* W82GO005 (-) *"I suppose the other main challenge was the multidisciplinary nature of the programme. I think the challenge of it is when you put together a team obviously from all different backgrounds not with different agendas but with different experiences and knowledge and different perspectives",* W82GO026 (-) *"I suppose it is a challenge working in a multi-disciplinary team. We are used to working on our own and we have our own way of doing it. And we are probably all guilty of thinking you know, that we know best",* W82GO004 (-) *"Different people (disciplines) are coming from different backgrounds so everyone has their own priorities or what they see as important. But when we haven't had real proper time to really develop the format or to really work on that you are going to have competing priorities or competing perspectives",* W82GO006
The Patient	
Parental Resistance (weight misperception and denial)	(-) *"I think there was a denial that there was anything wrong with their child, or that their child was overweight. There was a total denial about that because the population in general look like their child. Their child may be a little bit above of what the normal population looks like, but they didn't see that as an issue at all",* W82GO028 (-) *"There was a massive reluctance on the part of the parent to accept that their child was obese and that certainly was an issue. So even at this stage they would have had discussions with the public health nurse and the area medical officer and then I would have seen them and they still didn't believe that their child was obese. Now some of them by the end of our discussion and talking about it in more detail were coming around to the idea. But a few of them still like refused to accept that there was an issue with weight",* W82GO004 (-) *"Other parents then just didn't reply or didn't get in touch because they believed everything was ok and there wasn't a problem with their child. They didn't need any programme. I think that definitely was a huge problem out there in the community setting",* W82GO012 (-) *"And I think another blocker was the fact that some people are in denial that their children are obese. They just couldn't see it",* W82GO013
The Social Context	
Supportive colleagues	(+)*"Once she came on board there were two of us, it was a lot easier to share the workload and if I couldn't be there for a day she could be there for it so I suppose that definitely took the load off and she also acted as a sounding board you know? If there was something I wasn't sure of, I could say what do you think about this and vice-versa, you know what I mean?",* W82GO016

	(+) *"It was incredibly helpful talking to my counterpart in the other site. So talking to my colleagues in different settings really helped. Just about working out what the actual pitfalls were, what worked for them, what doesn't work for them. It was really useful",* W82GO006 (+) *"It was great to have one other person to bounce things off within your own department. I found it very useful. Cause you could sit and talk and see where things were going with it",* W82GO011
Leadership	(+) *"I mean if we didn't have her pulling all those people and bits together it wouldn't have worked. She did a great job in I think the co-ordination role cause I think running something like this with people dispersed across a whole county and city then you need a project manager on the ground.",* W82GO017 (+) *"She (local lead) was always accessible, via email or she met us a couple of times as well. She took our concerns on board and fed back to national management",* W82GO001 (+) *"I think the local leads involvement was critical as it wouldn't have run without her. Her motivation was unreal",* W82GO012 (+) "It was the local lead driving it here that it worked. She was so motivated and kept it going really. She kept the momentum and put a lot of drive into it and she did a great job really in getting it off the ground. So definitely she was a good driver", W82GO022
Collaboration between national and local teams	(-) *"I did feel there was a very big gap once the decision had been made nationally to roll this out, there was a very big gap between us on the ground and them, there was no consultation or collaboration with people on the ground and I think that's where the problem was",* W82GO003 (-) *"I suppose again that's the link from the national people to the people on the ground. It was non-existent. We needed better communication",* W82GO009
The Organisational Context	
MDT Structure (logistics)	(-) *"I suppose one of the challenges definitely is that the health professionals are all in different places",* W82GO004 (-) *"I suppose it would have been easier if this was one team doing this. Like if they approached one service to roll out this programme. We are all in different places, we are all line managed by different people, we've different ways of working, we've different structures. Even just getting opportunities to meet. All those kind of practical difficulties really. That was always going to be a challenge from the start",* W82GO005 (-) *"Not being able to meet with the other health professionals to plan sessions was a challenge",* W82GO011

Resources	(-) *"I guess time constraints because a lot of people were pressurised for time. Like even ourselves we wouldn't have been able to go to every session and I would have liked to have gone but we just couldn't. We didn't have the time. We didn't have the staff to be able to attend so I think time and resource pressures were the main concerns",* W82GO013
Training	(-) *"It (the training) was as if they were trying to sell us the programme when you know we were already there. We were already sold. I mean we knew why it was important... because of the obesity issue so there was no need to go over all that again. They should have just focused on how to actually implement and deliver the programme",* W82GO011 (-) *"It (the training) was a long day and I just felt a more practical day would have been suitable. It was very lecture style with information just being given to us and while it was interesting some of it was repetitive and really not necessary in terms of clinical assessment of obesity that was gone through and signs and markings to look out for, we knew all that",* W82GO010
External Environment	
Lack of existing services	(+) *"There is nothing out there so that's where it was great to have something like W82GO. That if you did see a child that you know there was something. Some sort of pathway",* W82GO001 (+) *"I was excited about it, you know it was nice to be part of a pilot project. Currently service is kind of served dependent on what kind of part of the county that the child is living in. It's kind of patchy so it was great to get involved in something new.",* W82GO002
Media	(+) *"There was a huge media campaign ongoing around the time we were implementing the programme which got some parents thinking and talking. I mean those things do have a big impact. Things like Operation Transformation that's aired in January have a huge impact. I think we need more media on the immediate impact of childhood obesity and not just the long-term impacts",* W82GO003 (-) *"I think maybe it's (obesity) hyped up a little bit in the media. I think maybe that in itself could be making things difficult for parents to come forward. We don't have any other disease related issue hyped up as much you know? If you had a child with obesity you would be feeling a small bit cringe like. You'd be wanting to find somewhere private to get some help like you know",* W82GO020
Stigma	(-) *"It's (childhood obesity) also getting a very bad press so it's a difficult thing to hear the obesity word in relation to your own child. It has a stigma associated with it and parents don't want to acknowledge it"*, W82GO029

	(-) *"Wouldn't have their child come to a programme in case they'd be labelled overweight or obese. There is a stigma and just from hearing again I wasn't in the parents room, but just from hearing other colleagues feedback it's the parents fear of feeling judged and blamed",*W82GO002

(+) Facilitators, (-) Barriers.

The Innovation

In terms of the *W82GO-community* pilot programme (innovation), while stakeholders believed it came from a credible source having been developed by one of the national children's hospitals in Ireland, many had doubts over its accessibility and about how well it would transfer to the community setting. This uncertainty resulted in feelings of unease and community practitioners were hesitant to get involved initially. One stakeholder explained how she worried at length about what impact the programme would have on existing services and how feasible it was to run in the community; *"The setting is different.* W*e were taking a programme that was from an acute setting into the community - that possibly was where the breakdown happened because you didn't have the same services. You didn't have people on site. There was travel, there was all these other logistics that weren't thought about when they were moving an acute programme to the community"*, W82GO021. In particular, stakeholders believed they were dealing with a very different cohort of families than the hospital-based programme as described by the following quote; *"You've a very different kind of child coming into the hospital than you do in the general community. You've a very different kind of parent. Even if you had a parent who was resistant to hearing about their child being overweight, if they are attending hospital appointments regularly they are obviously already engaged about their child's health... so I believe that's a major barrier straight away that they possibly didn't have to face in the hospital you know?"*, W82GO010.

In addition to the differences in the target group, stakeholders believed the programme was too medicalised for the community setting and some felt it did not fit with their perception of a healthy lifestyle programme. This was due to the number of health professionals involved and in particular, the involvement of medical staff. Furthermore, many stakeholders thought the collection of clinical markers of disease and medical history during the initial assessments was unnecessary. As one stakeholder described; *"the initial assessments were totally irrelevant. I mean when I heard that bloods were being taken I thought oh for God sake. You know we were supposed to be running a community-based education intervention where the focus should be on changing lifestyles. It's not our job to be diagnosing other problems",* W82GO005.

Individual Professional

While stakeholders both applauded and recognised the need for a multidisciplinary approach to the treatment of childhood obesity, it created significant barriers to programme implementation. The variety of community health professionals involved in the implementation of *W82GO-community* with differing perspectives and priorities led to role uncertainty and in some cases a perception of disrespect between disciplines. One stakeholder captures this theme in the following quote; *"I suppose the other main challenge was the multidisciplinary nature of the programme. I think the challenge is when you put together a team obviously from all different backgrounds not with different agendas but with different experiences and knowledge and different perspectives",*W82GO026. Stakeholders described how *"there was quite a lack of understanding of the various discipline roles and responsibilities and some were even unsure of what some disciplines did",* W82GO012. This lack of understanding sometimes resulted in tension between disciplines and created a

challenging environment to work in. Others recalled feeling concerned about where they fit into the programme and believed a structured programme plan outlining specific roles and responsibilities was lacking.

Another key barrier that emerged at the level of the individual professional was their low perceived self-efficacy in dealing with childhood obesity and/or working with this young age group. In particular, many stakeholders reported their fear of approaching the subject with parents given the risk of upsetting them or *"rocking the boat".* One stakeholder reported that *"it's something you want to do something about but it can be very difficult to approach the subject with parents. It's a very sensitive issue",* W82GO001. In our study, stakeholders in Site A received motivational interviewing workshops for childhood obesity. This training equipped these stakeholders with increased skills and confidence in working with families on weight management issues. As one stakeholder described, post motivational interviewing training, she wasn't *"frightened of dealing with them (parents) at all", It's kind of second nature to me now... I know the buzz words, I know exactly what to say to them. And body language, the whole lot",* W82GO002. Others felt it was quite *"alien"* to work with children aged 5-7 years and believed they had not the appropriate training to do so.

Despite these barriers, all stakeholders were aware that childhood obesity was an issue in their respective communities and recognised the urgent need for treatment; *"Yeah I think it's a time bomb that went off over the past ten years and that we are behind it, way behind and the sooner we get going and doing whatever we can the better",* W82GO012. Furthermore, stakeholders' personal interest in tackling the issue, and their motivation and dedication to seeing the programme through were what many believed to be the main drivers behind

programme completion; *"It went ahead due to a lot of determination and not because it was easily implementable... if that's a word",* W82GO014.

Patient

Low programme uptake was a key issue during implementation. Many stakeholders believe that obesity has become the norm in society and as a result *"people don't recognise overweight people as being in that actual overweight category because it's become normal to be surrounded by overweight people",* W82GO021. In terms of the *W82GO-community* pilot programme, almost all stakeholders indicated that although children measured as obese on the growth charts their parents seemed unaware of any excess weight and once informed, many refused to accept that their child was obese. As a result of this misperception parents did not realise or accept the need for treatment. Speaking of her experience, one stakeholder described how *"other parents just didn't reply or didn't get in touch because they believed everything was ok and there wasn't a problem with their child. They didn't need any programme. I think that definitely was a huge problem out there in the community setting",* W82GO012. Because of this low recognition amongst parents, many stakeholders recalled the resistance they faced when trying to discuss the issue with them and their fear prior to making contact with parents. One stakeholder explained how some parents would *"be really angry so you're taking angry phone calls in the evening. You know when you come in from a day's work so it was really difficult",* W82GO002.

Social Context

Local level stakeholders believed there was a certain level of *"naïvety"* at national level about the reality of rolling out the pilot programme on the ground. They felt consultation during the

planning stage was lacking and that national-level stakeholders had *"little experience of the practical aspects of childhood obesity"* as *"no one was actually working with obese children or even groups on a day to day basis",* W82GO004. As a result, unrealistic expectations and timeframes prevailed, particularly during the recruitment phase. This led to frustration and confusion among local-level health professionals during implementation.

Communication between national and local level stakeholders was considered poor. However, the presence of a local lead facilitated the exchange between staff on the ground and management at national level and was seen by almost all stakeholders as crucial for programme implementation. Furthermore, stakeholders felt that because of the multidisciplinary approach of the programme *"you needed someone on the ground"*; if they did not have a local lead *"pulling all those people and bits together, it wouldn't have worked because running something like this with people dispersed across a whole county and city is difficult"*, W82GO005. The presence of supportive colleagues and management were identified as further enabling factors.

Organisational Context

The multidisciplinary structure of the programme also created barriers at the organisational level. In addition to differing individual perspectives and priorities, the added complexities of working in different locations created difficulties during programme implementation. In many cases stakeholders didn't *"work at the same site… or even the same town which was a challenge"* as it "*took up a lot of time organising between schedules and travelling to meet and go through practicalities",* W82GO007.

In addition to these challenges, at the organisational level, stakeholders reported that implementation was hampered due to insufficient resources (i.e. staff and time) and training. It was reported that two other proposed areas withdrew from the pilot programme because of the lack of staff and leadership on the ground to run the programme. Stakeholders felt that they had very different resource issues to the hospital-based teams who are *"within the confines of a hospital… so they would or should have the same vision or focus... whereas we can see now with a community based programme the professionals can be very different in their training, they can have a different ethos in the departments within their community. It's very individual. We have different line managers and different resources to deal with",* W82GO011. Some stakeholders *"didn't want to get involved because of existing workloads"*, and the lack of extra resources or allocated time to implement the pilot. Furthermore, while acknowledging the little time hospital staff had to develop community-specific training local-level stakeholders felt they needed more *"practical and tailored"* information. Many described the training they received as *"too general*" and stated that *"it would have been very helpful to have had more practical tips on how to actually run the programme with this age group",* W82GO012.

External Environment

In the Grol and Wensing model, the 'economic and political context' refers to financial arrangements, regulations and policies - themes which did not emerge during our research. Therefore, the sixth level was renamed 'external environment' to include wider societal perspectives and determinants.

In terms of the external environment, the lack of existing services to treat and manage childhood obesity meant many stakeholders were excited to come on board and implement

this new initiative. One stakeholder described *"waiting for years for something to happen in this area",* W82GO005. The media was recognised as both a barrier and a facilitator to programme implementation. While stakeholders believed TV and radio campaigns have the potential to raise awareness they felt that the issue was *"also getting very bad press"* and being *"hyped up a little bit"* which in itself may make it more difficult for parents to come forward. Additionally, staff felt that the stigma surrounding childhood obesity and weight management programmes created a significant barrier to programme implementation as they believed many parents were reluctant to attend or even talk about the issue of weight for fear of singling out or *'labelling'* their child.

Vision for the future

In terms of the future scale up of *W82GO-community*, the majority of stakeholders recommend establishing dedicated childhood obesity teams within the community, *"ideally people who are located at least in the same town",* who can offer a range of interventions for different levels of need. One stakeholder described *"a tiered effect, for example there could be a level one which could be a generic workshop or talk that you could roll-out in lots of schools. A level two then would be a seminar for parents and level three would be a group programme. Level four then could be actual specific one on one interventions".* Having a tiered approach would enable the team to match the level of need with the family and allow families to choose where on the scale they would best fit.

3.5. Discussion

This study identifies the barriers and facilitators to implementing a community-based weight management programme from a wide range of stakeholder perspectives. While community-based weight management programmes have become an important response to the obesity

epidemic given their potential reach and accessibility for families, the majority are small, efficacy trials [7] and little is known about the factors influencing their implementation in real-world settings. Our findings suggest that more consideration is needed during the planning stages, including the creation of a structured programme plan outlining specific roles and responsibilities. Local-level stakeholders believe they should be involved in this process as they have practical experience of working with families on the ground in their respective communities. In addition to their experience, the stakeholders we interviewed are keen to get involved in community-based weight management treatment provided the appropriate training and resources have been allocated. Within their 10 year framework for action, the Irish Government recognise the need for additional resources to be assigned and seek to *"mobilise the health services to better prevent and address overweight and obesity through effective community-based health promotion programmes"* as well as providing training and skills development [148]. Given this renewed commitment by the Irish Department of Health to empower community teams and communities, the road ahead looks promising.

A key barrier to the implementation of *W82GO-community* was perceived parental resistance which occurred at the patient level but is also intrinsically linked to the external environment where the increasing normalisation of overweight and obesity coexists with a stigma that surrounds the issue. Stakeholders delivering the programme described parental resistance occurring at every stage of the implementation process and suggested that parents did not appear to recognise the issue in their own children. As a result, stakeholders believed that parents did not see the need for treatment or refused to accept that their child was carrying excess weight. While parental attitudes reported in this study were based on the perceptions of staff, a lack of parental awareness regarding their child's weight and resistance towards

discussing weight issues has been documented in previous research [78, 117, 177-179]. This may be due in part to the belief that obesity has become the norm in society, a point which was suggested by stakeholders in this study, and previously outlined in the literature [116]. It is also possible that parental resistance stems from the stigma that is associated with excess weight and obesity [10, 117, 178, 179] or the negative media attention obesity has received. The framing of coverage by media may affect people's views about the causes of childhood obesity and the most appropriate strategies for addressing the problem [180]. Our findings highlight the need, at a policy level, for positive awareness-raising campaigns to encourage parental recognition of healthy childhood growth and development, in addition to knowledge regarding the importance of identifying obesity early in childhood.

Low perceived self-efficacy in approaching the subject of weight with parents was another barrier facing staff during implementation. Stakeholders in this study see the need for a childhood weight management programme in their communities and acknowledge their professional responsibility to get involved. However, they appear uncomfortable and unequipped to do this. This is consistent with previous research which found that low perceived skills and low perceived self-efficacy hamper the implementation of similar programmes [177, 181-184]. In our study, motivational interviewing workshops equipped stakeholders in Site A with increased skills and confidence in working with families on weight management issues. Motivational interviewing is a goal-orientated, patient-centred approach based on the use of communication skills to understand individuals' motivation for behaviour change [185] and has been found to be useful when applied in health care settings [186]. We therefore consider it important that healthcare professionals involved in the implementation of obesity programmes receive this training prior to programme commencement.

The multidisciplinary structure of the programme emerged as both a barrier to and facilitator of implementation and spread across many of the levels outlined by Grol and Wensing. While acknowledged that it was required to treat such a complex health issue, it resulted in lack of role clarity, a lack of understanding of specific discipline roles, and led to difficulties in scheduling. This may in part be due to the structure and governance of community health services within Ireland. While there is a vision for multidisciplinary working set out in multiple policy documents and an emphasis on integrated care [147, 148], the system is not set-up to support the concept. Stakeholders believe a simple roundtable introduction whereby practitioners could share their professional background and outline their specific role within the project would have helped overcome this ambiguity. They suggest it is a simple but often overlooked detail. Furthermore, stakeholders feel the establishment of a local lead was critical in assisting multidisciplinary working while also facilitating discussion between national and local level. Laws et al. also highlight the importance of having key local individuals responsible for driving and coordinating research translation [161].

Finally, an important finding from this research was the inherent problems in a *'one size fits all'* approach to community-based treatment. Stakeholders in our study suggest a tiered approach may be more suitable, beginning with a brief intervention which intensifies based on a child's degree of obesity, the family's motivation, and the capacity of the community and/or healthcare provider. This finding is in line with a suggestion from Staniford et al. who suggest that future interventions should tailor treatment according to participants' age, degree of obesity and their readiness or confidence to change [187]. In addition to tailoring a programme to the individual, programmes need to be adapted for the community setting. Stakeholders in our study raised concerns that the W82GO programme, having been

developed in a hospital setting, was too medicalised for community practice. In particular, the lengthy assessment process which in some cases involved blood tests and the presence of medically trained doctors, was unnecessary for a community-based lifestyle programme. This finding is consistent with previous research conducted by Watson et al. who evaluated a family-based childhood obesity treatment intervention and found they needed to modify the assessment process by replacing community pediatrician assessments with parent/carer self-completion forms for reasons of time and cost [188]. To develop a full picture of treatment, future research should examine what aspects of the programme work, for whom, in what context and why.

Strengths and Limitations

This is one of few qualitative studies, and the first in Ireland, that explored the factors that hampered and facilitated the implementation of a community-based, multi-component childhood weight management programme from a wide range of stakeholder perspectives. While interviewing a wide range of stakeholders provided a thorough overview of the relevant issues, the themes that emerged were relatively homogenous across disciplines which added to the authority of the findings. While this study provides important insight into the implementation of childhood obesity programme in the community, several limitations should be acknowledged. According to de Casterlé *et al.*, (2012) *"using a preconceived framework runs the risk of prematurely excluding alternative ways of organising the data"(pg.362)*[189]. However, data were analysed inductively first before mapping emergent themes onto the Grol and Wensing Framework. Furthermore, in subsequent phases of analysis we adapted the framework to capture the influence of the external environment on implementation. Social desirability bias is a risk when stakeholders are known to the

researcher conducting the interviews. In this study the stakeholders knew the researcher as an external programme evaluator. However, we do not believe this bias had an effect as stakeholders were keen to *"tell their story".* It is also important to note that parental attitudes reported in this study were based on the perceptions of staff delivering the programme. Other studies have identified differences between parents, staff and children in terms of their attitudes towards childhood obesity treatment [187]. We are conducting further research with parents and children to understand the factors influencing their decisions to engage or disengage with obesity treatment. This research is presented in Chapter six of this thesis.

3.6. Conclusions

In light of the dearth of knowledge available on the translation of multi-component childhood weight management programmes to community settings, this study highlights the barriers and facilitators of implementing such programmes from a wide range of community healthcare and admin perspectives. Our results suggest the assignment of clear roles and responsibilities, the provision of sufficient practical training and resources, and organisational support play pivotal roles in overcoming barriers to change. Furthermore, our findings on the challenges of multidisciplinary working and translating hospital programmes to community settings are applicable to the implementation of interventions beyond that of childhood weight management. This evidence should be used to develop implementation plans to improve the translation of interventions into real world settings.

Chapter 4. Barriers and facilitators to initial and continued attendance at community-based lifestyle programmes among families of overweight and obese children: A systematic review

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4.1. Abstract

Background & Aim: The success of childhood weight management programmes relies on family engagement. While attendance offers many benefits including the support to make positive lifestyle changes, the majority of families referred to treatment decline. Moreover, for those who do attend, benefits are often compromised by high programme attrition. This systematic review investigated factors influencing attendance at community-based, lifestyle programmes among families of overweight or obese children.

Methods: A narrative synthesis approach was used to allow for the inclusion of a range of research designs. Quantitative, qualitative and mixed-methods studies were included. Articles published in English were included if they (1) were original research studies, (2) included children aged 4-12 years, (3) had a primary focus on pediatric weight management that (4) incorporated lifestyle (i.e. diet, physical activity and behavioural) components, and (5) reported on the factors influencing attendance at family-based programmes that were delivered in the community setting. The electronic databases, PubMed, CINAHL, EMBASE and PsychINFO were searched from inception to March 2015 and the reference lists of all relevant studies were hand searched for additional articles.

Results: Results suggest that parents provide the impetus for programme initiation and this is driven largely by a concern for their child's psychological health and wellbeing. More often than not, children go along without any real reason or interest in attending. Over the course of the programme however, children's positive social experiences such as having fun and making friends fostered the desire to continue. The stigma surrounding excess weight and the denial of the issue amongst some parents presents further barriers to enrolment and warrant further study.

Conclusions: Efforts are urgently required to optimise the effectiveness of childhood obesity treatment in the community setting. This study provides practical recommendations to guide future policy makers, programme delivery teams and researchers in developing strategies to boost recruitment and minimise attrition.

4.2. Introduction

Childhood overweight and obesity is a significant public health issue. While acknowledging that some researchers have shown that childhood obesity is not declining [190], there is a multitude of work showing a slowing down and possible decline in its prevalence [32-34]. The current plateau is at an unacceptably high level [3] and the costs for children, their families and health services remain substantial [4].

The problems associated with childhood obesity have been widely documented [31, 44, 191]. An obese child is not only at an increased risk of chronic disease later in life but is also at risk, in the short term, of developing a range of co-morbidities, as well as several orthopaedic and neurological conditions [44, 72, 192]. Obese children are also more likely to develop emotional and psychosocial problems, including low self-esteem, the associated feelings of anxiety and isolation, as well as the subsequent involvement in risky behaviours [44, 46, 56]. Given these problems, developing effective interventions to prevent and treat childhood overweight and obesity is vital.

International evidence suggests that family-based programmes [174] that combine healthy eating, physical activity and behavioural components are efficacious in treating childhood obesity [7]. However, the success of these programmes relies heavily on family engagement [173]. Families who initiate treatment for childhood obesity can benefit in several ways, such as, availing of the opportunities to identify any underlying health issues, as well as gaining the support they require to make long-lasting positive lifestyle changes [193, 194]. Despite these benefits, the majority of families referred to treatment decline the invitation [194, 195]. Moreover, for those who do attend, the programme-related benefits are often compromised by high programme attrition which is a common occurrence, affecting up to 75% of

participants and their families who enrol in treatment [173]. While non-attendance or drop-out directly impacts upon the children and their families, it also has negative consequences for the health service. Drop-out is usually preceded by missed appointments, leading to a loss of work time which in turn decreases the productivity of practitioners [193, 196, 197], contributes to increased delays for families already on waiting-lists [193, 198], and increases overall health service expenses [193, 196, 197].

Some of the factors that influence families' decisions to engage or disengage with childhood weight management programmes may be modifiable and potentially preventable. Therefore, there is a need to identify these factors so that strategies to enhance recruitment and retention rates can be developed. Recently, Dhaliwal and colleagues [199] published an integrative review documenting the various predictors of, and reasons for, attrition in paediatric weight management programmes delivered in clinical or research institutions. While few consistent predictors of attrition were reported, the most commonly reported reasons for terminating care included logistical barriers and unmet family needs [199]. Skelton *et al.* examined the reasons given by families for discontinuing outpatient paediatric weight management programmes prematurely, and reported similar findings [173]. While these reviews reveal important reasons for attrition from childhood weight management programmes, they do not address the factors influencing attrition from community-based programmes, nor do they focus on the factors influencing initiation. As in clinical settings [173, 199], an improved understanding of the factors influencing attendance at community-based programmes will lead to enhanced programme development, marketing and delivery, and subsequently improved recruitment and retention rates [173, 199].

Review aim

The aim of this systematic review was to synthesise the findings of quantitative, qualitative and mixed-methods research investigating the predictors of, and factors influencing, attendance or non-attendance at community-based lifestyle programmes amongst families of overweight or obese primary school-aged children. Within this overall review question, we specifically sought to identify the barriers and facilitators related to both initial and continued attendance.

4.3. Methods

4.3.1. Study Design

To facilitate a comprehensive understanding of programme attendance, quantitative, qualitative and mixed-methods studies were included in the review and a narrative synthesis approach, as developed by Popay *et al.* was utilised [200]. This process is not to be confused with the narrative descriptions that accompany many reviews. A narrative synthesis *"refers to a process of synthesis that can be used in systematic reviews focusing on a wide range of questions, not only those relating to the effectiveness of a particular intervention"* (p.5) and *"whilst narrative synthesis can involve the manipulation of statistical data, the defining characteristic is that it adopts a textual approach to the process of synthesis to 'tell the story' of the findings from the included studies"* (p.5). Furthermore, according to the authors, the approach is particularly suited to analysing factors influencing implementation [200].

4.3.2. Search Strategy

A comprehensive literature search was undertaken utilizing a range of electronic databases including PubMed, EMBASE, CINAHL and PsychINFO. No time limit was placed on the search

and search terms (overweight, obesity, paediatric, child, attendance and interventions) were comparable between databases. Example strategies used in EMBASE and CINAHL are presented in Table 8. The reference lists of all relevant studies were also hand searched for additional articles.

Table 8 Sample EMBASE and CINAHL Search strategies

Concept 1		Concept 2		Concept 3
(overweight OR obese OR obesity OR weight OR lifestyle*) intervention OR programme OR management OR treatment OR clinic	**AND**	attrition OR attend* OR non-attend* OR engage* OR terminat* OR retention OR drop-out OR dropout* OR compliance OR enrol* OR initiate OR treatment refus* OR motivate OR participat* OR partake OR uptake	**AND**	pediatric* OR child* OR minor OR youth

4.3.3. Study Selection

Articles published in English were included in the review if they 1) were original research studies, 2) included children aged 4-12 years, 3) had a primary focus on paediatric weight

management that 4) incorporated lifestyle components (i.e. diet, physical activity, behavioural), and 5) reported on the factors influencing initial and/or continued attendance at family-focused programmes delivered in the community setting. Articles were excluded from the review if the study population were not overweight or obese, if studies had a primary focus on adolescent or adult obesity, if studies were based in hospital or research-based institutions, if it was a commentary paper, or if the study was not available as a full-text.

After initial scoping searches and consultation with a University librarian one reviewer (EK) selected the search terms. All studies were assessed against the inclusion criteria. Once duplicates were removed, studies were excluded in the first instance if there was evidence in the title that they were not related to childhood overweight or obesity. Subsequent studies were excluded if they were deemed ineligible following inspection of the abstract. The final step involved reading the full text of each article in order to identify the final group of studies to be included in the review. A flow diagram presents the results of the search in Figure 4. It follows the Preferred Reporting Items for Systematic Reviews and Meta Analyses: The PRISMA Statement [201] in an effort to standardize the method of reporting the selection process in conducting a systematic literature review.

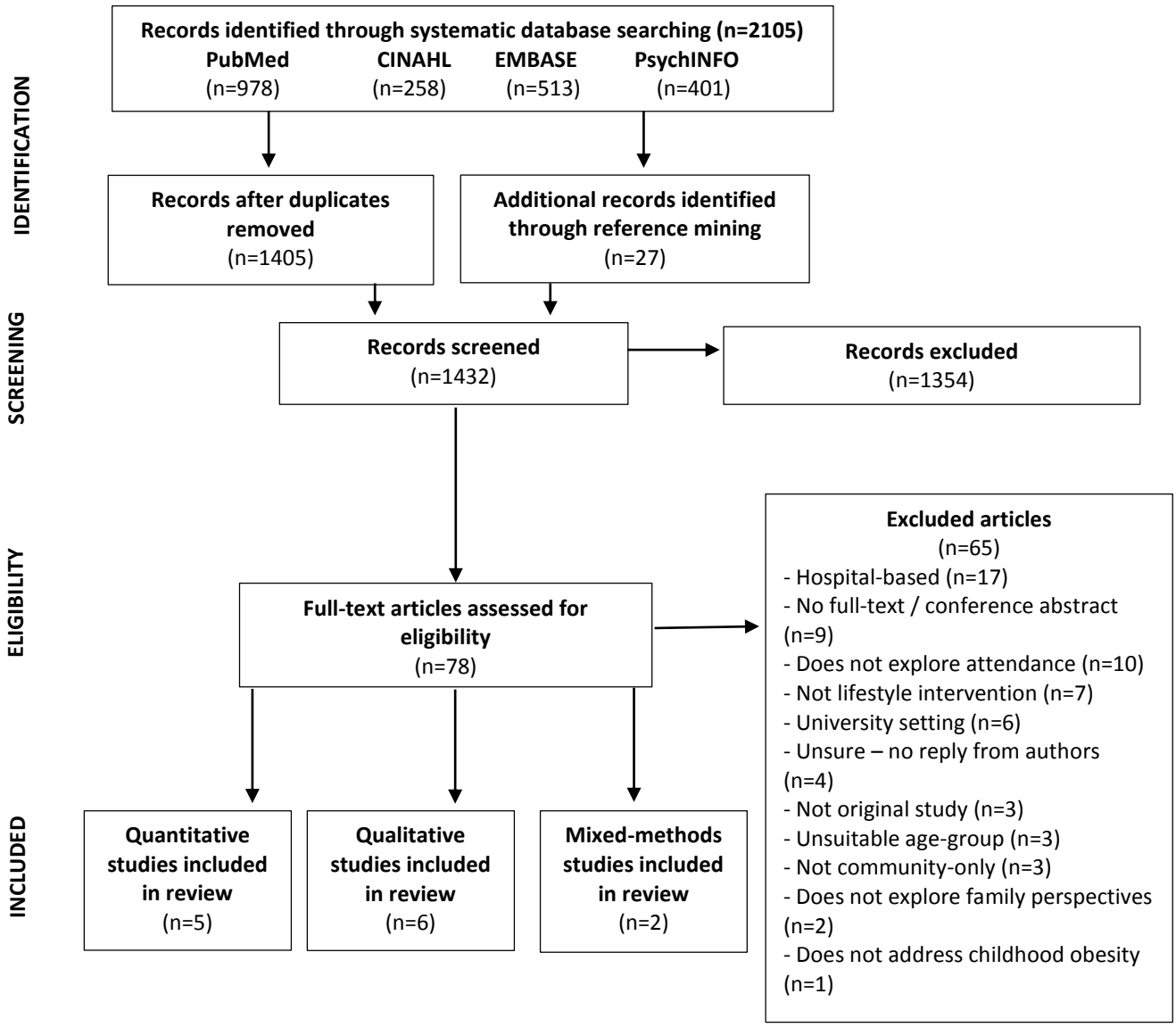

Figure 4 Flow chart of studies screened, excluded (with reasons), and included in the review

4.3.4. Quality Assessment

Two reviewers (EK, JH) conducted quality assessment and Bowling's quality checklist [202, 203] was used to appraise the articles. This checklist allowed us to assess and compare study aims, design, methods, analysis, results, discussion and conclusions. Studies were not excluded on the basis of the quality assessment. Tables 9-11 show the data extracted from all studies and the methodological issues which emerged.

4.3.5. Data Extraction

A preliminary synthesis was conducted by tabulating the relevant data into separate data extraction tables, according to their study design. Three reviewers (EK, SMcH, FS) extracted the following data: author, publication year, location and setting, study methodology, sample characteristics, variables associated with attendance and/or the barriers to and facilitators of attendance, overall study findings, and indicators of study quality. Textual descriptions and information regarding study quality were also included in the data extraction tables.

4.3.6. Data Synthesis

Data synthesis was informed by guidance in the conduct of narrative synthesis in systematic reviews compiled by Popay *et al.* [200] and the following steps were followed 1) preliminary analysis, 2) exploration of relationships, and 3) assessment of the robustness of the synthesis. Theory development was not carried out because of the exploratory nature of the research synthesised.

Firstly, to develop the preliminary synthesis, the descriptive characteristics and complete result sections from each article were extracted in a table. These results were analysed by EK and MPD using the method for thematic analysis as described by Thomas and Harden [204] in the software package NVivo v10. Codes were assigned to units of meaning in the results section of each study. Codes were then organised into categories of factors influencing programme attendance (both initial and continued). These categories were entered into synthesis tables and similarities and differences across the studies were identified. Finally, idea webs were constructed to explore the relationships between the findings across the different studies. Ideas webs, as described by Clinkenbeard [205], use spider diagrams as a method for visualising and exploring possible connections across study findings [200, 205].

4.4. Results

Our search strategy identified 2105 articles. Of these, 1405 remained after duplicates were removed (Figure 5). Screening of titles and abstracts resulted in 78 potentially eligible studies. Of these, 13 peer-reviewed journal articles met the inclusion criteria [9, 10, 117, 178, 179, 206-213]. Quantitative methods were employed in five of the studies included (Table 9), qualitative methods in six (Table 10) while two studies used mixed-methods to achieve their aim (Table 11).

Table 9 Characteristics of Quantitative Studies

Reference	Country	Design	• Sample Size (% male) • Age range • Mean age (SD)	Programme description	Focus on attendance	Quality (Score)
Fagg *et al*. (2015) [206]	United Kingdom	Quantitative before and after study	• 21088 (*N/S) • 7 - 13yrs • *N/S	MEND 7-13 programme is a community group-based, 10 week behaviour change intervention for children who are overweight or obese.	Explored predictors of attendance	No major quality issues identified (9/13)
Welsby *et al.* (2014) [9]	Australia	Quantitative before and after study	• 2,499 (45.2%) • 7 - 13yrs • 10.2yrs (1.7 yrs)	Go4Fun is a community-based, multi-disciplinary group family obesity programme run as a 20 biweekly (i.e. 10 weeks) after school programme.	Explored predictors of attendance	Results from the qualitative feedback survey not adequately reported. (8/13)
Stockton *et al.* (2012) [210]	United States	Data drawn from RCT	• 303 (0%) • 8-10yrs • *N/S	GEMS is a two-year family-orientated, group-based obesity prevention programme for children and their primary caregiver. Interventions are run weekly for the first 14 weeks and then reduced to once a month for remainder of intervention.	Explored barriers and facilitators to attendance	External validity reduced due to the African-American population of girls (8/13)
Williams *et al.* (2010) [213]	United States	Quantitative before and after study	• 155 (42.6%) • *N/S • 5.77yrs (*N/S)	6 month community-based family-focused intervention (14 sessions of 1 hour duration). Frequency of sessions varied from weekly during intensive phase (sessions 1-8) to biweekly (sessions 9-12) and then monthly (sessions 13 & 14).	Explored predictors of attendance	Small number of variables were considered. (8/13)

Reference	Country	Design	• Sample Size (% male) • Age range • Mean age (SD)	Programme description	Focus on attendance	Quality (Score)
Gronbaek *et al.* (2009) [207]	Denmark	Quantitative prospective trial	• 100 (44%) • *N/S • 10.9 yrs	Community-based, family-focused 18 month treatment consisting of a 6 month intensive period and a less intensive 1 year follow-up. Intervention consisted of individual and group-based sessions.	Explored predictors of and barriers to attendance	No control group thus weakening the quality of the study (9/13)

*N/S: Not specified

Table 10 Characteristics of Qualitative Studies

Reference	Country	Design	• Sample Size (% male) • Age range • Mean age (SD)	Programme Description	Focus on attendance	Quality (Score)
Teevale *et al.* (2015) [211]	New Zealand	Semi-structured interviews with parents/ primary care-givers of obese children	• 42 (15%) parents • 36–45 yrs • *N/S	FANAU FAB is an 8 week group community-based family-led lifestyle weight-management programme for obese children.	Explored barriers and facilitators to attendance	No major quality issues identified (10/13)
Lucas *et al.* (2014) [10]	United Kingdom	Semi-structured interviews with families	• 23 families (*N/S) • *N/S • *N/S	MEND 7-13 is a group-based, family-focused 10 week behaviour change programme for children who are overweight or obese.	Explored barriers and facilitators to attendance	No major quality issues identified (11/13)
Grow *et al.* (2013) [178]	United States	Semi-structured interviews with parents	• 23 (4%) parents • *N/S • 40.3yrs	Strong Kids, Strong Teens is an 18 week community-based, family-focused group healthy lifestyle promotion programme	Explored barriers and facilitators to attendance	No major quality issues identified. (11/13)
Newson *et al.* (2013) [117]	United Kingdom	Semi-structured	• 11 (27%) families • *N/S • *N/S	12 month community-based programme split into three stages: Stage 1- intense 12 weekly 2 hour	Explored barriers and facilitators to attendance	Small homogenous sample

Reference	Country	Design	• Sample Size (% male) • Age range • Mean age (SD)	Programme Description	Focus on attendance	Quality (Score)
		interviews with families		group sessions. Stage 2- bimonthly individual follow-up sessions. Stage 3: follow long-term action plan		(9/10)
Visram *et al.* (2012) [179]	United Kingdom	Semi-structured interviews with families	• 20 families (N/S) • *N/S • *N/S	Community based, individualised, multi-disciplinary support for children and their families	Explored barriers and facilitators to attendance	No major quality issues identified (10/13)
Twiddy *et al.* (2012) [212]	United Kingdom	Semi-structured interviews with families	• 23 families (N/S) • *N/S	WATCH-IT, community-based, family-focused, multidisciplinary programme combining group and individual sessions. Families commit for 3 months with an option to renew 3 monthly for a year.	Explored barriers and facilitators to attendance	No major quality issues identified (10/13)

*N/S: Not specified

Table 11 Characteristics of Mixed Methods Studies

Reference	Country	Design	Sample Size (% male) Age range Mean age (SD)	Programme Description	Focus on attendance	Quality
O'Connor *et al.* (2013) [208]	United States	Mixed-methods study within an RCT	• 40 families (20%) • *N/S • *N/S	Helping HAND, a 6-month community-based, family-focused programme with individual sessions for parents and children.	Explored predictors and barriers / facilitators to attendance	External validity reduced due to the primarily Hispanic / low income populations (6/13)
Rice *et al.* (2008) [209]	United States	Mixed-methods study using the information collected via interviews of families	• *N/S • 7-17yrs • *N/S	12 month community-based, family-focused programme. Frist 3 months were group based, followed by 3 month transition phase, followed by 6 month maintenance phase.	Explored barriers and facilitators to attendance	Limited information on sample and methods (4/13)

*N/S: Not specified

Five of the included studies reported on the non-modifiable predictors of attendance (e.g. gender, age and ethnicity) [9, 206-208, 213]. Of these five, three examined the predictors of initial attendance [9, 206, 208] and four reported on the predictors of continued attendance [9, 206, 207, 213]. Ten studies reported on the modifiable factors influencing attendance (e.g. programme location and staff) [10, 117, 178, 179, 207-212]. Out of these, eight explored the reasons behind both initial and continued attendance while Rice *et al.* reported solely on the factors influencing initial attendance and Gronbaek *et al.* reported exclusively on continued attendance. These barriers to, and facilitators of both initial and continued attendance are summarised in Table 12, and discussed in the following section.

