

# Multiple stakeholder views of pre-school child weight management practices: a mixed methods study

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## Abstract

**Objective:** With the increasing prevalence of unhealthy weight status in pre-school children, this study sought to understand current pre-school child weight management practices in Blackburn with Darwen, UK, with a view to informing appropriate intervention strategies.

**Design:** Mixed-methods study (semi-structured interviews, quantitative survey)

**Setting:** Urban-rural borough with high ethnic diversity in the North-West of England.

**Methods:** Phase 1 involved 15 semi-structured interviews with public health/service managers, health professionals and children's centre staff to explore current pre-school weight management practices, challenges and perceived training needs. Phase 2 involved a quantitative survey of multidisciplinary health professionals (n=30) who work with pre-school children. Data were analysed thematically and perceived challenges organised into individual, interpersonal and organisational levels of the socio-ecological model.

**Results:** Current pre-school child weight management practices appeared to be inconsistent, and staff were unable to locate clear protocols or referral pathways. Challenges most commonly related to individual family factors (e.g. families not perceiving child's weight status to be a problem) and organisational factors (e.g. lack of time). Perceived training needs differed between professions and included Body Mass Index calculation and interpretation, weight-related communication and pre-school nutrition/physical activity guidelines.

**Conclusion:** Inconsistencies in practice and a lack of clear pathways limited pre-school child weight management practices in Blackburn with Darwen. Although many challenges were attributed as external to the individual, potential steps to help practitioners cope with these demands are outlined.

**Keywords:** qualitative; obesity; diet; physical activity; socio-ecological model; early years; children; England

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## Introduction

Childhood obesity increases risk of both physical and psychological health problems in later life (van Grieken et al., 2013). In England in 2017-18, over one-fifth of 4-5 year olds were overweight or obese (National Child Measurement Programme, 2018). Whilst the majority of research into unhealthy child weight status has focused on overweight, recent global evidence suggests the incidence of child underweight may also be increasing (Wake et al., 2013). Little is currently known about the health status of underweight children, but available evidence indicates an association with adverse health in later childhood and adolescence (Wake et al., 2013). Given the growing incidence and health risks associated with both over- and under-weight, it is important both are given consideration in the development of child weight management strategies.

Children's eating and physical activity (PA) habits are thought to be established in the pre-school years (Wolman et al., 2008), with children as young as 3-5 years shown to associate food with health (Wiseman et al., 2018). The pre-school years are therefore an important time for health promotion and prevention of future weight problems (Buscemi et al., 2014). Although limited, research into the treatment and prevention of unhealthy weight status during the pre-school years has demonstrated some positive behavioural outcomes (for both children and their parents) e.g. increased fruit and vegetable consumption, increased frequency of family meal times, and positive changes in PA and screen time (Willis et al., 2016). Health professionals (e.g. General Practitioners (GPs), nurses, Health Visitors (HV)) and childcare staff in contact with pre-school children and their parents are in a key position to identify and address unhealthy weight status at an early stage.

Current guidance around managing pre-school child weight advocates that health professional interventions incorporate a number of components including PA, diet, and engaging with the whole family to promote behaviour change (National Institute for Health and Care Excellence (NICE), 2015). However, more specific information appears to be lacking, especially with respect to underweight. While weight is regularly monitored for children under 2 years and for school-aged children, routine weight checks for children between 2 and 4 years are less consistent within the UK, despite recommendations for regular pre-school weight monitoring (Child Growth Foundation, 2012). When opportunities do arise to measure a child's weight status, the stigma attached to childhood obesity presents challenges for health professionals in discussing child weight with parents (Chadwick et al., 2008). Nurses and HVs have reported a lack of confidence, feelings of intimidation and a lack of capacity, training and protocols in child weight management (Turner et al., 2016; Willis et al., 2012). There is a need therefore to develop effective strategies to equip professionals working with young children to effectively identify and manage unhealthy child weight status in the pre-school years.

