Preschool staff and parents' perceptions of preschool children's physical activity and fundamental movement skills from an area of high deprivation: A qualitative study

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Abstract

This study investigated preschool staff and parents' perceptions of preschool children's physical activity (PA) and fundamental movement skills (FMS), in relation to the environment, facilities, play and barriers to PA. Following institutional ethics approval, semi-structured focus groups were conducted in 4 preschools, with the inclusion of parents and staff of 2-4-year-old children from North Warwickshire, England. The focus groups consisted of between four and five participants and included both parents and staff. However, focus groups were homogeneous in terms of gender, socioeconomic background and predominately homogeneous in ethnic background. Thematic analysis was used to identify key themes and subthemes. Emergent themes included: spacious outdoor environment, the use of climbing frames and outdoor equipment for promoting PA and developing FMS, who was responsible for PA; time, cost, health and safety concerns as barriers to PA and staff training. Findings suggest that preschools provide good opportunities for PA and FMS, especially for preschool children from low socio-economic backgrounds, allowing them access to outdoor exercise and equipment. However, results from the focus groups highlighted a need for more staff training and greater parental involvement in relation to PA and FMS opportunities, to further improve preschool children's PA levels and develop their FMS. To increase PA and FMS in preschool children, interventions are required which continue with the current levels of PA in preschools, whilst

including greater parental involvement and staff training for increasing PA levels and developing FMS.

Keywords

Fundamental movement skills; low socio-economic background; physical activity; preschool children; thematic analysis

Introduction

Understanding barriers and opportunities to PA in preschool children, in their preschool environment and at home is essential, in terms of their current and future health.

What is the daily recommended physical activity a preschool child should participate in? Preschool children should engage in at least 180 minutes of moderate to vigorous physical activity (MVPA) per day, through challenging indoor or outdoor activities, to facilitate motor development (National Association for Sport and Physical Education 2009, Reilly *et al*. 2012). Preschool children should minimise the time that they spend in extended sedentary periods of time, to improve cardiovascular health and contribute to a healthy weight (Department of Health 2011). Of children aged between 2-4 years in England, only 9% of boys and 10% of girls meet the recommended 180 minutes of MVPA per day (Health and Social Care Information Centre 2012). In England, there is a growing number of children attending preschools due to the government allocating 15 hours for 38 weeks, for all 3 year olds (Institute for Fiscal Studies 2014); placing emphasis on preschools to impact on the PA of their preschool children. Preschool children with parents who have a low socioeconomic status background and a high body mass index, are also at a greater risk of being overweight/obese (van Stralen *et al*. 2012).

What factors effect preschool children participating in PA?

PA levels of children vary, partly due to the different characteristics of the preschool setting (Pate *et al*. 2004) and home setting. Multiple factors determine PA behaviours and these include physiological, psychological, social, environmental and demographic (Giles-Corti *et al*. 2011). Settings with greater space and more opportunities for outdoor play and PA are required, as a lack of space is a major cause of being overweight for 10-40% of children in developed countries (Blair *et al*. 1994). It has since been found that areas of higher greenness were associated with lower odds of increasing BMI (OR: 0.87; 95% CI: 0.79-0.97), suggesting that children should get outside and engage in healthy behaviours as one way of combating childhood obesity (Bell *et al*. 2008). Spacious environments should be part of a preschool's layout as this could be influential in promoting PA in the form of independent mobility (Boldemann *et al*. 2006). Therefore, given their influence in shaping the habits/development of preschool children, parents and staff require a greater understanding of the importance of and barriers to PA, and the impact these barriers have on preschool children's health.

It is important to understand staff and parents' perceptions of preschool children's involvement with PA, including their interaction with the environment and consideration of their socio-economic status. A qualitative study researched PA in 7-9 year olds and identified the safety of the children being a barrier to PA outdoors, whilst parental constraints relating to the weather and equipment, also affected their PA levels (Eyre *et al*. 2015). Therefore, understanding barriers that exist and prevent preschool children participating in PA in their preschool and home environment, could be influential in helping to inform future interventions around increasing PA levels in preschool children.

Is there a link between FMS and PA?

Good fundamental movement skills (FMS)/motor development, positively influence PA participation (Cliff *et al*. 2009) and if opportunities are provided by the environment of the

preschool to engage in motor tasks, then motor skill competence will develop (Barnett *et al*. 2013). Children with better developed motor skills spend significantly more time in MVPA and vigorous physical activity (VPA) and significantly less time in sedentary behaviours, when compared to children with less developed motor skills (Williams *et al*. 2008; Wrotniak *et al*. 2006). Previous FMS are reported as being better predictors of current PA levels (Bryant *et al*. 2014). Therefore, learning and practicing FMS will lead to future success in both participation and maintenance of PA (Bryant *et al*. 2014). National data on adolescent physical inactivity mirrors the data on early childhood FMS delays (Stodden *et al*. 2008); supporting the assumption that different levels of motor skill development in children, may be an influencing factor in being physically active. This appears to suggest that FMS and PA track each other, therefore, understanding how FMS affects preschool children's daily PA is imperative.

PA and motor development are important, as they both develop in the preschool years and they are precursors for future PA and development of FMS, which are relevant for lifelong daily living and sport specific movements (Gallahue 1982). However, the majority of studies that have examined this issue have taken a quantitative approach directly measuring preschool children's PA patterns (Jackson *et al*. 2003; Penpraze *et al*. 2006; Trost *et al*. 2000). Whilst this approach is useful, it is of key importance to understand the perceptions and experiences of parents and preschool staff, regarding the PA of preschool children. This is crucial to build the foundations for a physically literate life and to inform future interventions to enhance PA and motor development in this age group. Qualitative data can provide contextual information and at the same time a rich insight into human behaviour (Guba and Lincoln 1994).