Table 12 Summary of facilitators and barriers to initial and continued attendance

	Predictors of Attendance	Facilitators	Barriers
Initial Attendance	- Gender [9, 206, 208]	- Parental Concern for Child's Psychological wellbeing [10, 117, 178, 210-212] - Social interaction [117, 178, 210] - Lifestyle-focused approach [117, 178, 210] - Family-centred approach [178, 211]	- Stigma [10, 117, 178, 179] - Denial [117, 178, 179] - Personal and programme logistics [117, 178, 207-209]
Continued Attendance	- Gender [9, 206] - Ethnic minority [9, 207, 213] - Lone parent families [206, 213] - Families living in lower socioeconomic areas [9, 206]	- Social interaction and support [9, 10, 117, 178, 179, 209, 211] - Practical sessions [178, 179, 210, 211] - Family-centred approach [10, 178, 179, 208, 211] - Programme staff [10, 211, 212]	- Personal circumstances and logistics [10, 117, 178, 207, 208, 211] - Programme Staff [10, 212]

Non-modifiable predictors of initial and continued attendance

Gender appears to influence attendance in weight management programmes. Three of the included quantitative studies reported on the predictors of initial attendance [9, 206, 208], and all found that families with overweight or obese girls were more likely to enrol in weight management programmes than families with overweight or obese boys. Similarly, out of the three quantitative studies that examined the association between gender and completion, two found that families with overweight or obese girls were also more likely to complete treatment than those of boys [9, 206].

Three of the four quantitative studies which examined the association between ethnicity and drop-out reported that those families of ethnic minority were more likely to discontinue care prematurely [9, 207, 213]. Furthermore, two of the included qualitative studies support this finding by suggesting that some families dropped out of treatment as a result of language difficulties [207, 211], or because they felt the programme was "*culturally inappropriate*" [211].

In terms of other non-modifiable predictors of attendance, three of the included studies examined family structure and socioeconomic background [9, 206, 213]. Results suggest that lone-parent families [206, 213] and those families living in lower socioeconomic areas [9, 206] were more likely to drop out. Similarly, Lucas *et al*. reported further difficulty in recruiting families from deprived groups or neighbourhoods [10].

Baseline child body mass index (BMI) and age were not found to be associated with attendance. Two studies examined weight status and found that child BMI was not associated with drop-out [206, 213]. While child age was not examined as a predictor of initial

attendance by any of the included studies, Fagg *et al*. found that it was not associated with continued attendance [206].

Modifiable factors influencing initial attendance

Facilitators

Parental concern for child's psychological wellbeing

Parents were the primary decision-makers when it came to whether or not their family would enrol in a childhood weight management programme and more often than not, children *'just went along'* without any particular reason or interest in attending [178, 207, 210]. Parents were motivated to enrol largely because of their concern for their child's health [117, 178, 179, 210, 211] and more specifically a concern for their child's psychological wellbeing [10, 117, 178, 210-212]. In two studies, parents enrolled specifically because their child had been bullied [10, 211]. For example, in the 10-week MEND programme evaluated by Lucas *et al*. parents were aware of occasions of *"bullying"* or *"social isolation"* experienced by their child and so when deciding whether to enrol or not, they often prioritised any benefits to their child's psychological health over weight loss [10]. In another study some children noted that the experience of being *"bullied a lot"* motivated them to take action [117]. The perceived positive psychological benefits of attending, including the opportunity to improve their child's self-esteem [117, 210, 212] and self-confidence [117, 212], as well as mitigating any adverse social experiences their child might be experiencing [10, 178, 211], encouraged parents to enrol their children.

Social interaction

Children participated in childhood weight management programmes primarily for the social interaction they appeared to offer and many enrolled simply *"to have fun"* and *"make friends"* [117, 178, 210]. The studies included in this review focused primarily on group-based programmes which offered children the opportunity to play games and exercise with others of similar age [117, 178, 210]. Newson *et al.* highlighted the opportunity for social interaction as an incentive for parents also; parents enrolled with the expectation of meeting and gaining the support of other parents in the group [117]. Some parents who participated in this study felt it was good to attend and *"speak to other parents who are trying to change things"* while their children *"could make friends with other kids"* who could *"play on the same level"* as their own child [117].

Lifestyle-focused approach

Three studies reported on parent's interest in programmes that focused on lifestyle (i.e. incorporated nutrition, physical activity and behavioural components) as a factor influencing enrolment [117, 178, 210]. While all of the included studies reported on programmes that promoted lifestyle change through physical fitness, healthy eating and psychological support, Grow *et al.* reported that several of the parents they interviewed specifically mentioned that they did not want their child to *"be put on a diet"* and favoured programmes that took a more holistic approach to healthy weight management rather than those that focused on weight loss or dieting alone [178]. Parents were interested in the *"informative part of the program"* and liked that the programme *"encompassed everything, the nutrition, the motivation and the exercise" [178].* Furthermore, parents cited the opportunity to learn new skills and

enhance their knowledge on lifestyle-related behaviours as further motivating factors for enrolment [117, 178].

Barriers

Stigma

The stigma surrounding the issue of excess weight and associated treatment programmes was reported as a significant barrier to initial attendance for both children and parents in four of the included studies [10, 117, 178, 179]. Parents reported that children were reluctant to attend a programme for *"fat kids"* either because they didn't identify themselves as carrying excess weight or didn't want others to identify them as being overweight [178]. Similarly, Lucas *et al.* identified several children who reported that they were hesitant to attend because they believed they weren't *"fat"* or because they disliked being identified by others as *"fat" [10].*

The stigma surrounding the issue also appeared to influence whether or not parents engaged with a programme [10, 117, 179]. They appeared to be influenced by the perceptions held by close friends and family and were more likely to refuse referral if they expressed negative comments [117]. Additionally, three of the studies reported that parents were afraid of raising the subject of weight with their child out of fear of causing upset to them [178] or that involving them in such programmes would be harmful to their self-esteem [117, 179]. For example, in a qualitative study conducted with 20 children and their families, Visram *et al.* reported parental concerns about their child being labelled as overweight or obese and the negative impact it would have on the child's self-esteem [179].

Parental Denial

Parental denial was another barrier to initial attendance [117, 178, 179]. Parents sometimes relied on their own visual observation of their child rather than that of a health professional to justify rejecting a place on the associated weight management programme [117, 179]. These parents refused to accept their child was carrying excess weight with many referring to their child as *'stocky'* or *'broad'* [179], or believing they *"would grow into it"* [117]. Grow *et al.* found that others compared their children to peers of similar build stating that they*'re 'normal, just like other children"* [117]. This denial led to their perceived lack of need for such a programme and subsequently their refusal of the referral.

Personal and Programme Logistics

Finally, changing family circumstances such as moving school or relocating and scheduling conflicts were a challenge for many families [178, 207, 209]. Parents often found it hard to prioritise time for the programme when they had *"so many other things to do"* in the evenings [117]. For others, programme logistics proved too difficult to overcome when deciding to enrol in a programme [117, 178, 209]. For example, in terms of location, both safety [117] and distance from home [178, 209] were important factors influencing programme enrolment [117, 178, 208].

Modifiable factors influencing continued attendance

Facilitators

Social interaction and support

While parents were key to initial attendance, their children were the main drivers behind continued attendance. Once enrolled in a programme, having fun [9, 10, 178, 209] and making new friends [10, 117, 178, 179, 211] motivated sustained engagement. Children particularly enjoyed the opportunity to play with children of a (i) similar age, (ii) weight status or (iii) activity level [10, 117, 178, 179, 211]. Lucas *et al*. captured this point in the following quote where a participant expressed comfort in being surrounded by those of similar capability *"I found them fun because I was surrounded by different people who were in the situation that I was in, in terms of being overweight and finding exercise difficult."[10].* The majority of the studies reported on group-based programmes whereby children spent time exercising and playing games together while parents participated in the educational component. Visram et al. who evaluated an individual-based programme, as opposed to a group-based programme, reported that participating children stated they were keen to meet other children in similar situations and recommended this as an area for improvement [179].

Parents returned to programmes primarily for the group support they received [10, 117, 178, 211]. The shared experience often reduced feelings of *"isolation"* [10] and many parents valued the *"social acceptance"* of a group describing shared problems which often resulted in the knowledge that they're not alone [10, 211]. While normalising the issue for many, these group-based programmes also offered further social support through the exchange of personal *"struggles and triumphs"[211],* personal tips and tricks as well as holding each other

accountable from week to week. The parent-only session included in these programmes [10, 117, 178, 211] allowed parents to discuss problems they may be experiencing in relation to their own families positive lifestyle change with others on a similar journey that would not otherwise be possible in individual-based programmes.

Practical sessions

Programmes which offered practical sessions further boosted continued attendance [178, 179, 210, 211]. These sessions, whereby parents tried new hands-on activities such as cooking demonstrations [178, 211], healthy food shopping expeditions [211], visualising portion sizes [211], outdoor activity sessions [179] or community-field trips [210], motivated families to continue attending. Parents appreciated *"those kind of things, like the portion sizes… instead just saying it, actually showing portion sizes to the parents so they can see it for themselves, see it being done"* [211]. Results from Teevale *et al*. suggest that parents were more interested in the practical aspect of the programme as opposed to the theory behind it. For example one mother reported that *"…you don't want to hear theory when you're a mum. You want to hear real-life experience and what's practical for us"[211].* Similarly, the parents participating in the study conducted by Stockton and colleagues reported that the field trips provided practical ways of experiencing the theoretical objectives of the GEMS programme [210].

Family-centred approach

All of the included studies reported on family-based programmes where both parents and their child were invited to attend the sessions. This simultaneous delivery of the programme to parents and their children appeared to further enhance retention for a number of reasons

[178, 208, 211]. Three of the included studies reported that both parents and children enjoyed the dedicated parent-child time that the programmes afforded [178, 208, 211] either because they provided the opportunity to do exercise together or provided the mutual support they needed to keep attending. One parent expressed their appreciation of having *"something like that where it's just her and I doing something together, just the two of us, I mean I thought that was great"* while another felt *"it was good opportunity for my child and me to do something together*"[178]*.* Parents also placed value in a programme where both they and their child could attend together and therefore could actively participate and support each other [211]. Parents noted how receiving the same information made them *"work together to help each other"* while others felt that *"it would be hard"* to do the programme by themselves. One parent described how *"there was a time when my daughter would say, I don't want to say, 'cause they're telling me I can't eat this and can't eat that. And I go, No we'll go, 'cause they're telling me the same thing. When she saw it was difficult for me too and we started getting into a routine, she started wanting to go"[211].* Furthermore, inviting other family members to participate in these programmes boosted its acceptability [10, 178, 179, 211]. Three of the included studies suggested inviting siblings to come along as this sometimes alleviated the added cost of childcare [10, 178, 179].

Programme Staff

Programme staff emerged as both barriers to [10, 212] and facilitators of [10, 211, 212] programme attendance. Having staff who lack experience, enthusiasm or group management skills can hinder programme efforts and even result in some families dropping out of treatment. Conversely, a good staff–participant relationship was an important aspect of these programmes and viewed by some parents as vital for continued attendance [211, 212]. Staff

"who made it fun" for children and those with personal experience in either parenting or healthy weight management [10] enhanced continued attendance. Furthermore, Twiddy *et al.* reported that the continuity of staff was an important factor for the success of any programme as staff-participant relationships can be built upon week after week [212]. Regular communication between programme staff and families [179, 211] where *"study people would ring and remind"* parents further facilitated continued attendance [211].

Barriers

Personal and programme logistics

In addition to programme staff, logistical issues created significant barriers to continued attendance. Changing family circumstances including moving home, family illness, or pregnancy [10, 178, 207, 211] and scheduling conflicts such as school holidays and after-school activities [10, 178, 208, 211], and a lack of transport to programme location [10, 117, 178, 208, 211] were reported as reasons for families discontinuing care. For example, Lucas *et al.* reported that transportation to the programme location was problematic when public transport was not available and driving not an option [10].

4.5. Discussion

Childhood obesity is a public health priority worldwide, but the way in which programmes are delivered for its management has received little attention [193]. This review explored the factors influencing attendance at community-based lifestyle programmes among families of overweight or obese children aged 4-12 years and has revealed several important findings. Despite varying findings across the quantitative studies which examined predictors of attendance, two relatively consistent predictors emerged, 1) at the child-level, boys are more

likely to refuse or drop-out of treatment than girls and 2) at the family-level, those families of ethnic minority also more likely to disengage from care. This is consistent with research on hospital-based childhood weight management programmes conducted by Skelton and colleagues [173]. Future research should focus on exploring the reasons behind these findings and developing strategies to improve retention among these groups.

Secondly, our results suggest that children's parents provided the impetus for programme initiation and this was driven largely by a concern for their child's psychological health and wellbeing. More often than not, children went along without any real reason or interest in attending. Over the course of the programme however, children's positive social experiences such as having fun and making friends fostered the desire to continue attending. These outcomes highlight the need for strategies employed to enhance recruitment to focus on parents and those to minimise attrition to focus on both parents and children.

Our review also revealed a number of personal reasons (e.g. prejudices, fears) and practical reasons (e.g. distance, transport and scheduling) behind their decisions to engage or disengage with community based intervention programmes. The stigma associated with being overweight or obese created a significant barrier to initial attendance. Research suggests that overweight and obese children are vulnerable to stigma and stereotyping from multiple sources [57] and in efforts to avoid or minimise this victimisation some families may refuse the referral to care. Puhl and colleagues recommend that researchers carefully consider how messages are framed in programmes to address childhood obesity [57]. Our review found that parents were motivated to enrol in programmes that focused on attaining a healthy lifestyle, rather than those which centred on weight-loss, and so a move away from labelling associated programmes as weight-related interventions may be useful. This finding

is consistent with other research that recommends programmes have a focus on health rather than weight or thinness [57, 214]. Furthermore, the way in which health practitioners address the topic of weight with families is of critical importance as it forms the foundation of interventions to address the issue of childhood overweight and obesity. Many parents may feel blamed or judged by their health care provider and as a result may delay or even refuse to accept care [57]. Practitioners should avoid using language that places blame on parents and should ensure they address the topic of weight in an appropriate, non-judgemental and sensitive manner. For example, in a study conducted by Puhl and colleagues, results suggest that the terms “fat” and “obese” were rated as the “most undesirable, stigmatizing and blaming” and should be avoided [215].

Eckstein and colleagues reported that successful health behaviour change cannot occur unless the health issue is recognised and acknowledged [108] and research has shown that parents are unlikely to implement changes to their child’s lifestyle unless they recognise the need for such changes or perceive their child to be at risk [84]. This review found that denial, or a lack of parental recognition of their child’s excess weight, was a key barrier to attendance at childhood weight management programmes. Parental misperception of child weight is common. Previous reviews found that ≥50% of parents fail to correctly identify their child as overweight [81, 82, 98, 99]. However, little evidence is available on what influences this misperception. Through qualitative research, Jain *et al.* and Rich *et al.* have offered some insight on the reluctance of mothers to acknowledge overweight in their children [111]. Results suggest that a distrust of weight charts, fear of being blamed, unwillingness to label their child as overweight or believing they would grow out of it were key factors [111, 112]. As mentioned above, parents may not want to recognise their child is carrying excess weight

or label their child as overweight in case their child is stigmatised [99]. Furthermore, it has been suggested that parents may not recognise overweight in their children to avoid acknowledging and taking responsibility for their own overweight [113, 114]. Alternatively, given the prevalence of overweight children worldwide it is also possible that changing social norms mean that parents simply do not recognise overweight in their children [110, 115]. In a study conducted by Newson *et al.* authors suggest that denial may be partly due to the *'normalisation'* of childhood obesity within the context of today's society, which has permitted families to refuse referral on the basis that their child is not different to others [117]. The first step in the prevention/treatment process is to identify overweight. Therefore, strategies and campaigns to increase awareness of childhood overweight and obesity, and to simplify means of explaining measurement and classification are needed at a policy level. Additionally, a greater understanding of the reasons influencing parental misperception of child's weight status should be explored through further research. This is presented in Chapter 6 of this thesis.

Finally, in keeping with the reviews conducted on hospital and research based programmes, this review suggests that practical problems including transport, scheduling conflicts and changing family circumstances were an issue for all families and common reasons for attrition [173, 199]. Location, transportation and distance to treatment programmes can be important barriers for families participating in weight management programmes and highlight the need for similar programmes to be available locally or in sites easily accessible by public transport or with free onsite parking. Furthermore, many appointment times are during daytime hours, meaning children would miss school and parents would miss work in order to attend. For many parents, obesity is not seen as a *'disease'* and, therefore, they may be less willing to

miss school/work for treatment than for other conditions that are perceived to be more of a health issue [117, 216]. Evening or weekend appointments may address this barrier. However staff should spend time discussing and addressing any barriers to attendance before families initiate care.

Strengths and Limitations

To our knowledge this is the first systematic review of the barriers and facilitators associated with family attendance at community based childhood weight management programmes. This review included an extensive and systematic search of the literature and included quantitative, qualitative and mixed-methods research in order to facilitate a comprehensive understanding of programme attendance. To ensure reliability, quality check procedures were conducted including double screening and checking by independent researchers at the data extraction, coding and quality appraisal stages. However, it is important to acknowledge several limitations. Firstly, while a good combination of countries are represented in this research it is important to note that most of the evidence in the included studies is derived from European or Australasian-based research, thus limiting the generalizability of the results to other countries (most notably the United States). For example, insurance coverage may influence attendance in the US but in countries with universal health care coverage (e.g., United Kingdom, Australia and New Zealand), other factors appear to be more pertinent. Secondly, because we did not include unpublished studies and studies that were published in a language other than English, some relevant papers may have been excluded. The synthesis is therefore limited to published data which tends to range in quality and given the heterogeneity of study designs and programme characteristics, it was not possible to conduct a meta-analysis. In addition, many studies failed to adequately recruit those families who

declined treatment and so this group may be underrepresented. Future efforts should be made to elicit the barriers to attendance as perceived by those non-attenders.

4.6. Conclusion

Failure to attend and complete treatment is a common and worrying issue for health professionals and policy makers working in the area of childhood obesity treatment. While there is still some uncertainty as to what type of service is effective in treating and managing childhood obesity one thing is certain – governments and the health service need to provide a service in a way that is acceptable and appropriate to families. Our review has found that the stigma associated with carrying excess weight, as well as low levels of recognition of the problem amongst parents are important barriers to programme initiation an require urgent attention. However, once enrolled in a programme positive social interactions as well as good staff-participant relationships nurture continued engagement. Our findings have important implications for future programmes that aim to successfully recruit and retain participants for community-based childhood weight management programmes.

Chapter 5. Understanding engagement in a family-focused, multicomponent childhood weight management programme delivered in the community setting

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THIS PAPER HAS BEEN RECENTLY SUBMITTED TO PUBLIC HEALTH NUTRITION

5.1. Abstract

Background

Engaging families in paediatric weight management is difficult and time consuming. This paper explores public health nurses (PHNs) experiences of referring to, and families' feelings of being referred to, a multi-component, community-based, childhood weight management programme and provides insight into family's motivation to participate in and complete treatment.

Methods

Qualitative study using semi-structured interviews and the draw and write technique. Nine PHNs involved in the referral process, ten parents whose children were referred, participated and completed the programme and nine children who completed the programme took part in this study.

Results

PHNs were afraid of misclassifying children as obese and approaching the subject of excess weight with parents. Peer support from other PHNs as well as training in how best to talk about weight with parents were potential strategies suggested to alleviate these fears. Parents recalled the anxiety they felt as result of the 'medical terminology' used during referral, their inability to interpret it and what it meant for the health of their child. Despite initial fears, a concern for their children's future was a major driver behind their participation. Children's enjoyment of the programme was key to programme completion.

Conclusion

This study provides evidence of the difficulties of referring families to community weight management programmes and provides practical suggestions on how to support referrers. Findings also reveal the factors influencing uptake of community weight management programmes. Motivations driving programme uptake and completion should be maximised by staff and policy-makers when developing similar programmes.

5.2. Background

Childhood obesity is a significant public health issue [32, 190]. The current plateau is unacceptably high [3] and the costs for children, their families and health services remain substantial [4]. Children who are obese are likely to remain obese through to adulthood [43] and to develop chronic disease. Moreover, an obese child is also at increased risk of immediate co-morbidities including orthopaedic and neurological conditions, breathing disorders and psycho-social problems [44]. Childhood is therefore a critical time for the implementation of effective prevention and weight management initiatives.

Uncertainty surrounds the most effective way to manage childhood obesity in the community [217]. While international recommendations agree that programmes to treat childhood obesity should be family-focused and combine healthy eating, physical activity and behavioural components [5, 7, 174], their success relies heavily on family engagement and attendance [173]. With the majority of families declining referral and up to 75% of families discontinue care, poor engagement is one of the greatest challenges facing teams tasked with implementing childhood obesity programmes and yet, is often underestimated [218]. This raises concern regarding the sustainability of community-based programmes [20, 173].

Referral to childhood obesity programmes is a challenge for both the staff involved in referring and the families identified for referral [218]. Research has found that school nurses involved in referral fear parental reactions to hearing about their child's overweight status [182]. These reactions may be influenced by factors including parental underestimation of children's weight as well as health professional's skills in relaying the information [219].

The retention of participants in childhood obesity programmes is also problematic [20]. High programme attrition is common [173] and while it directly impacts upon the child and their

family, it also has negative consequences for the health service. Drop-out reduces the productivity of practitioners [193, 196, 197], contributes to increased delays for families already on waiting-lists [193, 198], and increases overall health service expenses [193, 196, 197].

Thus, before dedicating resources to scaling-up programmes, early-phase evaluation is necessary to identify and minimise factors hindering programme success [165]. The aims of this study were:

1. To understand PHN and parental perceptions of referring to, and being referred to, a family-focused childhood weight management programme for children with obesity, respectively.
2. To identify the factors that motivate families to accept referral to a community based childhood obesity programme.
3. To ascertain the factors that encourage parents and children to complete the programme.

5.3. Methods

5.3.1. Context of the childhood weight management programme, referral, PHN training

Childhood weight management programme (W82GO-community)

W82GO-community was a 12 month, family-focused, behaviour change pilot programme for children aged 5-7 years who measured ≥98th percentile. Its aim was to improve nutrition, increase physical activity and facilitate behaviour change [14] and was modelled on best practice recommendations [5-7, 174]. The programme was offered free of charge and was delivered by a multidisciplinary team of community health professionals including dietitians,

physiotherapists, PHNs, psychologists, health promotion officers, area medical officers and administrators. Table 13 outlines key aspects of the *W82GO-community* programme.

Table 13 Key Aspects of the *W82GO-community* Programme

Aspect	
Programme Aim	Reduce obesity in children with BMI ≥98th percentile by improving children's dietary intake, physical activity levels and weight status while also increasing children's quality of life and psychosocial health.
Specific Programme details	12-month duration: initial individual assessment to ascertain eligibility followed by two phases; Phase 1, the initial intensive phase, consisted of six weekly group sessions for both the child and their parent/carer. These sessions lasted approximately one and a half to two hours and incorporated educational and practical sessions to increase physical activity, improve nutrition and increase sleep. Upon completion of phase 1, children returned with their parents/carers for three booster maintenance group sessions at three, six and nine months. These sessions aimed to encourage the family to continue with lifestyle changes and mitigate the barriers to change. At 12 months, the children and their parents/carers returned for a final individual assessment to document any changes and make plans for sustainment.
Delivery Location	Initial assessments took place in community healthcare offices while the subsequent group sessions were delivered in a local sports or community centre, weekdays, between 3.30 and 6pm.
Involvement	Sessions were for parents and children.
Participants	Children were eligible if they were aged between 5-7 years; were obese (BMI ≥98th centile); had no apparent clinical problems, comorbidities, or limitations to engaging in physical activity; no use of medication known to effect body weight; and had at least one parent/carer who was able to attend each of the programme sessions.
Components	Physical activity, diet and nutrition, behavioural, parent education sessions, child activity sessions.
Intervention facilitators	Community-based dietitians, physiotherapists, public health nurses, psychologists, health promotion officers, area medical officers, administrators and local area management.

Referral

As part of a pilot school measurement programme, children's body weight and height were measured in school by PHNs using standardised procedures. Weight and height data was subsequently used to calculate BMI and children were classified as obese if their BMI plotted ≥98th BMI percentile using the UK90 cut-offs [26]. Out of over 2000 children measured by PHNs, 121 (6%) plotted ≥98th percentile making them potentially eligible for the programme. Of this 121, PHNs invited 94 parents (77.6%) to attend, by phone or letter. 27 parents (Site A=7, Site B=20) were not invited either because they couldn't get in touch with a parent/carer, because of a known disability that would limit the child's ability to engage in the group programme or because some PHNs believed the demand for the programme would exceed places available. Those parents interested in attending received a letter detailing *W82GO-community* and referring them to an initial assessment to ascertain programme eligibility. During initial assessment, the child and his/her parent/carer met with members of the multidisciplinary team for 1-2 hours. Families were eligible for the programme if the child was between 5-7 years old; was obese (BMI ≥98th centile); had no limitations to engaging in physical activity; was not taking medication known to affect body weight; and had at least one parent/carer who was able to attend each of the programme sessions. Families who met these criteria were offered the programme. PHNs were asked to conduct this screening and make referrals to *W82GO-community* as part of their existing roles.

PHN Training

All PHNs were invited to take part in a brief training programme prior to the commencement of *W82GO-community*. Training included a needs assessment, a one-day educational training course and two days of clinical shadowing with an experienced *W82GO* programme

practitioner at the Temple St Children's University Hospital where the programme was developed. Feedback collected for Chapter three of this thesis outlined how this training did not cover the practical aspects of running the programme such as screening or referral in any great detail. However, it is important to note that the PHNs in Site A received motivational interviewing workshops for childhood obesity (separate to the programme) at the time of programme implementation.

Site Differences

The programme was piloted in two community sites (Site A & Site B) from April 2015 for 12 months. Differences between sites have already been described in Table 3 (pg. 24) Chapter two of this thesis. Briefly, key differences thought to be of importance to this chapter (in addition to the provision of MI training in Site A as previously mentioned) include the number of staff per site (Site A=21; Site B= 12), the number of PHNs per site (Site A=8; Site B= 5) as well as the presence of an administrator in Site A who was responsible for follow-up with parents as well as providing session reminders. The lack of an administrator in Site B may account for the poor documentation of the families referred to the programme and may partly explain for the low uptake. Additionally, while staff in Site B decided to follow the manual to the letter, staff in Site A adapted the programme in favour of more group interaction i.e. they used more group sessions and decided against using PowerPoint slides.

Family engagement

By April 2016, both community sites had completed one year of the *W82GO-community* pilot programme and figure 5 outlines families flow through the programme. Almost half (n=44, 47%) of the 94 families invited for initial assessment presented at these appointments.

Following this, less than half of families (n=18, 41%) attended the first group session. This represents a large number of families dropping out following initial assessment. In terms of attrition during the programme, four families (22%) dropped out during phase one and an additional six (33%) dropped out during phase two.

In Site A, out of the 41 eligible families, 39 (95.1%) were referred to the programme and 16 (41%) families presented for initial assessment. Out of this, 14 (87.5%) families agreed to take part in the programme and presented themselves on day one. Numbers participating in Site A remained relatively high throughout the intensive phase (Phase one) of the programme however numbers dropped to as low as three during phase two. In Site B, out of the 80 eligible families, 55 (68.7%) were referred to the programme and 28 (50.9%) families presented for the initial assessment. Out of this 28, just five (17.8%) families agreed to take part in the programme and at week six of the intensive phase three families were still attending. These three families continued with the booster sessions with an additional family returning at six months post intervention. Programme staff at Site B chose not to go ahead with the final booster session due to the low numbers attending and the amount of staff time and resources required to run it.

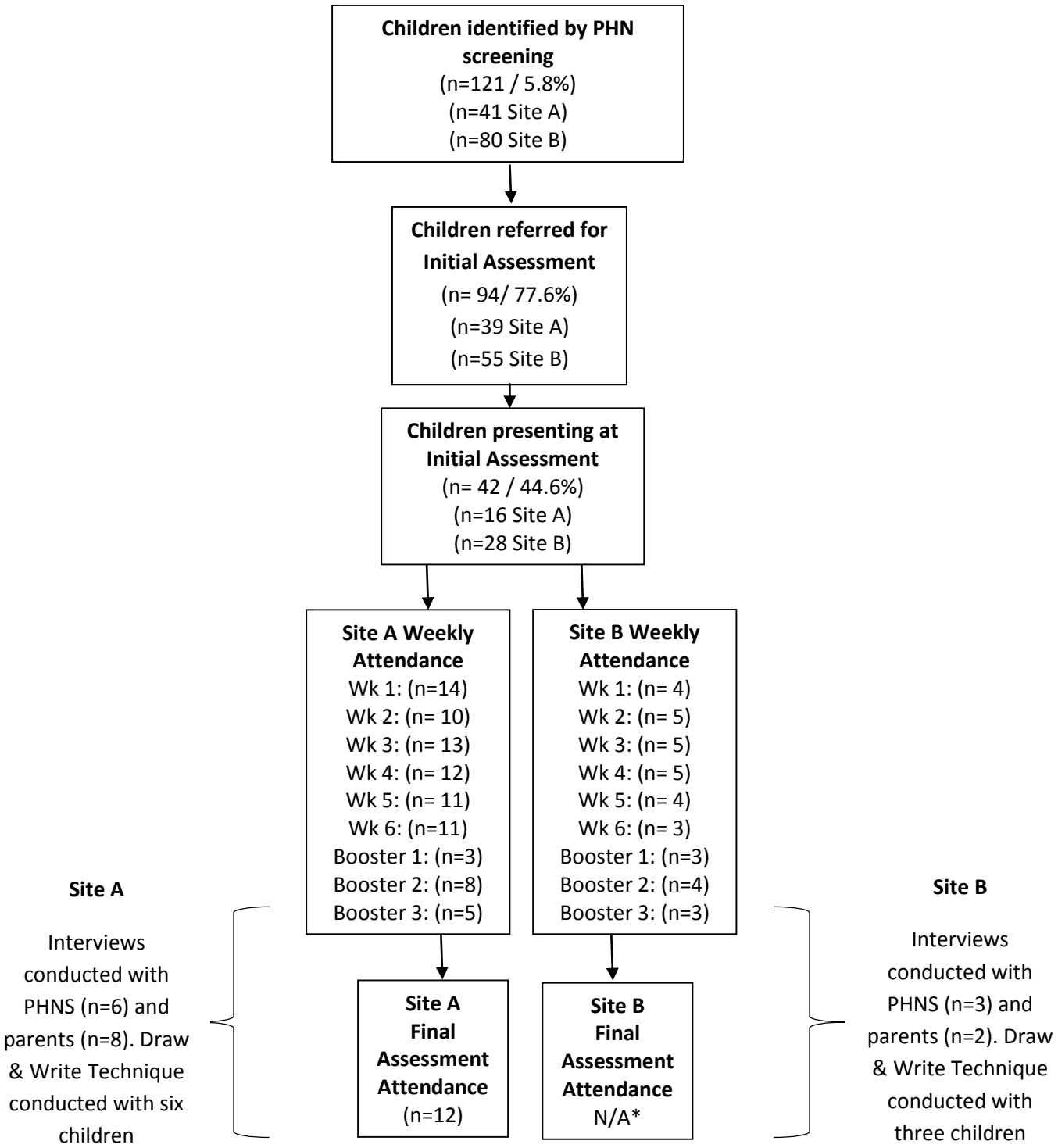

Figure 5 Childrens flow through the W82GO community programme

*Programme staff at Site B chose not to go ahead with the final assessment at 12 months due to the low numbers attending

5.3.2. Study design and sample

A qualitative approach using semi-structured interviews and the draw and write technique [220] was used. All PHNs who referred families to *W82GO-community* (n=13) were invited to participate by email and followed up by telephone during which the researcher outlined the study aims and methodology. Given the likelihood that many parents would not engage in the study, all parents referred for initial assessment (n=94), including 42 initial attenders and 52 non-attenders, were invited to take part in an interview. Participation was incentivised with a €100 voucher prize draw at the end of data collection. Finally, all families present at week six of the group sessions (n=14) received an information pack outlining the Draw and Write technique (refer to 5.3.3 for more information) and inviting children to take part. Ethical approval was granted by the Clinical Research Ethics Committee of the Cork Teaching Hospitals.

5.3.3. Data collection

Semi-structured interviews

All participants were invited to take part in face-to-face interviews. However, due to time and scheduling difficulties a mixture of telephone (n=17) and face-to-face (n=2) interviews were conducted. Semi-structured topic guides were developed for the two groups based on literature and thorough discussion with international experts. The topic guide for PHNs covered their experience of referring parents to *W28GO-community*, perceptions of barriers to and facilitators of participating as well as their views on the value of such a programme in their community. The parent topic guide addressed issues including their experience of the referral process, reasons for attending/not-attending and reasons for on-going attendance or drop-out. Prompts and probes were used throughout the interviews to stimulate discussion

(See Appendix 3 for both topic guides). Prior to each interview, participants were informed about the purpose of the study, that participation was voluntary and that they could terminate the interview at any stage. Signed informed consent was obtained before each interview, which lasted on average 45 minutes. Participants were interviewed between August 2015 and February 2016 by EK. For PHNs, data saturation was judged to have been reached between interviews eight and nine as no new themes emerged [175]. For parents, saturation occurred after interview nine. No new themes emerged and responses were comparable between sites. Hand written notes were taken throughout the interviews which were digitally recorded, transcribed verbatim and imported to NVivo QSRv10 software for analysis.

Draw and Write technique

The Draw and Write Technique [220] is a child-friendly method of collecting data from young children [221] who may have difficulty conveying their feelings verbally [222] and has been used to collect children's views in the health field [220-228]. During the final group session, after initial introductions, EK provided children with paper, pencils and colours and asked them to draw a picture of *"what they thought was good or bad about the programme"*. Upon completion of the drawing, EK asked each of the children to describe it. They were also asked to title their drawings and given a final opportunity to describe it. EK recorded individual answers and transcribed them for coding purposes. An example of the prompts used can be found in Appendix 3. Informed consent was obtained from each child's parent, and each child gave his or her assent prior to participation.

5.3.4. Data analysis

Data were analysed iteratively to allow for emergent themes to be explored in subsequent interviews. Thematic analysis [229] was conducted in the first instance by EK with frequent debriefing sessions with co-authors (SMH and FS) to discuss similarities or differences. This process involved reading and re-reading the transcripts several times resulting in data immersion [229]. After familarisation, data were coded and codes were examined for patterns and similarities and grouped together to form inductive themes, which were then reviewed and further refined. Four interviews (2 PHN/2 parent) were subject to inter-coder reliability by two authors not involved in data collection (SMH & FS). The emerging themes from the PHNs and parents were comparable, therefore these data are presented consecutively under the same thematic headings.

5.5. Results

Of 13 PHNs invited for interview, nine participated (six PHNs from Site A, three PHNs from Site B). Of the 94 parents that were invited to participate, ten mothers took part (eight from Site A and two from Site B). It is important to note that these ten mothers completed the programme. Two interviews were conducted in person and 17 were conducted by telephone. Of 14 children, nine took part in the draw and write component of the study (Site A=6, Site B=3). Figure 6 illustrates the key factors influencing parents' decision to enrol in the programme as well as suggestions for improving referral.

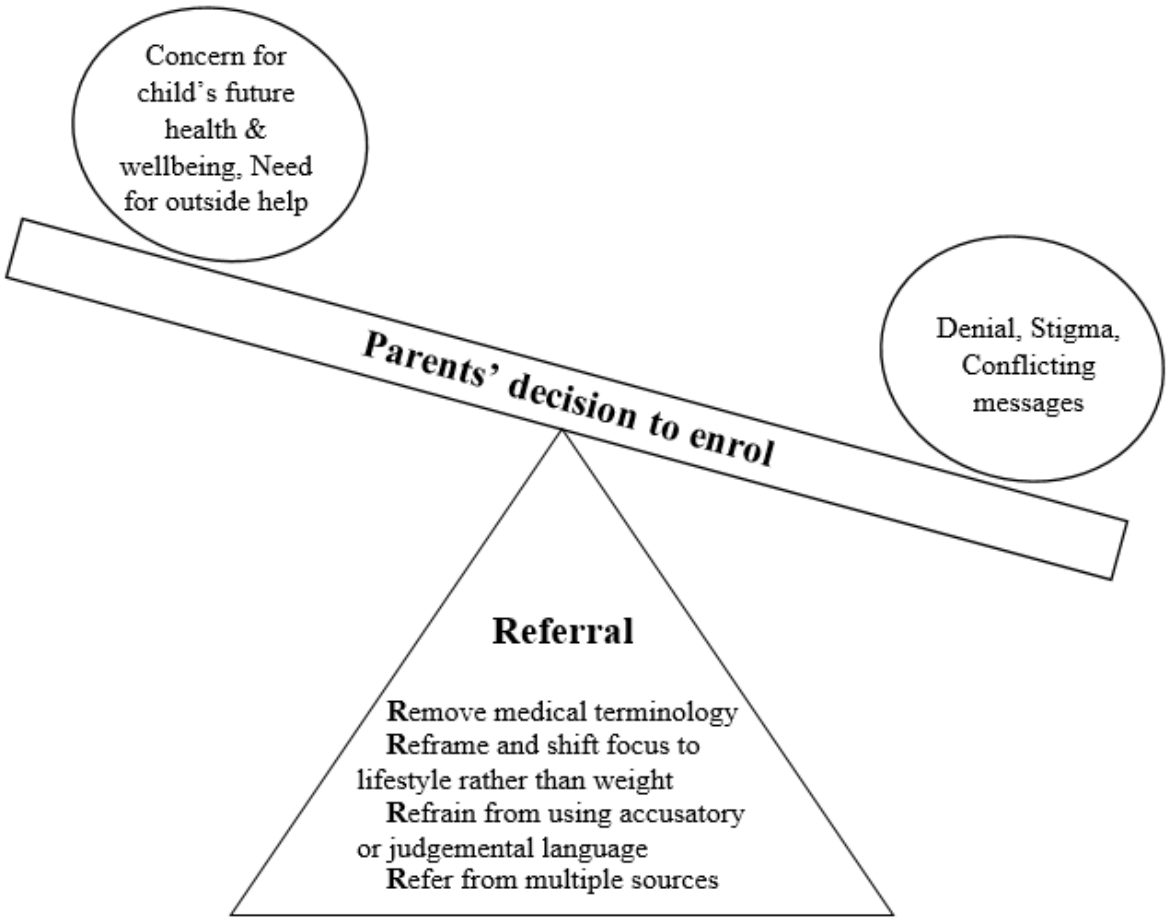

Figure 6 Factors influencing enrolment and suggestions for improving the referral process

PHN and parent perceptions regarding the referral process

PHNs and parents reported a number of fears relating to the referral process. For PHNs these fears included misclassifying children as obese and approaching parents about their child's excess weight. For parents, most were afraid of what the referral meant for the health and wellbeing of their child. This concern helped some parents overcome initial denial and ultimately outweighed any fears they had regarding the stigmatisation of obesity.

PHNs fear of misclassifying children as overweight or obese

PHNs expressed an overwhelming sense of fear and anxiety regarding the referral process. They spoke of the accuracy and precision required when using BMI growth charts and a common feeling was a *"fear of getting it wrong"* and misclassifying children as obese. One PHN explained how *"there was a big fall out from your interpretation so you really needed to be 100% that you were correct. If you think of the size of the problem you could be landing on a parent's shoulders depending on a small tiny box you're trying to interpret it's kind of a bridge too far nearly.",* (PHN009). As a result of this fear, PHNs found themselves double and triple checking at every stage of the screening process; "*You've to check them three or four times. You've got to be in a room on your own and you've got to go back and forward. Especially for the ones who were overweight or obese. If they were over the line I would say I checked them half a dozen times before I sent out the letter because your worst nightmare would be to send out a letter when they weren't right",* (PHN003). The fear and anxiety of getting the diagnosis wrong and the resulting time spent double and triple checking led to a call from PHNs for the development of a national standardised BMI app that could be used by all professionals referring children to weight management programmes. Furthermore, in an effort to share the responsibility of referral, PHNs suggested community-programmes should comprise of open referral pathways whereby all health professionals could refer; *"It's a lot of pressure being the only ones responsible for referral. There should be an opt-in approach whereby parents could come forward themselves. Referral should be from multiple sources",* (PHN003).

PHN fear of approaching the subject of weight with parents

Another reported fear was that of telling parents their child carried excess weight. PHNs were afraid of causing upset to families who they would encounter regularly. One PHN stated *"it was so bad sometimes that I used to bless myself before I went on the phone",* (PHN001). The *"dread"* felt by PHNs was due in part to some PHNs low perceived self-efficacy in discussing weight with parents as well as the verbal abuse experienced during referral. PHNs expressed mixed levels of confidence in addressing weight issues with families. Many spoke of *"feeling drained"* at the end of the working day as a result of these phone calls and outlined a need for more support. Some acknowledged that a quick debrief with other nurses often helped alleviate some of the strain.

All PHNs believed that training on communicating to parents that their child carried excess weight was needed. Separate to the implementation of *W82GO-community*, motivational interviewing (MI) was provided to PHNs locally at one of the two pilot sites. This training influenced PHNs' feelings of confidence and readiness. In site B where no MI took place PHNs spoke of their fear of contacting parents with some *"thankful when they didn't answer the phone",* (PHN001). This compared to feelings of confidence and readiness in site A where PHNs received MI training specific to childhood obesity. One PHN described how she was not *"frightened of dealing with parents anymore",* because during the training she learned *"how to explain things in a sensitive non-judgemental manner and where to leave pauses for the parent to digest the information",* (PHN009). Another possible mechanism suggested by PHNs to avoid and reduce such negative initial reactions was to send a letter to parents on a Friday communicating the results of the screening process and advising that the relevant PHN would be in contact during the following week; *"That way parents had time to digest the information*

over the weekend so they wouldn't have been as defensive or angry when phoned the following week. It worked well", (PHN003).