Previous studies have framed child weight management research within Bronfenbrenner's (1979) Socio-Ecological Model (SEM) (e.g. Huang and Glass, 2008; Steele et al., 2011). The SEM highlights the importance of influences on child weight management practices at the individual (e.g. lack of family motivation), interpersonal (e.g. risk to relationships), organisational (e.g. job pressures) and societal levels (e.g. normalisation of overweight). Understanding pre-school child weight management practices and the challenges professionals face at each level may help to inform the development of effective interventions to promote a healthy weight status in pre-school children. This study

therefore utilises the SEM to explore current practices in pre-school child weight management in Blackburn with Darwen, a mixed urban-rural borough in the North West of England with a Black and Minority Ethnic (BME) population of 31% and high levels of both over, and underweight in pre-school children (Lancashire City Council, 2011). The study was instigated following concern from local public health and primary care practitioners that pre-school child weight management practices in Blackburn with Darwen needed improving. Intervention cannot however take place until policy-makers understand 'what is happening now' (Craig et al., 2008). This mixed-methods study therefore addressed the following three research questions:

- What are current practices for managing child weight in the pre-school years (2-4 years) in Blackburn with Darwen?
- What are the challenges faced in managing pre-school child weight?
- What training needs do practitioners perceive in relation to managing pre-school child weight?

## **Methods**

### ***Design***

#### ***Mixed Methods***

This study employed a mixed-methods design (Onwuegbuzie et al., 2010) as neither a quantitative nor a qualitative approach alone would have achieved an understanding of the multiple perspectives required to address the research questions (Creswell, 2013). The qualitative phase (phase 1) explored the experiences of multi-agency stakeholders in managing pre-school child weight. These findings informed the development of an online survey conducted with a larger sample of frontline health professionals in the later quantitative phase (phase 2) of work.

#### ***Qualitative Phase (Phase 1)***

##### ***Participants and recruitment***

Recruitment for phase 1 involved a purposive sampling strategy, with the aim of recruiting multidisciplinary professionals with some knowledge of, interest in or involvement in the current pre-school child weight management practices in Blackburn with Darwen. Invitation e-mails were distributed via research steering group members and representatives from the local Clinical Commissioning Group (CCG) (it is not therefore known how many professionals received this invite). Fifteen multi-disciplinary professionals (4 GPs, 2 HVs, 3 community nursery nurses (CNNs), 2 children's centre staff, 4 public health/service managers) consented to take part. The majority of participants were female ( $n=12$ ), White British ( $n=11$ ) and worked full time ( $n=10$ ). Practice experience ranged from 5-34 years with a mean of 17.6 years.

##### ***Semi-structured interviews***

Interview topics were informed by the child weight management literature and the study research questions, and included exploration of current pre-school child weight management practices, challenges in managing pre-school child weight and perceived training needs. As participants' roles in child weight management varied, two interview schedules were developed: the first for front line practitioners, the second for public health/service managers (see online supplementary material for interview schedules).

In line with qualitative recommendations (Shenton, 2004; Creswell, 2013), pilot interviews were conducted with two health professionals unconnected to the research project (a children's nurse and a GP) and subsequent amendments made to improve clarity of questions. To enhance trustworthiness, participants were assured of their anonymity, and informed that the research was part of a study exploring pre-school child weight management and was not auditing practice. Interviews lasted between 20 and 41 minutes (mean 29.8 minutes) and were conducted at the participant's place of work.

### *Data Analysis*

Interviews were audio recorded and transcribed verbatim by [DB] and imported into QSR Nvivo 11 qualitative software programme for analysis. Thematic analysis, drawing on guidance from Braun and Clarke (2006), was conducted by [DB] with frequent debriefing sessions with [PW].

Data analysis occurred in two stages: first, after the familiarisation process (reading and rereading transcripts) data extracts were assigned codes as close as possible to the participant's own words. Second, after all interviews had been coded, codes were scrutinised for patterns and similarities to form inductive themes relevant to each research question, which were then further reviewed and refined.

This process revealed challenges in managing pre-school child weight (research question two) that related to individual, interpersonal and organisational factors. It was therefore decided to organise the themes for research question two (challenges in managing pre-school child weight) within the SEM framework (Davison and Birch, 2001; Bronfenbrenner, 1992) to enable a deeper understanding of the levels at which challenges were occurring.