To the author's knowledge, no study to date has provided such information. Therefore, the aim of this study is to investigate preschool staff and parents' perceptions of preschool children's PA and FMS, from a qualitative perspective, considering the environment, facilities, play, socio-economic status and barriers to PA.

Method

Study design

Research was approached with an interpretivist qualitative study design, that included semi-structured focus group interviews. An interpretivist approach aims to understand the actions and perceptions of individuals through their own view and in their own social context (Bryman et al. 2009). Given the goal of this study, this lens was ideal as it allowed for the examination of the participants experiences and perceptions of PA in preschool children (Brydges et al. 2016). This approach ensures that appropriate dialogue between the researchers and participants occurs to collaboratively construct a meaningful reality.

Participants

Following institutional ethics approval and informed consent, a purposive sample of parents and staff of 2-4-year-old preschool children attending four different part-time and full-time nurseries/pre-schools in North Warwickshire, England, participated in this study (n = 17, this consisted of: staff = 7, parents = 10). North Warwickshire was chosen as it incorporates preschools in areas that are considered to have the highest levels of socio-economic deprivation in the County. The focus groups consisted of four to five in each group. They were homogenous in terms of gender (all female), socioeconomic background and predominately ethnic background (16 = Caucasian, 1 = South Asian). Morgan (1988) stated that the goal is to have a homogenous group in background, yet not in attitude. As homogeneous groups know each other, there is the hope they are more comfortable to be open with each other. Within Warwickshire, there are nine Super Output Areas (SOA) that are in the top 10% of the most

deprived in England (Warwickshire Government 2010); the preschools used in this study were all in such an SOA.

Instrument

Data for the study was collected via semi-structured focus group interviews. Focus groups are important due to promoting interaction between participants, they allow individuals to explore and clarify their views efficiently (Kitzinger 1995). They facilitate discussion on a topic through the application of clearly formulated questions (Stewart and Shamdasani 1990). These were used to gain an in-depth understanding of preschool children's PA levels, both in the preschools and at home. Each focus group consisted of four or five participants, as recommended by King and Horrocks (2010); with each focus group containing a mixture of staff and parents. The focus groups were heterogeneous in their nature, as they were mixed with parents and staff, yet homogeneous in terms of the participant's gender, socioeconomic background and predominately their ethnic background. This was to enable both parents and staff to voice their views and to also allow them to interact, to further the focus group discussions. Focus groups were chosen as they provide a more naturalistic data collection method in comparison to questionnaires and interviews (Wilkinson 2004). They are advantageous as they allow participants the opportunity to contribute answers based on other people's responses; this can promote free flow of a discussion and allow the language and responses of participants to be heard (Wilkinson 2004).

Researchers

The focus group interviews were conducted by a single trained interviewer (the first author). The interviewer has previous experience of conducting qualitative research, has a background in PA promotion and sport and exercise science. The interviewer has been involved with

preschool children, staff and parents for 8 years, she is a mother of two children (one who was preschool age at the time the interviews were conducted).

Procedures

Six main topic areas were used in the focus groups for questioning parents and staff, they were: 1) knowledge, beliefs and sources of PA; 2) knowledge and beliefs about obesity; 3) knowledge of the environment and facilities for PA; 4) barriers and facilitators to preschool children's PA; 5) knowledge and beliefs of FMS linked with PA; and 6) staff training on PA. The topic areas and questions (see Appendix 1) were adapted primarily from Pate *et al.* (2013) and their views of research questions related to PA in preschool children. Pate *et al*. (2013) suggested that these questions/topic areas will allow practitioners to gain information to provide a more robust understanding of PA and its health implications for preschool children; whilst supplying knowledge to inform what effective strategies could be implemented to ensure preschool children are provided with appropriate PA to keep them healthy. The questions asked were open ended to allow for greater depth in the responses. The chosen topics were important, because they covered a variety of areas previously shown to influence PA. This approach allowed the participants to freely discuss PA levels of the preschool children. Given the importance surrounding obesity prevention through PA in preschools, it was important to examine parents and staffs' knowledge and beliefs about obesity/fatness. Such information is key in targeting future interventions and ensuring any approaches taken to increase PA or reduce unhealthy weight are viable.

The interviews were conducted, during preschool hours, in the preschool settings that staff and parents were connected with. Familiar settings provide comfort and are beneficial for focus group data collection methods (King and Horrocks 2010). The interviews lasted between 45 and 65 minutes per group in accordance with the maximum two hours as stated by Krueger

and Casey (2009). This time window was sufficient for conversations to occur and for the participants to be engaged and not lose concentration.

Analysis of qualitative data

The focus groups were digitally recorded (Olympus DS-2400, digital voice recorder, China), anonymised and transcribed verbatim. A facilitator verified the transcripts; this person was additional to the person interviewing/analysing. This took the form of using two analysts to review the recordings and compare their findings; this is known as analyst triangulation (Patton 2000). This extra analyst provides an important check in terms of selective attention and blind interpretative bias, whilst ensuring the verification and validation of qualitative analysis (Patton 2000). The data from the focus group interviews were analysed using thematic analysis, where patterns within the sample were found, according to guidelines proposed by Braun and Clarke (2006). Thematic analysis is a widely used mechanism which is used to identify, analyse and report patterns within qualitative data; it is considered to reflect reality and determine themes (Braun and Clarke 2006), allowing key themes and subthemes to be identified from the transcripts. The results reported were agreed by all analysers. This takes the view of a phenomenological approach which focuses on the personal knowledge and subjectivity of an individual, whilst emphasising the importance of personal perspective and interpretation (Lester 1999).

Results and Discussion

This study has provided a qualitative overview of perceptions of environmental influences on PA and the development of FMS of preschool children, from the view of both parents and preschool staff. No study, to date, appears to have done this and as such, the current study makes a novel contribution to the literature. The use of a qualitative approach was significant

as it explored the thoughts and actions of the parents and preschool staff and importantly the reasons for these behaviours. Such a standpoint appears to have been neglected in the literature relating to the facilitators and barriers to PA in children in the early years. The study aimed to consider the environment, facilities, play, and barriers to PA and FMS development.