Parental fear of negative consequences of referral

For parents, the referral process was also one of fear and apprehension. Parents were afraid of the consequences of the referral and what it meant for the health and wellbeing of their child. One parent recalled the referral being *"horrific"* and described the letter she received outlining her child's overweight status as "*scary"*. In particular, the list of professionals involved in delivering the programme created panic and parents automatically feared the worst in relation to their child's health; *"...a doctor, a physio and the worst of all was the psychologist. It sounded like my child was on deaths door".* The initial fear of the diagnosis was compounded by a lack of understanding of BMI and growth charts which were used to explain their child's weight status; *"Something needs to be done about explaining BMI and the chart because for the life of me I couldn't get my head around it. I can imagine some parents thinking it was nonsense drawing someone's height and weight on a chart and coming up with x*", (PARENT003).

Furthermore, even though these parents eventually agreed to participate in *W82GO-community* they recalled being afraid of the potential psychological consequences of enrolling their child on a weight management programme. They feared putting a negative *'label'* on their child and believed this may have discouraged other parents from enrolling. Some referred to weight as a *'taboo topic'* and one described how *"people were taking it as an offence on themselves. They don't want to be found out as the bad parent",* (PARENT005). Another recalled the reaction she received when she told extended family of her decision to

take part in the *W82GO-community* programme; *"Even when I'd say we were going to go on this programme they looked at me with horror on their face",* (PARENT010).

Parental denial – a barrier to engagement

PHNs were unanimous in the view that perceived parental denial was the key driver for the lack of involvement. They believed obesity has become the norm in their community resulting in parents not viewing their child as overweight and hence declining referral. The parent's interviews supported this, *"I felt oh for god's sake what are they on about. Because you look at him and you don't see it. I didn't believe it"*, (PARENT006). This initial denial was ultimately overcome by feelings of *"guilt"* should they be wrong and *"a fear of doing nothing"*. PHNs recalled how parents used terms including; *"he's a fine big, heavy boy", "He was a 10lb baby", "he's strong like his father"* or *"big-boned like his grandparents"* to describe their child's weight in an attempt to justify it. Furthermore, some PHNs described how they themselves have become desensitised to the issue; *"Even for some of us health professionals involved there was a sense of shock. Because they didn't look obese... we have become accustomed to weight over the last couple of years",* (PHN005).

Conflicting Messages

Parents spoke of how they received conflicting messages in relation to their child's weight status from family, friends and figures of authority including school teachers and GPs and suggested this could possibly undermine others parent's motivation to enrol. Parents recalled how extended family members would question the need to attend such a programme while one mother recalled attending her own family GP for confirmation of her child's weight status and was told *"it's just puppy fat. They checked him over and said it's an age thing, that there*

was nothing wrong with him", (PARENT009). Other parents described the reactions they experienced at the school gate when they told other parents or teachers about the programme; *"she (teacher) just laughed and said not to take any notice of it, that he doesn't look it",* (PARENT006).

What motivated parents to enrol?

Despite initial fears, the parents in this study ultimately chose to participate in and complete the programme. Reasons included a prevailing concern for their child's future health as well as wanting help from a source outside the family.

Concern for child's future health and wellbeing

Parents described how the *'guilt of doing nothing'* or *'fear of future health consequences'* motivated them to enrol; *"I kept thinking heaven forbid down the line if there was a serious problem no one would help me then and I wouldn't have done anything about it. It would be on my conscience"*, (PARENT001). This parent described how regardless of how she felt about attending the programme she would do anything for her child; *"I know if it was for me I probably wouldn't have gone but when it's for your child it's a different story",* (PARENT001). *"Doing it for your child"* was a common theme and this motivation appeared to be more powerful than the initial denial or stigma felt by some parents. While most were concerned for their child's future health, for others emotional issues such as bullying were more salient. These parents were afraid their child would fall victim of bullying in the future should they not accept the referral; *"You don't want your child being bullied because they are overweight. I hear of awful stories in the papers and through friends. I'm not aware of it at this young age but definitely as he gets older it may become a problem and then that leads to all psychological*

issues doesn't it?", (PARENT003). Furthermore, parents believed that 5-7 years was a good age to tackle the issue before *"it got out of hand"* and became *"something much harder to get a handle on",* (PARENT003).

Wanting 'outside help'

Some of the parents who enrolled in *W82GO-community* suspected there was an issue with their child's weight but were unsure about how to address it or *"where to go for help".* These parents described feeling relieved when offered the programme and outlined how they needed *"someone from outside the family"* to help them make the necessary changes either because they didn't know what lifestyle changes to make or felt their own efforts weren't being taken seriously by their children; *"I wanted someone to show me how. I suppose I wanted him to hear it from someone else too because he sometimes would only laugh at me. I was delighted to get the extra help",* (PARENT004).

<u>What encourages families to complete the programme?</u>

Child's enjoyment

Parents reported children's enjoyment of the programme as the main reason for continuing treatment. They described how children had fun, played games and made friends with children of a similar age and ability and some indicated that they would have dropped out prematurely if it were not for the children's enjoyment, "*I kept going only because they were loving it so much. I didn't love it, they loved it"*, (PARENT006). As part of this group, children had the opportunity to be *"team leaders"* and one parent described how her son *"used come running out telling me that he won this or that or got to choose who was on his team",* (PARENT006). This theme of enjoyment also emerged and was confirmed during discussions

with the children. During the draw and write component of this study, when asked what they thought about the programme the children focused on the fun they had playing games and making friends with other children, as is also evident in their drawings (Figure 7). One child said *"It was great fun. I loved playing with the big yoga balls and playing with my friends. We can do all different games and run up and down and play together",* (CHILD002).

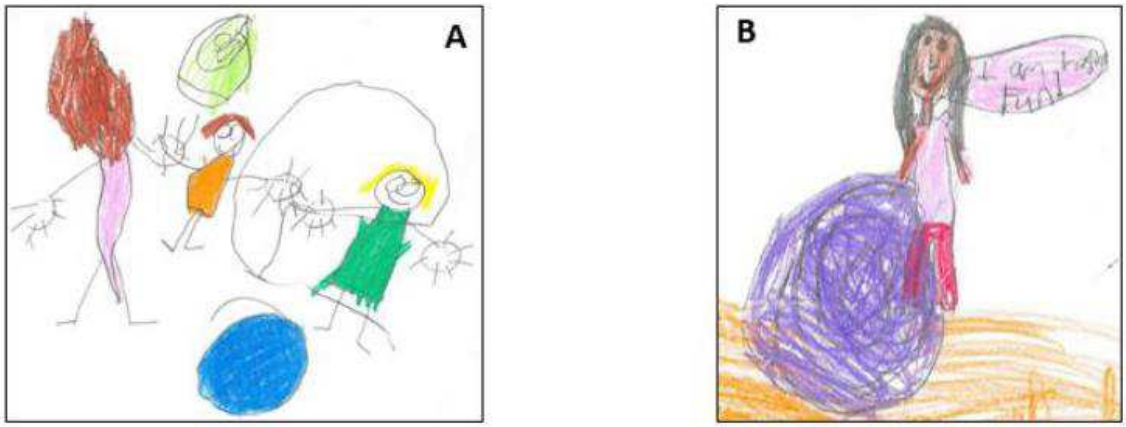

Figure 7 Pictures drawn for draw and write exercise: Pictures drawn in response to the following question: What's good and what's bad about coming here each week? (A) Playing with new friends (CHILD002), (B) Playing games (CHILD005)

It was recorded that having enthusiastic staff fostered this fun atmosphere. Parents mentioned the warm welcome their children received each week and how facilitators went to the effort of *"ensuring no one was left out".* For the children, in particular, the presence of a male facilitator enhanced enjoyment; *"when you get to play with him it's even better. He's so cool and has got really good skills",* (CHILD007). Finally, the additional social support of a sibling contributed to this enjoyment. Talking about sibling attendance one parent described how her child would be uncomfortable and shy at first but *"when he saw his sister doing it he would eventually do it too",* (PARENT006). This was confirmed by the children as some

described how it reassured them; *"Sometimes I didn't like leaving my mom. I liked it when my sister came with me",* (CHILD003).

Group support

Parents appreciated the social support they received during the group sessions and a common view amongst parents was learning that they weren't the *"only ones"*. One mother spoke of her relief of *"hearing other people's stories. You realise 'it's not just me'. It was good to hear that you're not the only person out there",* (PARENT003). The group sessions afforded parents the opportunity to learn practical *"tips and tricks"* and *"do's and don'ts"* other parents were using to reinforce healthy lifestyles at home. Furthermore, parents preferred more visual and practical sessions such as *"dealing with tantrums, saying no and even different activities to do when it's raining",* (PARENT006) rather than those more *"lecture-style"* sessions.

5.6. Discussion

This study aimed to identify and understand, from PHNs, parents and children's perspectives, factors that influence uptake and completion of a community-based, multicomponent, childhood weight management programme. An overwhelming sense of fear resided over the referral process, for both PHNs and parents. For PHNs this related to getting the diagnosis wrong and in relaying results of children's excess weight status to parents. Peer support from other PHNs as well as training in delivering the diagnosis were potential strategies suggested to alleviate this fear. Parents feared the worst as a result of both the technical language used by some PHNs but also their inability to interpret the information, particularly BMI charts. Despite these initial fears, parents were driven to participate initially by a concern for their children's future health and wellbeing. Children's enjoyment was key to encouraging parents to complete the programme. Maximising these factors is essential for the sustainability and

spread of community programmes, since enrolment and retention rates remain low, as evidenced internationally [20, 173] and in this Chapter.

We suggest, and it is also supported in the literature, that a lack of resources (i.e. time and support services) [177, 182, 230], low perceived self-efficacy [177] and fear of discussing weight issues with parents [177, 181] are some of the biggest challenges facing referrers and offer solutions to help overcome such barriers. Firstly, PHNs in this study suggested the need for the development of a BMI app to help reduce the time spent screening children for referral. They felt an app would significantly speed up the process of referral through the automatic calculation of children's BMI percentiles while also reducing the worry of misclassification. Furthermore, PHNs recalled instances where parents used online calculators to determine their child's BMI resulting in different estimates. Many PHNs believed an app could also be used as a resource to direct parents to should they question the results of the screening. Numerous mobile apps are now available to assist health care professionals in maintaining and accessing health records, patient management and monitoring, clinical decision-making, communications and consulting [231-234] and these have been found to enhance accuracy [231, 235], efficiency [235, 236] and productivity [231, 235]. While limited information exists on the effectiveness of an app for obesity screening, Surka et al., found their app decreased screening time and eliminated errors in calculating scores relating to cardiovascular disease risk [237]. Secondly, PHNs faced a range of parental responses [219] (e.g. relief, resistance, fear, disinterest, denial or anger) when communicating news of a child's overweight status and they shouldn't be expected to manage these responses without appropriate training. In our study PHNs believed that MI training boosted their confidence and efficacy in communicating *'bad news'* regarding overweight and obesity.

MI is a non-judgemental, guided, empathetic style of counselling [185], and has been described as a promising approach for health professionals in treating obesity [238, 239]. In their study, Dawson and colleagues reported that weight-related MI feedback allowed further time and opportunity for parents to explore their thoughts about excess weight in relation to their child [239]. They reported that those parents who received feedback via MI showed a greater increase in concern about their child's weight [239]. This is important as we know that increasing parental awareness and recognition of the health risks makes them more likely to engage in behaviour change [84]. We therefore recommend that healthcare professionals involved in both referral to, and delivery of, obesity programmes receive this training prior to programme commencement.

A lack of parental awareness and/or denial regarding their child's weight and resistance towards discussing weight issues limited enrolment and affected engagement in this study. This finding concurs with the literature [18, 20, 177, 178]. Parents provided some realistic suggestions to increase enrolment e.g. toning down the language used in referral letters and removing medical terminology. This finding is supported by Gillespie and colleagues [240] and may potentially improve parental engagement. We recommend all future literature on weight management programmes be reviewed to ensure that every individual can *"obtain, process, and understand basic health information and services needed to make appropriate health decisions"* [241, 242]. In addition to this, in this study parents suggested moving away from labelling programmes as weight management programmes and reframing them in a more positive light, such as a healthy lifestyle or skills-based programme for all the family. Most parents suggested referring to the programme as a *'sports-camp'* or *'fit-camp'* for all the family as they had done. This finding is consistent with other research that recommends

programmes have a focus on health rather than weight or thinness [57, 214]. This positive reframing may also encourage those who fear being stigmatised by others for joining a programme for weight management.

In the current study only active methods of referral were used for the weight management programme and this required a significant amount of time and resources and resulted in additional strain and pressure for PHNs. Recent research suggests that the use of multiple referral strategies (i.e. newspaper, school leaflets, local radio and social media as well as PHN/GP referral) is advisable with some directly targeting families and others providing 'blanket coverage' [243, 244]. Using both methods, as suggested by PHNs in this study, would potentially allow programme staff to enrol parents who are already concerned about their child's weight and those who are not [243]. Furthermore, encouraging positive word of mouth, fostering strong links with community groups and distributing printed materials in a range of ways including within school newspapers, targeted mail-outs and posting in community venues has been suggested to boost participation and minimise attrition rates to community-based health promotion programmes [245].

School nurses hold a unique position in the health services for addressing weight-related health with children and their families because of their role in monitoring and promoting children's health during school years. Despite the fear and anxiety PHNs felt throughout the referral process for *W82GO-community* they believed they were the right individuals to make the referral because of the long-lasting relationship they had with families and feel they should be involved in any future programmes provided the appropriate training and resources are made available.

The factors motivating families to get involved and complete treatment should be harnessed in efforts to enhance engagement. In common with earlier studies, parents cited the fear of doing nothing and a concern for their child's future health and well-being (i.e. name-calling, bullying, social relationships) as reasons for enrolment [20, 246]. More frequently these reasons outweighed the desire for any weight-related outcomes [246]. Health professionals and programme developers need to be aware of the importance of the psychological benefits of attending and highlight them in any programme related marketing activities. Finally, to appeal to parents, a family-based programme that facilitates sibling involvement and includes practical and visual sessions with an emphasis on fitness and lifestyle was suggested by both parents and staff. These findings confirm and strengthen what we found in the earlier systematic review on barriers and facilitators to attendance and retention [20].

Limitations of this study

A major limitation of this study was the failure to recruit non-attenders or those families who dropped out of treatment despite the provision of an incentive and reminders. As might be expected, this is not uncommon and similar studies of family-focused childhood weight management programmes also had low response rates from this hard to reach group [10, 247]. Despite this limitation we believe the mothers we interviewed were open in their responses about what worked well for them and what didn't work so well. Additionally, recall bias is possible since we interviewed PHNs and parents 12 months after programme referral. Finally, no data were collected on PHN experience at the time of interviewing and not enough information on other types of referral made (n=1 PHN spoke of difference between referring children to eye clinic for glasses and that it should be no different) which could have impacted upon referral.

5.7. Conclusion

Childhood obesity is a complex and sensitive issue. The study provides first hand evidence of the difficulties of referring families to community weight management programmes and ensuring their attendance. It also provides some practical suggestions on how to support those referring children and their families and provides evidence on the factors that contribute to the uptake of community weight management programmes. Policymakers need to recognise childhood obesity as a serious public health issues and allocate appropriate resources to support the evidence-based management of obesity through practical training and education in the area of childhood obesity and related lifestyle issues.

Chapter 6. Misperception of child weight status: A cross-sectional analysis of the Cork Children's Lifestyle Study (CCLaS).

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THIS PAPER WILL BE SUBMITTED TO THE INTERNATIONAL JOURNAL OF OBESITY

6.1. Abstract

Background

Despite the increased global awareness of childhood obesity, a high proportion of parents and children continue to misclassify child weight status. This is worrying given that one of the first steps in the prevention and treatment of childhood obesity is for parents to correctly identify that their child is carrying excess weight. The aim of this study was to identify factors associated with parental and child misperception of child weight.

Methods

A cross-sectional study involving a sample of 1,075 children, aged 8-11 years, drawn from primary schools in Cork city and county in Ireland. Data were collected using child and parent self-administered questionnaires. Physical measurements were taken by trained researchers according to standard procedures. Univariate and multivariable logistic regression analysis was used to examine factors influencing parental and child perceptions regarding child weight.

Results

Just over half (n=623; 58%) of the children were male and a quarter of children were either overweight or obese (n=278; 26%). The majority of parents were female (n=906; 89%), Irish (n=833; 87%) with over 60% (n=626) having completed third level education or higher. Almost one-quarter (24%) of parents of all children misclassified their child's weight status. Forty four per cent of parents of overweight or obese children underestimated their child's weight. In all children, factors associated with parental misperception of child weight included the child being female (OR=1.95; 95% CI: 1.36-2.81, P<0.001), being overweight or obese (OR=2.84; 95% CI: 1.95-4.15, P<0.001), child misclassification of own weight (OR=3.28; 95% CI: 2.26-4.78, P<0.001) and parent reported child computer use (OR=1.64; 95% CI: 1.12-2.39, P=0.01). In overweight or obese children, accuracy in parental perception of weight was improved with increasing child age (OR=0.49; 95% CI: 0.27-0.88, P=0.02). 76% (n=213) of overweight or obese children underestimated their weight. Factors associated with child misperception of weight regardless of measured weight status included the child being overweight or obese (OR=5.35; 95% CI: 3.76-7.61, P<0.001), parental misperception of child weight (OR=2.74; 95% CI: 1.94-3.86, P<0.001) and low parental education (OR=1.72; 95% CI: 1.13-2.60, P=0.01). Finally, overweight or obese children had increased odds of misperceiving their own weight status if their parents misclassified their child's weight (OR=3.98; 95% CI: 1.95-8.10, P<0.001).

Conclusion

Findings suggest that with the rising prevalence of obesity, in an obesogenic society where overweight and obesity has become the norm, the capacity of both parents and children to correctly classify their weight status is significantly impaired. Health care professionals should be aware of the frequent misperception of weight status, especially when dealing with parents of younger children and children who are overweight or obese.

6.2. Background

Despite the increased global awareness of childhood obesity, a high proportion of parents and children continue to misclassify child weight status. The public health relevance of this weight-related misperception has received considerable attention [248-250] mainly because of its possible effect on determining health behaviour.

Previous reviews report that ≥50% of parents fail to correctly identify their child as overweight [79, 81-83, 98, 99], a trend that appears to be increasing over time [81]. Several studies suggest that this misperception may be due to various social determinants of health including parental education [100-102], child BMI, child age or gender [79, 102-104], lower child birth weight [105] and ethnicity [101]. However, the results of these studies have been inconsistent, and where some have reported significant associations, others have not [79, 98, 99, 106-110].

While studies examining self-perceptions of weight among children are limited, the available evidence suggests that they are also likely to misperceive their weight status [2, 89-96], particularly overweight and obese children. A recent European study found that 43% (n=479) of overweight/obese children underestimated their weight status [94]. In Ireland, the Growing Up in Ireland Report (n= 8,081) on Overweight and Obesity Among 9-year-olds reported that of those measured as overweight, only 15% (n=1213) perceived themselves to be overweight [2]. For those measured as obese, the proportion perceiving themselves as overweight increased to 35% (n=2828), however, this meant that 65% (n=5252) saw themselves as *'about right'* or underweight [2]. Little is known of the factors influencing this misperception. However, one plausible explanation may be that being exposed to high levels of overweight and obesity, as the societal norm shifts in that direction, makes it more difficult

for parents, children and health professionals to correctly classify their own weight status [90, 251].

Family-focused programmes that combine healthy eating, physical activity and behavioural components have been recommended for treating childhood obesity [5-7], however, their application in real-life settings remains a challenge [18]. Engaging families has emerged as a significant barrier to the implementation of these programmes [18, 20] and is reflected in the low enrolment and retention rates as evidenced in Chapter five of this thesis. Parental misperception of child weight is a potential contributing factor to this lack of engagement [20]. Eckstein and colleagues reported that successful health behaviour change cannot occur unless the health issue is recognised and acknowledged [108]. Research has shown that parents are unlikely to implement changes to their child's lifestyle unless they perceive the child to be at risk or recognise the need for change [84]. Therefore, key to the prevention or treatment of childhood obesity is for parents to correctly identify that their child is carrying excess weight.

It is important to identify the factors influencing parental and child misperception of weight as it may reveal possible subgroups of the population who need to be targeted in terms of awareness raising campaigns to help them recognise the issue. While such information was not collected during the implementation of *W82GO-community* the opportunity arose to conduct a secondary analysis on data collected from primary school aged children aged 8-11 years. While these children are older than those who were referred to the *W82GO*-community programme it has long been acknowledged that about 40% of overweight children will carry their excess weight through to adolescence [43, 252] and the factors influencing

parental and child perception of weight are likely to be similar. Therefore, using a cross-sectional sample of 1,075 Irish children aged 8-11 years, the aims of this study were:

- to determine the magnitude of parental perception of their child's weight status compared with the child's objectively measured BMI;
- to determine the magnitude of a child's perception of their own weight compared with their objectively measured BMI; and
- to identify the determinants of parent's misperception of the child's weight status as well as the determinants of a child's misperception of their own weight status.

6.3. Methods

6.3.1. Study design and sample

Details of the Cork Children's Lifestyle Study (CCLaS) have been described elsewhere [35]. In summary, the study aimed to recruit 1,000 primary school children to assess the current prevalence of overweight and obesity in Irish children aged 8-11 years, and explore risk factors at an individual, family, and environmental level. Information on primary schools in Cork city (an urban area) and Mitchelstown (a rural area) was obtained from the Department of Education and Skills website. Children in 3rd and 4th class (years 5 and 6 of enrolment to primary school) were the target population. While schools from the urban area were recruited using probability proportionate-to-size and purposive sampling, all schools in the rural area were invited to participate. Data were collected in schools over a 14-month period from April 2012 to June 2013. At the school level, 27 out of 46 schools participated (response rate of 58.6%), and 1,075 out of 1641 children participated (response rate 65.5%) in the study. In terms of the urban/rural mix; the majority of students (n=961; 89%) were enrolled in urban schools while 11% (n=114) students were from rural schools. The Delivering Equality of

Opportunity in Schools (DEIS) programme was used as an indicator of social class whereby DEIS schools differ markedly from non-DEIS schools in terms of the social class background, parental education, household income and family structures of their students. Schools classified as DEIS Band 1 have a much higher concentration of disadvantage than other schools and also cater for more complex needs, with a greater prevalence of students from Traveller backgrounds, non-English speaking students and students with special educational needs. In terms of the CCLaS dataset, 64% of children (n=686) were from non-DEIS schools, 21% (n=231) were from DEIS Band 1 and 15% (n=158) were from DEIS Band 2. Ethical approval was granted from the Clinical Research Ethics Committee of the Cork Teaching Hospitals, Cork, Ireland. Only children who provided his/her assent and whose parents/guardians provided informed consent participated in the study.

Measures

Data were collected using child and parent self-administered questionnaires (included in Appendix 5) as well as physical measurements. Based on the literature presented in chapter two of this thesis [79, 82, 94, 102, 104], several potential correlates of parental and child misperception of weight were included in this study (i.e., child age, child gender, child BMI, child reported TV use, child and parent reported child physical activity levels, parent gender, parent ethnicity, parent reported child TV and computer use, parent education level and parent self-reported weight status). Variable definitions are presented in Table 14. Parents self-reported height and weight was used to calculate parent BMI from which we categorised parents as normal weight (including underweight) or overweight/obese.

Table 14 Variable definitions

Variable Name	Definition & Reference Value
Child Characteristics	
Sex	Male Female
Age	8-9 years 10-11 years
Birth Weight	Low (<2.5kgs) Normal (2.5kg - 4kg) High (>4kgs)
Child self-perception of weight status	Child perceives themselves underweight Child perceives themselves normal weight Child perceives themselves overweight
Parent perception of child weight status	Parent perceives child underweight Parent perceives child normal weight Parent perceives child overweight Parent doesn't know
Child reported physical activity per week	Low (None / 1-2 times) Medium/high (3-7 days)
Child reported TV viewing per week day	<1hr >1hr
Parent reported child TV viewing per week day	<1hr >1hr
Parent reported child computer use per week day	<1hr >1hr
Parent reported child light physical activity per week (i.e. that was not hard enough to make him / her breathe heavily and make his / her heart beat fast? Light exercise includes, for example walking or slow cycling. Includes time in physical education class)	Low (None / 1-2 times) Medium/high (3-7 days)
Parent reported child hard physical activity per week (i.e. hard enough to make him / her breathe heavily and make his / her heart beat faster? Hard exercise includes, for example, playing football, jogging, or fast cycling. Includes time in physical education class)	Low (None / 1-2 times) Medium/high (3-7 days)
Parent Characteristics	
Sex	Male Female
Ethnicity	Irish Other

Marital status	Married Other
Family type	Single-parent Two-parent
Education	Primary/Secondary Third level Post-graduate
Employment	Employed Other
Parent self-reported BMI	Normal (incl. underweight) Overweight / Obese
Parental perception of own weight	Underweight Normal weight Overweight/obese Don't Know

Measured weight status – child only

Children's height and weight were measured by trained researchers using standardised methods [35]. Height was measured to the nearest 0.1 cm using a portable Seca Leicester height/length stadiometer (Seca, Birmingham, UK) and weight was measured to the nearest 0.1 kg using a Tanita WB100MA weighing scale (Tanita Corporation, IL, USA). Measurements were taken without shoes and in light clothing. A child's BMI was calculated using the formula weight (kg)/height $(m)^2$. Age and sex-specific International Obesity Taskforce (IOTF) definitions were used to categorise children as underweight, normal weight and overweight/obese [27, 30]. Data for children's measured BMI were available for 99.3% (n=1,068) of the sample.

Perceived weight status – child and parent

Parent perception of child's weight was assessed using the following question: *"How would you describe your child's weight at the moment?" ("Very underweight", "Moderately underweight", "Slightly underweight", "Slightly overweight", "Moderately overweight", "Very overweight", "About the right weight", "Don't know").* In light of the small proportion of

children classified in the extreme categories, we recoded the answers into a 4-category variable: (1) Parent perceived underweight (*very underweight, moderately underweight and slightly underweight*); (2) Parent perceived normal weight (*About the right weight)*; (3) Parent Perceived Overweight/obese (*slightly overweight, moderately overweight and very overweight*); and (4) Don't know. Parental perception of own weight was assessed using the question: *'Do you think that you are?' ("Very underweight", "Moderately underweight", "Slightly underweight", "Slightly overweight", "Moderately overweight", "Very overweight", "About the right weight", "Don't know")* which was subsequently recoded into a 4-category variable: (1) Underweight (including very *underweight, moderately underweight and slightly underweight*); (2) Normal weight (*About the right weight)*; (3) Overweight/obese (including *slightly overweight, moderately overweight and very overweight*); and (4) Don't know.

Child self-perception of weight was assessed by asking the children: "*How would you describe yourself?" ("Very skinny", "A bit skinny", "Just the right size", "A bit overweight", "Very overweight").* We recoded child answers into a 3-category variable: (1) Child perceived underweight (*very skinny, a bit skinny*); (2) Child perceived normal weight (*Just the right size*); and (3) Child perceived overweight/obese (*a bit overweight, very overweight*).

Parent perception of child's weight and child self-perception of weight were recoded into binary variables; parent classification of child weight (Correctly classified/ Incorrectly classified) and child classification of own weight (Correctly classified/ Incorrectly classified), respectively.

6.3.2. Data analysis

Cross-tabulations and chi-squared analyses were used to summarise parent and child characteristics according to their child's measured BMI status (defined using IOTF BMI cut-

offs). Independent univariate logistic regression models were fitted for parent and child misperception of weight for each variable. The *P-value* of the likelihood ratio test for each univariate regression is reported along with the 95% confidence intervals (CIs) for each level of the associated variable. Variables appearing as statistically significant (P<0.10) in the univariate logistic regressions were used to obtain an initial multivariable logistic regression fit. A P-value (two-tailed) of less than 0.05 was considered to indicate statistical significance in multivariable logistic regression models. In logistic regression models, parents who did not know their child's weight status were excluded from analysis (n=19). Furthermore, because misperception of child overweight and obesity was the primary aim of this paper the final regression models included only those children who were overweight/obese. Data were analysed Statistical Package for the Social Sciences statistical software package version 24 (IBM Corp., Armonk, NY, USA).

6.5. Results

Sample characteristics

Table 15 summarises the socio-demographic characteristics of the study population, presented according to objectively measured BMI status. Just over half (n=623; 58%) the children were male and, according to IOTF obesity classification, a quarter of children were either overweight or obese (n=278, 26%). The median age was 9.9 years (data not shown). The majority of participating parents were female (n=906; 89%), Irish (n=833; 87%), and married (n=740; 73%). Over 60% (n=626) had a third level qualification or higher. While almost 60% of parents (n=524) were in the normal (incl. underweight) BMI category based on their self-reported height and weight, over half perceived themselves to be overweight or obese (n=540; 53%).

Results presented in table 15 indicate that a number of variables including child age, child reported physical activity and TV viewing, parent reported child TV viewing, parent reported child physical activity as well as parental education, BMI and family-type are significantly associated with child measured BMI status.

At the child level, more overweight or obese children reported watching TV for more than one hour per day compared to normal or underweight children. This pattern was the same for parent reported child TV viewing. Additionally, for parent-reported child hard and light physical activity, a higher proportion of parents of overweight or obese children reported low levels of physical activity and fewer parents of overweight children reported medium/high physical activity than those parents of normal weight or underweight children.

At the parent/family level, fewer normal weight children came from single-parent families (n=126; 17.6%), compared to underweight (n=9; 30.9%) or overweight or obese children (n=65; 25.5%). In terms of parental education, similar numbers of children with overweight or obesity were reported for those with primary/secondary (n=113; 45%) and tertiary (n=108; 43%) education. This number decreased to 33 (13%) for those children whose parents had post-graduate education. Finally, significantly more overweight or obese children had overweight or obese parents (n-116; 55%) compared to normal or underweight children (Table 15).

Table 15 Characteristics of the study population according to child's measured BMI status

			Child's measured BMI status – IOTF			
	Factor	Total Population n=1068*	Underweight n=46 (4%)	Normal weight n=744 (70%)	Overweight/ obese n=278 (26%)	*P Value*
		n (%)	n (%)	n (%)	n (%)	n (%)
Child characteristics						
	Sex					0.09
	Male	620 (58.1)	23 (50)	448 (60.2)	149 (53.6)	
	Female	448 (41.9)	23 (50)	296 (39.8)	129 (46.4)	
	Age					**0.011**
	8-9 years	560 (52.4)	15 (32.6)	388 (62.2)	157 (56.5)	
	10-11 years	508 (47.6)	31 (67.4)	356 (47.8)	121 (43.5)	
	Birth Weight					
	Low	52 (5.4)	6 (15)	33 (4.9)	13 (5.2)	0.06
	Normal	880 (90.6)	34 (85)	618 (91)	228 (90.5)	
	High	39 (4.0)	0 (0)	28 (4.1)	11 (4.3)	
	Child self-perception of weight status					**<0.001**
	Child perceives themselves underweight	276 (26)	28 (60.9)	222 (29.9)	26 (9.5)	
	Child perceives themselves normal weight	699 (65.8)	17 (37)	495 (66.7)	187 (68)	
	Child perceives themselves overweight	88 (8.2)	1 (2.2)	25 (3.4)	62 (22.5)	
	Parent perception of child weight status					**<0.001**
	Parent perceives child underweight	112 (11.2)	23 (53.5)	86 (12.2)	3 (1.2)	
	Parent perceives child normal weight	718 (71.6)	20 (46.5)	590 (83.6)	108 (42.5)	
	Parent perceives child overweight	154 (15.4)	0 (0)	20 (2.8)	134 (52.8)	
	Parent doesn't know	19 (1.9)	0 (0)	10 (1.4)	9 (3.5)	
	Child reported physical activity					**0.028**
	Low	339 (31.7)	19 (41.3)	218 (29.3)	102 (36.7)	
	Medium/high	729 (68.3)	27 (58.7)	526 (70.7)	176 (63.3)	
	Child reported TV viewing per day					**0.013**
	<1hr	520 (49)	26 (56.5)	376 (51.2)	114 (41.5)	
	>1hr	542 (51)	20 (43.5)	358 (48.8)	161 (58.5)	
	Parent reported child TV viewing					**0.001**
	<1hr	227 (22.2)	16 (36.4)	168 (23.7)	40 (15.2)	
	>1hr	796 (77.8)	28 (63.6)	541 (76.3)	223 (84.8)	
	Parent reported child computer use					0.08
	<1hr	634 (61.9)	23 (52.3)	454 (63.9)	152 (57.6)	
	>1hr	391 (38.1)	21 (47.7)	256 (36.1)	112 (42.4)	
	Parent reported child light physical activity					**0.007**
	Low	286 (28.1)	11 (25.6)	181 (25.5)	94 (35.6)	
	Medium/high	730 (71.9)	32 (74.4)	528 (74.5)	170 (64.4)	
	Parent reported child hard physical activity					**<0.001**
	Low	317 (31.2)	14 (31.8)	193 (27.3)	110 (41.7)	
	Medium/high	698 (68.8)	30 (68.2)	514 (72.7)	154 (58.3)	
Parental characteristics						
	Sex					0.53
	Male	113 (11.2)	4 (9.3)	84 (11.9)	25 (9.5)	
	Female	899 (88.8)	39 (90.7)	622 (88.1)	238 (90.5)	
	Ethnicity					0.10
	Irish	827 (87)	38 (90.5)	582 (87.5)	207 (84.8)	
	Other	124 (13)	4 (9.5)	83 (12.5)	37 (12.5)	
	Marital status					0.10

			Child's measured BMI status – IOTF			
	Factor	Total Population n=1068*	Underweight n=46 (4%)	Normal weight n=744 (70%)	Overweight/ obese n=278 (26%)	*P Value*
		n (%)	n (%)	n (%)	n (%)	n (%)
	Married	735 (73.4)	30 (69.8)	530 (75.4)	175 (68.6)	
	Other	266 (26.6)	13 (30.2)	173 (24.6)	80 (31.4)	
	Family type					**0.026**
	Single-parent	198 (19.8)	9 (30.9)	124 (17.6)	65 (25.5)	
	Two-parent	803 (80.2)	34 (79.1)	579 (82.4)	190 (74.5)	
	Education					**0.009**
	Primary/Secondary only	371 (37.4)	14 (32.6)	244 (35.2)	113 (44.5)	
	Third level	426 (43)	22 (51.2)	296 (42.7)	108 (42.5)	
	Post-graduate	194 (19.6)	7 (16.3)	154 (22.2)	33 (13)	
	Employment					0.78
	Employed	566 (58.2)	26 (60.5)	390 (57.4)	147 (59.8)	
	Other	405 (41.8)	17 (39.5)	289 (42.6)	99 (40.2)	
	Parent self-reported BMI					**<0.001**
	Normal (incl. underweight)	524 (59.3)	31 (77.5)	398 (62.9)	95 (45)	
	Overweight / Obese	360 (40.7)	9 (22.5)	235 (37.1)	116 (55)	
	Parental perception of own weight					**0.001**
	Underweight	54 (5.3)	4 (9.3)	35 (4.9)	15 (5.7)	
	Normal weight	404 (39.7)	19 (44.2)	311 (43.7)	74 (28.1)	
	Overweight/obese	540 (53)	20 (46.5)	351 (49.3)	169 (64.3)	
	Don't Know	20 (2)	0 (0)	15 (2.1)	5 (1.9)	

*1068= number of children with measured weight & height data and subsequent BMI classification

P values presented in bold are significant <0.05.

Parental misperception of child weight status

Twenty-four percent (n=237) of parents misclassified their child's weight status. Almost half (44%, n=111) of parents of overweight/obese children *underestimated* the weight status of their child. The majority of parents (n=718; 72%) perceived their child to be a normal weight (Table 15).

Table 16 presents factors associated with parental misperception of child weight for all children. In univariate logistic regression analysis, parents of girls (OR=1.60; 95% CI: 1.19-2.14, P=0.002), overweight/obese children (OR=4.03; 95% CI: 2.94-5.53, P<0.001), parents who reported their child used computers for more than one hour per day (OR=1.51; 95% CI: 1.12-2.04, P=0.006) and whose child's self-perception of weight was incorrect (OR=3.93; 95% CI:

2.87-5.37, P<0.001), were more likely to misclassify their child's weight. These variables remained influential in multivariable logistic regression.

Parental ethnicity and education level were also associated with their misperception of their child's weight. Parents who were not of Irish ethnicity (OR=1.58; 95% CI: 1.03-2.41, P=0.04) or parents with primary or secondary level education compared to third level or higher (OR=1.61; 95% CI: 1.04-2.49) were also more likely to misperceive their child's weight status. These variables were only important at univariate level and not influential in the final multivariable model (Table 16).

Table 16 Factors associated with parental misperception of child weight status – all children

	Factor	Misclassified n=237	Correctly Classified n=747	Univariate Logistic Regression			Multivariable Logistic Regression†		
				OR	95% CI	*P* value*	OR	95% CI	*P* value*
Child characteristics									
	Sex					**0.002**			**<0.001**
	Male	115 (48.5)	449 (60.1)	Ref			Ref		
	Female	122 (51.5)	298 (39.9)	1.60	1.19, 2.14		1.95	1.36, 2.81	
	Age					0.31			
	8/9 years	131 (55.3)	385 (51.5)	Ref					
	10/11 years	106 (44.7)	362 (48.5)	0.86	0.64, 1.15				
	Birth weight					**0.06***			0.06*
	Low	16 (7.2)	35 (4.9)	Ref			Ref		
	Normal	202 (90.6)	641 (90.5)	0.68	0.37, 1.27		0.64	0.32, 1.29	
	High	5 (2.2)	32 (4.5)	0.34	0.11, 1.04		0.31	0.09, 1.04	
	Child BMI					**<0.001**			**<0.001**
	Normal weight (incl. underweight)	126 (53.2)	613 (82.1)	Ref			Ref		
	Overweight/obese	111 (46.8)	134 (17.9)	4.03	2.94, 5.53		2.84	1.95, 4.15	
	Child classification of own weight					**<0.001**			**<0.001**
	Correctly classified	74 (31.2)	478 (64.1)	Ref			Ref		
	Misclassified	163 (68.8)	268 (35.9)	3.93	2.87, 5.37		3.28	2.25, 4.78	
	Parent reported child TV viewing					0.33			
	<1hr	47 (20.2)	172 (23.2)	Ref					
	>1hr	186 (79.8)	568 (76.8)	1.20	0.83, 1.72				
	Parent reported child computer use					**0.006**			**0.01**
	<1hr	129 (54.7)	478 (64.6)	Ref			Ref		
	>1hr	107 (45.3)	262 (35.4)	1.51	1.12, 2.04		1.64	1.12, 2.39	
	Parent reported child light physical activity					0.35			
	Medium/high	163 (69.7)	538 (72.8)	Ref					
	Low	71 (30.3)	201 (27.2)	1.17	0.85, 1.61				
	Parent reported hard child physical activity					0.21			
	Medium/high	156 (66.1)	518 (70.5)	Ref					
	Low	80 (33.9)	217 (29.5)	1.22	0.90, 1.67				

	Factor	Misclassified n=237	Correctly Classified n=747	Univariate Logistic Regression			Multivariable Logistic Regression‡		
				OR	95% CI	*P* value*	OR	95% CI	*P* value*
Parental characteristics									
	Sex					0.44			
	Male	23 (9.9)	86 (11.7)	Ref					
	Female	210 (90.1)	649 (88.3)	1.21	0.74, 1.97				
	Marital status					0.8			
	Married	168 (73.4)	544 (74.2)	Ref					
	Other	61 (26.6)	189 (25.8)	1.05	0.75, 1.46				
	Family type					0.54			
	Two-parent	182 (79.5)	596 (81.3)	Ref					
	Single-parent	47 (20.5)	137 (18.7)	1.12	0.78, 1.63				
	Ethnicity					**0.04**			0.12
	Irish	182 (93.1)	613 (88.6)	Ref			Ref		
	Other	37 (16.9)	79 (11.4)	1.58	1.03, 2.41		1.53	0.89, 2.63	
	Education					**0.04***			0.99*
	Post-graduate	35 (15.0)	153 (21.3)	Ref			Ref		
	Third level	104 (44.6)	312 (43.3)	1.46	0.95, 2.24		1.31	0.79, 2.19	
	Primary/secondary only	94 (40.3)	255 (35.4)	1.61	1.04, 2.49		1.09	0.64, 1.86	
	Employment					0.49			
	Employed	126 (57.0)	423 (59.7)	Ref					
	Other	95 (43.0)	286 (40.3)	1.12	0.82, 1.51				
	Parent self-reported BMI					0.16			
	Normal (incl. underweight)	107 (54.9)	399 (60.5)	Ref					
	Overweight / Obese	88 (45.1)	261 (39.5)	1.26	0.91, 1.74				
	Parental perception of own weight					0.86			
	Normal weight (incl. underweight)	108 (46.8)	336 (46.1)	Ref					
	Overweight/obese	123 (53.2)	393 (53.9)	0.97	0.72, 1.31				

*Linear test for trend

‡Model adjusted for child gender, birth weight, child BMI, child classification of own weight, parent reported child computer use, parental ethnicity and parent education status. Multivariable logistic regression is based on n=844 (79.9%) participants who had complete data for all variables.

P values presented in bold are significant <0.10 in univariate logistic regression analysis and <0.05 in multivariable logistic regression analysis.