### ***Quantitative Phase (Phase 2)***

Phase 2 involved an online survey (informed by the findings of phase 1 and current literature) with frontline health professionals. The purpose of this phase was to explore the extent to which the qualitative findings were representative of a broader cohort of practitioners.

### *Participants and recruitment*

Invitation e-mails containing a link to an online survey were distributed to eligible health professionals via service leads and representatives from the local CCG. The survey link was open for six weeks with reminders sent out bi-weekly. Practitioners were eligible if they were involved in providing healthcare for pre-school children within Blackburn with Darwen. Whilst it was not possible to know how many practitioners received the e-mail invites, it is

estimated there were approximately 100 GPs, 70 practice nurses, 42 HVs, and 8 CNNs working in Blackburn with Darwen who were eligible to take part.

Thirty health professionals (10 GPs, 3 Practice Nurses, 10 HVs and 7 CNNs) consented to take part and completed the survey. The majority of participants were female ( $n=22$ ), White British ( $n=22$ ) and worked full time ( $n=17$ ). Years of practice ranged from 2-35 years with a mean of 11.4 years. Due to the anonymity of the survey, it was not known whether any of the survey respondents also participated in the phase 1 interviews.

### *Measures*

*Online survey:* [DB] designed the survey through an iterative process of input and feedback from all co-authors (a mixture of clinicians, academics and public health professionals). The survey was delivered through the Bristol Online Surveys (BOS) online survey platform (see online supplementary for survey). Staff had the flexibility to complete it at a time and place of their own choosing, and responses were anonymous (Evans and Mathur, 2005).

*Survey sections:* In line with phase 1, the survey contained 3 sections each relating to the study research questions. Questions included multiple choice questions, Likert scales and open response questions. Likert and multiple-choice questions were compulsory to answer in order for the respondent to be transferred to the next page, whereas open response questions were optional. The measure to assess challenges in managing pre-school child weight was adapted from Wu and Steele (2011) for a UK pre-school population (see supplementary resource for full survey).

As recommended by Van Teijlingen and Hundley (2002), the survey was piloted with a GP and children's nurse unconnected to the research study to check for understanding. No changes were made following the pilot testing, other than minor amendments to grammar and spelling.

### *Data Analysis*

Survey data was directly exported into SPSS 23 for analysis. Frequencies, percentages, medians and interquartile ranges were calculated where appropriate. To enable a comparison of results with phase 1, a secondary analysis of the data for research question two was conducted to group perceived challenges into the appropriate level of the SEM.

### **Ethical approval**

Ethical approval was obtained from Liverpool John Moores University research ethics committee for both phases of the study [16/SPS/007, 16/SPS/027].

### **Results**

Results from phases 1 and 2 are integrated and presented for each research question. Data for all professions is presented together, and differences are highlighted where relevant. Verbatim quotes with participant identifiers provide illustrative examples from interviews.

## ***Current practices for managing child weight in the pre-school years (2-4 years)***

### *Identifying weight status*

Almost half of interview participants indicated visual assessment as being an important cue for identifying weight status (e.g. '[before weighing] *'you can see they are overweight'*', GP 4). This was supported by survey findings that showed 83% (n=25) of respondents would use visual assessments either always (40%, n=12) or most of the time (43.3%, n=13). It was acknowledged by interview participants that by weighing only those children who visually appeared to be over/underweight, milder cases of unhealthy weight status might be missed. Interview participants also identified using growth charts (as recommended in their training) (*'we put them on the chart and then obviously we follow the growth policy'*, CNN3). This was supported by survey findings that showed that 63.3% (n=19) of respondents would use growth charts 'always' (n=13, 43.3%) or 'most of the time' (n=6, 20%). None of the interview participants and only 4 (13.3%) survey respondents reported using Body Mass Index (BMI) in order to identify a child's weight status, over half of survey respondents saying they would 'never' use BMI (n=17, 56.7%).