Results are presented in relation to each of the six main topic areas and quotes are referenced as the individual setting identified by Se, followed by the preschool staff and parents as S and P, respectively. The main themes from the focus group interviews were related to promoting PA and FMS development, and they were: the outdoor environment is influential, time and cost are a barrier for parents, more parental involvement is required and staff training on how to implement PA and FMS in preschool settings is needed.

Knowledge, beliefs and sources of PA

Participants' knowledge of PA and their beliefs and opinions of PA can be seen in Table 1.

What is PA?

Regardless of the setting all parents and staff had a good knowledge of PA. The results highlight that both parents and preschool staff had a good understanding of PA, as they linked it to movement, an increased heart rate and the outdoors. The emerging themes all related to movement where running, jumping, using the tricycles and the outdoor space were all mentioned. Participants reported that '*PA is anything that increases heart rate, for example running'* (Se1, S1; Se2, S1).

What are the benefits of PA?

There were numerous benefits of PA that were mentioned and these were categorised under physiological, psychological and sociable (Table 1). That said, the main benefits of PA were

associated with the physiological and psychological changes as PA was viewed as 'burning fat and energy' and it makes the children 'physically better'. However, the physiological benefits of burning energy, were continuously linked with the psychological benefits of the preschool children having 'better concentration' levels, being 'more attentive' and generally 'more focused'.

Perceptions of Play

Play was seen as key to contributing to PA by both parents and staff. 'Play' was described as '*being physical*' (Se1, S2), participating in '*anything that the children enjoy and is fun, like jumping and role play'* (Se2, P3), it '*could involve anything from doing a jigsaw to being imaginative super heroes*' (Se1, S1). Play was summarised as '*learning through mainly outdoor activities like playing on climbing frames and running around*' (Se4, S2). '*Our children do a drama group, this also promotes play as they tend to be giants and very physical, this is where play and PA interlink*' (Se1, S1). It was added that '*children don't view PA and play as different, which is positive, as children just exercise and enjoy it, whereas adults sometimes see it as a chore'* (Se2, P3). '*When outside the children are actively moving around and pretending to be different characters*' (Se3, S2), '*they never sit down, a game always evolves someway, whether it is playing aeroplanes or running around'* (Se4, S1). The outdoor environment was viewed as the main instigator in allowing play to occur, which in accordance with the parents and staffs' opinions, is also where PA is primarily initiated. Parents and staff felt that the preschool children play for '*the majority of the day'* (Se1, P1), '*they never stop*' (Se2, P2). With most participants acknowledging that '*play occurs most of the time, apart from food and stories'* (Se1, P2), potentially '*75% of the time'* (Se1, S1).

What/who are the key sources of PA in the children?

Parents and staff are key sources of PA for preschool children, with childcare settings being a strong predictor of PA levels (Pate *et al*. 2008). Participants from three of the settings agreed that both parents and preschool staff are the key sources of PA. One participant stated, '*it depends on how much time the child spends in a care setting, for example if most of their time is in nursery, then nursery should be responsible'* (Se3, P2). One participant stated the responsibility lies with the '*parents as they [preschool children] are at home more*' (Se2, P2). This was further supported as it was felt that '*parents did have a responsibility as well when they are with their child'* (Se3, S1; Se3, S2). Therefore, the role of the parents needs to be considered when designing interventions associated with PA for preschool children. A different view point was that one participant felt that her '*son instigates it [PA] and then as the parent I follow it. If it's a day when really wet and not able to get outside, then I know about it!*' (Se3, P1). This is implying that the outdoor environment is a key contributor to promoting PA for preschool children.

[Table 1 near here]

Knowledge and beliefs about obesity

Obesity was viewed as important by both parents and staff and they implicitly linked a lack of PA with obesity. Participants' believed preschool children become obese due to '*sitting on their backsides, playing computer games*' (Se2, P3), '*participating in sluggish behaviour*' (Se2, P1) and '*parents giving them process foods…to keep them quiet*' (Se2, S1), this was stated as being evidenced through the preschool children's lunch boxes, staff members own opinions and through links with media coverage (Table 2). Preschool children's' lifestyle, whether that is the past times they participate in or the foods they eat, both influence their weight status and potential to become obese. This was supported by Larson *et al*. (2011) who completed a review

and identified that a lack of strong regulations in childcare settings exist in relation to PA and diet.

Participants' opinions of obese children were, it is '*not nice to see*' (Se1, S2), '*I feel sorry for the child*' (Se2, P3), '*it can be a negative judgemental view and opinion of them being fat*' (Se4, S2), '*it is not an opinion of the child…a judgement of the parents*' (Se2, P1), '*sometimes we take things for granted and others may not be able to be healthy*' (Se1, P1), we '*cannot judge as we do not know if the parents have money to buy healthy foods'* (Se1, S1). '*Personally, I feel if the parents are overweight then they are not doing the correct things at home regarding eating and PA, then the children see this and think it is normal, this goes to all generations*' (Se3, P2). When discussing what counts as obese, it was mentioned that '*staff do not know the weight of the children, so it's their appearance we go by and those children that are 'more chunky''* (Se1, S1). One setting said '*we have an obese boy, the boy's health is starting to suffer as he struggles to move as easily as the other children'* (Se4, S1), '*children are starting to pick on him, we have informed health visitors'* (Se4, S2). It was added that some participants were '*shocked that some preschool children are obese, I thought their metabolisms are faster. I thought their body's burn junk foods quicker*' (Se3, P3). The participants felt that this was a misconception by society and it was agreed that preschool children also need to participate in regular PA.