Table 17 displays factors associated with parental misperception of child weight status among overweight and obese children only. Parents of overweight or obese children who misperceived their own weight were more likely to misperceive their child's weight (OR=4.17; 95% CI: 2.08-8.39, P<0.001). Accuracy of parental perception was significantly improved with increasing child age (OR=0.43; 95% CI: 0.26-0.72, P=0.002).

Parents who perceived themselves as overweight/obese were less likely to misclassify their child's weight than parents who perceived themselves to be under or normal weight (OR=0.45; 95% CI: 0.26-0.78, P=0.004). Non-Irish parents were significantly more likely to misperceive their child's overweight/obese status (OR=2.78; 95% CI: 1.28-6.02, P=0.01) compared to Irish parents. These variables also remained significant in the multivariable logistic regression model (Table 17). No significant associations were found between parental education or BMI and perception of child weight status.

Table 17 Factors associated with parental misperception of child weight status – overweight and obese children only

	Factor	Misclassified n=111	Correctly Classified n=134	Univariate Logistic Regression			Multivariable Logistic Regression†		
				OR	95% CI	*P* value*	OR	95% CI	*P* value*
Child characteristics									
	Sex					0.20			
	Male	53 (47.7)	75 (56.0)	Ref					
	Female	58 (52.3)	59 (44.0)	1.39	0.84, 2.31				
	Age					**0.002**			**0.02**
	8/9 years	74 (66.7)	62 (46.3)	Ref			Ref		
	10/11 years	37 (33.3)	72 (53.7)	0.43	0.26, 0.72		0.49	0.27, 0.88	
	Birth weight					**0.06***			0.17*
	Low	8 (7.6)	4 (3.1)	Ref			Ref		
	Normal	94 (89.5)	115 (90.6)	0.41	0.12, 1.40		0.36	0.09, 1.49	
	High	3 (2.9)	8 (6.3)	0.19	0.03, 1.12		0.26	0.04, 1.91	
	Child classification of own weight					**<0.001**			**<0.001**
	Correctly classified	12 (10.8)	45 (33.6)	Ref			Ref		
	Misclassified	99 (89.2)	89 (66.4)	4.17	2.08, 8.39		4.53	1.99, 10.32	
	Parent reported child TV viewing					0.39			
	<1hr	20 (18.3)	19 (14.3)	Ref					
	>1hr	89 (81.7)	114 (85.7)	0.74	0.37, 1.47				
	Parent reported child computer use					0.88			
	<1hr	65 (58.6)	76 (57.6)	Ref					
	>1hr			0.96	0.58, 1.60				
	Parent reported child light physical activity					0.27			
	Medium/high	67 (60.9)	90 (67.7)	Ref					
	Low	43 (39.1)	43 (32.3)	1.34	0.92, 2.28				
	Parent reported hard child physical activity					0.56			
	Medium/high	68 (61.3)	76 (57.6)	Ref					
	Low	43 (38.7)	56 (42.4)	0.86	0.51, 1.44				
Parental characteristics									
	Sex					0.45			
	Male	9 (8.3)	15 (11.2)	Ref					

	Factor	Misclassified n=111	Correctly Classified n=134	Univariate Logistic Regression			Multivariable Logistic Regression†		
				OR	95% CI	*P* value*	OR	95% CI	*P* value*
	Female	100 (91.7)	119 (88.8)	1.40	0.59, 3.34				
	Marital status					0.20			
	Married	79 (73.8)	86 (66.2)	Ref					
	Other	28 (26.2)	44 (33.8)	0.69	0.39, 1.22				
	Family type					0.15			
	Two-parent	86 (80.4)	94 (72.3)	Ref					
	Single-parent	21 (19.6)	36 (27.7)	0.64	0.35, 1.18				
	Ethnicity					**0.01**			0.07
	Irish	82 (78.1)	109 (90.8)	Ref			Ref		
	Other	23 (21.9)	11 (9.2)	2.78	1.28, 6.02		2.37	0.93, 6.08	
	Education					0.99*			
	Post-graduate	15 (13.9)	16 (12.5)	Ref					
	Third level	46 (42.6)	58 (45.3)	0.85	0.38, 1.89				
	Primary/secondary only	47 (43.5)	54 (42.2)	0.93	0.42, 2.08				
	Employment					0.49			
	Employed	61 (58.1)	77 (62.6)	Ref					
	Other	44 (41.9)	46 (37.4)	1.21	0.71, 2.06				
	Parent self-reported BMI					0.29			
	Normal (incl. underweight)	41 (49.4)	49 (41.9)	Ref					
	Overweight / Obese	42 (50.6)	68 (58.1)	0.74	0.42, 1.30				
	Parental perception of own weight					**0.004**			0.10
	Normal weight (incl. underweight)	48 (44.9)	35 (26.7)	Ref			Ref		
	Overweight/obese	59 (55.1)	96 (73.3)	0.45	0.26, 0.77		0.59	0.32, 1.10	

*Linear test for trend

†Model adjusted for child age, child birth weight, child classification of own weight, parental ethnicity and parent classification of child weight. Multivariable logistic regression is based on n=8210 (78.1%) participants who had complete data for all variables.

P values presented in bold are significant <0.10 in univariate logistic regression analysis and <0.05 in multivariable logistic regression analysis.

Child misperception of own weight status

Forty-five per cent (n=478) of children misperceived their own weight status. Of children who were overweight/obese, 76% (n=213) underestimated their weight. The majority of children (n=699; 65%) perceived they were normal weight (Table 15). Almost 30% (n=222) of measured normal weight children perceived themselves to be underweight. Conversely, 39% of underweight children overestimated their weight status (Table 15).

Table 18 shows factors associated with child misperception of own weight for all children. Compared to underweight and normal weight children, overweight or obese children had increased odds of misperceiving their own weight status (OR=6.63; 95% CI: 4.81-9.14, P<0.001). Similarly, children whose parents incorrectly classified their child's weight status had an increased probability of misclassifying their own weight status (OR=3.93; 95% CI: 2.87-5.37, P<0.001). These variables remained significant predictors of weight misperception in children in the multivariable logistic regression model (Table 18).

Children from single-parent families were significantly more likely to misperceive their own weight than children from two-parent parent families (OR=1.40; 95% CI: 1.02-1.92, P=0.04). Furthermore, compared to those children whose parents had completed post-graduate education, those children whose parents had completed primary/ secondary or tertiary education also had increased odds of misclassifying their own weight (primary/secondary: OR=2.05; 95% CI: 1.42-2.95 / third-level: OR=1.55; 95% CI1.08-2.21). Finally, parent employment also appeared to be significantly associated with child self-perception of weight in that children whose parents were unemployed or other were more likely to misperceive their weight status compared to children whose parents were employed (OR=1.31; 95% CI: 1.01-1.70, P=0.04). Parent education remained the only statistically significant variable associated with child misperception of own weight in multivariable logistic regression model (Table 18).

Amongst overweight and obese children only (Table 19), child age and child reported TV viewing were associated with child misperception of own weight in univariate analysis, however, these associations did not remain significant in the multivariable logistic regression model. Finally, overweight or obese children whose parents misclassified child weight were four times more likely to also misclassify their weight (OR=4.17; 95% CI 2.08-8.39, P<0.001) and this remained significant in the adjusted model. No other significant associations were found (Table 19).

Table 18 Factors associated with child misperception of own weight status – all children

	Factor	Misclassified n=462	Correctly Classified n=582	Univariate Logistic Regression			Multivariable Logistic Regression†		
				OR	95% CI	*P* value*	OR	95% CI	*P* value*
Child characteristics									
	Sex					0.90			
	Male	265 (57.4)	336 (57.7)	Ref					
	Female	197 (42.6)	246 (42.3)	1.02	0.79, 1.30				
	Age					0.62			
	8/9 years	246 (53.2)	301 (51.7)	Ref					
	10/11 years	216 (46.8)	281 (48.3)	0.94	0.74, 1.20				
	Birth weight					0.64*			
	Low	24 (5.7)	28 (5.3)	Ref					
	Normal	377 (89.5)	487 (91.4)	0.90	0.52, 1.58				
	High	20 (4.8)	18 (3.4)	1.30	0.56, 3.00				
	Child BMI					**<0.001**			**<0.001**
	Normal weight (incl. underweight)	258 (55.8)	520 (89.3)	Ref			Ref		
	Overweight/obese	204 (44.2)	62 (10.7)	6.63	4.81, 9.14		5.35	3.76, 7.61	
	Child reported physical activity					0.14			
	Medium/High	305 (66.0)	409 (70.3)	Ref					
	Low	157 (34.0)	173 (29.7)	1.22	0.94, 1.58				
	Child reported child TV use					0.20			
	<1hr	217 (47.2)	294 (51.2)	Ref					
	>1hr	243 (52.8)	280 (48.8)	1.18	0.92, 1.50				
	Parent classification of child weight					**<0.001**			**<0.001**
	Correctly classified	268 (62.2)	478 (86.6)	Ref			Ref		
	Misclassified	163 (37.8)	74 (13.4)	3.93	2.87, 5.37		2.74	1.94, 3.86	
Parental characteristics									
	Sex					0.32			
	Male	44 (10.0)	66 (12.0)	Ref					
	Female	397 (90.0)	486 (88.0)	1.23	0.82, 1.84				
	Marital status					0.16			
	Married	310 (71.4)	415 (75.5)	Ref					
	Other	124 (28.6)	135 (24.5)	1.23	0.93, 1.64				

	Factor	Misclassified n=462	Correctly Classified n=582	Univariate Logistic Regression			Multivariable Logistic Regression‡		
				OR	95% CI	*P* value*	OR	95% CI	*P* value*
	Family type					**0.04**			0.31
	Two-parent	337 (77.6)	456 (82.9)	Ref			Ref		
	Single-parent	97 (22.4)	94 (17.1)	1.40	1.02, 1.92		1.21	0.84, 1.75	
	Ethnicity					0.80			
	Irish	353 (86.7)	460 (87.3)	Ref					
	Other	54 (13.3)	67 (12.7)	1.05	0.72, 1.54				
	Education					**<0.001***			**0.01***
	Post-graduate	64 (14.9)	128 (23.5)	Ref			Ref		
	Third level	185 (43.0)	239 (43.9)	1.55	1.08, 2.21		1.43	0.96, 2.13	
	Primary/secondary only	181 (42.1)	177 (32.5)	2.05	1.42, 2.95		1.72	1.13, 2.60	
	Employment					**0.04**			0.09
	Employed	229 (54.8)	328 (61.4)	Ref			Ref		
	Other	189 (45.2)	206 (38.6)	1.31	1.01, 1.70		1.30	0.96, 1.75	
	Parent self-reported BMI					0.39			
	Normal weight (incl. underweight)	216 (57.6)	300 (60.5)	Ref					
	Overweight / Obese	159 (42.4)	196 (39.5)	1.12	0.86, 1.48				
	Parental perception of own weight								
	Normal weight (incl. underweight)	208 (47.8)	245 (44.7)	Ref					
	Overweight/obese	227 (52.2)	303 (55.3)	0.88	0.69, 1.14	0.33			

*Linear test for trend

‡Model adjusted for child BMI, parent classification of child weight, family type, parental education and employment status. Multivariable logistic regression is based on n=916 (86.7%) participants who had complete data for all variables.

P values presented in bold are significant <0.10 in univariate logistic regression analysis and <0.05 in multivariable logistic regression analysis.

Table 19 Factors associated with child misperception of own weight status – overweight and obese children only

	Factor	Misclassified (n=204)	Correctly Classified (n=62)	Univariate Logistic Regression			Multivariable Logistic Regression†		
				OR	95% CI	*P* value*	OR	95% CI	*P* value*
Child characteristics									
	Sex					0.45			
	Male	104 (51.0)	35 (56.5)	Ref					
	Female	100 (49.0)	27 (43.5)	1.25	0.70, 2.21				
	Age					**0.07**			0.33
	8/9 years	119 (58.3)	28 (45.2)	Ref			Ref		
	10/11 years	85 (41.7)	34 (54.8)	0.59	0.33, 1.04		0.73	0.39, 1.37	
	Birth weight					0.24*			
	Low	11 (5.9)	2 (3.5)	Ref					
	Normal	169 (90.4)	51 (89.5)	0.60	0.13, 2.81				
	High	7 (3.7)	4 (7.0)	0.32	0.05, 2.22				
	Child reported physical activity					0.98			
	Medium / High	128 (62.7)	39 (62.9)	Ref					
	Low	76 (37.3)	23 (37.1)	1.01	0.56, 1.81				
	Child reported TV viewing					**0.09**			0.14
	<1hr	90 (44.1)	20 (32.3)	Ref			Ref		
	>1hr	114 (55.9)	42 (67.7)	0.60	0.33, 1.10		0.61	0.32, 1.18	
	Parent perception of child weight					**<0.001**			**<0.001**
	Correctly classified	89 (47.3)	45 (78.9)	Ref			Ref		
	Misclassified	99 (52.7)	12 (21.1)	4.17	2.08, 8.39		3.98	1.95, 8.10	
Parental characteristics									
	Sex					0.59			
	Male	18 (9.3)	7 (11.7)	Ref					
	Female	176 (90.7)	53 (88.3)	1.29	0.51, 3.26				
	Marital status					0.51			
	Married	135 (70.7)	37 (66.1)	Ref					
	Other	56 (29.3)	19 (33.9)	0.81	0.43, 1.52				

	Factor	Misclassified (n=204)	Correctly Classified (n=62)	Univariate Logistic Regression			Multivariable Logistic Regression‡		
				OR	95% CI	*P* value*	OR	95% CI	*P* value*
	Family type					0.23			
	Two-parent	148 (77.5)	39 (69.6)	Ref					
	Single-parent	43 (22.5)	17 (30.4)	0.67	0.34, 1.29				
	Ethnicity					0.34			
	Irish	152 (83.5)	48 (88.9)	Ref					
	Other	30 (16.5)	6 (11.1)	1.58	0.62, 4.02				
	Education					0.29*			
	Post-graduate	29 (15.4)	4 (6.9)	Ref					
	Third level	79 (42.0)	28 (48.3)	0.39	0.13, 1.21				
	Primary/secondary only	80 (42.6)	26 (44.8)	0.42	0.14, 1.32				
	Employment					0.28			
	Employed	106 (57.9)	37 (66.1)	Ref					
	Other	77 (42.1)	19 (33.9)	1.42	0.76, 2.65				
	Parent self-reported BMI					0.51			
	Normal weight (incl. underweight)	73 (45.9)	19 (40.4)	Ref					
	Overweight / Obese	86 (54.1)	28 (59.6)	0.80	0.41, 1.55				
	Parental perception of own weight					0.35			
	Normal weight (incl. underweight)	69 (35.9)	17 (29.3)	Ref					
	Overweight/obese	123 (64.1)	41 (70.7)	0.73	0.39, 1.40				

*Linear test for trend

‡Model adjusted for child age, child reported TV viewing and parent perception of child weight. Multivariable logistic regression is based on n=245 (91.1%) participants who had complete data for all variables.

P values presented in bold are significant <0.10 in univariate logistic regression analysis and <0.05 in multivariable logistic regression analysis.

6.6. Discussion

Weight misperception is of public health significance as it may limit the effectiveness of obesity prevention and treatment efforts. The primary aim of this study was to determine the magnitude of parent and child misperception of child weight and we found that the ability of parents and children to correctly classify child weight is significantly limited. Almost one-quarter of parents misclassified their child's weight (regardless of measured weight) and this appeared to be influenced by a number of factors including child gender and parent reported child computer use. In the present study, parents of girls were more likely to misperceive their child's weight status compared to parents of boys. Previous studies investigating gender differences have reported conflicting results and where some studies found no difference in parental misperception between boys and girls [100, 253-255], others report that parents were more likely to misperceive boys' weight status compared to girls' [83, 99, 103, 256]. Findings also suggest that compared to those parents who reported their child used a computer <1hr/weekday, parents who reported their child used computers more often were significantly more likely to misperceive their child's weight. While the literature is limited regarding how perception of child's lifestyle behaviours relate to perception of weight one could surmise that given the increased awareness around screen time and its association with sedentary behaviour and excess weight [257], parents who believe their child spends more time using computers, and is hence more sedentary, might have a skewed perception of weight. Further research is required to establish the link, if any, between screen time and parent perception of child weight.

Of particular interest was the large proportion of parents underestimating their child's overweight or obese weight status. Results show that almost half (45%) of parents of

overweight and obese children in our study felt their child was *"about the right weight'"* or *"underweight".* This is a somewhat lower figure than has been reported in recent reviews [79, 82] which may suggest there has been an improvement in the awareness and recognition of childhood overweight and obesity, possibly due to increased coverage in the Irish media. Despite this improvement, this is still a substantial proportion within our sample and it may be due to a number of reasons. Firstly, given the prevalence of overweight and obesity among children worldwide, it is possible that changing social norms mean that parents simply do not recognise overweight and obesity in their children [110, 115, 116, 251, 258-260]. Research in social psychology suggests that when a person evaluates their own behaviour or appearance, they do so by making social comparisons [261, 262]. Earlier this year, Robinson and colleagues identified how personal perceptions of weight status are likely to be shaped by a *'norm comparison'* process [263]. Therefore, as overweight becomes more normal, underestimation of weight status amongst individuals with overweight and obesity will be more common [263]. We conducted this study in Ireland, where currently, one-in-four children and two out of three of Irish adults are overweight or obese [2, 78]. Therefore, it is conceivable that detecting overweight and obesity has become more difficult in situations where it has become more prevalent. Secondly, Jones and colleagues found that parents often associate 'overweight' with the extreme cases which are so often illustrated in the media [264]. This echoes the findings presented in Chapter five of this thesis where parents recalled how a recent national media campaign used *"extreme examples"* of obese children which they believed only increased parental denial by allowing some to believe their child *"wasn't that bad".* Thirdly, the proportion underestimating child weight may also be partly explained by the use of the phrase ''overweight'' in the questionnaire both because some parents have difficulties in understanding the term overweight [111] while others are hesitant in labelling

their child as overweight due to the negative stigma associated with it [265]. Jain *et al.* and Rich *et al.* suggest a distrust of weight charts, fear of being blamed or believing they would grow out of it, were key factors attributable to the reluctance of mothers to acknowledge overweight in their children [111, 112].

While the current study was unable to test these hypotheses for misperception, a number of potential factors influencing parental misperception of child's overweight status were identified. In accordance with previous research, this study found that accuracy of parental perception was significantly improved with increasing child age [82, 255]. Parents were more likely to misperceive the weight of younger children. This is alarming because recognizing and addressing childhood obesity at an early age is critical to taking steps toward preventing a potential lifetime of health risks and challenges for obese children [43]. It is possible that this misperception arises from the age-old belief that weight gain during early life was seen as healthy and having a 'big baby' was encouraged. Another reason may be because parents of younger children are likely to believe it's part of the natural growing process whereas parents of older children may be less confident that their child would outgrow their overweight status [99].

Regarding child self-perception of weight, we found that 44% of children misperceived their weight and, similar to research conducted in adult populations, we show that overweight and obese children were more likely to misperceive their weight status compared to normal or underweight children [90, 92, 94]. Over three-quarters of overweight or obese children misclassified their weight status. Interestingly, we found that almost one-third of normal weight children perceived themselves to be underweight. This shows a shift in perception of weight which may possibly be due to the *'normalisation'* of obesity [117] in Irish society.

Furthermore, results revealed that child misclassification of their own weight (regardless of measured weight status) is more common in children whose parents have a lower level of education. Unlike other studies we found no association between child misperception of weight and child gender [87, 96] or parent BMI [90, 94], employment [94] or ethnicity [96].

Childhood obesity is an important risk factor for obesity in adolescence and older age [43] as well as the development of certain chronic diseases including cardiovascular disease, type 2 diabetes mellitus and some cancers. Therefore intervention in childhood is critical. The finding that both parents and children misperceive overweight/obesity status presents an important barrier to obesity prevention and treatment. Unless children or their families perceive their weight status correctly, their acceptance of weight management programmes is likely to be low [20, 86].

Theoretical models underpinning many obesity treatment programmes emphasise the need for participants to recognise that they are at risk. Therefore, early interventions should focus on finding ways to encourage parents to recognise overweight/obesity in their children. Our results highlight the need for health care professionals to have discussions about weight with parents, regardless of perceived weight, and Prochaska and DiClementes's stages of change theory may prove a useful tool for doing so [16]. This theory suggests that those parents in the 'pre-contemplation' stage (i.e. those parents unaware of a problem) may be encouraged and empowered to recognise the issue. When accuracy of parental perceptions is improved parents may be more likely to move to the preparation or action stage of change [16, 84, 86]. A correct parental perception may be a small stepping-stone in improving the health of overweight and obese children. In the meantime, health care practitioners should focus on informing and motivating parents on how to promote healthy behaviours.

Strengths and Limitations

This study has several limitations. The cross-sectional design precluded the identification of causal associations. Self-reported weight-related behaviours were not objectively measured and may be subject to recall bias. Furthermore, it is possible that selection bias may be present in our sample as self-selection occurred at both the school and parent level.

This study also has a number of strengths. A major strength of this study is that heights and weights were objectively measured by trained researchers. Our study sample is broadly representative of school-going children of 8-12 years as it includes families from only-boy, only-girl and mixed schools as well as Delivering Equality of Opportunity in Schools (DEIS) and non-DEIS schools. Furthermore, our study was able to explore factors associated with both parental and child misclassification of child weight status.

6.7. Conclusion

Despite the increased global awareness of childhood obesity, a high proportion of parents and children continue to misclassify child weight status. Relying on parents and children to seek help in changing lifestyle behaviours is likely to be ineffective unless efforts to improve recognition are prioritised. Initiatives aiming to treat childhood obesity should target the population subgroups identified in this study to increase their awareness and encourage their engagement. Health care professionals should be aware of the frequent misperception of weight status, especially when dealing with parents of younger children, girls or children who are overweight or obese. Additionally, strategies and campaigns to increase awareness of childhood overweight and obesity are needed at a policy level.

Chapter 7. Discussion

7.1. Summary of main findings

This thesis adds to the current limited evidence base regarding the implementation of a family-focused, multicomponent, childhood weight management programme delivered in Irish communities. This concluding chapter summarises the main findings of this thesis, its strengths and limitations, implications for policy and practice and recommendations for future research.

7.1.1. Chapter Three: Barriers and facilitators to the implementation of *W82GO-community*

There is a need for pragmatic, 'real-world' evaluation of interventions to understand the applicability of interventions across everyday practice [163-165]. A review of the literature presented in Chapter 2 of this thesis found that there are relatively few examples of published studies reporting on the pragmatic application of childhood obesity treatment programmes [9, 10]. When introduced under less-controlled conditions, insight into the factors influencing implementation is crucial. Chapter three addressed this gap in the literature by identifying the barriers and facilitators perceived by those tasked with implementing *W82GO-community* and reported several important findings. The multidisciplinary structure of the programme emerged as both a barrier to and facilitator of implementation. Similar to Visram and colleagues, stakeholders implementing *W82GO-community* spoke positively about the opportunity to work with colleagues in other disciplines, although it was acknowledged that multi-disciplinary working could be very difficult to coordinate [179]. Additionally, in accordance with previous research, results suggest that low perceived skills and self-efficacy in dealing with childhood overweight and obesity may have further hampered programme implementation [177, 181-184]. These findings suggest the assignment of clear roles and

responsibilities, the provision of sufficient practical training and resources as well as organisational support play pivotal roles in overcoming these barriers to change. This evidence should be used to develop implementation plans to improve the translation of interventions into real-world settings.

7.1.2. Chapter Four: Barriers and facilitators to initial and continued attendance

A key barrier to programme implementation, as outlined by others [173, 193, 196, 197, 199] and in Chapter three of this thesis, was a lack of parental engagement. Research to date has focused on programme attrition and while it reveals important reasons behind drop-out, it does not address the issue from a community perspective, nor does it focus on the factors influencing programme enrolment. Therefore, Chapter four presents the results of a systematic review on the barriers and facilitators behind family engagement (both initial and continued) in community-based childhood weight management programmes. Results suggest the need to develop strategies to improve uptake and retention amongst families of boys as well as those of ethnic minority. This low uptake may be partly explained by high levels of misperception of child weight amongst parents of boys [79, 83, 99, 102, 103, 256] and those from other ethnic minorities as described in Chapter two of this thesis [96, 99, 101].

The review also revealed a number of personal reasons behind families' decisions to engage or disengage with childhood weight management programmes. The stigma associated with childhood obesity and obesity created a significant barrier to initial attendance. While the mechanisms behind this stigma did not emerge from this review, previous research suggests that overweight and obese children are vulnerable to stigma and stereotyping [57] from multiple sources and in an effort to avoid or minimise this victimisation some families may refuse the referral to care. Furthermore, this review found that denial, or lack of parental

recognition of child overweight, was a key barrier to enrolment [117, 178, 179]. These findings have important implications for future programmes that aim to successfully enrol and retain participants.

Efforts are urgently required to optimise the effectiveness of childhood obesity treatment in the community setting. This study provides practical recommendations to guide future policy-makers, programme delivery teams and researchers in developing strategies to boost recruitment and minimise attrition.

7.1.3. Chapter Five: Factors affecting referral and uptake to *W82GO-community*

As evidenced by the limited number of studies included in the systematic review presented in Chapter four, the issue of uptake to community-based childhood weight management programmes has received little attention and is a significant and often underestimated barrier to programme implementation [18, 244, 266]. Furthermore, no research has been conducted into the factors influencing referral, uptake and completion of childhood weight management programmes in an Irish community setting. This chapter provides evidence of the difficulties of referring families to community weight management programmes and provides practical suggestions on how to support referrers as well as those involved in designing lifestyle programmes. PHNs and parents expressed an overwhelming sense of fear and anxiety regarding the referral process of *W82GO-community* and this was related to PHN low perceived self-efficacy and what referral meant for the health of their child, respectively. In accordance with previous research, this study confirmed that a concern for child's health and wellbeing [10, 20, 117, 178, 179, 210-212] as well as a need for help from a source outside the family [178] were key motivators behind family enrolment while child enjoyment (i.e.

having fun and making new friends) [9, 10, 117, 178, 179, 209, 211] and group support [10, 117, 178, 211] motivated continued attendance.

In efforts to minimise referral-related fear, supports including practical training in the measurement of childhood obesity, how to approach the subject of weight with parents and peer support should be provided to all PHNs working in the area of childhood obesity. Furthermore, motivations driving programme uptake and completion should be maximised by staff and policy-makers when developing similar programmes.

7.1.4. Chapter Six: Misperception of child weight

Engaging families emerged as a significant barrier to the implementation of *W82GO-community* in Chapter three and is reflected in low enrolment and retention rates presented in Chapter five of this thesis. One reason for this lack of engagement, identified in the aforementioned papers, is parental misperception of weight. The results presented in chapter six identified that, in accordance with the literature presented in Chapter two, both parents and children misclassify child weight and this misperception is greater amongst overweight and obese children [79, 82, 83, 99]. Results show that almost half of parents of overweight and obese children and three-quarters of overweight / obese children underestimated their weight. These are a somewhat lower figures than those reported in recent reviews [79, 82] and in Irish literature [2] and may suggest there has been an improvement in the awareness and recognition of childhood overweight and obesity, possibly due to increased coverage in the Irish media.

Furthermore, the results of studies investigating the predictors of parent and child misperception of child weight have been inconsistent, and where some have reported significant associations, others have not. The cross-sectional study presented in Chapter six

of this thesis found child age [82, 255] and child misclassification of own weight was significantly associated with parental misperception. Interestingly, in accordance with previous studies we found that those parents with a higher BMI were less likely to misperceive their child's weight status that parents of normal or low BMI [2]. However, this association did not hold up in the final adjusted model. At child level, results suggest that parental misclassification of child weight was a significant predictor of child misperception of overweight / obese weight status.

Findings suggest that in an obesogenic society where overweight and obesity have become the norm, the capacity of both parents and children to correctly classify their weight status is significantly impaired. When accuracy of parental perceptions is improved parents may be more likely to move to the preparation or action stage of change [16, 84, 86]. Therefore, health care professionals should be aware of the frequent misperception of weight status, especially when dealing with parents of overweight or obese children. A correct parental perception may be a small stepping-stone in improving the health of overweight and obese children. In the meantime, health care practitioners should focus on informing and motivating parents on how to promote healthy behaviours. Additionally, strategies and campaigns to increase awareness of childhood overweight and obesity are needed at a policy level.

7.2. Strengths and Limitations

This section provides a synopsis of the overall strengths and limitations to this thesis. The strengths and limitations of the individual papers have been acknowledged and addressed in the previous chapters.

A key strength of this thesis is the importance of studying, in detail, the implementation of real-world interventions for treating childhood obesity. The research carried out for this PhD

was grounded in the real-world experience of a national pilot programme drawing on a wide range of national and local-level stakeholders. It moved beyond theoretical questions on efficacy to real-world implementation and revealed that implementation issues including low engagement, societal norms around weight and stigma, as well as overburdened staff are likely to impact on programme success. It highlights how implementing a programme without adequate planning or consideration for context results in a costly, under resourced and poorly attended service. Findings from this PhD highlight the importance of implementation science as a field of research and how it isn't always taken into consideration during the programme development phase.

A further strength of this thesis is that it addressed a timely and relevant research area within the Irish policy context. Given the dedication of the Irish Government to provide effective community-based health promotion programmes [148] and the limited evidence base surrounding the implementation of such programmes in *'real-life'* settings, this PhD provides invaluable information which has been feedback to national level policy makers. The results presented include practical recommendations to guide policy makers, programme delivery teams and researchers in developing strategies to boost recruitment, improve delivery and minimise attrition. The relevance of the findings is highlighted in the fact that this work has been presented at numerous scientific conferences both nationally and internationally (Appendix 4). Furthermore, to date, two of the four original research papers have been published in peer reviewed scientific journals (Appendix 5). In addition, this work has also attracted attention from national print media (Appendix 4).

This thesis also has some limitations. A major limitation of this PhD was the very nature in which this programme was chosen and piloted. *W82GO-community* was chosen as the pilot

programme with little consideration given to other potential programmes and without adequate collaboration with the staff on the ground who would be involved in programme implementation. Furthermore, because this was a national pilot programme, decisions on the selection of pilot sites and staff who would deliver the programme as well as the way in which families were referred were beyond the author's control. Local-level staff were asked to implement this programme in addition to their existing roles without extra time or resources and this may have impacted on their delivery of and enthusiasm for the programme.

Another important limitation of this PhD was that programme fidelity was not evaluated. Implementation fidelity focuses on the extent to which a program is executed as planned [267]. It asks questions including; does the delivered programme match the designed programme? i.e. was *W82GO-community* delivered as programme developers intended it to be delivered? Are programme features being implemented? Did the programme last the intended amount of time? Primary research into interventions and their outcomes should involve an evaluation of implementation fidelity if the true effect of the intervention is to be discerned. While general information on adherence to the programme manual (Table 3) or the number of programme sessions delivered (Figure 5) is known to the PhD candidate, it was not evaluated in such a way that could be measured or associated with successful/unsuccessful programme implementation and readers should take this into account when interpreting the findings.

Additionally, this PhD research evaluated an Irish-developed childhood weight management programme in two Irish communities. Therefore, findings are not generalizable or applicable to other communities in other countries. Despite this limitation, this PhD gives a true account

of how services are provided under normal service conditions and the results are likely to be comparable across other sites in Ireland.

Finally, the failure to recruit non-attenders or those families who dropped out of treatment despite the provision of an incentive and reminders. As might be expected, this is not uncommon and similar studies of family-focused childhood weight management programmes also had low response rates from this hard to reach group [10, 247]. While this in part was a significant finding, the low response and uptake rate is a significant limitation to the generalisability of the qualitative findings.

7.3. Implications for Policy and Practice

Currently, in Ireland, almost two in three adults and one in four children are either overweight or obese and WHO predicts that Ireland will become one of Europe's most overweight countries by 2030 [1]. Therefore, efforts to prevent and reverse this trend should be prioritised by the Irish Government. The changes needed to reverse the epidemic will likely require many interventions that span multiple levels (Figure 8) and are sustained for many years. These include individual behaviour change, setting change in schools, homes, workplaces and communities, sector change within agriculture, food services, education, transportation and urban planning as well as a combined effort to alter social norms in relation to body weight [4, 268].

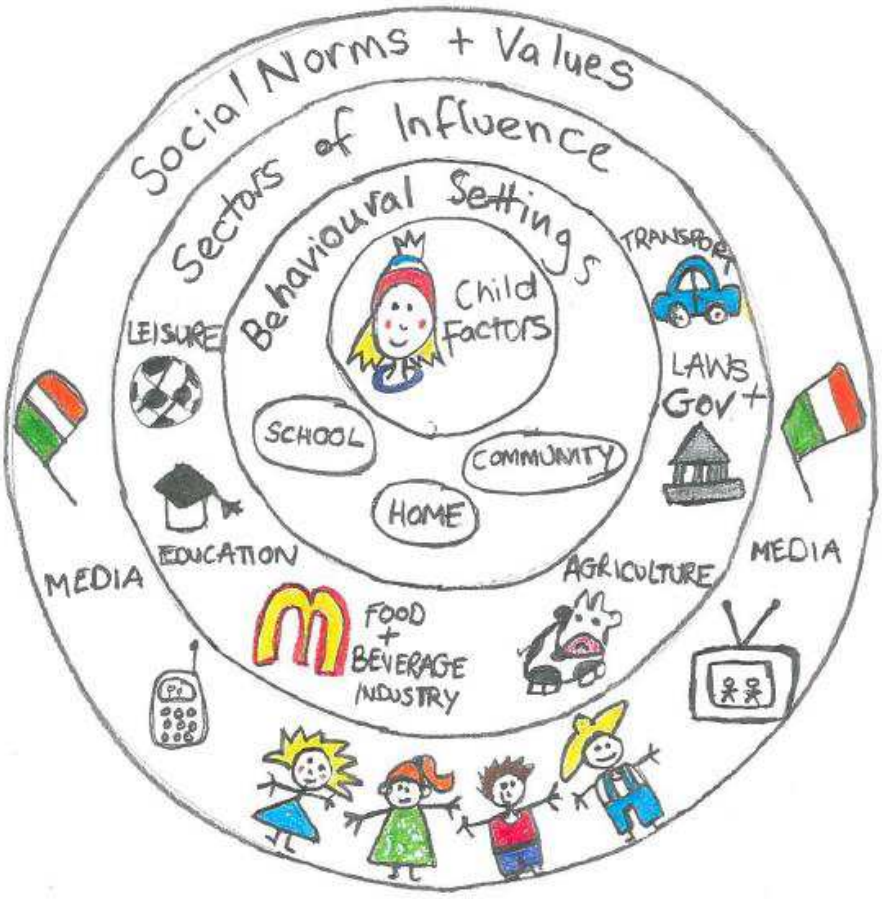

Figure 8 Multiple levels for addressing childhood obesity [170]

The globalisation of food systems promoting the overconsumption of energy-dense, nutrient-poor foods and beverages is the main contributor to the current obesity pandemic [269]. Therefore, it is clear that population-level, policy and fiscal measures including taxes on sugar-sweetened beverages, front-of-pack food labelling, regulation of food quality and availability in schools and hospitals as well as restriction of food marketing to children remain integral in the fight against obesity [270]. In Ireland, the most recent obesity policy outlines a plan to regulate for a healthier environment by developing legislation for calorie posting to support people in making healthier choices, to agree food reformulation targets with the food

industry, in developing a proposal for the roll-out of a levy on sugar-sweetened drinks as well as developing a code of practice for food and drinks promotion, marketing, sponsorship and product placement [148]. While acknowledging that these low-agency population-level approaches [271] are of critical importance in the prevention of obesity, they are unlikely to be sufficient in achieving weight loss in the subset of individuals with obesity [272]. Specialised health care is required for those currently carrying excess weight.

Ambiguity surrounds the most effective way to treat childhood obesity. Current best practice guidelines continue to recommend that obesity treatment programmes should combine healthy eating, physical activity and behavioural components. Since work on this PhD commenced there have been no developments in the provision of a childhood weight management programme for children with overweight or obesity in Irish communities. The *W82GO-community* programme pilot has ended and no programme has been introduced in its absence. However, within their ten year framework for action published in 2016, the Irish Government recognises the need for additional resources to be assigned to *"mobilise the health services to better prevent and address overweight and obesity through effective community-based health promotion programmes"[148]* as well as providing training and skills development for those delivering such programmes. The research carried out as part of this PhD provides important evidence and recommendations should such programmes materialise.

7.3.1. Policy implications

A key barrier to the implementation of *W82GO-community* was a lack of parental engagement which resulted in low enrolment and high attrition rates. The qualitative research conducted for this PhD revealed that parental misperception of their child's overweight or obese status

was a contributing factor to this low engagement. A number of initiatives should be considered at policy level to tackle this misperception. Firstly, strategies and campaigns to increase awareness of childhood overweight and obesity, and to simplify means of explaining measurement and classification are needed. Interestingly, parents who participated in the *W82GO-community* programme recalled how a recent national media campaign used *"extreme examples"* of obese children which they believed only increased parental denial by allowing some to believe their child *"wasn't that bad"*. Furthermore, campaigns that increase awareness of the immediate health consequences of childhood obesity, particularly the implications to child well-being including low self-esteem, bullying or depression may be effective in rousing parent's motivation to take action.

Another contributing factor to low parental engagement that emerged throughout this PhD was the stigma surrounding obesity. Although obesity rates have risen substantially, weight-related stigma is rarely afforded the same recognition or intervention as other disease stigmas i.e. smoking and lung cancer [273]. While obesity has become the *'norm'* in society it hasn't become as normal to discuss it. Research suggests that overweight and obese children are vulnerable to stigma and stereotyping from multiple sources [57] and in efforts to avoid or minimise this victimisation some families may refuse the referral to care. Therefore programme delivery teams should carefully consider how messages are framed in programmes to address childhood obesity [57]. The most recent Irish obesity policy aims to remove the stigma associated with obesity, especially in children, through its communication strategy which will focus on enhancing awareness of being a healthy weight, and altering perceptions where necessary [148]. In this PhD, parents suggested referring to childhood weight management programmes as *'sports-camps'* or *'fit-camps'* for all the family. They also

suggest removing any connection with weight from programme marketing materials and instead refocus on lifestyle change. This finding is consistent with other research that recommends programmes have a focus on health rather than weight or thinness [57, 214]. This positive reframing may also encourage those who fear being stigmatised by others for joining a programme for weight management.

7.3.2. Practice implications

Research shows that implementation is a process that takes time and occurs in incremental stages, each requiring different conditions and activities [274]. The first two stages (Figure 9) involve exploring and planning. Stage one of the process involves an organisation or government deciding what the intervention is that they will implement and activities during this phase include assessing the needs of those affected by the intervention, the fit and feasbility of the intervention as well as internal capacity or readiness for implementing it [274]. At the end of the second stage there should be a clear plan for implementing the intervention and a team of qualified individuals identified, who will take responsibilty for guiding the process [274]. It is evident through the research carried out for this PhD that although a motivated team of individuals were identifed not near enough time was spent on these preliminary stages. These stages require the following questions to be answered;

1. *What type of service should be implemented?* During the exploration stage the processes of mapping community needs and understanding the enabling and limiting aspects of the contexts in which interventions can occur are hugely important.
2. *Who should be responsible for implementation?* Identify qualified and motivated individuals as well as the resources they require to implement the service successfully.

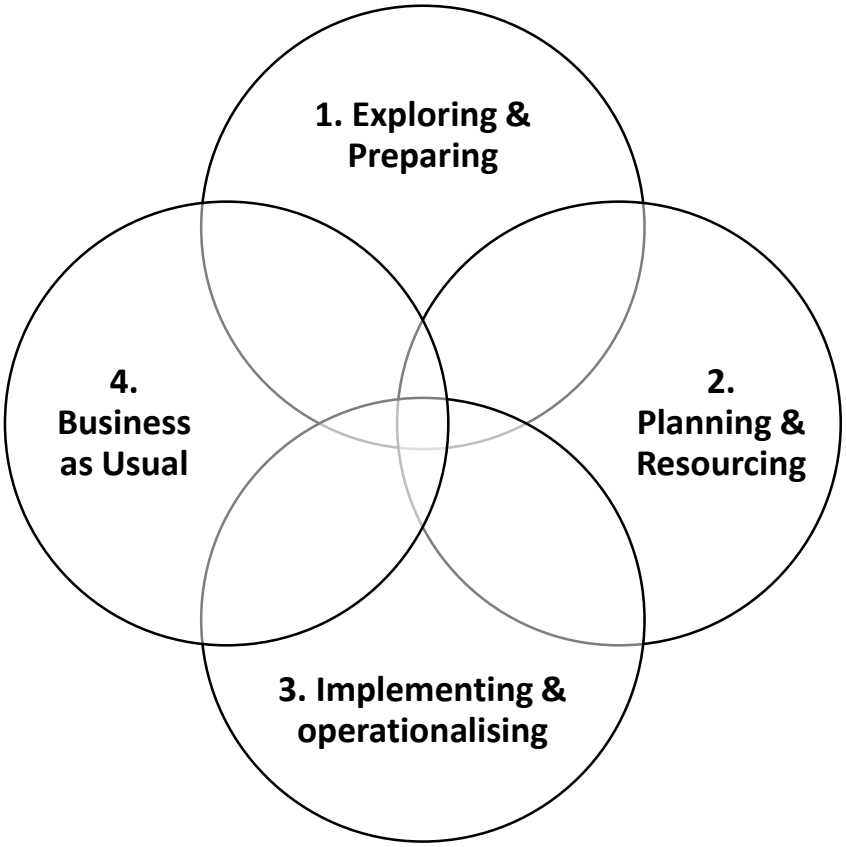

Figure 9 Four Stages of Implementation (273)

This PhD has unearthed a number of practical recommendations which answer the above questions and should be taken into consideration by the Irish Health Service when (and if) they decide to implement a childhood weight management programme in the future. Specific health service recommendations are presented in Table 20 and outlined in the following section.