### *Communicating weight-related topics*

Most interview participants stated that if they had concerns about the child's weight status, they would raise these with parents (*'I would address it even if that wasn't what they'd come for'*, GP3). However, there were inconsistencies in practice, with GPs indicating that unless a parent raised concerns about the child's weight they would not discuss it. Some participants indicated that parental attitudes prevented them addressing children's unhealthy weight status due to concern of negative reactions. They noted the importance of a good relationship with families in facilitating weight-related conversations and parents' acceptance of any advice or guidance given. (*'I do manage to talk without offending them [parents] and the important thing is you don't need to offend the parents so they don't come back to you'*, GP4). Growth charts were often used as an objective tool to raise unhealthy weight status with parents, providing an opportunity to relate their child's position on the chart in comparison to where they should be. (*'I think having the centile chart is a really good thing because obviously you can use that as a visual aid and parents can understand'*, HV1). Whilst survey responses suggested professionals were marginally more likely to raise the issue of overweight with parents (n=22 71.0%) than underweight (n=20 64.5%), interview participants indicated finding underweight easier to discuss as it can be attributed to more external contributory factors (e.g. fussy eating), thus reducing parental responsibility.

### *Practitioner interventions*

After identifying unhealthy weight status in a pre-school child, interview participants reported employing their own interventions, for example, making further assessments (*'I might ask them to keep a food diary'*, CNN3) providing advice and support to families (*'I may leave them with some literature to have a read of or websites to go on'*, CNN 1), or arranging a follow-up appointment to assess the family's progress in implementing any advice given (*'I might just sort of say, would you like some advice about that, you know, shall we weigh and*

*measure them again sometime', GP2).* Survey findings suggested there was little variation in the likelihood of a follow-up being offered if the child was underweight ( $n=12$ , 38.7%) compared to overweight ( $n=10$ , 32.3%). A few interview participants noted that the results of any follow-up assessments provided additional information to pass on in case of referral.

### *Signposting and referrals*

Interview participants reported referring to either local services, (*'they've got the local children's centres that we can refer to who run some physical activities sessions and things like that', CNN1*), or to appropriate health professionals. It was suggested these referrals were in line with current guidance (*'there is a growth policy - if it crosses over more than two centiles up or down it is a referral to the GP', HV1*). Survey findings indicated little variation in referrals to specialist paediatric services. Professionals were marginally more likely to refer an underweight child to a paediatrician ( $n=17$ , 56.6%) than an overweight child ( $n=15$ , 50%). Respondents were, however, more likely to refer an overweight child to leisure centre services ( $n=11$ , 35.5%) than an underweight child ( $n=2$ , 6.5%). Knowledge of referral routes and services appeared to vary between individuals, with some interview participants reporting knowledge of referral routes and available services, others indicating little knowledge outside of their professional role.

### ***Challenges faced in managing pre-school child weight***

The challenges to managing pre-school weight identified in both phases of the study have been grouped into the appropriate level of the SEM. Challenges identified through the interview phase are displayed in table 1 alongside verbatim quotes. Survey findings are displayed in table 2 along with medians and inter-quartile ranges.

[Tables 1 and 2 about here]

### *Individual factors*

In terms of family factors, interview findings highlighted that pre-school child weight management services are often inaccessible to working parents. Interview and survey results highlighted that familial demographic and cultural factors might pose a challenge in managing pre-school child weight, such as limited resources ( $Mdn=4$ ,  $IQR=2$ ), lack of proficiency in English ( $Mdn=4$ ,  $IQR=3$ ), or cultural norms that may favour a larger body size. Weight-specific challenges were identified by interview participants, such as parents expressing concern that their child was underweight when the child's weight status was in fact healthy. Equally, where overweight was not deemed to be a concern for parents this presented a challenge for survey respondents ( $Mdn=5$ ,  $IQR=2$ ). Only one individual staff barrier emerged from the interview phase relating to a lack of practitioner concern about overweight. Survey findings indicated that participants did not see staff factors as a barrier to managing pre-school child weight.

### *Interpersonal Factors*

A number of interpersonal challenges were identified in the course of the interviews. Participants described how on some occasions it felt inappropriate to raise a child's weight status due to other complex issues, e.g., a 'chaotic' home environment or child protection concerns. Overweight was viewed as a sensitive topic with stigma attached, and participants reported concerns that raising weight status could risk damaging relationships with families. In the survey however, neither "feeling that it was an inappropriate time" nor "worrying about harming their relationship with parents" were seen as notable challenges to addressing pre-school child weight-related health (both  $Mdn=2$ ,  $IQR=2$ ).