All participants stated that preschool children's weight is a responsibility of parents and settings. '*Preschools are not responsible for children's weight, but they are responsible for activities for when they are in settings*' (Se3, P1). '*Some children are only at the setting for 3 hours a day, some days a week*' (Se4, S2). We '*can't control what the children eat and do regarding activity at home and vice versa*' (Se1, S1). Children's weight status and PA levels '*has to involve the home setting as well*' (Se2, P1). '*Preschools are important in providing PA, in terms of time and space to burn off energy, yet they are not solely responsible* (Se2, S1). '*It*

must be considered that some children at the setting, are only active when in the setting, this informs the planning' (Se4, S1). '*In the end it sometimes feels that the PA of these children are our responsibility as it is the only exercise they participate in*' (Se4, S2). These comments are crucial, because in respect to the preschool staffs' 'planning', they aim to provide the preschool children with appropriate time and activities for PA; this is helping to ensure they meet the requirements of 180 minutes of PA a day. The preschool environment was identified as the main place, where the majority of preschool children participate in MVPA, and for some children, the only place. The home environment did not appear to promote PA for all preschool children. One parent stated that she is '*tired when I get home from work so I don't always go outside and exercise with my son, sometimes putting the TV on is easier. I do try to exercise with him at the weekend and this does happen more than in the week. I know he exercises at nursery though*' (Se4, P1). This parent feels that her son gains the required PA levels at preschool and therefore she is happy if she does not participate in exercise with him during the week. A further parent stated that '*I use the weekends to catch up on household chores as I work in the week, this can prevent my child from being as active as maybe he should'* (Se2, P2). It has been suggested that lower income households have greater access to technology, increasing sedentary behaviour, as opposed to MVPA (Tandon *et al*. 2012). Engaging and educating preschool children to eat healthy food and exercise more were the key findings. This emphasises the relevance of preschools maintaining the MVPA levels that they deliver. It also suggests that future interventions with preschool children need to involve parental engagement more (Summerbell *et al*. 2012), particularly for PA interventions in the home environment and combining this with training the parents to understand FMS and PA levels and to be confident in improving them in their preschool children. This is important as habitual PA is associated with many health benefits in children, with greater health benefits being associated with higher levels of PA (Janssen and LeBlanc 2010). Participants mentioned, '*in deprived areas more*

walking is needed, yet parents do not…there is the need for more free facilities for children' (Se2, P3). Also, the involvement of '*family incentive exercise is imperative*' (Se2, P1) and ideally there should be '*more active…and free activities*' (Se2, P1) '*for all of the family*' (Se4, S1). A mixture of free swimming and team activities for all the family were mentioned as ways of improving participation in PA, to prevent obesity for preschool children and their parents.

The suggestions made by the parents and staff regarding changes that can be made to resolve the obesity epidemic all focused on educating and promoting not just the children but the whole family to eat healthy and be physically active. The '*family incentive with exercise is imperative*' (Se2, P1; Se, P2), however the cost of family exercise was raised and it was stated that more activities need to be free. The safe walk to nursery and cycle schemes were favourably looked at, however the concern around time to complete these activities was raised by some parents. In relation to 'eating' the incentive for lower income families to receive fresh fruit and vegetable vouchers was commended and so was a 'fat tax', as the aim was this would encourage families to eat healthier. Parents and staff agreed that interventions to prevent obesity were required and these should be a combined effort in terms of promotion from the government, local government and individuals.

[Table 2 near here]

Knowledge of the environment and facilities for PA

The indoor and outdoor space are both important in promoting PA in preschool children, because '*in this country we don't have the weather so the children are active in both environments*' (Se1, P1; Se1 S1) (Table 3). However, this was contradicted slightly, as one

parent said that '*the outside is very important due to getting fresh air, it is important to get outside in as much weather as possible*' (Se3, P3). Staff at one setting stated that '*free flow for the children happens, they play outside when they want, within a set time, this excludes registration, snack and lunch times*' (Se3, S2). When it came to specifying the facilities and equipment being used in the settings, it was the outdoor space that was always mentioned, with '*the outdoors [being] more important as it is larger*' (Se4, S1; Se4 S2). Parents did infer that when their children are active at home it is always the outside environment that they promote PA in. Parents stated that they are happy for their children '*to be active on trampolines, kicking a football, doing somersaults*' (Se2, P1), however, they do not promote PA of this nature inside '*because it would involve the children breaking something or injuring themselves'* (Se3, P1).

This study highlighted that the outdoors is considered a key environment for PA. This includes the key features of space, within the outdoor environment to run around in and also climbing frames to play on. Studies have noticed that play space has been significantly negatively associated with sedentary activity and positively associated with vigorous activity (Ridgers *et al*. 2010), and children are more active in spacious areas, compared to restrictive areas (Pellegrini and Smith 1993); with outdoor play being associated with a lower risk of being overweight (Velduis *et al*. 2012). Being outside was considered imperative, as it provides a large area that could be accessed in all weathers; although indoor areas were viewed as important, as the English weather is temperamental. This study is key in that it has captured the thoughts of both parents and staff on PA and FMS levels and discovered that they both agree that it is vitally important to improve PA and FMS. They stated that this is achieved primarily through participation in PA and FMS in a spacious outdoor environment, where the preschool children can run around, or in an outdoor area with a climbing frame, which they can climb and be active. This is supported by Pate *et al*. (2008) as they stated that being in the outdoors is one of the most powerful correlates of PA in children. Equally, the time a preschool

child spends outside has a positive association with PA (Hinkley *et al*. 2008). The outdoor equipment that was referred to in this current study was climbing frames, bikes and balls; when compared to the indoors there was more concern for health and safety. Research shows that children engage in vigorous PA, when equipment such as balls and jump ropes are provided (Wilenberg *et al*. 2010). Facilities that were linked with PA and FMS development were the outside area, school fields and playgrounds, with one preschool using an adjacent school hall. The positive influence of preschools as key instigators in promoting preschool children's PA levels, FMS and health was evident, as all of the preschools promoted PA and FMS through different projects such as daily games, involvement of external companies and staff running 'Forest School' sessions.