Recommendations:

Table 20 Recommendations for the Irish Health Service Executive regarding the implementation of a childhood weight management programme

Stage 1: Exploring & Preparing	
Activities	**Who?**
Consult the literature prior to deciding on an evidence-based weight management programme	National team with input from key stakeholders
Assess internal capacity / readiness for implementing intervention	National team
Secure buy-in through consultation with key stakeholders including local-level leads, management, front-line staff and service users (i.e. parents and children)	National team with input from key stakeholders
Identify champions to promote and normalise intervention	National team
Develop national campaign to raise awareness of childhood obesity, the importance of early detection as well as the high prevalence of parents not recognising obesity - Be cognisant of using extreme examples in campaigns and printed media	National team
Stage 2: Planning & Resourcing	
Identify resources required to implement intervention	National & local-level teams
Consider the development of dedicated obesity teams	National team
Establish local leads to facilitate communication between national and local level stakeholders and to assist with multidisciplinary working	National & local-level teams
Develop implementation plan outlining specific roles and responsibilities	National & local-level teams
Provision of practical training in the measurement of weight status to all staff involved in referral	National & local-level teams
Provision of training on how to effectively approach the subject of weight with parents i.e. motivational interviewing training for all healthcare professionals involved in both referral to, and delivery of, obesity programmes	National & local-level teams
Consider development of a national standardised BMI app for use by both health professionals and parents	National team
Develop and trial strategies for boosting enrolment including; - The use of multiple referral strategies (i.e. newspaper, school leaflets, local radio and social media as well as PHN/GP referral)	National & local-level teams

- Reframing obesity: programme materials should shift focus away from weight towards family approach to attaining healthier lifestyles - Troubleshoot ways of engaging families of boys or those from other ethnic groups - Ensure all information assessed for health literacy to ensure that every individual can obtain, process, and understand basic health information and services needed to make appropriate health decisions. Remove medical terminology - Highlight the wellbeing benefits of attending the programme as well as the opportunity to learn new practical skills - Ensure programmes are made available locally or in sites easily accessible by public transport or with free onsite parking - Spend time discussing and addressing any barriers to attendance before families initiate care - Ensure programmes are family focused and consider inviting other siblings to attend	
Develop and trial strategies for minimising attrition including; - Ensure children are enjoying the programme through games and group work - Reminder text messages - Practical and visual sessions with an emphasis on fitness and lifestyle	National & local-level teams
Stage 3: Implementing & Operationalising	
Ensure allocated time for peer-support and debriefing	Local-level teams
Providing on-going coaching and assistance to staff	Local-level teams
Monitoring on-going implementation	National team
Stage 4: Business as Usual	
Ongoing evaluation	National & local-level teams

What type of service should be delivered?

In the event the Irish health service decide to pilot another multicomponent, family-focused, childhood weight management programme in the community setting this PhD provides crucial evidence to inform its eventual scale up. Through qualitative research conducted with staff and management on the ground we found overwhelming support for such a service to be provided in the community setting. This support was derived both from the inherent lack of existing services in the community combined with staff personal interest in the area of healthy eating and physical activity. Despite this enthusiasm, a number of pitfalls were encountered during implementation and resulted in a number of recommendations which should be taken into consideration by those responsible for service provision at national level.

Firstly, an important finding from this research was that a *'one size fits all'* approach to community-based treatment is not appropriate. Stakeholders who participated in our qualitative work proposed a tiered approach to care may be more suitable, beginning with a brief intervention which intensifies based on a child's degree of obesity, the family's motivation, and the capacity of the community and/or healthcare provider. This finding is in line with a suggestion from Staniford et al. who suggested that future interventions should tailor treatment according to participants' age, degree of obesity and their readiness or confidence to change [187]. It also supports the US Expert Committee [128] proposed four stages of paediatric obesity care, beginning with brief counselling in primary care for children with mild obesity. They suggest that subsequent stages intensify efforts tailored to the severity of obesity, from multidisciplinary and structured weight management to pharmacotherapy or bariatric surgery [128, 272].

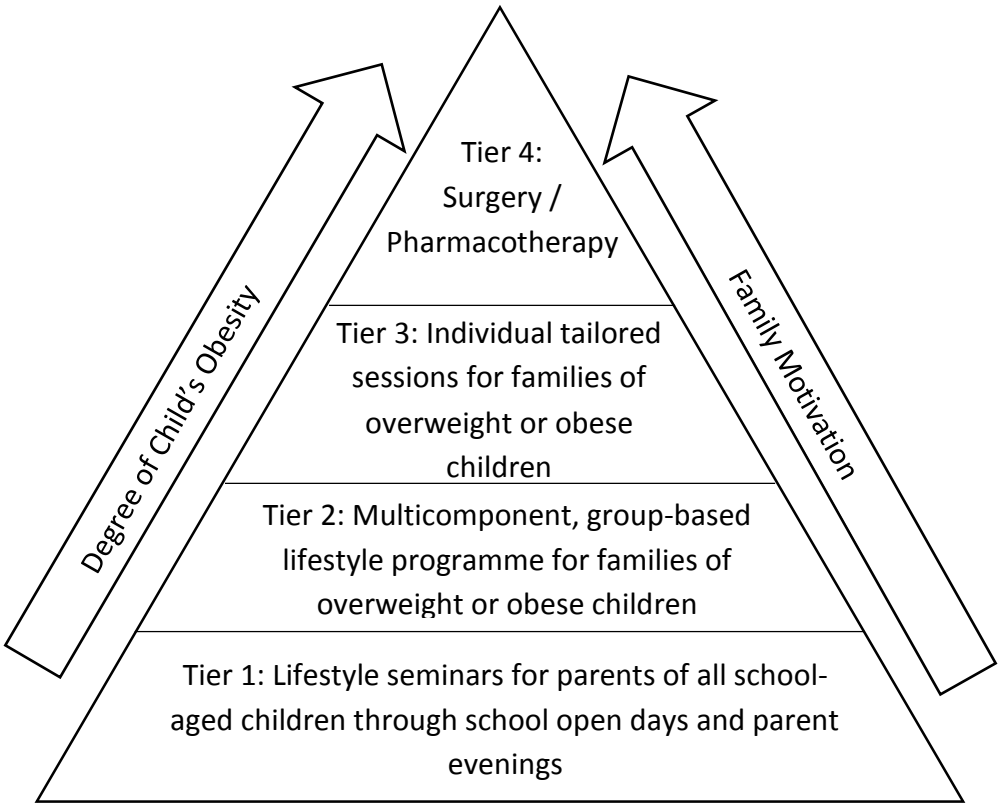

Figure 10 Example of tiered approach to care suggested by the stakeholders who participated in this PhD

Figure 11 depicts an example of a tiered approach to care as proposed by the stakeholders who participated in the research for this PhD. Tier one consists of a brief lifestyle seminar covering the broader aspects of healthy eating, physical activity as well as the importance of a healthy weight to be provided to parents of all children regardless of child weight status. Following the identification of children in need of weight management Tier two consists of a community-based, group lifestyle programme for both parents and their children. Tier three is one-on-one intervention for those *'uncomfortable'* in group situations or those families who need more tailored advice. Finally, Tier four consists of surgical and pharmacotherapies for those adolescents with extreme obesity who cannot be cared for through lifestyle counselling

alone. Having a tiered approach would enable teams to match the level of need with the family and allow families to choose where on the scale they would best fit.

The findings of the PhD relate primarily to Tier two of the model and when deciding on an appropriate programme, the staff interviewed for this PhD suggested looking further afield for examples of well-established and more widely applied programmes such as the previously mentioned MEND [9, 11, 12, 137, 141, 167, 168], rather than *'reinventing the wheel'.* Similar to *W82GO-community,* MEND was designed as a multicomponent, community-based weight management programme for families of overweight or obese children aged 7-13 years. It is a healthy lifestyle programme based on the principals of nutritional and sports science, psychology, learning and social cognitive theories [137]. Table 21 outlines the key similarities and differences between *W82GO-community* and MEND. Important to note are the differences in how families are referred and in programme facilitators. Briefly, in MEND, self-referral was permitted and encouraged through local and national advertising while in *W82GO-community* school public health nurses made the referral. Additionally, those facilitating MEND sessions aren't necessarily health professionals but non-specialist nutrition or physical activity leaders trained by MEND international. Those facilitating *W82GO-*community were multidisciplinary health professionals which was suggested to be too medicalised for the community setting. Of further relevance is the absence of the term 'weight' in the MEND (Mind, Exercise, Nutrition, Do It!) programme name. These are important differences given the findings of this PhD.

Table 21 Key similarities and differences between *W82GO-community* and MEND

Aspect	*W82GO-community*	MEND
Programme aim	Reduce obesity in children with BMI ≥98thcentile, improve children's dietary intake, physical activity levels and weight status while also increasing children's quality of life ad psychosocial health.	Support families of overweight or obese children to adopt and sustain healthier lifestyles.
Participants	Families of children aged 5-7 years who measured BMI ≥98thcentile	Families of overweight or obese children aged 7-13 years
Setting	Sessions held in community settings such as sports (recreation) centres and family centre.	Sessions held in community settings such as sports (recreation) centres and schools.
Specific programme details	12 months (6 sessions over 6 weeks; 1.5hr group sessions held once per week in the afternoon, booster sessions at 3, 6 and 9 months). Because of this age-group, the facilitators in Site A decided to split children from their parents. While parents received the educational component, children had a physical activity class. In Site B, facilitators followed the manual and for the first hour children and parents received the educational component and for the last half hour children were taken out to do physical activity while parents received more education. Following programme delivery all facilitators in both sites were unanimous that for this age group parents and children should be split from the outset.	Six month (20 sessions delivered over 10 weeks; 2hr group sessions held twice weekly in the early evening). The first hour is an interactive family session on nutrition and behaviour topics, followed by one hour of fun exercise for the children while the parents meet for support and discussion on topics such as goals and rewards, label reading and problem solving.
Components	Sessions comprised of four healthy eating sessions, one physical activity sessions, with behaviour change techniques combined and one review session. Booster sessions covered maintaining healthy lifestyle	Sessions comprised of an introduction meeting, 8 sessions on behaviour change, 8 sessions providing nutrition education, 16 physical activity sessions and a closing session.

Aspect	*W82GO-community*	MEND
	change, problem solving and planning for the future.	
Involvement	Sessions for parents and children. Siblings are welcome.	Sessions for parents and children. Siblings are welcome.
Referral	Health professional referral.	Self-referral and health professional referral.
Intervention facilitators	Community-based dietitians, physiotherapists, public health nurses, psychologists and area medical officers.	Two MEND leaders (non-specialist) and on assistant to groups of 8-15 children and their accompanying parents or carers and siblings.
Facilitator training	Training included a needs assessment, a one-day educational training course and two days of clinical shadowing with an experienced *W82GO* programme practitioner at the National Children's University Hospital where it was developed. Each community practitioner was supplied with a user manual which outlined the programme and detailed the content for both phases.	To ensure standardised delivery across sites, all trainers received 4 days of training and were provided with identical materials: theory and exercise manuals, children's hand-outs, programme resources, and teaching aids. The manuals contained detailed methods for delivery of all sessions.

Results from this PhD indicate that a group-based programme whereby multiple parents and children attend sessions is recommended. I found that the group element was a key motivator for sustained engagement and programme completion. Parents return to these programmes primarily for the group support they received [10, 117, 178, 211]. While normalising the issue for many, these group-based programmes also offered further social support through the exchange of personal tips and tricks as well as holding each other accountable. The group element also afforded parents the opportunity to discuss problems they may be experiencing in relation to their families positive lifestyle change with others on a similar journey that would not otherwise be possible in individual-based programmes. Furthermore, children also

particularly enjoyed the opportunity to play with children of a (i) similar age, (ii) weight status or (iii) activity level.

Who should be responsible for delivery?

The most recent report published by the WHO on ending childhood obesity supports guidance outlining the need to provide multidisciplinary care [5]. Research carried out during this PhD revealed the need to establish dedicated childhood obesity teams to take responsibility for the prevention and management of childhood obesity in the community. In line with WHO recommendations, it was suggested this team would be multidisciplinary in nature with input and support from dietitians, physical activity advisors and psychologists. Care should be taken in how this would pan out as the pilot of *W82GO-community* was found to be too-medicalised, partly because of the numbers of health professionals involved. Community-based interventions allow for the wealth of assets (i.e. community clubs, sports clubs etc.) available in every community to be tapped and used with efficiency and direction [140]. In efforts to reduce both the cost and the stigma associated with *W82GO-community*, many of the staff interviewed for this PhD suggested involving community groups who are experienced in dealing with families and groups i.e. local sports partnerships or after school clubs to get involved. It may be more cost effective but also input from well-known community groups may help normalise these programmes and encourage attendance however further research is required to establish this. Being part of a team with dedicated time to tackle obesity may help overcome the pressures of existing workloads. Furthermore, being exposed to children and families and the topic of weight on a continual basis is likely to enhance staff confidence and skills in dealing with the issue, as opposed to dipping in and out of it as cases arise. Care should be taken to ensure the assignment of clear roles and responsibilities when utilising

multidisciplinary team working and the stakeholders involved in this PhD suggested roundtable introductions as a simple but often over-looked detail that would enhance clarity.

Public health nurses were found to be integral to the provision of community-based treatment. They hold a unique position in addressing weight-related health with children and their families because of their role in monitoring and promoting children's health during the school years. Despite the fear and anxiety PHNs felt throughout the referral process for *W82GO-community* they believed they were the right individuals to make the referral because of the long-lasting relationship they had with families and feel they should be involved in any future programmes provided the appropriate training and resources are made available. In 2016, the Department of Health published a report entitled *'A Health Behaviour Change Framework and Implementation Plan for Health Professionals in the Irish Health Service'* [275]. Within this report they highlight the concept of *'making every contact count'*. With this in mind, the research conducted during this PhD found that PHNs felt that they had the opportunity to provide brief lifestyle sessions to children in years one and six (entry and exit) of primary school – given they are provided with the allocated time and resources to do so. Therefore, should a dedicated obesity team be established in the future, PHNs felt that they should be part of it and suggested they could get involved in the services provided in Tiers one and two of their suggested tiered model.

In terms of referral, healthcare professionals involved in both referral to, and delivery of, obesity programmes should receive practical motivational interviewing (MI) training prior to programme commencement as it may influence practitioner self-efficacy in raising the issue of weight with parents. While boosting the confidence and efficacy of referrers it also affords parents the time to explore their thoughts about excess weight in relation to their child.

Dawson and colleagues reported that those parents who received feedback via MI showed a greater increase in concern about their child's weight [239]. This is important since increasing parental awareness and recognition of the health risks are more likely to engage in behaviour change [84]. Furthermore, should routine screening be implemented staff should be trained in how to accurately measure and record height and weight and to determine BMI centile using age - and gender-specific charts to help parents and carers recognise that their child is overweight or obese as well as the benefits of addressing their weight [6].

Research carried out as part of this PhD further suggests that the responsibility for referral should not fall on one discipline alone. Programmes should be advertised widely and parents should be allowed to self-refer. Promoting programmes more widely could help encourage families to self-refer while also normalising the programme [6]. In the roll-out of *W82GO-community* only active methods of referral were used which required a significant amount of time and resources and resulted in additional strain and pressure for PHNs. Using both methods, as suggested by PHNs in this PhD, would potentially allow recruiters to enrol parents who are already concerned about their child's weight and those who are not [243]. Furthermore, encouraging positive word of mouth, fostering strong links with community groups and distributing printed materials in a range of ways including within school newspapers, targeted mail-outs and posting in community venues has been suggested to boost participation and minimise attrition rates to community-based health promotion programmes [245].

7.4. Future Research

This PhD identified the barriers and facilitators to implementing a multidisciplinary childhood weight management programme in the community setting in Ireland and explored the factors

influencing one key implementation barrier; parental resistance. The next steps in this research are to focus on the impact of organisational issues including the mechanisms/feasibility of employing a multidisciplinary team on programme outcomes, the impact of staff on attendance rates as well as the effectiveness of motivational interviewing training on recruitment/referral rates.

Furthermore, additional qualitative research is required to ascertain why the population subgroups identified in this PhD are less likely to engage in treatment programmes or more likely to misperceive weight. Finally, future research teams need to delve into the mechanisms behind the stigma of obesity and attempt to uncover strategies to address it.

7.5. Conclusions

Reduction of global obesity will need a combination of effective care coupled with policy and environmental changes to both support those who have lost weight and in preventing weight gain [270]. International guidance recommends ensuring all lifestyle weight management programmes are designed and developed with input from a multidisciplinary team and have taken into account the views of children, young people and their families. This PhD considers the views and experiences of national and local-level stakeholders, parents and children on implementing and attending a family-focused, multicomponent childhood weight management programme in the community setting. The findings of this PhD, in conjunction with those from existing research and policy literature, have resulted in a number of implications for the future delivery of community-based weight management programmes in Ireland.

In light of the recent obesity policy framework and action plan, the Irish health service should consider the development of dedicated multidisciplinary obesity teams with input from

community-leaders. Resources should be allocated and practical training be made available to those individuals tasked with implementing prevention and treatment initiatives. Finally, more time and effort should be spent on development and planning stages to ensure all avenues of tackling enrolment and attrition issues outlined in this PhD are addressed.

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Appendices

Appendix 1: Community-based childhood obesity treatment services in Ireland

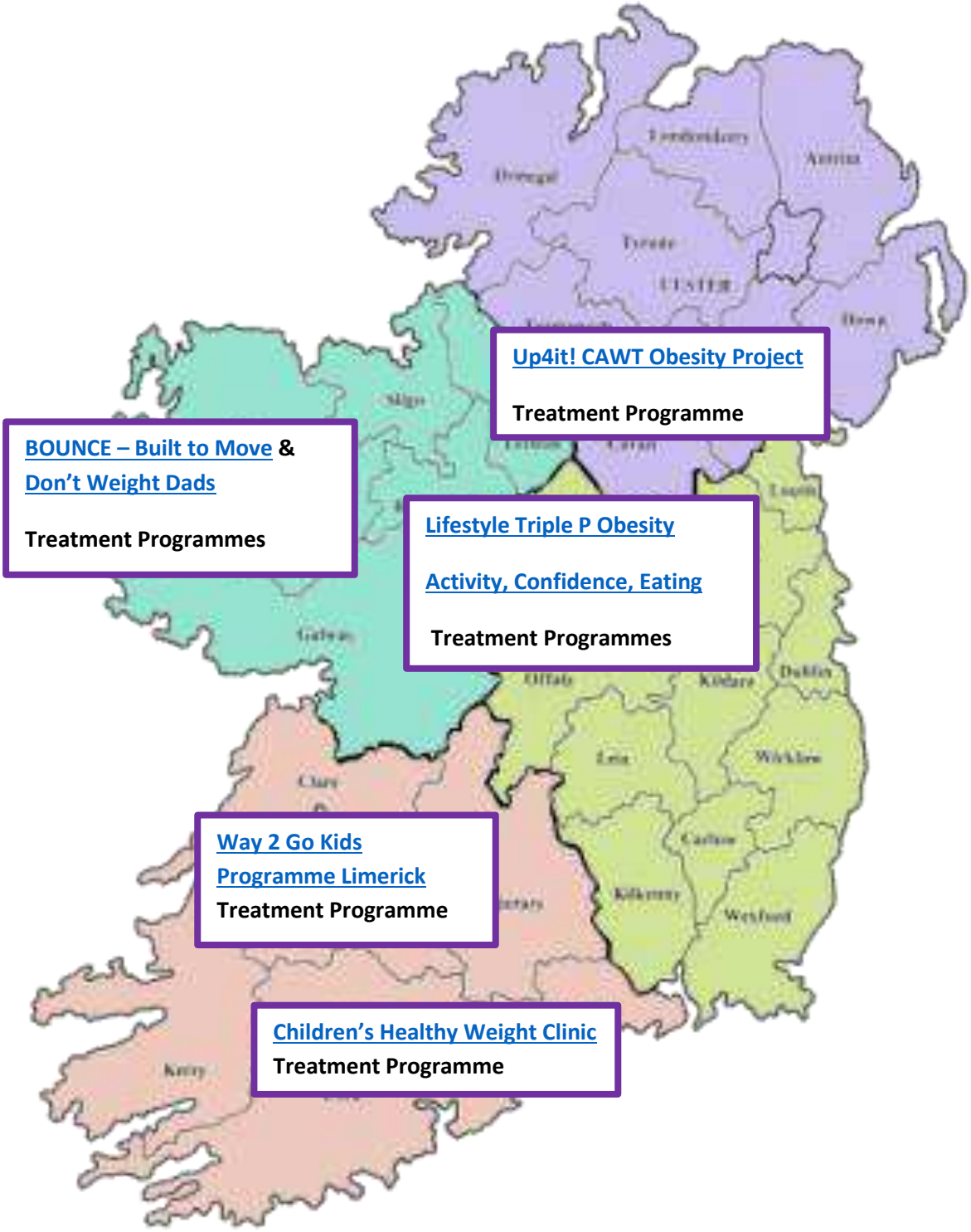

Table 22 Community Treatment Programmes

Community Treatment Programmes				
Name	**Programme Description**	**Target Population / Recruitment procedures**	**Status**	**Evidence base / evaluation**
Lifestyle Triple P Parenting Programme	Parent-only 16 week programme delivered through 10 weekly group sessions and 6 individual telephone sessions. The programme is run by public health nurses trained by Triple P International. Aim is to reduce the prevalence of childhood obesity in children aged 5-10 years by improving parent's skills' and confidence in managing children's dietary and activity patterns and in promoting a healthy lifestyle in their family.	Parents of overweight children aged 5-10 years. Parents are recruited in various ways; by GP and PHN referral and by self-referral through advertising etc.	On-going	West et al., 2010. The 12-week intervention was associated with significant reductions in child BMI z score and weight-related problem behaviour. At the end of the intervention, parents reported increased confidence in managing children's weight-related behaviour, and less frequent use of inconsistent or coercive parenting practices. All short-term intervention effects were maintained at one-year follow-up assessment, with additional improvements in child body size. Programme also undergoing RCT in Penn State and in the Netherlands although lack of parental engagement may have slowed progress.
Up4it! CAWT Obesity Project (offers both prevention and	This project adopts a community focused, multi-faceted approach to preventing and tackling obesity within families and young children. There are two elements to the project: - 'Healthy Lifestyles' - A prevention project delivered to families and individuals	Healthy Lifestyles – Families of children under 5 years. Local referral pathway linked with childcare organisations Making a Difference – Families of overweight	Not-running	Evaluation. Core Completers 74% – Wk 1 to Wk 12 significant differences: - Decrease in BMI z-score - Decrease in Waist circumference z- score - Increase in body perception - Self-esteem remained high

treatment programmes)	encountering weight problems. This is a prevention programme, to support 250 families with children under 5 years, to reduce the risk of childhood obesity, through the provision of life skills to make positive lifestyle changes. An initial family lifestyle assessment will help further define the programme and a family action plan will shape family progress over a three month period which involves regular and follow-up support. 'Making a Difference - A Family Approach to Managing Obesity' - A follow up 6 month programme delivered to overweight/obese children and their families. This is a weight management programme targeting 110 overweight/ obese children aged 8 -11 with a family approach. This programme manages childhood obesity through a holistic approach, incorporating healthy eating, an active lifestyle and positive mental health messages. An initial child assessment alongside the development of personal and family goals will further define the six month programme which involves regular and follow-up support. An action plan will	and obese children aged 8-11 years. Referral pathway incorporating a range of local healthcare professionals.		Full Completers 40% – Wk 1 to Wk 48 significant differences - Decrease in BMI z-score - Decrease in Waist circumference z-score - Increase in body perception - Self-esteem remained high

	further help to embed changes in everyday lifestyle.			
Way 2 Go Kids Programme	*'Way to Go Kids!'* (WTGK) is a, 8 week healthy eating and physical activity education program designed to support overweight and underactive children (aged 9-12 years) in developing skills needed for healthy approach to weight management. The emphasis in this program is to stop the weight gain while maintaining normal growth and development. This program takes a balanced approach to eating. The focus is on balancing calories for growth by reducing fat and sugar and increasing physical activity each day. Way To Go Kids recognises the importance of addressing weight in a sensitive and non-judgemental manner and so throughout the program the emphasis is placed on healthy eating and regular physical activity for a healthy body rather than focusing entirely on weight. Sports Development Officers from Limerick Sports Partnership help children build fun, physical activities into the day. The more active children are the more positive the impact on their self-esteem and mood, energy levels and sleep quality.	Families of children aged 9 – 12 years Recruitment of families via self-referral	On-going	The programmes was piloted in Limerick 2011, with 50% of participating children losing weight and 25% maintaining their weight loss by the end of the programme.

	HSE dieticians offer some great tips on developing healthy food habits for the whole family such as reducing portion size, replacing sugary drinks and encouraging healthier snacking and how to read food labels. These two hours sessions are fun but informative and are designed to engage, challenge and empower parents and children to make small lifestyle changes that offer great benefits and promote better health for the whole family. Sessions are limited to 10-15 children.			
BOUNCE – Built to Move	12 week programme for overweight/obese parents & their unhealthy weight children. The parents and children undergo basic assessments at the start of the programme. Parents and children work with a local basketball coach for 1 hour twice per week. They also attend a nutritional workshop for 45 minutes each week. Each workshop focuses on different themes. At the half-way stage (6 weeks)—the parents will meet a GP who will review their progress and lifestyle behaviours. At the end of the programme—basic assessments are carried out again and the	Families of overweight and obese children aged 9-12 years. Parents and children are recruited based on both approaches Referral from GP, Primary Care Team or Pharmacist and by Advertisements—Papers and Radio.	Not-running	The results of the questionnaires completed by families pre and post intervention highlight the in general the children have become more active, they spend less time engaging in sedentary behaviours, they consume fruit and vegetables with greater frequency and consume less soft drinks, sweets, cake and fried foods following the programme.

	GP is available to the families to review what went well and what needs attention. Those children with a very good attendance rate will receive a free annual membership to the Basketball club for a year. The aim of this programme is to halt and reverse the trend towards increasing weight gain in children, through increased physical activity, nutrition and basic lifestyle changes to daily living. Its ethos is to promote weight maintenance in the growing child.			
Don't Weight Dads	8 week course aims to encourage fathers and children to achieve a healthier weight and lifestyle. Fathers with their child (aged 8-13 years) attend the programme that is supported by dieticians, nutritionists, GPs and other qualified professionals to provide supports, information and skills. Don't Weight Dads will teach and demonstrate to parents Long Term Athletic Development (LTAD) which is a child-centred approach to teaching the right skill at the right time relevant to their child's developmental window rather than chronological age. LTAD not only covers	Fathers and children aged 8-13 years. Fathers and children are could self-refer following various advertising strategies.	Not-running	Not available.

	physical but also emotional, mental, personal, nutritional and lifestyle development. One of the goals is to arm parents and child with the knowledge to take control of one's lifestyle through simple and effective actions and techniques taught by a team of dedicated professionals all wanting to instil confidence for fathers and their children. Once each father and child completes the eight week course, they will each receive basketball gear along with a year's free membership to the club (worth over €300).			
Children's Healthy Weight Clinic	This is an individualised family childhood weight management programme based on the SCOTT project (Scottish Childhood Obesity Treatment). It is an office based one to one treatment programme which can be delivered in primary or secondary settings. It educates on necessary changes in diet, physical activity and sedentary behaviour, while incorporating behavioural change techniques which are underpinned by theoretical models. The programme gives service providers an important individualised family based paediatric treatment that can be adapted by health care professionals and service providers to	Families of overweight and obese children aged < 18 years old Families are referred by GPs or Public Health Nurses.	On-going	Hughes et al., 2008. The intervention had no significant effect relative to standard care on BMI z score from baseline to 6 months and 12 months. BMI z score decreased significantly in both groups from baseline to 6 and 12 months. For those who complied with treatment, there was a significantly smaller weight increase in those in the intervention group compared with control subjects from baseline to 6 months. There were significant between-group differences in favour of the intervention for changes in total physical activity, percentage of time spent in sedentary behaviour, and light-intensity physical activity.

	suit local circumstances. It can be easily incorporated into a multi-stranded weight management strategy, thus enabling service providers to meet Government targets. Owing to the differences in structure between HSE and NHS it isn't exactly run the same as in the UK but the same principles are applied.			
Activity, Confidence, Eating (ACE)	The Activity, Confidence and Eating (ACE) programme is a 12-week programme developed by an interdisciplinary working group including a dietitian, a psychologist and a physical activity health promotion officer. The dietetic component includes 2 education sessions with parents, one nutrition activity session with children and an education session with children and parents. The programme ran for 12 weeks. Trained physical activity health promotion officers, dietitians and psychologists run the programme using support materials from the resource folder provided.	Children aged 6 and 12 years with BMI above the 91st centile, with no medical cause for overweight or obesity.	Not-running	Evaluation measures were taken at different stages through the programme implementation at baseline, 3, 6 and 12 months (post intervention). The programme was effective in decreasing BMI in the short term however long term evaluation showed weight and waist circumference increased gradually post intervention. The main strengths of the programme include the clear structure and awareness of parents of what level of commitment are required, individual meetings between parents and professionals, informal delivery and participative nature focussing on a whole family approach.

Appendix 2: Supplementary material for Chapter 3

Table 23 The TIDieR (Template for Intervention Description and Replication) Checklist

Item number	Item	
	BRIEF NAME	
1.	Provide the name or a phrase that describes the intervention.	*'W82GO-community'* – a multi-component, family-focused childhood weight management pilot programme delivered in the community setting.
	WHY	
2.	Describe any rationale, theory, or goal of the elements essential to the intervention.	The *W82GO-community* programme is a family-focused programme grounded in behavioural change theory (transtheoretical model and social cognitive theory) and aims to reduce obesity in children with BMI ≥98th percentile, improve children's dietary intake, physical activity levels and weight status while also increasing children's quality of life and psychosocial health. During initial assessments the families' attitudes and behaviours related to health promotion are identified and specific and achievable goals are set. In attaining these goals, a number of sub-behaviours are promoted including self-efficacy, self-monitoring and self-management. At every stage of the process the team aims to empower the family to recognise and make the necessary changes to bring about positive lifestyle changes and motivate them to maintain these changes.

	WHAT	
3.	Materials: Describe any physical or informational materials used in the intervention, including those provided to participants or used in intervention delivery or in training of intervention providers. Provide information on where the materials can be accessed (e.g. online appendix, URL).	The *W82GO-community* programme includes: (1) The *W82GO-community* pilot programme was delivered by a multi-disciplinary team using a manual developed to support community-based healthcare professionals to deliver the programme in their area. It does so through the provision of a guide to setting up a team and preparing the delivery of the programme; a framework for individual sessions that allows for session preparation and planning including programme presentations on disc; materials, including template letters and evaluation forms that can be adapted to suit the local context and information on additional resources that are available to support the team (2) W82GO leaflet outlining the programmes goals and core elements to be distributed to families during recruitment (3) W82GO family information booklet including goal setting and additional resources and tips were distributed to all families attending the programme
4.	Procedures: Describe each of the procedures, activities, and/or processes used in the intervention,	Recruitment: heights and weights were measured in school by public health nurses (PHNs) using standardised procedures. Weight and height data were subsequently used to calculate body mass index (BMI) and children were classified as obese if their

	including any enabling or support activities.	BMI plotted ≥98th BMI percentile for age and gender using the UK90 recommended cut-off points for treatment or referral which are currently used in Irish practice. Parents of children meeting this eligibility criterion were contacted by their school PHN to inform them of their child's weight status and those who indicated an interest in attending the programme were subsequently invited to attend an initial screening assessment. This individualised initial assessment assessed eligibility before programme commencement. This assessment was carried out by a multidisciplinary team to rule out underlying medical conditions. In addition, indicators of health literacy, health beliefs and physical and environmental variables that might act as barriers to change were recorded. Following the initial assessment six group sessions took places over six weeks and group booster sessions occurred at three, six and nine months. During these group sessions parents and their children received an educational session for the first hour. Children were taken out to complete physical activity for the last 30 minutes while parents received an extra educational session. At 12 months another individualised final assessment took place to document any changes and make plans for sustainment.

	WHO PROVIDED	
5.	For each category of intervention provider (e.g. psychologist, nursing assistant), describe their expertise, background and any specific training given.	The W82GO community-programme was delivered by a multidisciplinary team of community health professionals including dietitians, physiotherapists, public health nurses, psychologists, health promotion officers, area medical officers, administrators and local area management. These health professionals had varying levels of experience of dealing with childhood obesity and as a result were invited to take part in a training programme prior to programme commencement. Training included a needs assessment, a one day educational training course and two days of clinical shadowing with an experienced *W82GO* programme practitioner at Temple Street Children's University Hospital in Dublin, Ireland. Each community practitioner was also supplied with a user manual which outlined the programme and detailed the content for both phases. Public health nurses in one of the sites received motivational interviewing training specific to childhood obesity as part of routine training in the area already being conducted in that area.
	HOW	
6.	Describe the modes of delivery (e.g. face-to-face or by some other mechanism, such as internet or	The W82GO-community programme involved face-to-face sessions and included a mixture of group and individualised sessions as outlined above.

	telephone) of the intervention and whether it was provided individually or in a group.	
	WHERE	
7.	Describe the type(s) of location(s) where the intervention occurred, including any necessary infrastructure or relevant features.	Initial assessments took place in community healthcare offices. Subsequent group sessions were delivered on weekdays in the afternoon at a local sports or community centre.
	WHEN and HOW MUCH	
8.	Describe the number of times the intervention was delivered and over what period of time including the number of sessions, their schedule, and their duration, intensity or dose.	The programme was run in two sites (Site A and Site B) over 12 months. The individual assessment lasted approximately one and half to two hours. The initial intensive phase consisted of 6 weekly group sessions for both the child and his/her parent/carer and these occurred over one afternoon a week and lasted approximately one and a half to two hours. The three booster sessions at three, six and nine months lasted approximately one to one and a half hours. During these group sessions parents and their children received an educational session for the first hour. Children were taken out to complete physical activity for the last 30 minutes while parents received an extra educational session. Upon completion of the 12 month programme children and

		their parents/carer return for a final assessment lasting approx. one and half to two hours. This model of implementation is in keeping with the transtheoretical model of behaviour change.
	TAILORING	
9.	If the intervention was planned to be personalised, titrated or adapted, then describe what, why, when, and how.	All families received the same intervention.
	MODIFICATIONS	
10.‡	If the intervention was modified during the course of the study, describe the changes (what, why, when, and how).	Two sites delivered the pilot programme to their respective communities. Site A decided to separate children and parents from the start of the group sessions because they felt children of this age would not gain anything nor were likely to understand the educational sessions. Children received a full physical activity session instead while parents received the educational session alone. Owing to low numbers attending the programme in Site B programme staff chose not to go ahead with the final assessment at 12 months and instead conducted the final assessments during the third booster session.
	HOW WELL	
11.	Planned: If intervention adherence or fidelity was assessed, describe how and by whom, and if any strategies were	Fidelity of intervention delivery was assessed using trainer self-reports and exit interviews.

	used to maintain or improve fidelity, describe them.	
12.‡	Actual: If intervention adherence or fidelity was assessed, describe the extent to which the intervention was delivered as planned.	In Site A, the programme was delivered in a more interactive manner (i.e. without the use of programme slides). Site B followed the manuals as planned.

** **Authors** - use N/A if an item is not applicable for the intervention being described. **Reviewers** – use '?' if information about the element is not reported/not sufficiently reported.

† If the information is not provided in the primary paper, give details of where this information is available. This may include locations such as a published protocol or other published papers (provide citation details) or a website (provide the URL).

‡ If completing the TIDieR checklist for a protocol, these items are not relevant to the protocol and cannot be described until the study is complete.

* We strongly recommend using this checklist in conjunction with the TIDieR guide (see *BMJ* 2014;348:g1687) which contains an explanation and elaboration for each item.

* The focus of TIDieR is on reporting details of the intervention elements (and where relevant, comparison elements) of a study. Other elements and methodological features of studies are covered by other reporting statements and checklists and have not been duplicated as part of the TIDieR checklist. When a **randomised trial** is being reported, the TIDieR checklist should be used in conjunction with the CONSORT statement (see www.consort-statement.org) as an extension of **Item 5 of the CONSORT 2010 Statement.** When a **clinical trial protocol** is being reported, the TIDieR checklist should be used in conjunction with the SPIRIT statement as an extension of **Item 11 of the SPIRIT 2013 Statement** (see www.spirit-statement.org). For alternate study designs, TIDieR can be used in conjunction with the appropriate checklist for that study design (see www.equator-network.org).

B. Semi-structured Interview guide for one-on-one interview with HSE staff actively involved in the implementation of *W82GO-community*

Interview topics & themes to include:

- knowledge and experience of childhood obesity and childhood weight management programmes in general
- background, context and communication of the *W82GO*-community programme
- specific responsibilities and experience in implementing/delivering *W82GO-community*
- barriers and enablers to implementation
- perceived successes and challenges experienced
- recommendations and vision for the future

Duration of Interview: The interview will take approx. 1 hour. I would just like to check a few details before we get started.

- *Would you mind if I record the interview? Anything we discuss will be confidential and your identity will remain anonymous on any reports or publications. Finally you can stop the interview at any point, if you wish. Do you have any questions before we get started?*

- Go through the consent form, sign and give copy. When you start recording: outline the following: *This is interview one recorded on ... (Date/Time)*

The researcher will remind all participants that the interview is confidential and anonymous. The interview will be explained as follows:

> *"The purpose of this interview if to ask you about your experience in implementing or delivering W82GO-community in Cork/Mayo. This will help us learn about the service, understand what worked well but also improve the things that didn't work well. Importantly, this will help us to do the best job possible to help other delivery teams in the future. There are no correct or incorrect answers to the questions I ask today. I am interested in your own experiences.*

Main Question	Probing Question
Knowledge and experience of childhood obesity and childhood weight management programmes	
• First of all, I would like you tell me about your thoughts on childhood obesity in general. And if its relevant, please explain your own experiences with delivering other weight management programmes • Do you think there is a need/room for a programme like *W82GO-community* in the community you work in? • Why do you think it was decided to roll out this specific programme AND why in Cork and Mayo?	**Probe to obtain more detail on beliefs (e.g. how important an issue do you think childhood obesity is? Do you come across it in your own normal day-to-day practice? What would be the main issue with families attending your clinics?)** **Are you aware of any other programmes that may have been rolled out? Other regions more in need of programmes like this?**
Background, context and communication of the *W82GO-community* programme	
• Can you tell me how you first heard of *W82GO-community*? • When did you first hear that you would be involved in the delivery of *W82GO-community*? Had you a say in whether or not you would be involved? • Was the programme what you initially expected? • What are your views on the multi-disciplinary approach of the intervention? • What are your views on the context in which the programme is being delivered? i.e. the wider environment. Do you think there is anything about the external environment which may have affected the implementation of the programme? • Do you think the age group is appropriate?	**How was this information shared with you? Verbal, brochure, email, website etc.? What would be most helpful to you as a practitioner?** **How did it make you feel knowing you were going to be delivering this programme? Had you any initial concerns? Are they still concerns now?** **Probe for specific information on format, content, resources, facilities** **Probe for more detail. Do you think the programme has had an impact on programme staff, on leadership and management, on awareness and support for the service** **Probe for more information. Is there anything in the physical, social or political environment which could either directly or indirectly affect the implementation/ delivery/uptake of the programme?** **Seek for clarification on answer. Why?**

Specific responsibilities in implementing *W82GO-community*	
• Can you describe to me your role in implementing the programme? • Can you tell me about your experiences of implementing the programme? Were there any specific successes or challenges you can recall? • What resources had you to implement/deliver this programme? • Were all sessions of the programme delivered? • X number dropped out of the programme – why do you think that is? Can you think of anything that could improve retention?	**In terms of implementing the programme, what were your specific responsibilities? Probe for specific information on time spent preparing, delivering and de-briefing sessions. Organising meetings. What are your thoughts on the support, coaching, assistance you received (if any) during the delivery of the programme?** **What were the main obstacles you were faced with? What helped with implementation? Issues related to establishment / operation.** **Probe for more information on what worked well / what didn't work well.** **Probe for more information on what strategies were used. Ask them about what worked well/ what didn't work well. How information was received by parents. What obstacles they faced? What they would have done if doing it again.** **Probe for information on resources, materials etc. they used, what they lacked, what would have been useful.** **If no, why not.** **Probe for more information on strategies they used to improve retention e.g. reminders**
Barriers and enablers to implementation	
• What are your overall thoughts on the implementation of the programme in your area? • In your opinion were all aspects of the programme delivered? • What challenges did you face in terms of implementing the programme? • Can you think of anything that would enable more effective implementation?	**What do you think worked well? What didn't work so well? Probe for specific information on communication, training and support etc. provided prior to the delivery of the programme**. **Probe for specific examples. Was there anything left out? Refer to fidelity checklist. Was anything tweaked? Why?** **Probe for specific examples. Can you think of any barriers to implementation that you faced throughout this journey?**

	Probe for specific examples. Have you any thoughts on the following aspects of the implementation of *W82GO-community*: • **Communication throughout** • **Leadership throughout** • **Support throughout**
Perceived successes and failures	
• How do you think the programme went overall? For staff involved in its delivery, for families and for children. • Do you think the programme worked? • Can you think of any 'Failures' or particular areas for concern	**Probe for specific examples. How do you think the families reacted to the programme? What do you think the parents thought of the programme? And the children?** **The aim of the programme is to improve nutrition, increase physical activity and facilitate behaviour modification, do you think it succeeded in achieving this in the families you worked with? Do you think the programme had an impact on** • **Physical health / psychosocial factors** • **Children / families** • **Individuals / the wider community** **(if they mention probe more for info on barriers to attendance / reasons for dropout)**
Recommendations and vision for the future	
• Is there anything in this whole process of implementing the programme that you would have done differently? Or would like to have happened differently for you? • In your own views are there any potential areas for improvement	**Probe for specific examples (i.e. communication, infrastructure for support etc.)** **Probe for more details. i.e. areas of improvement for clients and staff** **In your own views are there any areas of unmet need**
End of interview	
• Is there anything I have missed?	**Is there anything we didn't talk about that you would like to say? If yes, please explain.**

Interviewer will thank participant and conclude interview

Appendix 3: Supplementary material for Chapter 5

A. Semi-Structured Interview guide for one-on-one interview with PHNs involved in referring children to *W82GO-community*

Interview topics & themes to include:

- knowledge and experience of childhood obesity and childhood weight management programmes in general
- Experience of referring families to *W82GO-community*
- barriers and enablers to referral
- perceived successes and challenges experienced

Duration of Interview: The interview will take approx. 1 hour. I would just like to check a few details before we get started.