### *Organisational Factors*

Interview participants frequently reported job pressures as challenges to managing pre-school child weight, including factors such as lack of time and capacity, being understaffed, competing organisational priorities and stretched services. Survey data supported these findings, with lack of time and lack of resources both highlighted as challenges (both  $Mdn=4$ ,  $IQR=2$ ). Additional challenges identified through the interviews included insufficient and unclear pathways and referral routes. This knowledge differed between individuals, with a number of interview participants stating that even if they did identify unhealthy weight status in a child they would not know what to do next. Survey data however indicated that being unfamiliar with local services ( $Mdn=3$ ,  $IQR=4$ ) and referral routes and pathways ( $Mdn=3$ ,  $IQR=3$ ) were not major concerns for participants.

### ***Perceived training needs in relation to managing pre-school child weight***

In both the interviews and surveys, participants indicated the need for additional support and updates on managing pre-school child weight. Of the options provided in the survey (BMI calculation and interpretation, growth charts, weight-related communication, pre-school nutrition, and PA guidelines), the highest reported training need was BMI calculation and interpretation (66.6%,  $n=20$ ), and the lowest was growth charts (20.0%,  $n=6$ ). In the interviews, GPs in particular identified a lack of training in managing pre-school child weight. This was reflected in the experiences of other health professionals, (*'usually they [parents] will say the GP didn't want to look at my [red] book [personal child health record] or didn't understand what the centiles were for so it's quite clear that they haven't really got a clue'*, CNN3).

In both the interviews and surveys, perceived training needs varied between professions. Most interview participants (community nursery nurses, HVs and children's centre staff) were confident in child health-promotion and communication, whereas GPs indicated a lack of child-specific training (*'we had training about communication in the context of breaking bad news [yes] but not really addressing weight issues in toddlers and children'*, GP1). Similarly, in the survey phase, 17 participants (54.9%) did not think they needed further training in child weight-related communication, with only one CNN indicating a training need (14.3%), compared to 100% ( $n=3$ ) of practice nurses and 60% ( $n=6$ ) of GPs. Over half of survey participants (51.6%,  $n=16$ ,) indicated a need for training in pre-school nutrition guidelines, particularly GPs ( $n=7$ , 70%) and practice nurses ( $n=3$ , 100%). The need for training in pre-school PA guidelines was reported by GPs ( $n=9$ , 90%) and practice nurses ( $n=3$ , 100%) compared to just one CNN (14.3%) and two HVs (20%).



Interview participants from all professions indicated a need for greater knowledge of referral pathways and more regular training updates and refreshers.

## **Discussion**

The aim of this study was to improve understanding of multi-agency pre-school (2-4 years) weight management practices in Blackburn with Darwen, a mixed urban-rural borough in the North West of England. The study found inconsistencies in pre-school child weight management practices within and between professional groups. The most frequently cited challenges related to individual family factors within the SEM, e.g. low socio-economic status and families not perceiving the child's weight status to be a problem. Perceived training needs differed between professions and included BMI calculation and interpretation, weight-related communication and pre-school nutrition/PA guidelines.

For health professionals to manage pre-school child weight, they need the skills and knowledge to identify whether a child's weight status is healthy for their age and sex. This study however found inconsistencies in the measures used to assess pre-school child weight status. Participants in the interviews and surveys reported using a mixture of observation and growth charts. Consistent with previous research findings (Edvardsson et al., 2009; Regber et al., 2013), growth charts were perceived to be useful as an objective, visual tool to assist parental understanding, provide reassurance or highlight an unhealthy weight status. In spite of this, the majority of participants reported, at least in part, using visual cues to assess child weight status. This is concerning given health professionals have been shown to be poor at visually identifying children's weight status (Robinson, 2017). Similarly, the use of BMI (to be converted to centiles for age and sex) was limited to only a few practitioners, despite being recommended as best practice by the Royal College of Paediatrics and Child Health (RCPCH) (2013) and advocated in the Blackburn with Darwen local growth policy. It was not however possible from our data to know whether participants who used BMI were able to interpret this appropriately in relation to age and sex specific centiles. Whilst specific reasons were not provided for the lack of BMI use, it was notable the health visiting team were trained to use growth charts but not to calculate BMI or BMI centiles, and interview participants perceived a lack of clear guidance about best practice for pre-school child weight management (as reported elsewhere for school-aged children (Turner et al., 2016)). Other studies have found practitioner reluctance to use BMI due to a perceived inability and lack of time to compute centiles (Barlow et al., 2007; Regber et al., 2013) and a lack of faith in BMI as a measure (Isma et al., 2012; Turner et al., 2016).