The staff from a variety of settings stated that in order to see improvements in the preschool children's PA levels they would like to see the outdoor area ideally extended, the grass area utilised more (Se3) and additional climbing equipment to be added outdoors as well. One setting also stated if they were trained in football for example then they could run sessions and facilitate with improvements in PA. The key message here is that all suggested improvements regarding equipment and facilities to improve PA, were all centred around the outdoor environment.

[Table 3 near here]

Barriers and facilitators to PA

Time, cost, parent's lifestyle, the need for larger outdoor areas, too many barriers inside and health and safety concerns of specific staff, were considered as barriers to PA by all participants (Table 4). The impact barriers have on the preschool children is '*when they are not active… the children are crankier and irritated as they have not burnt their energy*' (Se3, P3). Time

was identified as a key barrier to PA, as this was associated with parents having busy lifestyles and having little time to dedicate to PA with their children. *'Parents have chores to complete, so sometimes the children are put in front of the television*' (Se2, P1); this prevents PA from taking place. Cost was also identified as a barrier, as parents perceived that they needed more money to facilitate PA. '*When the weather is not good, it is costly for swimming, play pits and structured activities*' (Se3, P1). If parents had more disposable income, or if activities were cheaper/free, then parents stated they would promote PA and FMS development more with their preschool children. Equally, more training for parents could be provided to show them how they can be physically active with their children and develop their FMS, without spending any money. In preschool, some settings stated health and safety as an issue, as some staff members are more cautious of the children climbing on slides and being active. It would be beneficial if staff could attend training on incorporating the use of the climbing equipment into a preschool child's day; this would promote more MVPA for the preschool children. This would help some staff to break down the barriers they personally have with the children engaging in activities on the climbing equipment. Parents should also be made aware of the health and safety concerns of staff, as it could be that their child is not as active in the preschool setting as they believe. It was stated by one member of staff, that '*some children prefer to stay inside and not go outside, this is because the child is so active outside of the nursery they 'relax' at nursery*' (Se3, S1). This is positive in terms of this setting feeling that some of their children are active at home, but then a barrier for the setting, as they struggle to involve some of the children in PA during preschool time.

[Table 4 near here]

Measuring PA and FMS

Opinions differed on how you can measure PA. Responses ranged from '*observing them [preschool children] taking part in running and jumping and how long they do it for*' (Se3, P1), to '*their behaviour, for example they are more conforming and their ability to learn*' (Se2, P1). The majority of the participants felt measuring PA was important, because '*if children are not active then it affects them physically and mentally'* (Se3, P3). It was considered a way of identifying who is obese and not, however, some individuals felt it is only necessary to measure PA if a child is overweight. This identified confusion in the staff and parents' opinions of PA and obesity, as PA is a health-related behaviour which is associated with obesity, not a measure of obesity.

Most parents and staff were supportive of measuring FMS as they felt it was essential in terms of developing PA levels in preschool children (Se1, P2; Se1, S1; Se2, P2; Se3, P1; Se4, S1). Some of the staff expressed interest in having an involvement in developing the children's FMS and PA levels; this was supported with positivity from the parents, as they were happy for the preschool staff to develop their children's FMS and PA levels. One parent did say it '*would take the pressure off of me having to ensure their levels [FMS and PA] were good enough*' (Se3, P1). However, some parents disagreed with measuring PA levels and FMS as they felt that measuring these was '*not really [important] unless my child was obese and I needed to do something about it*' (Se1, P1).

Measurement of FMS was therefore met with a divided opinion, as some participants felt that it was imperative, because if the preschool children are weak at any skills, then staff can practice specific skills and inform parents to work on them. Staff did say that they required more training in identifying the presence or absence of these FMS skills and if this happened, they were extremely willing to develop the skills with the preschool children. Such opinions align well with prior research showing that children with better developed FMS, spend significantly more time in MVPA and VPA and significantly less time in sedentary behaviours

(Williams *et al*. 2008; Wrotniak *et al*. 2006). Conversely, some individuals felt that there needs to be a balance between testing and children enjoying themselves; they do not want 'over measuring'.

Knowledge of FMS

The participants' definition of motor skills was very good. '*Fine motor skills are manipulation, for example, control of pencil, putting Lego together. Gross or large movements involve coordination of arms and legs [and] being able to kick a ball*' (Se2, P3). The participants defined FMS as involving '*movements like running and jumping, which are fundamental to what the children do on a daily basis*' (Se4, S1; Se4 S2). Staff '*promote gross motor skills probably more so outside, where these can be assessed'* (Se4, S2). It was felt that measurements '*help improve parent's knowledge; they know what their child should be achieving at their age*' (Se3, P1). However, some people felt '*we need a balance between testing and letting the children move*' (Se1, P2). In terms of instigators for FMS, it was felt that the outdoor space promoted '*running around*' (Se1, P1; Se1 P2), '*climbing and drama, which involve big movements*' (Se1, S1). The *staff 'promote gross motor skills probably more so outside, where these can be assessed'* (Se4, S2). Most preschools said that they ensured that their children participated in outdoor activity daily regardless of the weather, as the children simply wore their coats. Equally one nursery had an outdoor area that was undercover and easier to participate in PA in all weather. Whenever development of FMS was considered, the outdoor space was always referred to; this was where PA and FMS were always promoted. The indoor environment was considered a place for more formal learning to occur and viewed as having more health and safety concerns, which prevented the promotion of FMS and PA occurring in it. '*We [staff] are always developing their running, jumping and holding a pen, so they concentrate on fine and gross skills*' (Se3, S2). This highlighted that the staff were

knowledgeable on FMS, however they were honest and said that at times they felt they devoted more time to reading and writing in terms of 'achieving academic targets' than to FMS and PA levels. One parent stated that she has '*two children and my background knowledge is not that good on this area, I feel nursery staff need to help me promote this*' (Se1, P1). This parent felt that the preschool that her child attends should take more responsibility for improving parent's knowledge of FMS and PA levels. This would be placing further responsibility and involvement on preschool staff in developing preschool children's' FMS and PA levels. This opinion was not agreed with by many parents or staff because the staff (Se1, S1; Se4, S2) stated that their time was devoted to promoting PA to the preschool children within the setting. Additionally, some parents felt that it was '*the responsibility of the parents to improve their knowledge and get involved in PA more, parents should accept responsibility for their own child's health and stop blaming others'* (S3, P1).