- *Would you mind if I record the interview? Anything we discuss will be confidential and your identity will remain anonymous on any reports or publications. Finally you can stop the interview at any point, if you wish. Do you have any questions before we get started?*

- Go through the consent form, sign and give copy. When you start recording: outline the following: *This is interview one recorded on ……. (Date/Time)*

The researcher will remind all participants that the interview is confidential and anonymous. The interview will be explained as follows:

> *"The purpose of this interview if to ask you about your experience in referring families to W82GO-community in Cork/Mayo. This will help us to learn about the service, understand what worked well but also improve the things that didn't work well. Importantly, this will help us to do the best job possible to help other delivery teams in the future. There are no correct or incorrect answers to the questions I ask today. I am interested in your own experiences."*

Main Question	Probing Question
Knowledge and experience of childhood obesity and childhood weight management programmes	
• First of all, I would like you tell me about your thoughts on childhood obesity in general. And if its relevant, please explain your own experiences with delivering other weight management programmes • Do you think there is a need/room for a programme like *W82GO-community* in the community you work in?	**Probe to obtain more detail on beliefs (e.g. how important an issue do you think childhood obesity is? Do you come across it in your own normal day-to-day practice? What would be the main issue with families attending your clinics?)**
Background, context and communication of the *W82GO-community* programme	
• Can you tell me how you first heard of *W82GO-community?* • When did you first hear that you would be involved in referring to *W82GO-community*? Had you a say in whether or not you would be involved? • And how did this make you feel? • Was the programme what you initially expected?	**How was this information shared with you? Verbal, brochure, email, website etc.? What would be most helpful to you as a practitioner?** **How did it make you feel knowing you were going to be referring to this programme? Had you any initial concerns? Are they still concerns now?** **Probe for specific information on format, content, resources, facilities** **Probe for more information. Is there anything in the physical, social or political environment which could either directly or indirectly affect the implementation/delivery/uptake of the programme?**
Specific responsibilities in implementing *W82GO-community*	
• Can you describe to me your role in referring to the programme? • Can you tell me about your experiences of referring? Were there any specific successes or challenges you can recall?	**In terms of implementing the programme, what were your specific responsibilities? What are your thoughts on the support, coaching, assistance you received (if any) during the delivery of the programme?** **What were the main obstacles you were faced with? What helped with referral? Issues related to establishment / operation. Probe for more information on what worked well / what didn't work well.**

• Can you describe to me the referral process? • What do you think would prevent families from attending the first assessment? • What resources had you to refer to this programme? • X number dropped out of the programme – why do you think that is? Can you think of anything that could improve retention?	**Probe for more information on what strategies were used. Ask them about what worked well/ what didn't work well. How information was received by parents. What obstacles they faced? What they would have done if doing it again.** **Probe for information on resources, materials etc. they used, what they lacked, what would have been useful.** **Probe for more information on strategies they used to improve retention e.g. reminders**
Barriers and enablers to implementation	
• What are your overall thoughts on the referral to the programme in your area? • What challenges did you face in terms of implementing/delivering the programme? • Can you think of anything that would enable more effective implementation/delivery?	**What do you think worked well? What didn't work so well? Probe for specific information on communication, training and support etc. provided prior to the delivery of the programme**. **Probe for specific examples. Can you think of any barriers to implementation that you faced throughout this journey?** **Probe for specific examples. Have you any thoughts on the following aspects of the implementation of *W82GO-community*:** • **Communication throughout** • **Leadership throughout** • **Support throughout**
Perceived successes and failures	
• How do you think the programme went overall? For staff involved in its delivery, for families and for children. • Do you think the programme worked?	**Probe for specific examples. How do you think the families reacted to the programme? What do you think the parents thought of the programme? And the children?** **The aim of the programme is to improve nutrition, increase physical activity and facilitate behaviour modification, do you think it succeeded in achieving this in the families you worked with? Do you think the programme had an impact on**

• Can you think of any 'Failures' or particular areas for concern	• **Physical health / psychosocial factors** • **Children / families** • **Individuals / the wider community** **(if they mention probe more for info on barriers to attendance / reasons for dropout)**
Recommendations and vision for the future	
• Is there anything in this whole process of implementing/delivering the programme that you would have done differently? Or would like to have happened differently for you? • In your own views are there any potential areas for improvement	**Probe for specific examples (i.e. communication, infrastructure for support etc.)** **Probe for more details. i.e. areas of improvement for clients and staff**
End of interview	
• Is there anything I have missed?	**Is there anything we didn't talk about that you would like to say? If yes, please explain.**

Interviewer will thank participant and conclude interview

B. Semi-Structured Interview guide for one-on-one interview with parents/guardians

Interview topics & themes to include:

- Motivating factors
- Experiences of programme use, expectations and experiences
- Barriers and enablers to access
- Perceived outcomes and impact
- Reasons for initiation/ continuation/termination of treatment
- Potential areas for improvement

The researcher will remind all participants that the interview is confidential and anonymous. The interview will be explained as follows:

> *"The purpose of this interview if to ask you about your son's/daughter's referral to <insert name of childhood weight management programme>. We want to learn about your decision to attend the clinic. We would also like to learn about your experiences while attending and what factors kept you and your family attending. This will help us to learn about the service, what works well but also improve the things that don't work well. Importantly, this will help us to do the best job possible to help other families in the future. There are no correct or incorrect answers to the questions I ask today. I am interested in your own experiences."*

Programme outcome

- Still attending
- Completed
- Withdrawn
- Uncertain

Main Question	Probing Question
Motivating factors	
• First of all, I would like you to think back to when you were referred to the programme. How did it make you feel? Please tell me all you can remember about the referral process.	**Probe to obtain more detail on emotions (e.g. how did you cope with the referral process? How did your child cope? Did you do anything that appeared to help your child cope?)**
• Can you tell me why you decided to follow-up and take part in the programme?	**What personal or individual factors informed your decision? Probe for details regarding awareness, motivation, readiness to change, expectations.**
• Please tell me about other family members (i.e. spouse, grandparents, aunts, siblings) and peers (i.e. friends,	**What was their response to this referral? Did any family members' or peers' reaction to your**

co-workers) experiences when they learned your son/daughter was referred to the programme (if you told them). • Can you describe your own experiences and history with making healthy lifestyle changes? If relevant, please explain your own experiences with weight management • What do you remember from your discussions with your healthcare professional? What information did your receive about the referral/ programme and next steps? • In your own view, that do you think would help other parents and families to initiate care for weight management? Are there things that could make it easier to initiate care?	**child's referral/decision influence your decision to follow-up the referral? If yes, please explain.** **What things have you tried that worked? That things have you tried that didn't work? What challenges have you faced individually? What challenges have you faced as a family in making healthy changes?** **How was this information shared with you? Verbal, brochure, email, website etc.? What would be most helpful to you and your family?** **What do healthcare professional and clinics do well already? What could they do better to help families?**
Programme use, expectations and experiences	
• Was the programme what you initially expected? • Tell me about your overall thoughts of the programme • What were the benefits of attending / any high points? What were the disadvantages of attending / any low points?	**Probe for specific information on format, content, resources, facilities and programme staff.**
Barriers and enablers to access	
• What prevented you from attending?	**Probe for specific examples. Were the location/ times a problem?**
Perceived outcomes and impact	
• What impact do you think the programme had (if any) on your family and child's lifestyle? • What was the easiest to change? What wasn't?	**Probe for specific examples. Did the programme have an impact on diet / physical activity levels? Did the programme have an impact on physical health /psychosocial factors? (i.e. reduced social isolation, change in attitude, renewed interest in sport and other**

• What elements of the programme have they maintained? • For those who dropped out: Did they take anything away from that session(s) they attended?	**activities) Did the programme have an impact on their child / them / their family as a whole**
(For completers) Reasons for on-going attendance	
• What motivated you to continue to take part in the programme? • Did your child experience any challenges or successes that influenced your or his/her decision to continue care?	**Probe for specific examples. This could include positive or negative interactions with programme staff or family members and peers i.e. siblings, grandparents or friends. May also include factors beyond your child's control (i.e. illness, weather time, schoolwork etc.)**
• Did you or your family experience any challenges or successes that influenced your decision to continue care?	**Probe for specific examples. Anything from your family's perspective? Anything from the programmes perspective? Could include home relocation, occupation change, stress, more free time, new health concerns or improvements, weight loss or gain etc.**
• What would you say were the strengths of the care you received?	**Probe for specific examples. Could relate to factors including educational resources, professional support and relationships, positive rapport, encouragement, health benefits (real or perceived) etc.**
• What would you say were the weaknesses of the care you received?	**Probe for specific examples. Could be opposite to previous questions.**
• In your view, what would you think would help other parents and families to continue weight management care? Are there things that programme facilitators could do to make it easier to continue care for the longer-term?	**Probe for specific examples. For example, timing and duration of appointments, parking and transportation, additional resources etc.**
(For non-completers) Reasons for drop-out	
• Why did you leave the programme?	**Probe for more information. (i.e. issues related to the programme, perceived personal or external barriers, barriers to lifestyle change)**

• Did you do anything else? If yes, please explain.	**I.e. attend another programme/ go to internet for help etc.**
(For completers) Potential areas for improvement	
• Have you any suggestions for how the programme could be improved? • Suggest reasons why some might decline / withdraw from the programme • On-going support required by their child / family	
(For non-completers) Potential areas for improvement	
• Have you any suggestions for how the programme could be improved? • What would influence you to return to the programme? i.e. facilitators to engagement / attendance • On-going support required by their child / family	
End of interview	
• Is there anything I have missed?	**Is there anything we didn't talk about that you would like to say? If yes, please explain.**

Interviewer will thank participant and conclude interview

C. Draw and write technique

The Draw and Write Technique is a child-friendly and non-threatening method of collecting data from young children. Younger children may find it difficult to convey their feelings verbally, and this approach offers them the opportunity to do so at their own level. This technique is becoming increasingly popular as a method of collecting children's views within the field of health. During the final group session, the researcher (EK) introduced herself and the project briefly in a relaxed and friendly manner. She provided children with paper, pencils and colours and asked the children to draw a picture of what they thought of the *W82GO-community* programme. An example of the prompts used include *"I'm going to give you a big page and I would like you to draw a picture which you can colour in. I want to find out about how you felt coming here each week and what's good and what's bad about it. Firstly, if you just close your eyes for a minute and think about it before you draw. Think about all the classes you went to with your mom or dad or granny. Have you got the idea now?*" Upon completion of the drawing, the researcher asked each of the children to describe it. They were also asked to title their drawings and given a final opportunity to describe it: *"What else would you like me to know about your drawing?".* The researcher acted as a scribe and wrote down individual answers which were then transcribed for coding purposes. Informed consent was obtained from each child's parent, and each child gave his or her assent prior to participation. Figure 10 provides more examples of draw & write illustrations.

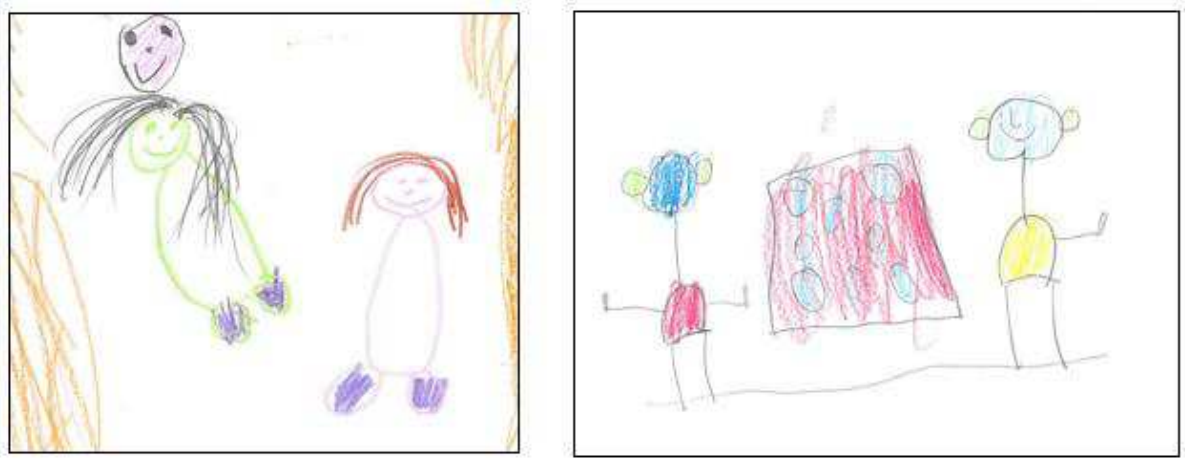

Figure 11 Further examples of pictures drawn for the draw and write exercise.

Appendix 4: Research output, dissemination, training and contributions

Research from this thesis has been published in peer-reviewed academic journals (Table 24) and has been presented at national and international conferences (Table 25). The candidate has also completed academic modules and training (Table 26). Furthermore, the candidate has made significant contributions to the Department of Epidemiology and Public Health, UCC while completing this PhD (Table 27).

Table 24 Peer-reviewed publications from this thesis

	Year	References for peer-reviewed journals
1	2016	**Kelleher E,** Davoren MP, Harrington JM, Shiely F, Perry IJ, McHugh SM. Barriers and facilitators to initial and continued attendance at community-based lifestyle programmes among families of overweight and obese children: a systematic review. *Obesity Reviews* 2017;18(2):183-194
2	2017	**Kelleher E,** O'Malley G, Harrington JM, Shiely F, Perry IJ, McHugh SM. If you build it will they come? An analysis of the recruitment of families to a community-based, multi-disciplinary childhood weight-management programme. Currently under review as a short report in Primary Health care Research and Development.
3	2017	**Kelleher E,** Harrington JM, Shiely F, Perry IJ, McHugh SM. Barriers and facilitators to the implementation of a community-based, multidisciplinary, family-focused childhood weight management programme in Ireland: A qualitative study. *BMJ Open* 2017 (TBA)
4	2017	**Kelleher E,** McHugh SM, Harrington JM, Perry IJ, Shiely F. Understanding engagement in a family-focused, multicomponent childhood weight management programme delivered in the community setting: facilitators for engagement. Submitted to the *Public Health Nutrition* in September 2017.
5	2017	**Kelleher E,** Shiely F, Harrington JM, Perry IJ, Millar SR. Misperception of child weight status: A cross-sectional analysis of the Cork Children's Lifestyle Study. To be submitted to the *International Journal of Obesity* in September 2017.

Table 25 Conference presentations during the PhD

Month/ Year	Conference	Title	Presentation
October 2015	Institute of Public Health, Croke Park, Dublin	Barriers & facilitators associated with initial and continued attendance at community-based interventions among families of overweight & obese children.	Oral
February 2016	SPHeRE Annual Conference, Royal College of Surgeons Ireland, Dublin	Barriers and facilitators associated with initial and continued attendance at community based interventions among families of overweight and obese children	Oral
April 2016	Association for the Study of Obesity in Ireland (ASOI) Annual Conference, Wood Quay Venue, Dublin	Factors influencing families' initial and continued attendance at community-based family-focused childhood weight management programmes: A systematic review. Translation of a multi-disciplinary family-focused childhood weight management programme to the real-world setting: Barriers and facilitators for success.	Poster Poster
May 2016	Division of Health Psychology	Factors influencing families' initial and continued attendance at community-based family-focused childhood weight management programmes: A systematic review.	Oral
June 2016	International Society for Behavioural Nutrition and Physical Activity (ISBNPA) Annual Conference, CTICC, Cape Town, South Africa	Factors influencing families' initial and continued attendance at community-based family-focused childhood weight management programmes: A systematic review.	Oral

		Translation of a multi-disciplinary family-focused childhood weight management programme to the real-world setting: Barriers and facilitators for success.	Poster
September 2016	Society for Social Medicine Annual Conference, University of York, United Kingdom	Translation of a multi-disciplinary family-focused childhood weight management programme to the real-world setting: Barriers and facilitators for success. Factors influencing families' initial and continued attendance at community-based family-focused childhood weight management programmes: A systematic review.	Oral Poster
January 2017	SPHeRE Annual Conference, Royal College of Surgeons Ireland, Dublin	Translation of a multi-disciplinary family-focused childhood weight management programme to the real-world setting: Barriers and facilitators for success. If you build it will they come? An analysis of the recruitment of families to a community-based, multi-disciplinary childhood weight-management programme.	Oral Poster
May 2017	European Congress of Obesity 2017, Porto, Portugal	User and provider perspectives on engaging families in a multicomponent childhood weight management programme delivered in the community setting. Translation of a multi-disciplinary family-focused childhood weight management	Oral Poster

		programme to the real-world setting: Barriers and facilitators for success. If you build it will they come? An analysis of the recruitment of families to a community-based, multi-disciplinary childhood weight-management programme.	Poster
Example of media coverage of PhD output:			
October 2015	The Irish Times The Irish Examiner	*'Majority referred to childhood obesity services refuse to attend.* Print media and online version: https://www.irishtimes.com/news/health/majority-referred-to-childhood-obesity-services-refuse-to-attend-1.2390372 'Fat chance for kids to avoid fast food stores' Print media and online version: http://www.irishexaminer.com/ireland/fat-chance-for-kids-to-avoid-fast-food-stores-358938.html	

Table 26 Courses completed during PhD

	Course modules	Date completed	Credits awarded
1	Evaluation of Public Health Interventions in Real-life Settings, Wageningen University, Netherlands	October 2017	Cert awarded
2	EH7003: Evidence Synthesis and Clinical Trials	May 2014	5
3	EH7005: Intro to Health Economics and Econometrics.	May 2014	10
4	EH7009: Population and Individual Health	May 2014	10
5	EH7010: Health Systems, Policy and Informatics	May 2014	10
6	EH7011: Interrogation, Interpreting and Reporting	May 2014	10
7	EC6015: Evaluating Health Outcomes 1	January 2015	5
8	Qualitative Research Methods, Oxford University	April 2015	Cert awarded
9	EC6016: Evaluating Health Outcomes 2	May 2015	5
10	NVivo Training Workshop, UCC	May 2014	Cert awarded
11	Implementation Science in Public Health Programs, Linkoping University, Sweden	December 2016	Cert awarded

Table 27 Contributions to the Department of Epidemiology & Public Health

Task	Details of contribution
EPINews Editor	Compiled The Department of Epidemiology and Public Health's Quarterly Newsletter Issue 1 Issue 5 Issue 9 Issue 2 Issue 6 Issue 10 Issue 3 Issue 7 Issue 11 Issue 4 Issue 8
Co-ordinator for Health Promotion pathway on MPH	Co-ordinated timetable with lecturers and students.
Assistant module co-ordinator and lecturer on the BSc in Public Health.	Co-ordinated classes and delivered lectures on the EH2008 module *Introduction to the Theories & Practices of Health Promotion* • Introduction to Health Promotion Approaches - Settings approach, Population Sub-groups approach and Topics approach • Working on Health with and in Communities • Introduction to Working with Individuals on Behaviour Change: Theory & Practice • Health Promotion Intersectoral Working on Obesity
BSc mentoring and tutoring	Mentored 10 first year BSc Public Health students in EH1006: Perspectives of Public Health, (2014 – 2017). Delivered lectures to 1st year BSc Public Health students for the following sessions in EH1006: Perspectives of Public Health, (2013 – 2016): • Working with data • Perspectives on public health

Appendix 5: Supplementary material for Chapter 6, Published papers and Ethical approval documents

Cork Children's Lifestyle Study – Child Questionnaire

Official use | C | C | L | S | | | | | S | C | H | | |

A. BACKGROUND INFORMATION

Please tick one box

A.1. Are you a boy or a girl:

☐ Boy ☐ Girl

A.2. How old are you? ☐

A.3. Do you have brothers or sisters?

☐ Yes ☐ No

A.4. How would you describe your health?

☐ Excellent ☐ Fair

☐ Good ☐ Poor

A.5. How would you describe yourself?

☐ Very skinny ☐ A bit overweight

☐ A bit skinny ☐ Very overweight

☐ Just the right size

B. YOUR NEIGHBOURHOOD

B.1. Thinking about where you live...Do you **like** the area you live in?

☐ A lot ☐ Not very much

☐ Quite a lot ☐ Not at all

B.2. Is there **a playground or park** near where you live?

☐ Yes ☐ No

B.3. Are there places for children to **play safely** near your home?

☐ Yes ☐ No

B.4. Do you **feel safe** in your neighbourhood?

☐ Yes

☐ Sometimes yes, sometimes no

☐ No

B.5. Is there **a garden** at your family home?

☐ Yes ☐ No

B.6. How often do your friends play at **your home**? [Include relatives of your own age if you count them as friends].

☐ A few times a week ☐ A few times a year

☐ About once a week ☐ Never

☐ About once a month

B.7. How often do you play at **your friend's homes**? [Include relatives of your own age if you count them as friends].

☐ A few times a week ☐ A few times a year

☐ About once a week ☐ Never

☐ About once a month

C. FOOD AND DIET

C.1. How many days per week do you eat **breakfast** before school?

☐ Everyday ☐ Most days ☐ Never

If you answered Everyday Skip to Question C.3.

C.2. If most days or never, what is the reason why you skip breakfast? **[Please tick one box]**

☐ I don't like breakfast

☐ No one in my family eats breakfast

☐ I don't have time in the morning to eat breakfast

☐ There are no breakfast foods in my house

☐ Other

C.3. How often do you **add salt** to food while at the table?

☐ Everyday ☐ Most days ☐ Never

C.4. What is your favourite snack?

C.5. How often do you eat your favourite **snack**?

☐ Everyday

☐ 1-3 times a week

☐ 4-6 times a week

☐ Less than once a week

C.6. What is your favourite drink?

C.7. How often do you drink your favourite **drink**?

☐ Everyday

☐ 1-3 times a week

☐ 4-6 times a week

☐ Less than once a week

D. SPORTS AND PHYSICAL ACTIVITY

D.1. Physical activity in your spare time:
Have you done any of the following activities in the **past 7 days** [last week]? If yes, how many times? **[Please tick one box per row]**

	No	1-2 times	3-4 times	5-6 times	7 times or more
Skipping	☐	☐	☐	☐	☐
Rowing/ canoeing	☐	☐	☐	☐	☐
Tag (chasing)	☐	☐	☐	☐	☐
Walking for exercise	☐	☐	☐	☐	☐
Cycling	☐	☐	☐	☐	☐
Jogging or running	☐	☐	☐	☐	☐
Swimming	☐	☐	☐	☐	☐
Rounders	☐	☐	☐	☐	☐
Dance	☐	☐	☐	☐	☐
Hockey	☐	☐	☐	☐	☐
Volleyball	☐	☐	☐	☐	☐
Basketball	☐	☐	☐	☐	☐
Soccer	☐	☐	☐	☐	☐
Football (GAA)	☐	☐	☐	☐	☐
Hurling/ camogie	☐	☐	☐	☐	☐
Rugby	☐	☐	☐	☐	☐
Tennis	☐	☐	☐	☐	☐
Judo/Taekwondo/Karate	☐	☐	☐	☐	☐
Other (give name) ☐	☐	☐	☐	☐	☐
Other (give name) ☐	☐	☐	☐	☐	☐

D.2. In the **last 7 days**, how many physical education [PE] classes did you have?

☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 or more

D.3. In the **last 7 days**, during your physical education [PE] classes, **how often were you very active** [playing hard, running, jumping, throwing]? **[Please tick one box]**

☐ I don't do PE ☐ Quite often

☐ Hardly ever ☐ Always

☐ Sometimes

D.4. In the **last 7 days**, what did you do most of the time at **morning break? [Please tick one box]**

☐ Sat down (talking, reading, doing school work)

☐ Stood around or walked around

☐ Ran or played a little bit

☐ Ran around and played quite a bit

☐ Ran and played hard most of the time

D.5. In the **last 7 days**, what did you normally do at **lunch break [besides eating lunch]**? **[Please tick one box]**

☐ Sat down (talking, reading, doing school work)

☐ Stood around or walked around

☐ Ran or played a little bit

☐ Ran around and played quite a bit

☐ Ran and played hard most of the time

D.6. In the **last 7 days**, on how many days **right after school**, did you do sports, dance, or play games in which you were very active? **[Please tick one box]**

☐ None

☐ 1 time last week

☐ 2 or 3 times last week

☐ 4 times last week

☐ 5 times last week

D.7. In the **last 7 days**, on how many **evenings** did you do sports, dance, or play games in which you were very active? **[Please tick one box]**

☐ None

☐ 1 time last week

☐ 2 or 3 times last week

☐ 4 or 5 times last week

☐ 6 or 7 times last week

D.8. On the **last weekend**, how many times did you do sports, dance, or play games in which you were very active? **[Please tick one box]**

☐ None

☐ 1 time last week

☐ 2 or 3 times last week

☐ 4 or 5 times last week

☐ 6 or 7 times last week

D.9. Which **one** of the following describes you best for the **last 7 days**? [Physical things, e.g. played sports, went running, swimming, bike riding, did aerobics]. Read all **five** statements before deciding on the **one** answer that describes you. **[Please tick one box]**

☐ All or most of my time was spent doing things that involve little physical effort

☐ I sometimes (1-2 times) did physical things in my free time

☐ I often (3-4 times) did physical things in my free time

☐ I quite often (5-6 times) did physical things in my free time

☐ I very often (7 or more times) did physical things in my free time

D.10. Mark **how often** you did physical activity [like playing sports, games, doing dance, or any other physical activity] for **each day last week**.

	None	**Little bit**	**Medium**	**Often**	**Very often**
Monday	☐	☐	☐	☐	☐
Tuesday	☐	☐	☐	☐	☐
Wednesday	☐	☐	☐	☐	☐
Thursday	☐	☐	☐	☐	☐
Friday	☐	☐	☐	☐	☐
Saturday	☐	☐	☐	☐	☐
Sunday	☐	☐	☐	☐	☐

D.11. Were you **sick last week**, or did anything prevent you from doing your normal physical activities? **[Please tick one box]**

☐ Yes

☐ No

☐ If yes what prevented you ☐

E. HOBBIES, ACTIVITIES & PETS

E.1. Which of the following things do you have at **home**? [Please place a tick in the box for each thing you have at home. Leave the box empty for things you don't have.]

- ☐ More than one car [or van]
- ☐ A home computer
- ☐ A games console [such as Xbox, Playstation]
- ☐ An active games console [such as Nintendo Wii]

E.2. Do you have any of these **in your bedroom**? [Please place a tick in the box for each thing you have in your bedroom. Leave the box empty for things you don't have.]

- ☐ A television
- ☐ A DVD or video player
- ☐ A home computer
- ☐ A games console [such as an Xbox or Playstation]
- ☐ An active games console [such as Nintendo Wii]
- ☐ None of these

E.3. How often do you play **computer games and games console (such as Xbox, PlayStation)**? **[Please select one answer]**

- ☐ Never
- ☐ 1 - 2 days per week
- ☐ 3 - 4 days per week
- ☐ Nearly everyday

E.4. How often do you play the **active games console** [such as Nintendo Wii]?

- ☐ Never
- ☐ 1 - 2 days per week
- ☐ 3 - 4 days per week
- ☐ Nearly everyday

E.5. How much time do you spend **watching television** each day?

- ☐ None
- ☐ Less than one hour
- ☐ Between 1 and 3 hours
- ☐ Between 3 and 5 hours
- ☐ Over 5 hours

E.6. How often do you **get homework**?

- ☐ Never
- ☐ 1 - 2 days per week
- ☐ 3 - 4 days per week
- ☐ Almost everyday

E.7. How much time do you spend doing **homework** each day?

- ☐ None
- ☐ Less than one hour
- ☐ Between 1 and 3 hours
- ☐ Between 3 and 5 hours
- ☐ Over 5 hours

E.8. What is your favourite hobby or activity? ☐

E.9. Is there a pet in your family?

☐ Yes ☐ No

E.10. If yes, what pets do you have? **[Tick all that apply]**

☐ Cat

☐ Dog

☐ Goldfish

☐ Rabbit

☐ Other [Please write down] ☐

E.11. If your family has a dog, do you walk the dog?

☐ Yes ☐ Sometimes ☐ No

Thanks for all your help!

CORK CHILDREN'S LIFESTYLE STUDY (CCLaS)

Parent Questionnaire

(To be filled out by the parent/guardian of the study child)

This questionnaire is part of the Cork Children's Lifestyle Study that you have consented for your child to take part in. It has been designed to examine the lifestyle and health of both you and your child. Questions included examine birth factors, physical activity levels and hobbies of your child. Questions specific to the parent/ guardian include those on current health, the general family setting, physical activity and dietary factors.

Please attempt to answer every question. It should take about 20 minutes to fill in this questionnaire.

Your answers will be treated as strictly confidential and will be used only for the purposes of this study. This questionnaire can be returned in the envelope provided within the blue study folder your child has been provided with and we will collect it from your child's school.

If you would rather have the questionnaire administered by telephone, please contact the research team using the contact details below and we can arrange this.

Thank you for taking the time to provide this information. Your input will provide valuable information to the study.

Cork Children's Lifestyle Study

Yours sincerely,

Eimear Keane,
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UCC
University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

RELATIONSHIP TO STUDY CHILD:

Q1. Are you the child's:

- ☐ Mother
- ☐ Father
- ☐ Other (Please Specify) ☐

A. STUDY CHILD'S BIRTH FACTORS

A.1. If known, how much did your child weigh at birth?

☐☐ Pounds ☐☐ Ounces **OR** ☐☐ Kilos ☐☐☐ Grams ☐ Don't Know

A.2. If known, was your child born late, on time or early?

- ☐ Late Birth (42 weeks or more)
- ☐ On Time (37-40 weeks)
- ☐ Somewhat Early (33-36 weeks)
- ☐ Very Early (32 weeks or less)
- ☐ Don't Know

A.3. If known, what was the mode of delivery?

- ☐ Normal Birth
- ☐ Vacuum Assisted Birth
- ☐ Forceps Assisted Birth
- ☐ Elective Caesarean
- ☐ Emergency Caesarean
- ☐ Don't Know
- ☐ Other ☐

A.4. Was your child ever breastfed?

- ☐ Yes
- ☐ No
- ☐ Don't Know
- ☐ Can't Remember

A.5. For how many months or weeks was your child breastfed?

☐☐ Months **OR** ☐☐ Weeks **OR** ☐☐ Days

- ☐ Don't Know
- ☐ Can't Remember

B. STUDY CHILDS CURRENT HEALTH

B.1. In general, how would you describe your child's health in the past year?

- ☐ Very Healthy, no problems
- ☐ Healthy, but with a few minor problems
- ☐ Sometimes quite ill
- ☐ Almost always unwell

B.2. Does your child have any ongoing chronic physical or mental health problem, illness or disability such as Asthma, ADHD etc?

- ☐ Yes
- ☐ No
- ☐ Don't Know

If No, please skip to question B.6.

B.3. What is the nature of this problem, illness or disability? Please describe as fully as possible. (Please record **diagnosis, not symptoms** of the problem)

B.4. How old was your child when he/she was diagnosed with this problem, illness or disability?

☐ Months Old **OR** ☐ Years Old

B.5. Is your child hampered in his/her daily activities by this problem, illness or disability?

☐ Yes, severely ☐ Yes, to some extent ☐ No

B.6. Do you think your child is:

☐ Very underweight ☐ Slightly overweight

☐ Moderately underweight ☐ Moderately overweight

☐ Slightly underweight ☐ Very overweight

☐ About the right weight ☐ Don't know

B.7. Does your child go to bed at a regular time?

☐ Always ☐ Rarely

☐ Usually ☐ Never

☐ Sometimes

B.8. On **normal school days,** what time in the morning does your child usually **wake up?**

hours **minutes**

☐☐ ☐☐ am

B.9. On **normal school days**, what time in the evening does your child usually **go to bed?**

hours **minutes**

☐☐ ☐☐ pm

B.10. On **weekends**, what time in the morning does your child usually **wake up?**

hours **minutes**

☐☐ ☐☐ am

B.11. On **weekends**, what time in the evening does your child usually **go to bed?**

hours **minutes**

☐☐ ☐☐ pm

B.12. How often does your child brush his/her teeth (or have them brushed for him/her)?

- ☐ My child's teeth are not usually brushed
- ☐ Less than once a day (e.g. every second day, once a week)
- ☐ Once a day
- ☐ Twice a day
- ☐ More than twice a day

C. STUDY CHILD'S EXERCISE AND PHYSICAL ACTIVITY

C.1. How many times in the **past 7 days** has your child done at **least 20 minutes of hard exercise,** hard enough to make him / her breathe heavily and make his / her heart beat **faster**? (Hard exercise includes, for example, playing football, jogging, or fast cycling). Include time in physical education class.

☐ None ☐ 1 to 2 days ☐ 3 to 5 days ☐ 6 to 7 days

C.2. How many times in the **past 7 days** has your child done at **least 20 minutes** of **light exercise** that was **not** hard enough to make him / her breathe heavily and make his / her heart beat fast? (Light exercise includes, for example walking or slow cycling). Include time in physical education class.

☐ None ☐ 1 to 2 days ☐ 3 to 5 days ☐ 6 to 7 days

C.3. How does your child usually (a) go to school and (b) come home from school?

(Tick one box in Col A and B)

	A. Going	B. Coming Home
He/ she walks	☐	☐
By public transport	☐	☐
By public transport and walking	☐	☐
School bus/coach	☐	☐
By car	☐	☐
Rides a bicycle	☐	☐
Other (please describe) ☐	☐	☐

C.4. How **long** does it take your child (a) to go to school (b) to come home from school?

(Tick one box in Col A and B)

	A. Going	B. Coming Home
Less than 5mins	☐	☐
5 mins - less than 10 mins	☐	☐
10 mins - less than 20 mins	☐	☐
20 mins - less than 30 mins	☐	☐
30 mins or more	☐	☐

D. YOUR CHILD'S HOBBIES AND ACTIVITIES

D.1. On a **normal weekday** during term time, how many hours does your child spend watching **television, videos or DVDs?** Please remember to include time before school as well as time after school.

- ☐ None
- ☐ Less than an hour
- ☐ 1 hour to less than 3 hours
- ☐ 3 hours to less than 5 hours
- ☐ 5 hours to less than 7 hours
- ☐ 7 hours or more

D.2. On a **normal weekday** during term time, about how many hours does your child spend **reading** for pleasure [NOT during school hours]? Include time when the child reads to themselves or is read to by someone else. Do not include time spent listening to books on audio tapes, records, cds or a computer.

- ☐ None
- ☐ Less than an hour
- ☐ 1 hour to less than 3 hours
- ☐ 3 hours to less than 5 hours
- ☐ 5 hours to less than 7 hours
- ☐ 7 hours or more

D.3. On a **normal weekday** during term time, about how many hours does your child spend using the **computer and non-active game consoles (Playstation, X-box etc).** Please include time before school as well as time after school. DO NOT include time spent using computers in school.

- ☐ None
- ☐ Less than an hour
- ☐ 1 hour to less than 3 hours
- ☐ 3 hours to less than 5 hours
- ☐ 5 hours to less than 7 hours
- ☐ 7 hours or more

D.4. On a **normal weekday** during term time, about how many hours does your child spend playing **active games consoles such as Nintendo Wii etc?** Please include time before school as well as time after school.

- ☐ None
- ☐ Less than an hour
- ☐ 1 hour to less than 3 hours
- ☐ 3 hours to less than 5 hours
- ☐ 5 hours to less than 7 hours
- ☐ 7 hours or more

D.5. On days when your child is given homework, home much time does he or she spend doing **homework**?

- ☐ 0 to 15 minutes
- ☐ 16 to 30 minutes
- ☐ 31 minutes to less than 1 hour
- ☐ 1 to less than 1.5 hours
- ☐ 1.5 to less than 2 hours
- ☐ 2 to less than 3 hours
- ☐ 3 to less than 4 hours
- ☐ 4 hours or more

E. YOUR CHILD'S DIET AND DIETARY HABITS

E.1. What type of milk does your child **typically** consume whilst at home? **(Please Tick One)**

- ☐ None
- ☐ Whole/ Full fat
- ☐ Low Fat
- ☐ Skimmed
- ☐ Super/ Fortified
- ☐ Other

E.2. Approximately, how much milk did your child drink in the **last 24 hours?** [This refers to the total amount of all milk full cream and skimmed that was drunk]. A small glass of milk contains approximately 100mls while a large glass contains approximately 250mls.

- ☐ Up to ½ pint (approx. 250mls)
- ☐ ½ - 1 pint (approx. 250 - 500mls)
- ☐ 1 - 1 ½ pints (approx. 500 - 1000mls)
- ☐ More than 1 ½ pints (more than 1000mls)

E.3. What type of **spread** does your child **usually** use on bread? **(Please Tick One)**

- ☐ Butter or hard margarine (e.g. Kerrygold)
- ☐ A low fat or polyunsaturated spread (e.g. LowLow)
- ☐ A cholesterol lowering spread (e.g. Flora Proactive, Kilkeely Gold Low Cholesterol Spread)
- ☐ None
- ☐ Other:

E.4. Does your child usually have something to eat **before going to school?**

- ☐ Yes
- ☐ No

E.5. Does your child usually have a meal in the **evening** during the week?

- ☐ Yes
- ☐ No
- ☐ Sometimes

E.6. If yes, does your child usually **sit** at a table for the evening meal?

- ☐ Yes
- ☐ No

E.7. Does your child consume fruit?

- ☐ Yes
- ☐ No

E.8. Does your child consume vegetables?

☐ Yes ☐ No

E.9. How many cans (330ml) or small bottles (up to 500ml) of **soft drinks** does your child usually have per week?

☐☐ Bottles **OR** ☐☐ Cans

E.10. How many cans (330ml) or small bottles (up to 500ml) of **energy or sports drinks** does your child usually have per week?

☐☐ Bottles **OR** ☐☐ Cans

E.11. Has your child had any of the following supplements in the last 12 months? **(Tick all that apply)**

☐ None ☐ Calcium ☐ Vitamin C ☐ Vitamin D

☐ Iron ☐ Cod liver oil ☐ Multivitamins ☐ Other_____

E.12. How often has your child taken supplements in the **last 12 months?**

☐ Never

☐ Yes, takes them most days **(Please give full name of supplement)** ☐

☐ Yes, takes them occasionally **(Please give full name of supplement)** ☐

E.13. Is your child on any type of **special diet** e.g. vegetarian, vegan, coeliac etc.?

☐ Yes ☐ No

If yes, please specify ☐

E.14. Please tick **one** box for each statement below:

	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree
I have to be sure that my child does not eat too many sweets (candy, ice-cream, cake or pastries)	☐	☐	☐	☐	☐
I have to be sure that my child does not eat too many high fat foods	☐	☐	☐	☐	☐
I have to be sure that my child does not eat too much of his/her favourite foods	☐	☐	☐	☐	☐
I intentionally keep some foods out of my child's reach	☐	☐	☐	☐	☐
I offer sweets (candy, ice cream, cake, pastries) to my child as a reward for good behaviour	☐	☐	☐	☐	☐
I offer my child her favourite foods in exchange for good behaviour	☐	☐	☐	☐	☐
If I did not guide or regulate my child's eating, s/he would eat too many junk foods	☐	☐	☐	☐	☐
If I did not guide or regulate my child's eating, s/he would eat too much of his/her favourite foods	☐	☐	☐	☐	☐

F. CURRENT PARENT/GUARDIAN HEALTH

F.1. In general would you say **your** health is…?

☐ Excellent ☐ Very good ☐ Good ☐ Fair ☐ Poor

F.2. What is **your** height without shoes?

☐ Feet ☐☐ Inches **OR** ☐☐☐.☐ Centimetres ☐ Don't Know

F.3. What is **your** weight without clothes and shoes?

☐☐ Stone ☐☐ Lbs **OR** ☐☐☐☐☐ Kilograms ☐ Don't Know

F.4. Where applicable, what is your **partner's** height without shoes?