Although the current study focused on pre-school children, many of the challenges identified were consistent with findings from a recent meta-synthesis focussed on children of all ages (Bradbury et al., 2018). In both studies, family factors (e.g. lack of parental concern over the child's weight status, limited family resources) were cited as key challenges to managing child weight. These challenges were perceived by practitioners as outside their control, and as inhibitive to families' motivation to implement lifestyle changes. Although such findings suggest a tendency for practitioners to attribute barriers externally (i.e. to families rather than themselves), interventions to train staff in motivational interviewing (e.g. Bonde et al., 2014) have shown that development of psychological skills such as empathy and reflective listening can enhance the ability of practitioners to foster motivation in parents.

Unlike previous studies with school nurses (Kubik et al., 2007; Moyers et al., 2005; Steele et al., 2011; Turner et al., 2016), our multidisciplinary sample did not report a perceived lack of knowledge or competency in managing pre-school child weight management. It is possible our participants had high levels of perceived competence in their practice. However, demand characteristics such as not wanting to admit to, or perhaps not being aware of, a lack of knowledge or competency may have contributed to these findings (Camphina-Bacote, 2003). GPs and practice nurses, however, indicated an awareness of their lack of expertise in the pre-school age group, highlighting need for training in areas including identifying weight status, nutritional and PA guidelines. This is likely to be attributable to the remit of their generic professional roles, when compared to health visiting and children's centre staff who were specifically trained to work with children aged 0-5 years.

Blackburn with Darwen is an area of high ethnic diversity, and participants in our study cited challenges relating to ethnicity and cultural differences (e.g. cultural views of body size, language barriers). Given that parents from different ethnic backgrounds may perceive different body sizes as healthy (Trigwell et al., 2014), it is relevant to consider how pre-school child weight management practices can best support families from multiple ethnic backgrounds. It has been suggested that specific cultural knowledge is not necessarily required when addressing child weight-related health issues (Leonard, 2001; Purnell, 2012). Rather, what is needed is a recognition of the impact of culture on health behaviours and a willingness to explore and respect cultural views when addressing health problems.

There has been little published research on weight-related communication with families of pre-school children, but weight-related communication has been consistently identified as a challenge by health professionals working with school-aged children (Findholt et al., 2013; Kubik et al., 2007; Steele et al., 2011; Turner et al., 2016). In the interviews, a small number of participants identified areas that would prevent them from discussing a child's weight status with a family, such as competing family demands and a fear of parental reactions. In addition, some GPs indicated that unless a parent raised concern about their child's weight status they would not discuss it. In the survey responses, however, communication was not identified as a challenge, although some professional differences emerged with GPs and practice nurses identifying communication as a training need. This is inconsistent with previous research that suggests health professionals face many barriers to child weight-related communication (Chadwick et al., 2008; Bradbury et al., 2018). There are a number of possible explanations for this inconsistency. Our sample may have been highly engaged practitioners with well-developed communication skills; there could be a mismatch between perceived and actual abilities; or health professionals may have been exhibiting 'unconscious incompetence' where they were unaware of the skills that they do not have (Campinha-Bacote, 2003). It is also possible challenges related to discussing weight status with school-aged children (e.g. children being able to understand the discussions, fear of instigating disordered eating (Findholt et al., 2013; Jones et al., 2014)) may not be relevant when working with younger children.