Staff training on PA

The majority of parents presumed that the staff '*have a basic, yet good understanding of PA*' (Se1, P1). One parent believed that staff '*are all NVQ trained and some are working up to degree level'* (Se2, P3). Staff from one setting stated that '*two members are fully trained forest school leaders and two have completed shorter training to accompany colleagues for forest schools*' (Se3, S1). Forest schools help to build independence, develop confidence, self-esteem and a positive attitude in preschool children, this happens through hands on learning exploring the outdoors. This differed between settings as staff from one setting said they '*are not trained, I feel there is no training available to participate in*' (Se4, S1; Se4 S2). The staff are always '*willing to accept training, it comes down to money*' (Se4, S1), they considered training important '*to keep current and improve knowledge*' (Se2, P2). '*Training provides ideas of how to link the Early Years Foundation Stage (EYFS) framework into sessions, to ensure the*

children are more active' (Se4, S2). Therefore, by attending relevant training, all preschool staff can improve the PA levels of preschool children. All staff did comment that they would like more training as this would ensure that they are all more competent at delivering PA and developing FMS, and this would help the preschools financially, as they would not need to hire in external companies. This is possible as childcare settings provide opportunities to improve time engaged in PA and allow staff to promote healthy behaviours (Kipping *et al*. 2016). Unfortunately, there is currently limited training available on PA, and all participants wanted further training for staff, covering how PA can be incorporated and delivered in a preschool setting; the cost of these courses was preventing training from occurring. Therefore, when considering future interventions, training on PA promotion for staff is a requirement.

Limitations

There are some limitations with this study. The four preschools were from a similar geographical area; therefore, it is hard to generalise to other areas. The majority of the sample was Caucasian; whilst it would have been interesting to hear the viewpoints of other participants, they were not available in this area. This sample was from a low SES area and therefore this study lacks generalisation to the wider population of preschool children. Future research into children from different SES areas would be welcome. As this was a qualitative study, then the research is dependent on the individual skills and experience of the researcher. The researcher conducting the interviews was trained in the completion of focus group interviews and how to construct and perform these. As the researcher was present in the focus groups then this may have prevented the participants' from making honest responses. This current study did not consider the impact that cultural differences had on this research area.

Cultural differences may have influenced the focus group outcomes; this is potentially an area for further exploration.

This current study was however the first to consider the staff and parents' views of PA and FMS in a low socio-economic area, while considering environmental issues. Including parents and staff in the focus groups, allowed for both of their opinions and a greater discussion of the preschool and home environment in terms of PA. Equally, having both parents and staff in the same focus group, could have prevented the parents from fully providing their opinion. The parents may have withheld from divulging negative opinions associated with PA in the preschool. It was considered that the key facilitator of PA and developing FMS is a spacious outdoor environment for the preschool children to move in and the inclusion of climbing frames for them to climb and be physically active on. This study has provided crucial data of preschool staff and parent's experiences and beliefs of PA levels, and what they believe are the key instigators for increasing PA and developing FMS for preschool children.

Conclusion

This study highlights that preschool settings and the outside environment are major influences in terms of promoting PA for preschool children from a low socio-economic area. This implies that, to improve PA in preschool children, the preschool settings and the outside environment are key instigators in allowing the children to be active, therefore more resources, for example, time and money need to be inputted into these to ensure preschool children are participating in the required PA levels. The qualitative approach taken here, provides a much needed perspective from the key caregivers, as those best placed to make positive changes in the lives of children, as to ideal means and locations, where health enhancing PA could be promoted, specific to children in their early years of development. The home environment was identified as needing to be more supportive in promoting PA and FMS. This could be achieved

by parents being trained in activities that allow them to engage themselves and their preschool children in PA, which have no, or a minimal cost. For future interventions, preschool settings should consider staff attending training, which focuses on receiving ideas on activities that will engage the children in PA and develop their FMS. Implementing these ideas would enable preschool children to be more physically active, increase their PA levels and develop their FMS, through both parental involvement and preschool staff training.

Declaration of interests

There are no conflicts of interest.

References

Barnett, L., Hinkley, T., Okely, A. D. and Salmon, J., 2013. Child, family and environmental correlates of children's motor skill proficiency. *Journal of Science and Medicine in Sport,* 16 (4), 332-336.

Bell, J. F., Wilson, J. S. and Liu, G. C. 2008. Neighborhood greenness and 2-year changes in body mass index of children and youth. *American Journal of Preventive Medicine,* 35 (6), 547-533.

Blair, S. N., Wood, P. D. and Sallis, J. F., 1994. Workshop E: Physical activity and health. *Preventive Medicine,* 23 (5), 558-559.

Boldemann, C., Blennow, M., Dal, H., Mårtensson, F., Raustorp, A., Yeun, K and Wester U., 2006. The impact of outdoor environment upon preschool children's physical activity and sun exposure. *Preventive Medicine,* 42 (4), 301-308.

Braun, V. and Clarke, V., 2006. Using thematic analysis in psychology. *Qualitative Research in Psychology,* 3 (2), 77-101.

Bryant, E. S., Duncan, M. J. and Birch, S. L., 2014. Fundamental movement skills and weight status in British primary school children. *European Journal of Sport Science,* 14 (7), 730-736.