☐ Feet ☐☐ Inches **OR** ☐☐☐.☐ Centimetres ☐ Don't Know

F.5. Where applicable, what is your **partner's** weight without clothes and shoes?

☐☐ Stone ☐☐ Lbs **OR** ☐☐☐☐☐ Kilograms ☐ Don't Know

F.6. Do you think that you are?

- ☐ Very underweight
- ☐ Moderately underweight
- ☐ Slightly underweight
- ☐ About the right weight
- ☐ Slightly overweight
- ☐ Moderately overweight
- ☐ Very overweight
- ☐ Don't know

F.7.How often do you try to lose weight through dieting?

- ☐ Very Often
- ☐ Often
- ☐ Sometimes
- ☐ Rarely
- ☐ Never

F.8. Have you ever been told by a doctor that **<u>you or your partner</u>** have, **or** have had any of the following conditions?

				If **<u>Yes</u>**, Please Answer	
Heart Disease	☐ Yes	☐ No	☐ Don't Know	☐ Me	☐ Partner
Stroke	☐ Yes	☐ No	☐ Don't Know	☐ Me	☐ Partner
Hypertension/ High Blood Pressure	☐ Yes	☐ No	☐ Don't Know	☐ Me	☐ Partner
Diabetes	☐ Yes	☐ No	☐ Don't Know	☐ Me	☐ Partner
Asthma	☐ Yes	☐ No	☐ Don't Know	☐ Me	☐ Partner
Depression	☐ Yes	☐ No	☐ Don't Know	☐ Me	☐ Partner
Gestational Hypertension *(during pregnancy)*	☐ Yes	☐ No	☐ Don't Know	☐ Me	☐ Partner
Gestational Diabetes *(during pregnancy)*	☐ Yes	☐ No	☐ Don't Know	☐ Me	☐ Partner
Other (Please Specify)	☐ Yes	☐ No	☐ Don't Know	☐ Me	☐ Partner

Smoking

F.9. Which statement best describes the rules about **smoking inside** your home?

- ☐ Smoking is not allowed anywhere inside the house
- ☐ Smoking is allowed in some places or at some times
- ☐ Smoking is allowed everywhere inside the house
- ☐ Don't know

F.10. Do you now smoke every day, some days, or not at all?

☐ Every day ☐ Some days ☐ Not at all

F.11. Have you yourself smoked at least 100 cigarettes in your entire life? (5 packs = 100 cigarettes)

☐ Yes ☐ No

Alcohol

F.12. How often do you have a drink containing alcohol?

- ☐ Never
- ☐ Monthly or less
- ☐ 2 - 4 times a month
- ☐ 2-3 times a week
- ☐ 4 or more times a week

F.13. How many drinks containing alcohol do you have on a typical day when you are drinking?

Please note that a standard drink is:

- a half pint or a glass of beer, lager or cider
- a single measure of spirits (e.g. whiskey, vodka, gin)
- a single glass of wine, sherry or port
- bottle of alcopops (long neck)

F.14. How often do you have **6 or more** [standard] drinks on **one occasion**?

- ☐ Everyday
- ☐ 5-6 times a week
- ☐ 2-4 times a week
- ☐ Once a week
- ☐ 1-3 times a month
- ☐ Less often
- ☐ Never

Exercise and Physical Activity

NOTE: IF 0 DAYS PER WEEK -ENTER 0 HOURS & 0 MINS - ALL 3 SECTIONS OF EACH Q [DAYS, HOURS & MINS MUST BE FILLED IN

F.15. Think about all the **vigorous activities** that you did in the last 7 days. Vigorous physical activities refer to activities that take hard physical effort and make you **breathe much harder** than normal. Think only about those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do vigorous physical activities like heavy lifting, digging, aerobics, or fast bicycling?

☐ Days per week

If No vigorous physical activities please skip to question F.18

F.16. How much time did you usually spend doing vigorous physical activities on one of those days?

☐☐ Hours per day ☐☐ Minutes per day ☐ Don't Know/Not sure

F.17. Think about all the **moderate activities** that you did in the last 7 days. Moderate activities refer to activities that take moderate physical effort and make you **breathe somewhat harder** than normal. Think only about those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do moderate physical activities like carrying light loads, bicycling at a regular pace or doubles tennis? Do not include walking.

☐ Days per week

If No moderate physical activities please skip to question F.20

F.18. How much time did you usually spend doing moderate physical activities on one of those days?

☐☐ Hours per day ☐☐ Minutes per day ☐ Don't Know/Not sure

F.19. Think about the time you spent **walking** in the last 7 days. This includes at work and at home, walking to travel from place to place, and any other walking that you might do solely for recreation, sport, exercise or leisure. During the **last 7 days**, on how many days did you walk for at least 10 minutes at a time?

☐ Days per week

If No walking please skip to question F.22

F.20. How much time did you spend walking on one of those days?

☐☐ Hours per day ☐☐ Minutes per day ☐ Don't Know/ Not sure

F.21. Think about the time spent **sitting** in the last 7 days. Include time spent in work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading or sitting or lying down to watch television. During the **last 7 days**, how much time did you spend sitting on **a weekday**?

☐☐ Hours per day ☐☐ Minutes per day ☐ Don't Know/ Not sure

Well being

STATEMENTS	**None of the time**	**Rarely**	**Some of the time**	**Often**	**All of the time**
I've been feeling optimistic about the future	☐	☐	☐	☐	☐
I've been feeling useful	☐	☐	☐	☐	☐
I've been feeling relaxed	☐	☐	☐	☐	☐
I've been feeling interested in other people	☐	☐	☐	☐	☐
I've had energy to spare	☐	☐	☐	☐	☐
I've been dealing with problems well	☐	☐	☐	☐	☐
I've been thinking clearly	☐	☐	☐	☐	☐
I've been feeling good about myself	☐	☐	☐	☐	☐
I've been feeling close to other people	☐	☐	☐	☐	☐
I've been feeling confident	☐	☐	☐	☐	☐
I've been able to make up my own mind about things	☐	☐	☐	☐	☐
I've been feeling loved	☐	☐	☐	☐	☐
I've been interested in new things	☐	☐	☐	☐	☐
I've been feeling cheerful	☐	☐	☐	☐	☐

G. PARENT/GUARDIAN DIET

G.1. How often do you eat fried food?

- ☐ Daily
- ☐ 4-6 times a week
- ☐ 1-3 times a week
- ☐ Less than once a week

G.2. How often do you add **salt** to food while **at the table?**

- ☐ Always
- ☐ Rarely
- ☐ Usually
- ☐ Never
- ☐ Sometimes

G.3. How often do you add **salt** to food while **cooking?**

- ☐ Always
- ☐ Rarely
- ☐ Usually
- ☐ Never
- ☐ Sometimes

G.4. On average, how many portions of fruit do you eat per day?

_____ portions per day

G.5. On average, how many portions of vegetables do you eat per day?

_____ portions per day

G.6. Did you eat snacks between your meals yesterday?

- ☐ Yes
- ☐ No

G.6.i. If yes, how many snacks did you eat yesterday: ☐

G.6.ii. If yes, what type of snacks did you eat yesterday? **(Please tick all that apply)**

- ☐ Biscuits/ Cake
- ☐ Scone
- ☐ Dried fruit
- ☐ Chocolate
- ☐ Yoghurt
- ☐ Vegetables
- ☐ Crisps/Popcorn/ Pretzels
- ☐ Fruit
- ☐ Nuts
- ☐ Other ☐

H. GENERAL FAMILY EATING QUESTIONS

H.1. What type of fat/oil would you usually use for cooking? **(Please Tick One)**

☐ Vegetable Oil ☐ Sunflower Oil ☐ Olive Oil/ Rapeseed oil

☐ Lard or dripping ☐ None ☐ Other_____

H.2. How often does your family **order take away** in a typical week?

☐ Daily ☐ 1-3 times a week ☐ 4- 6 times a week ☐ Less than once a week

H.3. How often does your family **eat out** in a typical week?

☐ Daily ☐ 1-3 times a week ☐ 4- 6 times a week ☐ Less than once a week

H.4. What type of restaurant does your family typically eat out in?

☐ Standard restaurant ☐ Café ☐ Fast food restaurant ☐ Other: ☐

H.5. Can you afford to buy enough food for your household?

☐ Always ☐ Sometimes ☐ Usually

☐ Rarely ☐ Never

H.6. During the past 7 days, how many times did all, or most, of your family living in your house eat a meal together?

☐ Never ☐ 1-2 times ☐ 3-4 times

☐ 5-6 times ☐ 7 times ☐ More than 7 times

I. FAMILY BACKGROUND

I.1 How many people in total (including yourself and all children of all ages) regularly live as members of your household?

☐ Persons

I.2. For each member of the household, including yourself, could you tell me their **relationship to the study child?**

Person	Gender	Date Of Birth	Age at last birthday	**Relationship to STUDY CHILD**
1	☐ Male ☐ Female			
2	☐ Male ☐ Female			
3	☐ Male ☐ Female			
4	☐ Male ☐ Female			
5	☐ Male ☐ Female			
6	☐ Male ☐ Female			
7	☐ Male ☐ Female			

I.3 What is your ethnic background?

- ☐ Irish
- ☐ Irish Traveller
- ☐ Any other White background
- ☐ African
- ☐ Any other Black background
- ☐ Chinese
- ☐ Any other Asian background
- ☐ Other, incl. mixed background

Please Specify: ☐

I.4. What is your current marital status? **(Please select one answer)**

- ☐ Single
- ☐ Married
- ☐ Cohabiting
- ☐ Separated
- ☐ Divorced
- ☐ Widowed

1.5. Does your family have the use of a car? (Including vans, minibuses etc)

- ☐ Yes
- ☐ No

I.6. What is the highest level of education **you** have completed to date? **(Please select one answer)**

- ☐ Primary or less
- ☐ Intermediate/ Junior/ Group Certificate or equivalent
- ☐ Leaving Certificate or equivalent
- ☐ Diploma or Certificate
- ☐ Primary degree
- ☐ Postgraduate/ Higher degree
- ☐ Refusal

I.7. Which of these descriptions BEST describes your usual situation in regard to work? (**Please select one answer)**

- ☐ Employee (incl. Apprenticeship or Community Employment)
- ☐ Self employed outside farming
- ☐ Farmer
- ☐ Student Full-time
- ☐ On state training scheme (FAS, Failte Ireland)
- ☐ Unemployed, actively looking for a job
- ☐ Long term sickness or disability
- ☐ Home duties/ looking after home or family
- ☐ Retired
- ☐ Other (specify)

I.8. How many hours do you normally work per week, including any regular overtime work?
If you work at more than one job, please include the hours in all jobs. ☐ hours

I.9. What is your **occupation** in this job? (What do you mainly do in your job?) Please describe as fully as possible.

☐

I.10. Do you supervise or manage any personnel in your job?

☐ Yes ☐ No

I.11. If yes, how many people do you supervise or manage? ☐

I.12. If self employed, how many employees (if any) do you have? ☐ ☐ N/A

I.13. Does anyone other than yourself and/or your spouse/partner provide care to the Study Child on a regular basis for 8 hours or more each week?

☐ Yes ☐ No

I.14. If yes, is this form of childcare provided in:

☐ The child's home

☐ A Relatives home

☐ Home of carer-non relative

☐ Centre (crèche, after school activity)

I.15. Approximately how many days per week does the Study Child spend in this form of childcare?

☐ days per week

I.16. Is this form of childcare paid or non-paid?

☐ Paid ☐ Non Paid

<u>The remaining questions are about your partner- where applicable, please fill in this section</u>

1.17. Where applicable, what is the highest level of education that **<u>your partner</u>** has completed to date? **(Please select one answer)**

☐ Primary or less

☐ Intermediate/ Junior/ Group Certificate or equivalent

☐ Leaving Certificate or equivalent

☐ Diploma or Certificate

☐ Primary degree

☐ Postgraduate/ Higher degree

☐ Refusal

I.18. Where applicable, which of these descriptions **BEST** describes **your partners** usual situation in regard to work? **(Please select one answer)**

- ☐ Employee (incl. Apprenticeship or Community Employment)
- ☐ Self employed outside farming
- ☐ Farmer
- ☐ Student Full-time
- ☐ On state training scheme (FAS, Failte Ireland)
- ☐ Unemployed, actively looking for a job
- ☐ Long term sickness or disability
- ☐ Home duties/ looking after home or family
- ☐ Retired
- ☐ Other (specify)

I.19. How many hours does your partner normally work per week, including any regular overtime work? If your partner works at more than one job, please include the hours in all jobs. ☐ Hours

I.20. What is your partner's occupation in this job? (What do you mainly do in your job?) Please describe as fully as possible.

☐

I.21. Does your partner supervise or manage any personnel in his/her job?

☐ Yes ☐ No

I.21. If yes, how many people does he/she supervise or manage? ☐ person/people

I.22. If your partner is self employed, how many employees (if any) does he/she have? ☐ employees

☐ N/A

Thank you once again for your participation

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BMJ Open

Barriers and facilitators to the implementation of a community-based, multidisciplinary, family-focused childhood weight management programme in Ireland: a qualitative study

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ABSTRACT

Objective To explore the barriers and facilitators experienced by those implementing a government-funded, community-based childhood weight management programme.

Design Qualitative using semistructured interviews.

Setting Two geographical regions in the south and west of Ireland.

Participants 29 national-level and local-level stakeholders responsible for implementing the programme, including professionals from dietetics, psychology, public health nursing, physiotherapy, health promotion and administration.

Methods Framework analysis was used to identify barriers and facilitators, which were mapped onto six levels of factors influencing implementation outlined by Grol and Wensing: the innovation, the individual professional, the patient, the social context, the organisational context and the external environment.

Results Most barriers occurred at the level of the organisational context. For all stakeholders, barriers arose due to the multidisciplinary nature of the programme, including the lack of role clarity and added complexity of working in different locations. Health professionals' low-perceived self-efficacy in approaching the subject of weight with parents and parental resistance to hearing about their child's weight status were barriers to programme implementation at the individual professional and patient levels, respectively. The main facilitators of implementation, occurring at the level of the health professional, included stakeholders' recognition of the need for a weight management programme and personal interest in the area of childhood obesity. Having a local lead and supportive colleagues were further implementation drivers.

Conclusions This study highlights the complexities associated with implementing a multidisciplinary childhood weight management programme, particularly translating such a programme to a community setting. Our results suggest the assignment of clear roles and responsibilities, the provision of sufficient practical training and resources, and organisational support play pivotal roles in overcoming barriers to change. This evidence can be used to develop an implementation plan to support the translation of interventions into real-world settings.

Strengths and limitations of this study

- This is one of few qualitative studies, and the first in Ireland, that explored the factors that hampered and facilitated the implementation of a community-based, multicomponent childhood weight management programme from a wide range of stakeholder perspectives.
- While interviewing a wide range of stakeholders provided a thorough overview of the relevant issues, the themes that emerged were relatively homogeneous across disciplines, which added to the authority of the findings.
- Data were analysed using a systematic approach, and an adapted version of the implementation model by Grol and Wensing was used to classify the barriers and facilitators into levels.
- Using a preconceived framework runs the risk of prematurely excluding other ways of organising the data. However, data were analysed inductively first before mapping onto the Grol and Wensing framework.

BACKGROUND

Childhood obesity is a worldwide public health concern, and there is now widespread agreement that the complex aetiology of the issue requires a multifaceted approach to treatment.[1–3] International recommendations agree that initiatives to reduce and manage childhood obesity should be family-focused and combine healthy eating, physical activity and behavioural components.[2 4 5] In 2016,

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the WHO published their report of the commission on ending childhood obesity within which they echo these recommendations but also add that they should be delivered by '*multi-professional teams with appropriate training and resources*'[5] (p11). These recommendations, however, have been largely based on small-scale studies conducted in controlled settings with specialised staff, thus limiting their applicability and generalisability to 'real-world' settings such as communities or hospitals.[2]

In public health, once interventions have undergone innovation testing and demonstrated efficacy, the next steps include replication and 'scale-up' to larger populations in 'real-world' settings.[6] There are relatively few examples of published studies reporting on the pragmatic application of effective childhood obesity treatment programmes.[7 8] While implementation issues such as engagement, local context, staffing and funding are likely to be common across many public health interventions,[8] little is documented about the experience of those implementing childhood weight management programmes and even fewer studies detail the factors influencing implementation.[9] For example, a lack of providers trained in evidence-based care for childhood obesity was listed by delegates attending a recent conference in the USA as a major barrier to treatment implementation.[3] Furthermore, with the majority of families declining referral and up to 75% of families discontinuing care, poor engagement with families has proven to be a significant challenge facing teams tasked with implementing such programmes.[10 11]

When introduced under less-controlled conditions, insight into the factors influencing implementation is crucial. Therefore, the aim of this study was to explore and categorise the barriers and facilitators experienced by those implementing a government-funded, community-based multicomponent childhood weight management pilot programme to inform their eventual scale-up.

METHODS

Intervention and context

Although trends appear to be stabilising in Ireland, prevalence of childhood obesity remains high.[12] Currently, in Ireland, almost one in four children is either overweight or obese,[13] and there is no standardised community-based weight management programme available to those children with obesity. Community programmes are usually provided on an ad-hoc basis and are rarely evaluated or sustained. In an attempt to identify a universal treatment, the Irish Health Service Executive planned to pilot the *W82GO-community* programme in two communities. This programme had previously demonstrated effectiveness in the hospital setting.[14] Its effectiveness in the community setting was to be assessed with the intention of nationwide roll-out should the programme demonstrate a positive impact on body mass index (BMI). The Template for Intervention Description and Replication checklist[15] was used to specify the details of programme delivery and is included in online supplementary file 1.

In summary, *W82GO* aims to improve nutrition, increase physical activity and facilitate behaviour change over 1 year.[14] It was designed as a hospital-based, family-focused multidisciplinary programme grounded in behavioural change theory and was modelled on best practice recommendations.[2 5 16] The primary goal was a reduction in BMI SD score and has previously been found to be effective when delivered in a hospital outpatient setting.[14]

The *W82GO* programme involves an initial individual assessment to ascertain family eligibility followed by two phases. Families were eligible for the programme if the child was between 5 and 7 years old, was obese (BMI ≥98th centile), had no limitations to engaging in physical activity, was not taking medication known to affect body weight and had at least one parent/carer who was able to attend each of the programme sessions. Siblings were also welcome to attend the sessions. Phase 1 involved an initial intensive phase consisting of six weekly group sessions for both the child and his/her parent/carer. These sessions lasted approximately 1½–2 hours and incorporated educational and practical sessions to increase physical activity, improve nutrition and increase sleep. On completion of phase 1, children returned with their parents/caregivers for three booster group sessions at 3, 6 and 9 months. These sessions aimed to encourage the family to continue with lifestyle change and to manage any barriers to change. Finally, at 12 months, the children and their parents/caregivers returned for a final individual assessment to document any changes and make plans for sustainment.

For the current study, *W82GO* was adapted and implemented in two community sites (site A and site B) from April 2015 for 12 months and subsequently renamed *W82GO-community*. Both sites were chosen as they were part of a national pilot growth measurement programme and included a mix of rural and urban towns in the west and south of Ireland. Initial assessments took place in community healthcare offices, while subsequent group sessions were delivered on weekdays in the afternoon at a local sports or community centre. The programme was offered free of charge and was delivered by existing community health professionals including dietitians, psychologists, public health nurses, physiotherapists, health promotion officers, area medical officers and administrators. These health professionals were brought together as a team and asked to deliver this programme as part of their existing roles. Table 1 outlines their specific responsibilities during programme implementation. All staff were invited to take part in a training programme prior to programme commencement. Training included a needs assessment, a 1-day educational training course and 2 days of clinical shadowing with an experienced *W82GO* programme practitioner at the National Children's University Hospital, where it was developed. Each community practitioner was supplied with a user manual,

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Table 1 Health professional roles during the implementation of *W82GO-community*

Health professional	Role in implementation of *W82GO-community*
National manager (n=1)	Overseeing implementation of *W82GO-community* in both community sites
Local manager (n=2)	Overseeing implementation of *W82GO-community* at the local level; local manager in site B was involved in referring to the programme
Physiotherapists (n=4)	Involved in initial assessments and delivering programme material
Dietitians (n=5)	Involved in initial assessments and delivering programme material
Psychologists (n=3)	Involved in initial assessments and delivering programme material
Public health nurses (n=13)	Referral to the programme
Area medical officers (n=4)	Involved in initial assessments
Health promotion officers (n=4)	Delivering programme material
Administration (n=2)	Involved in contacting parents regarding programme sessions

which outlined the programme and detailed the content for both phases.

Study design and sample

A qualitative approach using semistructured interviews was used. We adopted a purposive approach to sampling, inviting stakeholders with knowledge and experience of planning, coordinating or delivering *W82GO-community*. To ensure representation from each stakeholder group and given the small number of individuals in each, we invited all stakeholders to participate (n=38, see table 1). All stakeholders were contacted by email in the first instance and followed up by telephone contact during which the researcher outlined the study aims and methodology.

Data collection

All participants were invited to take part in face-to-face interviews. However, due to time and scheduling difficulties, a mixture of telephone and face-to-face interviews were conducted between August 2015 and February 2016 (during programme implementation). To ensure consistency all interviews were conducted by a single trained qualitative researcher (EK) using a semistructured topic guide. Participants knew the interviewer as an independent programme evaluator conducting this research as part of her PhD training. The topic guide was developed based on relevant literature and focused on seven issues: (1) awareness of the issue of childhood obesity and existing healthy lifestyle programmes; (2) perceived value of and interest in community evidence-based treatment programmes; (3) communication of the *W82GO-community* pilot programme; (4) specific role in implementing *W82GO-community*; (5) barriers and enablers to implementation; (6) perceived successes and challenges experienced; and finally (7) recommendations for the future roll-out of childhood weight management programmes in Irish communities. Core topics were the same across stakeholders, and particular probes were added for specific stakeholder groups depending on their role during the programme. For example public health nurses were specifically asked to report on the barriers and facilitators to referral. Prompts and probes were used throughout the interviews to stimulate discussion. Prior to each interview, participants were informed about the purpose of the study, that participation was voluntary and that they could terminate the interview at any stage for any reason. Signed informed consent was obtained before each interview, which lasted on average 45 min. Interviews were digitally recorded and transcribed verbatim. Data collection and analysis were iterative. Data saturation was judged to have been reached between interviews 20 and 25. However during recruitment, other stakeholders had expressed an interest in sharing their experience and so were given the opportunity to participate. The data from these interviews overlapped with the existing coding framework and thus contributed to the main themes. Ethical approval was granted by the Clinical Research Ethics Committee of the Cork Teaching Hospitals.

Data analysis

Framework analysis was used to analyse the data.[17] This approach enabled the investigation of a priori objectives while also allowing new themes to emerge from the data. One researcher (EK) transcribed and coded each transcript, while another (SMH) undertook initial coding of a selection of transcripts. Similarities and differences between the coding labels and definitions were discussed, and the coding framework was refined and applied to the remaining interviews. While this process was conducted at an early stage of the analysis, the coding process was iterative; emergent codes were added to the framework and contributed to the development of themes across the interviews. Codes were synthesised and grouped according to the dominant emergent themes. Themes were also analysed across stakeholder groups to identify similarities and differences across disciplines and positions. These themes were mapped onto a framework developed by Grol and Wensing,[18] which specifies six levels of factors that facilitate or impede implementation success: the innovation, the individual professional, the patient, the social context, the organisational context, and the economic and political environment.[18] Mapping

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Table 2 Barriers to and incentives for change at different levels of healthcare*

Level	Barriers/Incentives
Innovation	Advantages in practice, feasibility, credibility, attractiveness, accessibility
Individual practitioner	Awareness, knowledge, attitude, motivation to change, behavioural routines
Patient	Knowledge, skills, attitude, compliance
Social context	Opinion of colleagues, culture of the network, collaboration, leadership
Organisational context	Organisation of care processes, staff, capacities, resources, structures
Economic and political context	Financial arrangements, regulations, policies

*Grol and Wensing's multilevel model.[18]

emergent themes to the framework at this stage of the analysis ensured that we did not impose a predefined structure or terminology on participants' accounts. This well-established framework (table 2) was chosen because it describes how barriers and facilitators can be identified, categorised and used for the development of tailor-based implementation strategies to facilitate desired change,[18] in this instance implementing the *W82GO-community* programme. Discrepancies on the mapping of themes were discussed until consensus was reached. NVivo V.10 (QSR) was used to manage data analysis.

RESULTS

Participant characteristics

We contacted 38 stakeholders and recruited 29 interviewees (7 face-to-face, 22 telephone) from a range of disciplines and professions, yielding a response rate of 76% (table 3).

Barriers and facilitators

For all participants, barriers arose due to the multidisciplinary nature of the programme, including the lack of understanding of other disciplines, lack of role clarity as well as the added complexities of working in different locations. Participants' recognition of the need for a childhood obesity programme and their own personal interest in the area were the main drivers of implementation, while the presence of a local lead and supportive colleagues were further enabling factors. Views on the main barriers and facilitators to implementation were consistent across stakeholders; despite different disciplinary backgrounds, they had common experiences as implementers adding to the authority of the findings. Table 4 presents the perceived barriers and facilitators from the perspective of the stakeholders mapped onto the six implementation levels with quotations to illustrate each level.

Table 3 Stakeholders recruited from site A and site B

	Site A	Site B	National	Total
National manager	NA	NA	1	1
Local manager	1	1	x	2
Physiotherapists	2	1	1	4
Dietitians	3	x	x	3
Psychologists	1	1	x	2
Public health nurses	6	3	x	9
Area medical officers	x	2	x	2
Health promotion officers	3	1	x	4
Administration	1	x	1	2
Total	17	9	3	29

The innovation

In terms of the *W82GO-community* pilot programme (innovation), while stakeholders believed it came from a credible source having been developed by one of the national children's hospitals in Ireland, many had doubts over its accessibility and about how well it would transfer to the community setting. This uncertainty resulted in feelings of unease, and community practitioners were hesitant to get involved initially. One stakeholder explained how she worried at length about what impact the programme would have on existing services and how feasible it was to run in the community: "*The setting is different. We were taking a programme that was from an acute setting into the community - that possibly was where the breakdown happened because you didn't have the same services. You didn't have people on site. There was travel, there was all these other logistics that weren't thought about when they were moving an acute programme to the community.*" (W82GO021)

In particular, stakeholders believed they were dealing with a very different cohort of families than the hospital-based programme, as described by the following quote: "*You've a very different kind of child coming into the hospital than you do in the general community. You've a very different kind of parent. Even if you had a parent who was resistant to hearing about their child being overweight, if they are attending hospital appointments regularly they are obviously already engaged about their child's health… so I believe that's a major barrier straight away that they possibly didn't have to face in the hospital you know?*" (W82GO010)

In addition to the differences in the target group, stakeholders believed the programme was too medicalised for the community setting and some felt it did not fit with their perception of a healthy lifestyle programme. This was due to the number of health professionals involved, and in particular the involvement of medical staff.

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Table 4 Perceived barriers and facilitators to the implementation of *W82GO* in the community

Levels	Quotations to illustrate the identified levels
The innovation	
Credibility	* "*I suppose because it was attached to an acute hospital and because there was a consultant paediatrician and you had a lot of disciplines and a lot of very competent professionals involved, and that it had been successful when delivered there. That was the main reason I believed in the programme I suppose.*" (W82GO003)
Attractiveness (ie, multidisciplinary nature)	* "*I do think the MDT approach was superb. I think that if you're going to do something for a child who is obese then you need it.*" (W82GO018)
Transferability (ie, different population, different resource issues)	† "*You are talking about a different cohort of families. Families who are already in the system. They are used to going in for appointments. You're talking about a group who've already had difficulties identified by their GP or whoever so by the time they are going for the group they are already sold, they are used to it and they are used to that sort of setting which is very kind of fast and quick-paced and very focused.*" (W82GO002)
Relevance (eg, too medicalised)	† "*I think the area medical officer, the medical input I think is probably optional or at least part-time. It's of less importance. It medicalised this community programme a bit too much.*" (W82GO021)
The individual professional	
Awareness of the problem/recognition of need	* "*It is a problem, most definitely. I think it's a time bomb that went off over the past 10 years and that we are behind it. Way behind it and the sooner we get going and get doing something the better.*" (W82GO013)
Personal interest and motivation	* "*So that enthusiasm and that dedication made it happen, it was key to its success.*" (W82GO011)
Low self-efficacy	† "*I wouldn't be especially skilled in assessing children you know with obesity and that kind of thing… Or talking to parents about it… I was concerned about my own ability to, to get up to speed fairly quickly.*" (W82GO015)
Attitudes (ie, multidisciplinary perspectives)	† "*I suppose the other main challenge was the multidisciplinary nature of the programme. I think the challenges of it is when you put together a team obviously from all different backgrounds not with different agendas but with different experiences and knowledge and different perspectives.*" (W82GO026)
The patient	
Parental resistance (weight misperception and denial)	† "*I think there was a denial that there was anything wrong with their child, or that their child was overweight. There was a total denial about that because the population in general look like their child. Their child may be a little bit above of what the normal population looks like, but they didn't see that as an issue at all.*" (W82GO028)
The social context	
Supportive colleagues	* "*Once she came on board there was two of us, it was a lot easier to share the workload and if I couldn't be there for a day she could be there for it so I suppose that definitely took the load off and she also acted as a sounding board you know? If there was something I wasn't sure of I could say what do you think about this and vice-versa, you know what I mean?*" (W82GO016)
Leadership	* "*I mean if we didn't have her pulling all those people and bits together it wouldn't have worked. She did a great job in I think the co-ordination role cause I think running something like this with people dispersed across a whole county and city then you need a project manager on the ground.*" (W82GO017)
Collaboration between national and local teams	† "*I did feel there was a very big gap once the decision had been made nationally to roll this out, there was a very big gap between us on the ground and them, there was no consultation or collaboration with people on the ground and I think that's where the problem was.*" (W82GO003)
The organisational context	
MDT structure (logistics)	† "*I suppose one of the challenges definitely is that the health professionals are all in different places.*" (W82GO004)
Resources	† "*I guess time constraints 'cause a lot of people were pressurised for time. Like even ourselves we wouldn't have been able to go to every session and I would have liked to have gone but we just couldn't. We didn't have the time. We didn't have the staff to be able to attend so I think time and resource pressures were the main concerns.*" (W82GO013)

Continued

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Table 4 Continued

Levels	Quotations to illustrate the identified levels
Training	† "*It (the training) was as if they were trying to sell us the programme when you know we were already there. We were already sold. I mean we knew why it was important… because of the obesity issue so there was no need to go over all that again. They should have just focused on how to actually implement and deliver the programme.*" (W82GO011)
External environment	
Lack of existing services	* "*There is nothing out there so that's where it was great to have something like W82GO. That if you did see a child that you knew there was something. Some sort of pathway.*"
Media	* "*There was a huge media campaign ongoing around the time we were implementing the programme which got some parents thinking and talking. I mean those things do have a big impact. Things like Operation Transformation that's aired in January have a huge impact. I think we need more media on the immediate impact of childhood obesity and not just the long-term impacts.*" (W82GO003)
	† "*I think maybe it's (obesity) hyped up a little bit in the media. I think maybe that in itself could be making things difficult for parents to come forward. We don't have any other disease related issue hyped up as much you know? If you had a child with obesity you would be feeling a small bit cringe like. You'd be wanting to find somewhere private to get some help like you know.*" (W82GO020)
Stigma	† "*Wouldn't have their child come to a programme in case they'd be labelled overweight or obese. There is a stigma and just from hearing again I wasn't in the parents room, but just from hearing other colleagues feedback it's the parents fear of feeling judged and blamed.*" (W82GO002)

*Facilitators.
†Barriers.
GP, General practitioner.
MDT, Multidisciplinary team

Furthermore, many stakeholders thought the collection of clinical markers of disease and medical history during the initial assessments was unnecessary. As one stakeholder described: "*the initial assessments were totally irrelevant. I mean when I heard that bloods were being taken I thought oh for God sake. You know we were supposed to be running a community-based education intervention where the focus should be on changing lifestyles. It's not our job to be diagnosing other problems.*" (W82GO005)

Individual professional

While stakeholders both applauded and recognised the need for a multidisciplinary approach to the treatment of childhood obesity, it created significant barriers to programme implementation. The variety of community health professionals involved in the implementation of *W82GO-community* with differing perspectives and priorities led to role uncertainty and in some cases a perception of disrespect between disciplines. One stakeholder captures this theme in the following quote: "I suppose the other main challenge was the multidisciplinary nature of the programme. I think the challenge is when you put together a team obviously from all different backgrounds not with different agendas but with different experiences and knowledge and different perspectives." (W82GO026)

Stakeholders described how: "*there was quite a lack of understanding of the various discipline roles and responsibilities and some were even unsure of what some disciplines did.*" (W82GO012)

This lack of understanding sometimes resulted in tension between disciplines and created a challenging environment to work in. Others recalled feeling concerned about where they fit into the programme and believed a structured programme plan outlining specific roles and responsibilities was lacking.

Another key barrier that emerged at the level of the individual professional was their low-perceived self-efficacy in dealing with childhood obesity and/or working with this young age group. In particular, many stakeholders reported their fear of approaching the subject with parents given the risk of upsetting them or *"rocking the boat."* One stakeholder reported that: "*It's something you want to do something about but it can be very difficult to approach the subject with parents. It's a very sensitive issue.*" (W82GO001)

Stakeholders in site A had received motivational interviewing workshops for childhood obesity prior to our study. This training equipped these stakeholders with increased skills and confidence in working with families on weight management issues. As one stakeholder described, post motivational interviewing training she was not: "*frightened of dealing with them [parents] at all, It's kind of second nature to me now… I know the buzz words, I know exactly what to say to them. And body language, the whole lot.*" (W82GO002)

Others felt it was quite *"alien"* to work with children aged 5–6 years and believed they had no appropriate training to do so.

Despite these barriers, all stakeholders were aware that childhood obesity was an issue in their respective communities and recognised the urgent need for treatment:

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"*Yeah I think it's a time bomb that went off over the past ten years and that we are behind it, way behind and the sooner we get going and doing whatever we can the better.*" (W82GO012)

Furthermore, stakeholders' personal interest in tackling the issue, and their motivation and dedication to seeing the programme through, were what many believed to be the main drivers behind programme completion: *"It went ahead due to a lot of determination and not because it was easily implementable… if that's a word.*" (W82GO014)

Patient

Low programme uptake was a key issue during implementation. Many stakeholders believe that obesity has become the norm in society and as a result: "*people don't recognise overweight people as being in that actual overweight category because it's become normal to be surrounded by overweight people.*" (W82GO021)

In terms of the *W82GO-community* pilot programme, almost all stakeholders indicated that although children measured as obese on the growth charts, their parents seemed unaware of any excess weight, and once informed, many refused to accept that their child was obese. As a result of this misperception, parents did not realise or accept the need for treatment. Speaking of her experience, one stakeholder described how: *"other parents just didn't reply or didn't get in touch because they believed everything was ok and there wasn't a problem with their child. They didn't need any programme. I think that definitely was a huge problem out there in the community setting."* (W82GO012)

Because of this low recognition among parents, many stakeholders recalled the resistance they faced when trying to discuss the issue with them and their fear prior to making contact with parents. One stakeholder explained how some parents would: "*be really angry so you're taking angry phone calls in the evening. You know when you come in from a day's work so it was really difficult.*" (W82GO002)

Social context

Local-level stakeholders believed there was a certain level of *'naïvety'* at national level about the reality of rolling out the pilot programme on the ground. They felt consultation during the planning stage was lacking and that national-level stakeholders had: "*little experience of the practical aspects of childhood obesity*" as "*no one was actually working with obese children or even groups on a day to day basis.*" (W82GO004)

As a result unrealistic expectations and time frames prevailed, particularly during the recruitment phase. This led to frustration and confusion among local-level health professionals during implementation.

Communication between national-level and local-level stakeholders was considered poor. However, the presence of a local lead facilitated the exchange between staff on the ground and management at national level and was seen by almost all stakeholders as crucial for programme implementation. Furthermore, stakeholders felt that because of the multidisciplinary approach of the programme, *"you needed someone on the ground"*; if they did not have a local lead: *"pulling all those people and bits together, it wouldn't have worked because running something like this with people dispersed across a whole county and city is difficult.*" (W82GO005)

The presence of supportive colleagues and management were identified as further enabling factors.

Organisational context

The multidisciplinary structure of the programme also created barriers at the organisational level. In addition to differing individual perspectives and priorities, the added complexities of working in different locations created difficulties during programme implementation. In many cases stakeholders did not: "*work at the same site… or even the same town which was a challenge*" as it *"took up a lot of time organising between schedules and travelling to meet and go through practicalities."* (W82GO007)

In addition to these challenges, at the organisational level, stakeholders reported that implementation was hampered due to insufficient resources (ie, staff and time) and training. It was reported that two other proposed areas withdrew from the pilot programme because of the lack of staff and leadership on the ground to run the programme. Stakeholders felt that they had very different resource issues to the hospital-based teams who are: "within the confines of a hospital… so they would or should have the same vision or focus… whereas we can see now with a community based programme the professionals can be very different in their training, they can have a different ethos in the departments within their community. It's very individual. We have different line managers and different resources to deal with." (W82GO011)

Some stakeholders *"didn't want to get involved because of existing workloads"* and the lack of extra resources or allocated time to implement the pilot. Furthermore, while acknowledging the little time hospital staff had to develop community-specific training, local-level stakeholders felt they needed more *"practical and tailored"* information. Many described the training they received as *"too general"* and stated that: *"it would have been very helpful to have had more practical tips on how to actually run the programme session to session with this age group."* (W82GO012)

External environment

In the Grol and Wensing model, the 'economic and political context' refers to financial arrangements, regulations and policies—themes that did not emerge during our research. Therefore, the sixth level was renamed 'external environment' to include wider societal perspectives and determinants.

In terms of the external environment, the lack of existing services to treat and manage childhood obesity meant many stakeholders were excited to come on board and implement this new initiative. One stakeholder described: "*waiting for years for something to happen in this area.*" (W82GO005)

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The media was recognised as both a barrier and a facilitator to programme implementation. While stakeholders believed TV and radio campaigns have the potential to raise awareness, they felt that the issue is *"also getting very bad press"* and being *"hyped up a little bit,"* which in itself may make it more difficult for parents to come forward. Additionally, staff felt that the stigma surrounding childhood obesity and weight management programmes created a significant barrier to programme implementation as they believed many parents were reluctant to attend or even talk about the issue of weight for fear of singling out or *"labelling"* their child.

Vision for the future

In terms of the future scale-up of *W82GO-community*, the majority of stakeholders recommend establishing dedicated childhood obesity teams within the community, *"ideally people who are located at least in the same town,"* who can offer a range of interventions for different levels of need. One stakeholder described: "*a tiered effect, for example there could be a level one which could be a generic workshop or talk that you could roll-out in lots of schools. A level two then would be a seminar for parents and level three would be a group programme. Level four then could be actual specific one on one interventions.*"

Having a tiered approach would enable the team to match the level of need with the family and allow families to choose where on the scale they would best fit.

DISCUSSION

This study identifies the barriers and facilitators to implementing a community-based weight management programme from the perspective of stakeholders tasked with delivering such a programme. While community-based weight management programmes have become an important response to the obesity epidemic, given their potential reach and accessibility for families, the majority are based on small, efficacy trials,[2] and little is known about the factors influencing their implementation in real-world settings. Our findings suggest that more consideration is needed during the planning stages, including the creation of a structured programme plan outlining specific roles and responsibilities. Local-level stakeholders believe they should be involved in this process as they have practical experience of working with families on the ground in their respective communities. In addition to their experience, the stakeholders we interviewed are keen to get involved in community-based weight management treatment provided the appropriate training and resources have been allocated. Within their 10-year framework for action, the Irish Government recognises the need for additional resources to be assigned and seeks to: *'mobilise the health services to better prevent and address overweight and obesity through effective community-based health promotion programmes'*.[19]

The government also seek to provide training and skills development. Given this renewed commitment by the Irish Department of Health to empower community teams and communities, the road ahead looks promising.

A key barrier to the implementation of *W82GO-community* was perceived parental resistance, which occurred at the patient level but is also intrinsically linked to the external environment where the increasing normalisation of overweight and obesity coexists with a stigma that surrounds the issue. Stakeholders delivering the programme described parental resistance occurring at every stage of the implementation process and suggested that parents did not appear to recognise the issue in their own children. As a result stakeholders believed that parents did not see the need for treatment or refused to accept that their child was carrying excess weight. While parental attitudes reported in this study were based on the perceptions of staff, a lack of parental awareness regarding their child's weight and resistance towards discussing weight issues has been documented in previous research.[20–24] This may be due in part to the belief that obesity has become the norm in society, a point that was suggested by stakeholders in this study, and previously outlined in the literature.[25] It is also possible that parental resistance stems from the stigma that is associated with excess weight and obesity[8 21–23] or the negative media attention obesity has received. The framing of coverage by media may affect people's views about the causes of childhood obesity and the most appropriate strategies for addressing the problem.[26] Our findings highlight the need, at a policy level, for positive awareness-raising campaigns to encourage parental recognition of healthy childhood growth and development, in addition to knowledge regarding the importance of identifying obesity early in childhood.