In this study, a number of organisational challenges to managing pre-school child weight were identified, including job pressures, time, and insufficient resources, which have all been reported as challenges to managing child weight elsewhere (Bradbury et al., 2018). A number of gaps in participant knowledge around the provision of services were also identified. Interview findings indicated a need for greater clarity and dissemination of pathways and referral routes for both over-, and underweight. At times, the lack of clear

pathways was cited as a disincentive to address children's weight-related health issues. Whilst this was not identified as a challenge in the surveys, to our knowledge no local care pathway in Blackburn with Darwen existed at the time of the study. Unclear weight-management protocols are widely found when examining practice around children of all ages (Jones, 2014; Morrison-Sandberg et al., 2011; Turner et al., 2016). This highlights the importance of, and the need for, standardised practice and the development of clear child weight management care pathways (as outlined by NICE, 2018).

### ***Strengths and limitations***

Employing a mixed methods approach enabled a deeper exploration of current pre-school weight management practices than would have been possible using either a quantitative or qualitative approach alone. Unlike most previous research, the present study explored practitioner experiences of addressing both under-, and over-weight and their experiences of discussing these with the families of pre-school children. Mapping the challenges faced in practice to the SEM allows for the identification of multiple level factors to inform future interventions by both practitioners and policy makers. Furthermore, this study was driven by local public health need and carried out by a multi-disciplinary research team comprising practitioners, academics and public health specialists. Such multi-disciplinary collaboration is important in bridging the gap between academic research and public health priorities, ensuring child weight-related research remains timely and relevant for practice (Watson et al., 2013).

In order to overcome the limitations of much mixed-methods research (Sparkes, 2015), the study aimed to integrate the qualitative and quantitative study findings (as advocated by Creswell et al., 2011). This required the integration of data from a survey (that included an adaptation of a previously validated questionnaire) with findings that emerged through semi-structured interviews. It is possible the different terminology and descriptors used within the survey and interviews may have contributed to some of the inconsistencies in findings.

Moreover, as study participants were volunteers (and in the case of interview participants were known to have a particular interest in pre-school child weight management), it is possible they were a compliant sample and caution should be taken when generalising to the wider workforce. Additionally, the small numbers of participants from each professional group means any differences between professions may be due to individual rather than professional factors and should be viewed with caution. It is important to consider that both stages of the study relied on self-report, thus responses reflect what participants perceived themselves as doing, rather than their actual behaviour during clinical contacts.

### **Conclusion**

Tackling unhealthy weight status early in a child's life is important in order to avoid potential physical and psychological health problems in adulthood. Pre-school aged children generally have limited contact with health professionals. When contact does occur, it provides a valuable opportunity to identify unhealthy weight status and offer interventions. This study adds to the limited research in pre-school child weight management and how it is managed by multi-disciplinary professionals. The study found inconsistencies in practice in managing

pre-school child weight both within and between professional groups. A number of training needs for health professionals emerged, including identifying and communicating weight status with parents and the need to develop clear weight-related protocols and pathways. Future research should be directed towards developing multi-disciplinary interventions to promote evidence-based pre-school child weight management practices.

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The authors have no conflict of interest to declare.

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**Table 1: Challenges faced in managing pre-school child weight mapped in line with the socio-ecological model (SEM)**