Brydges, M., Denton, M. and Agarwal, G., 2016. The CHAP-EMS health promotion program: a qualitative study on participants' views of the role of paramedics. *BMC Health Services Research* 24;16(1):435.

Bryman, A., Teevan, J. J and Bell, E., 2009. *Social Research Methods*. 2nd ed. Toronto: Oxford University Press.

Cliff, D. P., Okely, A. D., Smith, L. M. and McKeen, K., 2009. Relationships between fundamental movement skills and objectively measured physical activity in preschool children. *Pediatric Exercise Science,* 21 (4), 436-449.

Department of Health., 2011. *Physical activity guidelines for Early Years (under 5s) – for children who are capable of walking* [online]. Department of Health. Available from: https://www.gov.uk/government/publications/uk-physical-activity-guidelines [Accessed 18 May 2016].

Eyre, E. L., Duncan, M. J., Birch, S. L. and Cox V., 2015. Environmental and school influences on physical activity on South Asian children from low socio-economic backgrounds: A qualitative study. *Journal of Child Health Care,* 19 (3), 345-358.

Gallahue, 1982. *Understanding motor development in children*. Boston: John Wiley and Sons, Inc.

Giles-Corti, B., Wood, G., Pikora, T., Learnihan, V., Bulsara, M., Van Niel, K., Timperio, A., McCormack, G. and Villanueva, K., 2011. School site and the potential to walk to school: The impact of street connectivity and the traffic exposure in school neighbourhoods. *Health Place,* 17 (2), 545-50.

Guba, E. G. and Lincoln, Y. S., 1994. Competing paradigms in qualitative research. *In* N. K. Denzin and Y. S. Lincoln ed. *Handbook of qualitative research.* Thousand Oaks, CA: Sage, 105-117.

Health and Social Care Information Centre, 2012. *Health Survey for England – 2012* [online]. Health and Social Care Information Centre. Available from: http://www.hscic.gov.uk/catalogue/PUB13218 [Accessed 10 July 2016].

Hinkley, T., Crawford, D., Salmon, J., Okely, A. D. and Hesketh. K., 2008. Preschool Children and Physical Activity A Review of Correlates. *American Journal of Preventive Medicine,* 34 (5), 435-441.

Institute for Fiscal Learning, 2014. *The impact of free early education for 3 year olds in England* [online]. Institute for Fiscal Learning. Available from: http://www.ifs.org.uk/uploads/publications/docs/MISOC%20Childcare%20briefing%20paper.pdf [Accessed 28 June 2016].

Janssen, I. and LeBlanc, A., 2010. Systematic review of the health benefits of physical activity and fitness in school-aged children and youth. *International Journal of behavioural nutrition physical activity,* 7 (1), 40.

Jackson, D. M., Reilly, J. J., Kelly, L. A., Montgomery, C., Grant, S. and Paton., J. Y., 2003. Objectively measured physical activity in a representative sample of 3- to 4-year old children. *Obesity Research,* 11 (3), 420-425.

King, N. and Horrocks C., 2010. *Interviews in Qualitative Research*. London, UK: Sage.

Kipping, R., Jago, R., Metcalfe, C., White, J., Papadaki, A., Campbell, R., Hollingworth, W., Ward, D., Wells, S., Brockman, R., Nicholson, A. and Moore, L., 2016. NAP SACC UK: protocol for a feasibility cluster randomised controlled trial in nurseries and at home to increase physical activity and healthy eating in children aged 2-4 years.

British Medical Journal [online], 6. Available from: http://bmjopen.bmj.com/content/6/4/e010622.full.pdf+html

Kitzinger, J., 1995. Qualitative research: introducing focus groups. *British Medical Journal,* 311 (7000), 299-302.

Krueger, R.A. and Casey, M. A., 2009. *Focus groups a practical guide for applied research*. 4th ed. Thousand Oaks, CA: Sage.

Larson, N., Ward, D. S., Neelson, S. B. and Story, M., 2011. What role can child-care settings play in obesity prevention? A review of the evidence and call for research efforts. *Journal of the American Dietetic Association,* 111 (9), 1343-1362.

Lester, S., 1999. *An introduction to phenomenological research* [online]. Stan Lester Developments, Taunton. Available from: https://www.researchgate.net/publication/255647619_An_introduction_to_phenomenological_research [Accessed 27 September 2016].

Morgan, D. L., 1988. *Focus groups as qualitative research*. Beverley Hills, CA: Sage.

National Association for Sport and Physical Education, 2009. Active Start: A Statement of Physical Activity Guidelines for Children From Birth to Age 5, 2nd Edition. Available from: https://www.columbus.gov/uploadedFiles/Public_Health/Content_Editors/Planning_and_Performance/Healthy_Children_Healthy_Weights/NASPE%20Active%20Start.pdf [Accessed 18 March 2016].

Pate, R. R., O'Neill, J. R., Brown, W. H., McIver, K. L., Howie, E. K. and Dowda, M., 2013. Top 10 research questions related to physical activity in preschool children. *Research Quarterly for Exercise and Sport*, 84, 448-455.

Pate, R. R., McIver, K., Dowda, M., Brown, W. H. and Addy, C., 2008. Directly observed physical activity levels in preschool children. *Journal of School Health,* 78 (8), 438-444.

Pate, R. R., Pfeiffer, K. A., Trost, S. G., Ziegler, P. and Dowda, M., 2004. Physical activity among children attending preschools. *Pediatrics*, 114 (5), 1258-1263.

Patton, M. Q., 2000. Enhancing the quality and credibility of qualitative analysis. *Health Services Research,* 34: 5 (part II), 1189-1208.

Pellegrini, A. D. and Smith, P. K., 1993. School recess: implications for education and development. *Review of Educational Research,* 63 (1), 51-67.