Low-perceived self-efficacy in approaching the subject of weight with parents was a barrier facing staff during implementation. Stakeholders in this study see the need for a childhood weight management programme in their communities and acknowledge their professional responsibility to get involved. However, they appear uncomfortable and unequipped to do this. This is consistent with previous research that found that low-perceived skills and low-perceived self-efficacy hamper the implementation of such programmes.[20 27–30] In our study motivational interviewing workshops equipped stakeholders in site A with increased skills and confidence in working with families on weight management issues. Motivational interviewing is a goal-orientated, patient-centred approach based on the use of communication skills to understand individuals' motivation for behaviour change[31] and has been found to be useful when applied in healthcare settings.[32] We therefore consider it important that healthcare professionals involved in the implementation of obesity programmes receive this training prior to programme commencement.

The multidisciplinary structure of the programme emerged as both a barrier to and facilitator of implementation and spread across many of the levels outlined by Grol and Wensing. While acknowledged that it was

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required to treat such a complex health issue, it resulted in lack of role clarity, a lack of understanding of specific discipline roles and led to difficulties in scheduling. This may in part be due to the structure and governance of community health services within Ireland. While there is a vision for multidisciplinary working set out in multiple policy documents and an emphasis on integrated care,[33] the system is not set up to support the concept. Stakeholders believe a simple roundtable introduction whereby practitioners could share their professional background and outline their specific role within the project would have helped overcome this ambiguity. They suggest it is a simple but often overlooked detail. Furthermore, stakeholders felt the establishment of a local lead was critical in assisting multidisciplinary working while also facilitating discussion between national and local levels. Laws *et al*[34] also highlight the importance of having key local individuals responsible for driving and coordinating research translation.

Finally, an important finding from this research was the inherent problems in a *'one size fits all'* approach to community-based treatment. Stakeholders in our study suggest a tiered approach may be more suitable, beginning with a brief intervention that intensifies based on a child's degree of obesity, the family's motivation and the capacity of the community and/or healthcare provider. This finding is in line with a suggestion from Staniford *et al*,[35] who suggest that future interventions should tailor treatment according to participants' age, degree of obesity and their readiness or confidence to change. In addition to tailoring a programme to the individual, programmes need to be adapted for the community setting. Stakeholders in our study raised concerns that the *W82GO* programme, having been developed in a hospital setting, was too medicalised for community practice. In particular, the lengthy assessment process, which in some cases involved blood tests and the presence of medically trained doctors, was unnecessary for a community-based lifestyle programme. This finding is consistent with previous research conducted by Watson *et al*,[36] who evaluated a family-based childhood obesity treatment intervention and found they needed to modify the assessment process by replacing community paediatrician assessments with parent/carer self-completion forms for reasons of time and cost. To develop a full picture of treatment, future research should examine what aspects of the programme work, for whom, in what context and why.

While this study provides important insight into the implementation of childhood obesity programme in the community, several limitations should be acknowledged. According to de Casterlé *et al*: 'using a preconceived framework runs the risk of prematurely excluding alternative ways of organising the data'[37] (p362).

However, data were analysed inductively first before mapping emergent themes onto the Grol and Wensing framework. In subsequent phases of analysis, we adapted the framework to capture the influence of the external environment on implementation. Social desirability bias is a risk when stakeholders are known to the researcher conducting the interviews. In this case the stakeholders knew the researcher as the programme evaluator. However, we do not believe this bias had an effect as stakeholders were keen to *"tell their story."* It is also important to note that parental attitudes reported in this study were based on the perceptions of staff delivering the programme. Other studies have identified differences between parents, staff and children in terms of their attitudes towards childhood obesity treatment.[35] We are conducting further research with parents and children to understand the factors influencing their decisions to engage or disengage with obesity treatment.

CONCLUSION

In light of the dearth of knowledge available on the translation of multicomponent childhood weight management programmes to community settings, this study highlights the barriers and facilitators to implementing such programmes from a wide range of community healthcare and administration perspectives. Our results suggest the assignment of clear roles and responsibilities, the provision of sufficient practical training and resources, and organisational support play pivotal roles in overcoming barriers to change. Furthermore, our findings on the challenges of multidisciplinary working and translating hospital programmes to community settings are applicable to the implementation of interventions beyond that of childhood weight management. This evidence should be used to develop implementation plans to improve the translation of interventions into real-world settings.

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Competing interests None declared.

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Data sharing statement Topic guides that were used in the interviews are available as additional supporting files. However, signed confidentiality agreements prevent us from sharing transcripts.

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Barriers and facilitators to the implementation of a community-based, multidisciplinary, family-focused childhood weight management programme in Ireland: a qualitative study

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Pediatric Obesity/Management

Barriers and facilitators to initial and continued attendance at community-based lifestyle programmes among families of overweight and obese children: a systematic review

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Summary

The success of childhood weight management programmes relies on family engagement. While attendance offers many benefits including the support to make positive lifestyle changes, the majority of families referred to treatment decline. Moreover, for those who do attend, benefits are often compromised by high programme attrition. This systematic review investigated factors influencing attendance at community-based lifestyle programmes among families of overweight or obese children. A narrative synthesis approach was used to allow for the inclusion of quantitative, qualitative and mixed-method study designs. Thirteen studies met the inclusion criteria. Results suggest that parents provided the impetus for programme initiation, and this was driven largely by a concern for their child's psychological health and wellbeing. More often than not, children went along without any real reason or interest in attending. Over the course of the programme, however, children's positive social experiences such as having fun and making friends fostered the desire to continue. The stigma surrounding excess weight and the denial of the issue amongst some parents presented barriers to enrolment and warrant further study. This study provides practical recommendations to guide future policy makers, programme delivery teams and researchers in developing strategies to boost recruitment and minimise attrition.

Keywords: Attendance, childhood, obesity, review, treatment.

Introduction

Childhood overweight and obesity is a significant public health issue. While acknowledging that some researchers have shown that childhood obesity it not declining (1), there is a multitude of work showing a slowing down and possible decline in its prevalence (2–4). The current plateau is at an unacceptably high level (5) and the costs for children, their families and health services remain substantial (6).

The problems associated with childhood obesity have been widely documented (7–9). An obese child is not only at an increased risk of chronic disease later in life but is also at risk, in the short term, of developing a range of co-morbidities, as well as several orthopaedic and neurological conditions (8,10,11). Obese children are also more likely to develop emotional and psychosocial problems, including low self-esteem, the associated feelings of anxiety and isolation, as well as the subsequent involvement in risky

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behaviours (8,12,13). Given these problems, developing effective interventions to prevent and treat childhood overweight and obesity is vital.

International evidence suggests that family-based programmes (14) that combine healthy eating, physical activity and behavioural components are efficacious in treating childhood obesity (15). However, the success of these programmes relies on family engagement (16). Families who initiate treatment for childhood obesity can benefit in several ways, such as, availing of the opportunities to identify any underlying health issues, as well as gaining the support they require to make long-lasting positive lifestyle changes (17,18). Despite these benefits, the majority of families referred to treatment decline the invitation (18,19). Moreover, for those who do attend, the programme-related benefits are often compromised by high programme attrition which is a common occurrence; up to 75% of participants and their families who enrol in these programmes drop out before programme completion (16). While non-attendance or drop-out directly impacts upon the children and their families, it also has negative consequences for the health service. Drop-out is usually preceded by missed appointments, leading to a loss of work time which in turn decreases the productivity of practitioners (17,20,21), contributes to increased delays for families already on waiting-lists (17,22) and increases overall health service expenses (17,20,21).

Some of the factors that influence families' decisions to engage or disengage with childhood weight management programmes may be modifiable and potentially preventable. Therefore, there is a need to identify these factors so that strategies to enhance recruitment and retention rates can be developed. Recently, Dhaliwal and colleagues (23) published an integrative review documenting the various predictors of, and reasons for, attrition in paediatric weight management programmes delivered in clinical or research institutions. While few consistent predictors of attrition were reported, the most commonly reported reasons for terminating care included logistical barriers and unmet family needs (23). Skelton *et al.* examined the reasons given by families for discontinuing outpatient paediatric weight management programmes prematurely, and reported similar findings (16). While these reviews reveal important reasons for attrition from childhood weight management programmes, they do not address the factors influencing attrition from community-based programmes, nor do they focus on the factors influencing initiation. As in clinical settings (16,23), an improved understanding of the factors influencing attendance at community-based programmes will lead to enhanced programme development, marketing and delivery, and subsequently improved recruitment and retention rates (16,23).

Review aim

The aim of this systematic review was to synthesise the findings of quantitative, qualitative and mixed-methods research investigating the predictors of, and factors influencing, attendance or non-attendance at community-based lifestyle programmes among families of overweight or obese primary school-aged children. Within this overall review question, we specifically sought to identify the barriers and facilitators related to both initial and continued attendance.

Methods

Design

To facilitate a comprehensive understanding of programme attendance, quantitative, qualitative and mixed-methods studies were included in the review, and a narrative synthesis approach, as developed by Popay *et al.*, was chosen (24). This process is not to be confused with the narrative descriptions that accompany many reviews. A narrative synthesis '*refers to a process of synthesis that can be used in systematic reviews focusing on a wide range of questions, not only those relating to the effectiveness of a particular intervention*' (p.5) and '*whilst narrative synthesis can involve the manipulation of statistical data, the defining characteristic is that it adopts a textual approach to the process of synthesis to 'tell the story' of the findings from the included studies*' (p.5). Furthermore, according to the authors, the approach is particularly suited to analysing factors influencing implementation (24).

Search strategy

A comprehensive literature search was undertaken utilizing a range of electronic databases including PubMed, EMBASE, CINAHL and PsychINFO. No time limit was placed on the search, and search terms (overweight, obesity, paediatric, child, attendance and interventions) were comparable between databases. Example strategies used in EMBASE and CINAHL are presented in Table S1. The reference lists of all relevant studies were also hand searched for additional articles.

Study selection

Articles published in English were included in the review if they (i) were original research studies; (ii) included children aged 4–12 years; (iii) had a primary focus on paediatric weight management that (iv) incorporated lifestyle components (i.e. diet, physical activity, behavioural); and (v) reported on the factors influencing initial and/or continued attendance at family-focused programmes

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delivered in the community setting. Articles were excluded from the review if the study population were not overweight or obese, if studies had a primary focus on adolescent or adult obesity, if studies were based in hospital or research-based institutions, if it was a commentary paper or if the study was not available as a full text.

After initial scoping searches and consultation with a University librarian, one reviewer (EK) selected the search terms. All studies were assessed against the inclusion criteria. Once duplicates were removed, studies were excluded in the first instance if there was evidence in the title that they were not related to childhood overweight or obesity. Subsequent studies were excluded if they were deemed ineligible following inspection of the abstract. The final step involved reading the full text of each article in order to identify the final group of studies to be included. A flow diagram presents the results of the search in Fig. 1. It follows the Preferred Reporting Items for Systematic Reviews and Meta Analyses: The PRISMA Statement (25) in an effort to standardize the method of reporting the selection process in conducting a systematic literature review.

Quality assessment

Two reviewers (EK, JH) conducted quality assessment, and Bowling's quality checklist (26,27) was used to appraise the articles. This checklist allowed us to assess and compare study aims, design, methods, analysis, results, discussion and conclusions. Studies were not excluded on the basis of the quality assessment. Tables 1–3 show the data extracted from all studies and the methodological issues which emerged.

Data extraction

A preliminary synthesis was conducted by tabulating the relevant data into separate data extraction tables, according to their study design. Three reviewers (EK, SMcH, FS) extracted the following data: author, publication year, location and setting, study methodology, sample characteristics, variables associated with attendance and/or the barriers to and facilitators of attendance, overall study findings and indicators of study quality. Textual descriptions and information regarding study quality were also included in the data extraction tables.

Data synthesis

Data synthesis was informed by guidance in the conduct of narrative synthesis in systematic reviews compiled by Popay *et al.* (24), and the following steps were followed: (i) preliminary analysis; (ii) exploration of relationships, and (iii) assessment of the robustness of the synthesis. Theory

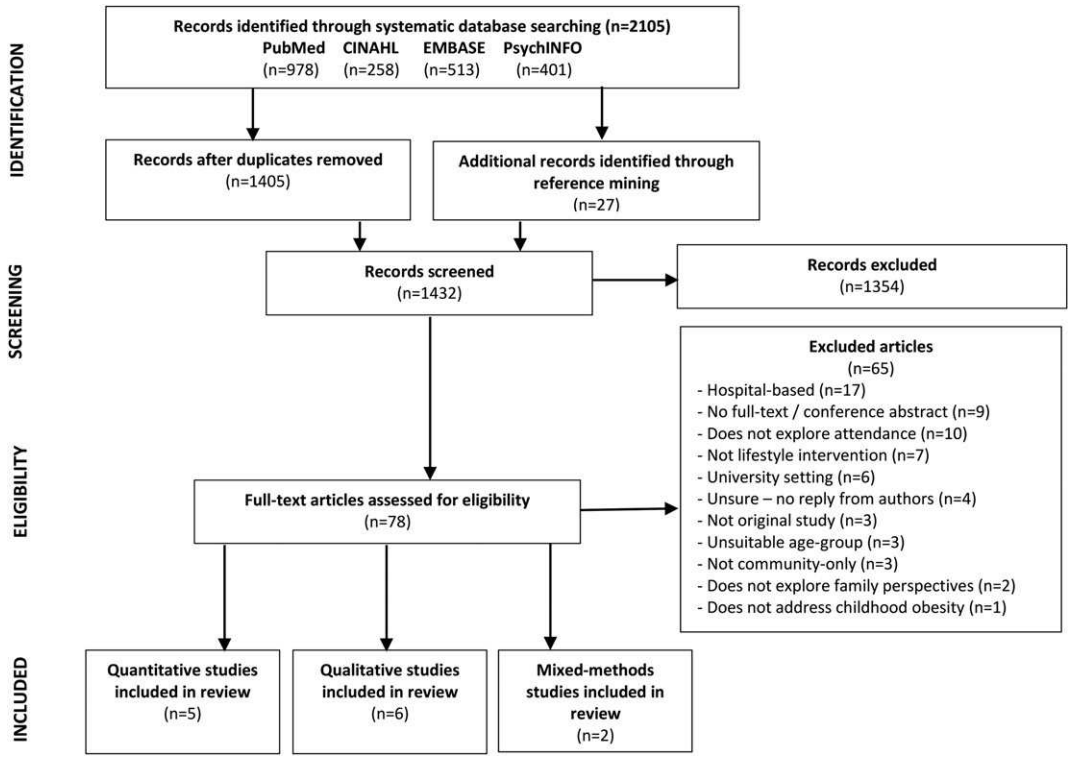

Figure 1 Flow chart of studies screened, excluded (with reasons) and included in the review.

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Table 1 Characteristics of quantitative studies

Reference	Country	Design	• Sample size (% male) • Age range • Mean age [SD]	Programme description	Focus on attendance	Quality (score)
Fagg *et al.* (2015) (30)	United Kingdom	Quantitative before and after study	• 21,088 (*N/S) • 7–13 years • *N/S	MEND 7–13 programme is a community group-based, 10-week behaviour change intervention for children who are overweight or obese.	Explored predictors of attendance	No major quality issues identified (9/13)
Welsby *et al.* (2014) (41)	Australia	Quantitative before and after study	• 2,499 (45.2%) • 7–13 years • 10.2 years [1.7 years]	Go4Fun is a community-based, multi-disciplinary group family obesity programme run as a 20 biweekly (i.e. 10 weeks) after school programme.	Explored predictors of attendance	Results from the qualitative feedback survey not adequately reported. (8/13)
Stockton *et al.* (2012) (37)	United States	Data drawn from RCT	• 303 (0%) • 8–10 years • *N/S	GEMS is a two-year family-orientated, group-based obesity prevention programme for children and their primary caregiver. Interventions are run weekly for the first 14 weeks and then reduced to once a month for remainder of intervention.	Explored barriers and facilitators to attendance	External validity reduced because of the African–American population of girls (8/13)
Williams *et al.* (2010) (42)	United States	Quantitative before and after study	• 155 (42.6%) • *N/S • 5.77 years (*N/S)	6-month community-based family-focused intervention (14 sessions of 1-h duration). Frequency of sessions varied from weekly during intensive phase (sessions 1–8) to biweekly (sessions 9–12) and then monthly (sessions 13 and 14).	Explored predictors of attendance	Small number of variables were considered. (8/13)
Gronbaek *et al.* (2009) (31)	Denmark	Quantitative prospective trial	• 100 (44%) •*N/S • 10.9 years	Community-based, family-focused 18-month treatment consisting of a 6-month intensive period and a less intensive 1-year follow-up. Intervention consisted of individual and group-based sessions.	Explored predictors of and barriers to attendance	No control group thus weakening the quality of the study (9/13)

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Table 2 Characteristics of qualitative studies

Reference	Country	Design	• Sample size (% male) • Age range • Mean age [SD]	Programme description	Focus on attendance	Quality (score)
Teevale *et al.* (2015) (38)	New Zealand	Semi-structured interviews with parents/ primary care-givers of obese children	• 42 (15%) parents • 36–45 years • *N/S	FANAU FAB is an 8-week group community-based family-led lifestyle weight-management programme for obese children.	Explored barriers and facilitators to attendance	No major quality issues identified (10/13)
Lucas *et al.* (2014) (33)	United Kingdom	Semi-structured interviews with families	• 23 families (*N/S) • *N/S • *N/S	MEND 7–13 is a group-based, family-focused 10-week behaviour change programme for children who are overweight or obese.	Explored barriers and facilitators to attendance	No major quality issues identified (11/13)
Grow *et al.* (2013) (32)	United States	Semi-structured interviews with parents	• 23 (4%) parents • *N/S • 40.3 years	Strong Kids, Strong Teens is an 18-week community-based, family-focused group healthy lifestyle promotion programme	Explored barriers and facilitators to attendance	No major quality issues identified. (11/13)
Newson *et al.* (2013) (34)	United Kingdom	Semi-structured interviews with families	• 11 (27%) families • *N/S • *N/S	12-month community-based programme split into three stages: Stage 1—intense 12 weekly 2-h group sessions. Stage 2—bimonthly individual follow-up sessions. Stage 3—follow long-term action plan	Explored barriers and facilitators to attendance	Small homogenous sample (9/10)
Visram *et al.* (2012) (40)	United Kingdom	Semi-structured interviews with families	• 20 families (N/S) • *N/S • *N/S	Community based, individualised, multi-disciplinary support for children and their families	Explored barriers and facilitators to attendance	No major quality issues identified (10/13)
Twiddy *et al.* (2012) (39)	United Kingdom	Semi-structured interviews with families	• 23 families (N/S) • *N/S	WATCH-IT, community-based, family-focused, multidisciplinary programme combining group and individual sessions. Families commit for 3 months with an option to renew 3 monthly for a year.	Explored barriers and facilitators to attendance	No major quality issues identified (10/13)

*N/S: not specified.

development was not carried out because of the exploratory nature of the research synthesised.

First, to develop the preliminary synthesis, the descriptive characteristics and complete result sections from each article were extracted in a table. These results were analysed by EK and MPD using the method for thematic analysis as described by Thomas and Harden (28) in the software package NVivo v10. Codes were assigned to units of meaning in the results section of each study. Codes were then organised into categories of factors influencing programme attendance (both initial and continued). These categories were entered into synthesis tables and similarities, and differences across the studies were identified. Finally, idea webs were constructed to explore the relationships between the findings across the different studies. Ideas webs, as described by Clinkenbeard (29), use spider diagrams as a method for visualising and exploring possible connections across study findings (24,29).

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Table 3 Characteristics of mixed methods studies

Reference	Country	Design	• Sample size (% male) • Age range • Mean age [SD]	Programme description	Focus on attendance	Quality
O'Connor *et al.* (2013) (35)	United States	Mixed-methods study within an RCT	• 40 families (20%) • *N/S • *N/S	Helping HAND, a 6-month community-based, family-focused programme with individual sessions for parents and children.	Explored predictors and barriers/facilitators to attendance	External validity reduced because of the primarily Hispanic/low income populations (6/13)
Rice *et al.* (2008) (36)	United States	Mixed-methods study using the information collected via interviews of families	• *N/S • 7–17 years • *N/S	12-month community-based, family-focused programme. First 3 months were group based, followed by 3-month transition phase, followed by 6-month maintenance phase.	Explored barriers and facilitators to attendance	Limited information on sample and methods (4/13)

*N/S: not specified.

Results

Our search strategy identified 2,105 articles. Of these, 1,405 remained after duplicates were removed (Fig. 1). Screening of titles and abstracts resulted in 78 potentially eligible studies. Of these, 13 peer-reviewed journal articles met the inclusion criteria (30–42). Qualitative methods were employed in five of the studies included (Table 1), quantitative methods in six (Table 2) while two studies used mixed-methods to achieve their aim (Table 3).

Five of the included studies reported on the non-modifiable predictors of attendance (e.g. gender, age and ethnicity) (30,31,35,41,42). Of these five, three examined the predictors of initial attendance (30,35,41) and four reported on the predictors of continued attendance (30,31,41,42). Ten studies reported on the modifiable factors influencing attendance (e.g. programme location and staff) (31–40). Out of these, eight explored the reasons behind both initial and continued attendance, while Rice *et al.* reported solely on the factors influencing initial attendance and Gronbaek *et al.* reported exclusively on continued attendance. These barriers to, and facilitators of both initial and continued attendance are summarised in Table 4, and discussed in the following section.

Non-modifiable predictors of initial and continued attendance

Gender influences attendance in weight management programmes. Three of the included quantitative studies reported on the predictors of initial attendance (30,35,41), and all found that families with overweight or obese girls were more likely to enrol in weight management programmes than families with overweight or obese boys. Similarly, out of the three quantitative studies that examined the association between gender and completion, two found that families with overweight or obese girls were also more likely to complete treatment than those of boys (30,41).

Three of the four quantitative studies which examined the association between ethnicity and drop-out reported that those families of ethnic minority were more likely to discontinue care prematurely (31,41,42). Two of the included qualitative studies support this finding with some families dropping out of treatment as a result of language difficulties (31,38), or because they felt the programme was '*culturally inappropriate*' (38).

In terms of other non-modifiable predictors of attendance, three of the included studies examined family structure and socioeconomic background (30,41,42). Results suggest that lone-parent families (30,42) and those families living in lower socioeconomic areas (30,41) were more likely to drop out. Similarly, Lucas *et al.* reported further difficulty in recruiting families from deprived groups or neighbourhoods (33).

Baseline child body mass index (BMI) and age were not found to be associated with attendance. Two studies examined weight status and found that child BMI was not

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Table 4 Summary of facilitators and barriers to initial and continued attendance

	Predictors of attendance	Facilitators	Barriers
Initial attendance	- Gender (28, 33, 39)	- Parental concern for child's psychological wellbeing (30–32, 35–37) - Social interaction (30, 32, 35) - Lifestyle-focused approach (30, 32, 35) - Family-centred approach (30, 36)	- Stigma (30–32, 38) - Denial (30, 32, 38) - Personal and programme logistics (29, 30, 32–34)
Continued attendance	- Gender (28, 39) - Ethnic minority (29, 39, 40) - Lone parent families (28, 40) - Families living in lower socioeconomic areas (28, 39)	- Social interaction and support (30–32, 34, 36, 38, 39) - Practical sessions (30, 35, 36, 38) - Family-centred approach (30, 31, 33, 36, 38) - Programme staff (31, 36, 37)	- Personal circumstances and logistics (29–33, 36) - Programme staff (31, 37)

associated with drop-out (30,42). While child age was not examined as a predictor of initial attendance by any of the included studies, Fagg *et al*. found that it was not associated with continued attendance (30).

Modifiable factors influencing initial attendance

Facilitators

Parental concern for child's psychological wellbeing

Parents were the primary decision-makers when it came to whether or not their family would enrol in a childhood weight management programme and more often than not, children '*just went along*' without any particular reason or interest in attending (31,32,37). Parents were motivated to enrol largely because of their concern for their child's health (32,34,37,38,40) and more specifically a concern for their child's psychological wellbeing (32–34,37–39). In two studies, parents enrolled specifically because their child had been bullied (33,38). For example, in the 10-week MEND programme evaluated by Lucas *et al*., parents were aware of occasions of '*bullying*' or '*social isolation*' experienced by their child and so when deciding whether to enrol or not, they often prioritised any benefits to their child's psychological health over weight loss (33). In another study, some children noted that the experience of being '*bullied a lot*' motivated them to take action (33). The perceived positive psychological benefits of attending, including the opportunity to improve their child's self-esteem (34,37,39) and self-confidence (34,39), as well as mitigating any adverse social experiences their child might be experiencing (32,33,38), encouraged parents to enrol their children.

Social interaction

Children participated in childhood weight management programmes primarily for the social interaction they appeared to offer, and many enrolled simply '*to have fun*' and '*make friends*' (32,34,37). The studies included in this review focused primarily on group-based programmes which offered children the opportunity to play games and exercise with others of similar age (32,34,37). Newson *et al.* highlighted the opportunity for social interaction as an incentive for parents also; parents enrolled with the expectation of meeting and gaining the support of other parents in the group (34). Some parents who participated in this study felt it was good to attend and '*speak to other parents who are trying to change things*' while their children '*could make friends with other kids*' who could '*play on the same level*' as their own child (34).

Lifestyle-focused approach

Three studies reported parent's interest in programmes that focused on lifestyle (i.e. incorporated nutrition, physical activity and behavioural components) as a factor influencing enrolment (32,34,37). While all of the included studies reported on programmes that promoted lifestyle change through physical fitness, healthy eating and psychological support, Grow *et al*. reported that several of the parents they interviewed specifically mentioned that they did not want their child to '*be put on a diet*' and favoured programmes that took a more holistic approach to healthy weight management rather than those that focused on weight loss or dieting alone (32). Parents were interested in the '*informative part of the program*' and liked that the programme '*encompassed everything, the nutrition, the motivation and the exercise*' (32). Furthermore, parents cited the opportunity to learn new skills and enhance their knowledge on lifestyle-related behaviours as further motivating factors (32,34).

Barriers

Stigma

The stigma surrounding the issue of excess weight and associated treatment programmes was reported as a significant barrier to initial attendance for both children and parents in four of the included studies (32–34,40). Parents reported that children were reluctant to attend a programme for '*fat*

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kids' either because they did not identify themselves as carrying excess weight or did not want others to identify them as being overweight (32). Similarly, Lucas *et al.* identified several children who reported that they were hesitant to attend because they believed they were not '*fat*' or because they disliked being identified by others as '*fat*' (33).

The stigma surrounding the issue also appeared to influence whether or not parents engaged with a programme (33,34,40). They appeared to be influenced by the perceptions held by close friends and family and were more likely to refuse referral if they expressed negative comments (34). Additionally, three of the studies reported that parents were afraid of raising the subject of weight with their child out of fear of causing upset to them (32) or that involving them in such programmes would be harmful to their self-esteem (34,40). For example, in a qualitative study conducted with 20 children and their families, Visram *et al.* reported parental concerns about their child being labelled as overweight or obese and the negative impact on the child's self-esteem (40).

Parental denial

Parental denial was another barrier to initial attendance (32,34,40). Parents sometimes relied on their own visual observation of their child rather than that of a health professional to justify rejecting a place on the associated weight management programme (34,40). These parents refused to accept their child was carrying excess weight with many referring to their child as '*stocky*' or '*broad*' (40), or believing they '*would grow into it*' (34). Grow *et al.* found that others compared their children to peers of similar build stating that they are '*normal, just like other children*' (34). This denial led to their perceived lack of need for such a programme and subsequently their refusal of the referral.

Personal and programme logistics

Finally, changing family circumstances such as moving school or relocating and scheduling conflicts were a challenge for many families (31,32,36). Parents often found it hard to prioritise time for the programme when they had '*so many other things to do*' in the evenings (34). For others, programme logistics proved too difficult to overcome when deciding to enrol in a programme (32,34,36). For example, in terms of location, both safety (34) and distance from home (32,36) were important factors influencing programme enrolment (32,34,35).

Modifiable factors influencing continued attendance

Facilitators

Social interaction and support

While parents were key to initial attendance, their children were the main drivers behind continued attendance. Once enrolled in a programme, having fun (32,33,36,41) and making new friends (32–34,38,40) motivated sustained engagement. Children particularly enjoyed the opportunity to play with children of a (i) similar age, (ii) weight status or (iii) activity level (32–34,38,40). Lucas *et al.* captured this point in the following quote where a participant expressed comfort in being surrounded by those of similar capability '*I found them fun because I was surrounded by different people who were in the situation that I was in, in terms of being overweight and finding exercise difficult.*' (33). The majority of the studies reported on group-based programmes whereby children spent time exercising and playing games together while parents participated in the educational component. Visram *et al.* who evaluated an individual-based programme, as opposed to a group-based programme, reported that participating children stated they were keen to meet other children in similar situations and recommended this as an area for improvement (40).

Parents returned to programmes primarily for the group support they received (32–34,38). The shared experience often reduced feelings of '*isolation*' (33), and many parents valued the '*social acceptance*' of a group describing shared problems which often resulted in the knowledge that they are not alone (33,38). While normalising the issue for many, these group-based programmes also offered further social support through the exchange of personal '*struggles and triumphs*' (38), personal tips and tricks as well as holding each other accountable. The parent-only session included in these programmes (32–34,38) allowed parents to discuss problems they may be experiencing in relation to their families positive lifestyle change with others on a similar journey that would not otherwise be possible in individual-based programmes.

Practical sessions

Programmes which offered practical sessions further boosted continued attendance (32,37,38,40). These sessions, whereby parents tried new hands-on activities such as cooking demonstrations (32,38), healthy food shopping expeditions (38), visualising portion sizes (38), outdoor activity sessions (40) or community-field trips (37), motivated families to continue attending. Parents appreciated '*those kind of things, like the portion sizes… instead of maybe if the plate is this big, but actually show portion sizes to the parents so they can see it for themselves, see it being done*' (38). Results from Teevale *et al.* suggest that parents were more interested in the practical aspect of the programme as opposed to the theory behind it. For example one mother reported that '*…you don't want to hear theory when you're a mum. You want to hear real-life experience and what's practical for us*' (38). Similarly, the parents participating in the study conducted by Stockton and colleagues reported that the field trips provided practical ways of experiencing the theoretical objectives of the GEMS programme (37).

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Family-centred approach

All of the included studies reported on family-based programmes where both parents and their child were invited to attend the sessions. This simultaneous delivery of the programme to parents and their children appeared to further enhance retention for a number of reasons (32,35,38). Three of the included studies reported that both parents and children enjoyed the dedicated parent-child time that the programmes afforded (32,35,38) either because they provided the opportunity to do exercise together or provided the mutual support they needed to keep attending. One parent expressed their appreciation of having '*something like that where it's just her and I doing something together, just the two of us, I mean I thought that was great*' while another felt '*it was good opportunity for my child and me to do something together*' (32). Parents also placed value in a programme where both they and their child could attend together and therefore could actively participate and support each other (38). Parents noted how receiving the same information made them '*work together to help each other*' while others felt that '*it would be hard*' to do the programme by themselves. One parent described '*there was a time when my daughter would say, I don't want to go, 'cause they're telling me I can't eat this and can't eat that. And I go, No we'll go, 'cause they're telling me the same thing. When she saw it was difficult for me too and we started getting into a routine, she started wanting to go*' (38). Furthermore, inviting other family members to participate in these programmes boosted its acceptability (32,33,38,40). Three of the included studies suggested inviting siblings to come along as this sometimes alleviated the added cost of childcare (32,33,40).

Programme staff

Programme staff emerged as both barriers to (33,39) and facilitators of (33,38,39) programme attendance. Having staff who lack experience, enthusiasm or group management skills can hinder programme efforts and even result in some families dropping out of treatment. Conversely, a good staff–participant relationship was an important aspect of these programmes and viewed by some parents as vital for continued attendance (38,39). Staff '*who made it fun*' for children and those with personal experience in either parenting or healthy weight management (33) enhanced continued attendance. Furthermore, Twiddy *et al.* reported that the continuity of staff was important to the success of any programme as relationships can be built upon week after week (39). Regular communication between programme staff and families (38,40) where '*study people would ring and remind*' parents further facilitated continued attendance (38).

Barriers

Personal and programme logistics

In addition to programme staff, logistical issues created significant barriers to continued attendance. Changing family circumstances including moving home, family illness or pregnancy (31–33,38) and scheduling conflicts such as school holidays and after-school activities (32,33,35,38), and a lack of transport to programme location (32–35,38) were reported as reasons for families discontinuing care. For example, Lucas *et al.* reported that transportation to the programme location was problematic when public transport was not available and driving not an option (33).

Discussion

Childhood obesity is a public health priority worldwide, but the way in which programmes are delivered for its management has received little attention (17). This review explored the factors influencing attendance at community-based lifestyle programmes among families of overweight or obese children aged 4–12 years and has revealed several important findings. First, despite varying findings across the quantitative studies which examined predictors of attendance, two relatively consistent predictors emerged: (i) at the child-level, boys are more likely to refuse or drop-out of treatment than girls and (ii) at the family-level, those families of ethnic minority also more likely to disengage from care. This is consistent with research on hospital-based childhood weight management programmes conducted by Skelton and colleagues (16), and future research should focus on exploring the reasons behind these findings and developing strategies to improve retention among these groups.

Second, our results suggest that childrens' parents provided the impetus for programme initiation, and this was driven largely by a concern for their child's psychological health and wellbeing. More often than not, children went along without any real reason or interest in attending. Over the course of the programme, however, children's positive social experiences such as having fun and making friends fostered the desire to continue attending. These outcomes highlight the need for strategies employed to enhance recruitment to focus on parents and those to minimise attrition to focus on both parents and children.

Our review also revealed a number of personal reasons (e.g. prejudices, fears) and practical reasons (e.g. distance, transport, scheduling) behind their decisions to engage or disengage with community based intervention programmes. The stigma associated with being overweight or obese created a significant barrier to initial attendance. Research suggests that overweight and obese children are vulnerable to stigma and stereotyping from multiple sources (43) and in efforts to avoid or minimise this victimisation some families may refuse the referral to care. Puhl and colleagues

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recommend that researchers carefully consider how messages are framed in programmes to address childhood obesity (43). Our review found that parents were motivated to enrol in programmes that focused on attaining a healthy lifestyle, rather than those which centred around weight-loss, and so a move away from labelling associated programmes as weight-related interventions may be useful. This finding is consistent with other research that recommends programmes have a focus on health rather than weight or thinness (43,44). Furthermore, the way in which health practitioners address the topic of weight with families is of critical importance as it forms the foundation of interventions to address the issue of childhood overweight and obesity. Many parents may feel blamed or judged by their health care provider and as a result may delay or even refuse to accept care (43). Practitioners should avoid using language that places blame on parents and should ensure they address the topic of weight in an appropriate, non-judgemental and sensitive manner. For example, in a study conducted by Puhl and colleagues, results suggest that the terms '*fat*' and '*obese*' were rated as the '*most undesirable, stigmatizing and blaming*' (45).

Eckstein and colleagues reported that successful health behaviour change cannot occur unless the health issue is recognised and acknowledged (46) and research has shown that parents are unlikely to implement changes to their child's lifestyle unless they recognise the need for such changes or perceive their child to be at risk (47). This review found that denial, or a lack of parental recognition of their child's excess weight, was a barrier to attendance at childhood weight management programmes. Parental misperception of child weight is common. Previous reviews found that ≥50% of parents fail to correctly identify their child as overweight (48–51). However, little evidence is available on the reasons behind this misperception. Through qualitative research, Jain *et al.* and Rich *et al.* have offered some insight on the reluctance of mothers to acknowledge overweight in their children (52). Results suggest that a distrust of weight charts, fear of being blamed, unwillingness to label their child as overweight or believing they would grow out of it were key factors (52,53). As mentioned above, parents may not want to recognise their child is carrying excess weight or label their child as overweight in case their child is stigmatised (50). Furthermore, it has been suggested that parents may not recognise overweight in their children to avoid acknowledging and taking responsibility for their own overweight (54,55). Alternatively, given the prevalence of overweight children worldwide it is also possible that changing social norms mean that parents simply do not recognise overweight in their children (56,57). In a study conducted by Newson *et al.*, authors suggest that denial may be partly because of the '*normalisation*' of childhood obesity within the context of today's society, which has permitted families to refuse referral on the basis that their child is not different to others (34). The first step in the prevention/treatment process is to identify overweight. Therefore, strategies and campaigns to increase awareness of childhood overweight and obesity, and to simplify means of explaining measurement and classification are needed at a policy level. Additionally, a greater understanding of the reasons influencing parental misperception of child's weight status should be explored through further research.

Finally, in keeping with the reviews conducted on hospital and research based programmes, this review suggests that practical problems including transport, scheduling conflicts and changing family circumstances were an issue for all families and common reasons for attrition (16,23). Location, transportation and distance to treatment programmes can be important barriers for families participating in weight management programmes and highlight the need for similar programmes to be available locally or in sites easily accessible by public transport or with free onsite parking. Furthermore, many appointment times are during daytime hours, meaning children would miss school and parents would miss work in order to attend. For many parents, obesity is not seen as a '*disease*' and, therefore, they may be less willing to miss school/work for treatment than for other conditions that are perceived to be more of a health issue (34,58). Evening or weekend appointments may address this barrier. However staff should spend time discussing and addressing any barriers to attendance before families initiate care.

Strengths and limitations

To our knowledge, this is the first systematic review of the barriers and facilitators associated with family attendance at community based childhood weight management programmes. This review included an extensive and systematic search of the literature and included quantitative, qualitative and mixed-methods research in order to facilitate a comprehensive understanding of programme attendance. To ensure reliability, quality check procedures were conducted including double screening and checking by independent researchers at the data extraction, coding and quality appraisal stages. However, it is important to acknowledge several limitations. First, while a good combination of countries are represented in this research, it is important to note that most of the evidence in the included studies is derived from European or Australasian-based research, thus limiting the generalizability of the results to other countries (most notably the United States). For example, insurance coverage may influence attendance in the US, but in countries with universal health care coverage (e.g. United Kingdom, Australia and New Zealand), other factors appear to be more pertinent (17). Second, because we did not include unpublished studies and studies that were published in a language other than English, some relevant

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papers may have been excluded. The synthesis is therefore limited to published data which tends to range in quality and given the heterogeneity of study designs and programme characteristics, it was not possible to conduct a meta-analysis. In addition, many studies failed to adequately recruit those families who declined treatment, and so this group may be underrepresented. Future efforts should be made to elicit the barriers to attendance as perceived by those non-attenders.

Conclusion

Failure to attend and complete treatment is a common and worrying issue for health professionals and policy makers working in the area of childhood obesity treatment. While there is still some uncertainty as to what type of service is effective in treating and managing childhood obesity, one thing is certain—governments and the health service need to provide a service in a way that is acceptable and appropriate to families. Our review has found that the stigma associated with carrying excess weight, as well as low levels of recognition of the problem amongst parents, are important barriers to programme initiation an require urgent attention. However, once enrolled in a programme positive social interactions as well as good staff–participant relationships nurture continued engagement. Our findings have important implications for future programmes that aim to successfully recruit and retain participants for community-based childhood weight management programmes.

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Conflict of interest statement

The authors have no other financial disclosures to make.

Supporting Information

Additional Supporting Information may be found in the online version of this article, http://dx.doi.org/10.1111/obr.12478

Table S1. Sample EMBASE and CINAHL Search strategies.

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Clinical Research Ethics Committee

Lancaster Hall,
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Cork,
Ireland.

Our ref: ECM 4 (mmm) 14/04/15 & ECM 3 (mm) 19/05/15

28th April 2015

Professor Ivan Perry
Head of Department of Epidemiology & Public Health
University College Cork
4th Floor
Western Gateway Building
Western Road
Cork

Re: Barriers and facilitators to the effective implementation of W82GO in the community setting in Ireland: lessons learned.

Dear Professor Perry

The Chairman approved the following:

- Insurance Certificate.

Full approval is now granted to begin this study.

Yours sincerely

Professor Michael G Molloy
Chairman
Clinical Research Ethics Committee
of the Cork Teaching Hospital

The Clinical Research Ethics Committee of the Cork Teaching Hospitals, UCC, is a recognised Ethics Committee under Regulation 7 of the European Communities (Clinical Trials on Medicinal Products for Human Use) Regulations 2004, and is authorised by the Department of Health and Children to carry out the ethical review of clinical trials of investigational medicinal products. The Committee is fully compliant with the Regulations as they relate to Ethics Committees and the conditions and principles of Good Clinical Practice.

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University College Cork, Ireland

Our ref: ECM 3 (yy) 13/10/15

9th September 2015

Professor Ivan Perry
Department of Epidemiology & Public Health
University College Cork
4th Floor
Western Gateway Building
College Road
Cork

Re: Families' perceptions of child weight management interventions – barriers and facilitators for engagement: a qualitative study.

Dear Professor Perry

The Chairman approved the following:

- Amendment Application Form signed 19th August 2015
- Study Protocol Version 2 dated 19th August 2015
- Invitation Letters Version 2 dated 19th August 2015
- Information Sheets Version 2 dated 19th August 2015
- Consent Forms Version 2 dated 19th August 2015
- Interview Questions Version 2 dated 19th August 2015.

Yours sincerely

Professor Michael G Molloy
Chairman
Clinical Research Ethics Committee
of the Cork Teaching Hospitals

The Clinical Research Ethics Committee of the Cork Teaching Hospitals, UCC, is a recognised Ethics Committee under Regulation 7 of the European Communities (Clinical Trials on Medicinal Products for Human Use) Regulations 2004, and is authorised by the Department of Health and Children to carry out the ethical review of clinical trials of investigational medicinal products. The Committee is fully compliant with the Regulations as they relate to Ethics Committees and the conditions and principles of Good Clinical Practice.