Challenge	Illustrative verbatim quote
<b>Individual level</b>	
<i>Family factors</i>	
<b>Working parents</b>	<i>'When I was in the health visiting service for one-to-one interventions it was 9-to-5 [yep] so if you've got a parent that works that could be a real issue' (PH2).</i>
<b>Cultural norms</b>	<i>'so it is different but regarding the obesity I think even in Asian communities the plumper the child is the better health he is' (GP4).</i>
<b>Language</b>	<i>'the mothers can't speak English' (GP3)</i>
<b>Deprivation</b>	<i>'you see particularly in Blackburn and I'm sure you are aware there is quite a lot of deprivation' (HV1)</i>
<b>Concern about underweight</b>	<i>'my experience has been that people who bring their children they think are underweight when in fact they are probably very healthy' (GP3)</i>
<b>Overweight not a parental concern</b>	<i>'very rarely do we see the children who are overweight, that is not a parental concern; they don't see it as a problem' (GP4).</i>
<i>Staff factors</i>	
<b>Overweight less of a practitioner concern</b>	<i>'you'd be more worried about that [an underweight child] then them being overweight really because you just hope that eventually they would run it [the weight] off and it's lower down the list' (GP2)</i>
<b>Interpersonal level</b>	
<b>Other complex issues</b>	<i>'other more pressing issues I suppose if you had another greater concern than the obesity or the underweight' (GP2)</i>
<b>Inappropriate time</b>	<i>like they were stressed and things had happened since we last saw them it might not be appropriate [to discuss weight] (CNN3)</i>
<b>Sensitive topic</b>	<i>'when they are overweight it's quite a sensitive issue really and parents take offence to it' (CNN3)</i>
<b>Risk to relationship</b>	<i>'the barrier is we don't want to completely lose them because then the children might get lost' (CCS1)</i>



Challenge	Illustrative verbatim quote
<b>Easier to address underweight</b>	<i>'I think probably underweight is easier than overweight because there is still a bit of a stigma to deal with being overweight and there isn't really with underweight' (GP2).</i>
<b>Organisational level</b>	
<b>Job pressures</b>	<i>'no one's picking up because health visitors are stretched and most of our [local authority/NHS] services are now [stretched]' (CCS1)</i>
<b>Lack of services</b>	<i>'there is actually very little services for children who are overweight so it's kind of like we are identifying these children but actually there is very little out there' (HV1).</i>
<b>Unclear pathways</b>	<i>'what sort of help can I offer the parent if there isn't a very clear pathway to manage those children' (GP1)</i>

Table 2: Median and interquartile range (IQR) for perceived barriers to pre-school child weight management (1 = not at all a barrier; 6 = very much a barrier). A median score  $\geq 4$  suggests the issue was on average perceived as a barrier.

Barrier	Mdn (IQR)
<b>Individual barriers</b>	
<i>Staff</i>	
Being unfamiliar with the traditional foods of different cultures	2.5 (3.0)
Not having knowledge of pre-school (2-4 years) child weight-related health topics such as nutrition and physical activity	2.5 (3.0)
Being unfamiliar with cultural practices and attitudes towards weight different from my own	2.0 (2.0)
Not feeling prepared to address families' reactions to discussing their pre-school child's health	2.0 (2.0)
Not feeling confident in discussing a pre-school child's weight-related health with their families	2.0 (2.0)
Not knowing how to raise a pre-school child weight related issue with parents	1.0 (2.0)
<i>Family</i>	
Families not perceiving their pre-school child's over-weight to be a problem	<b>5.0 (2.0)</b>
Parents not having fluency in English can prevent me from discussing a child's weight-related health	<b>4.0 (3.0)</b>
Families with limited resources (e.g. money, time, capacity) not being able to follow through with weight related recommendations	<b>4.0 (2.0)</b>
<b>Interpersonal barriers</b>	
Families not supporting my efforts to address the pre-school child's weight related health	<b>4.0 (2.0)</b>
Worrying that addressing pre-school child's weight-related health would harm my relationship with parents	2.0 (2.0)
I feel it is often an inappropriate time to address a pre-school child's weight-related health	2.0 (2.0)
Worrying about a families reaction if I initiate a discussion about their pre-school child's weight	2.0 (2.0)
<b>Organisational barriers</b>	
Not having the time to address a child's weight	<b>4.0 (2.0)</b>
Not having resources on pre-school weight-related health such as handouts to share with families	<b>4.0 (2.0)</b>
Being unfamiliar with services to which to refer a child and their family	3.0 (4.0)
Being unfamiliar with pre-school referral routes and pathways	3.0 (3.0)
There are often more pressing issues that I need to deal with than a pre-school child's weight	2.0 (3.0)
I find current weight measurement tools (i.e. growth charts and BMI) are not suitable for all ethnic groups	2.0 (3.0)
<b>Not seeing addressing preschool weight as being within my job responsibilities</b>	<b>1.0 (1.0)</b>

\*\* Factors perceived as a barrier (i.e. score 4 or above) are in **bold**.