Penpraze, V., Reilly, J. J., MacLean, C. M., Montgomery, C., Kelly, L. A. Paton, J. Y., Aitchison, T. and Grant. S., 2006. Monitoring of physical activity in young children: How much is enough? *Pediatric Exercise Science*, 18 (4), 483-491.

Reilly, J. J., Okely, A. D., Almond, L., Cardon, G., Prosser, L. and Hubbard, J., 2012. *Working Paper. Making the case for UK physical activity guidelines for Early Years: Recommendations and draft summary statements based on the current evidence*. Department of Health: London.

Ridgers, N. D., Fairclough, S. J. and Stratton, G., 2010. Variables associated with children's physical activity levels during recess: the A-CLASS project. *International Journal of Behavioral Nutrition and Physical Activity [online]*, 7, 74. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2959085/pdf/1479-5868-7-74.pdf [Accessed 28 August 2016].

Stewart, D. and Shamdasani, P. N., 1990. *Focus Groups: Theory and Practice*. Newbury Park, CA, USA: Sage.

Stodden, D. F., Goodway, J. D. and Langendorfer, S. J., 2008. A developmental perspective on the role of motor skill competence in physical activity: an emergent relationship. *Quest,* 60 (2), 290-306.

Summberbell, C. D., Moore, H. J., Vögele, C., Kreichauf, S., Wildgruber, A., Manios, Y., Douthwaite, W., Nixon, C. A. and Gibson. E. L., 2012. Evidence-based recommendations for the development of obesity prevention programs targeted at preschool children. *Obesity reviews,* 13 (Suppl. 1), 129-132.

Tandon, P. S., Zhou, C., Sallis, J. F., Cain, K. L., Frank, L. D. and Saelens, B. E., 2012. Home environment relationship with children's physical activity, sedentary time, and screen time by socio-economic status. *International Journal of Behavioral Nutrition and Physical Activity,* 26 (9), 88.

Trost, S. G., Pate, R. R., Freedson, P. S., Sallis, J. F. and Taylor, W. C., 2000. Using objective physical activity measures with youth: How many days of monitoring are needed? *Medicine and Sciences in Sports and Exercise*, 32 (2), 426-431.

Van Stralen, M. M., te Velde, S. J., van Nassau, F., Brug, J., Grammatikaki, E., Maes, L., De Bourdeaudhuij, I., Verbestel, V., Galcheya, S., Lotova, V., Koletzko, B. V., von Kries, R., Bayer, O., Kulaga, Z., Serra-Majem, L., Sánchez-Villegas, A., Ribas-Barba, L., Manios, Y. and Chinapaw, M. J., 2012. Weight status of European preschool children and associations with family demographics and energy balance-related behaviours: a pooled analysis of six European studies. *Obesity Reviews,* 13 (1), 29-41.

Velduis, L., Vogel, I., Render, C. M., Rossem, L., Oenema, A., HiraSing, R. A. and Raat, H., 2012. Behavioural risk factors for overweight in early childhood: the 'Be active, eat right' study. *The International Journal of Behavioral Nutrition and Physical Activity* [online], 9 (1). Available from: http://download.springer.com/static/pdf/421/art%253A10.1186%252F1479-5868-9-

74.pdf?originUrl=http%3A%2F%2Fijbnpa.biomedcentral.com%2Farticle%2F10.1186%2F1479-5868-9-74&token2=exp=1475506791~acl=%2Fstatic%2Fpdf%2F421%2Fart%25253A10.1186%25252F1479-5868-9-74.pdf*~hmac=7768d8758763ac03949cc2fa78123f8634c06df5197b0fe18683f65703097d34 [Accessed 28 July 2016].

Warwickshire Government., 2010. *Warwickshire Joint Strategic Needs Assessment (JSNA). The essential tool to inform commissioning. Deprivation in Warwickshire* [online]. Warwickshire Government. Available from: www.hwb.warwickshire.gov.uk/warwickshire-people-and-place/deprivation. [Accessed 12 March 2016].

Wilenberg, L. J., Ashbolt, R., Hollland, D., Gibbs, L., MacDougall, C., Garrard, J., Green, J. B. and Waters, E., 2010. Increasing school playground physical activity: a mixed methods study combining environmental measures and children's perspectives. *Journal of Science and Medicine in Sport*, 13 (2), 210-216.

Wilkinson, S., 2004. *Qualitative Research, Theory, Method and Practice*. London, UK: Sage.

Williams, H. G., Pfeiffer, K. A., O'Neill, J. R., Dowda, M., McIver, K. L., Brown, W. H. and Pate, R. R., 2008. Motor Skill Performance and physical activity in Preschool Children. *Obesity*, 16 (6), 1421-1426.

Wrotniak, B. H., Epstein, L. H., Dorn, J. M., Jones, K. E. and Kondilis, V. A., 2006. The relationship between motor proficiency and physical activity in children. *Pediatrics*, 118 (6), e1758-e1765.

Table 4. Barriers and facilitators to PA, individual settings are identified first as Se, followed by staff and parents as S and P respectively.

	Barriers/Facilitators
Time	Time, was considered a barrier by all participants, as parents have busy lifestyles and need to work, therefore, there is very little time for PA at home.
Cost	A further barrier which was identified by parents was '*cost and the ability to drive to get my son places for exercise*' (Se1, P2). Cost was considered a problem because '*when the weather is not good, it is costly for swimming, play pits and structured activities*' (Se3, P1).
Lifestyle	'*Parents have chores to complete, so sometimes the children are put in front of the television*' (Se2, P1), this prevents PA from taking place. A preschool child's day was described as, '*some are picked up from nursery at 5.30pm, they are taken home in a car, they have something to eat and then bed; they have no time for being active*' (Se1, S1). '*There is a lack of being able to walk a child to nursery*' (Se2, S1), this was attributed to parents having a lack of time for their child to participate in PA. When the children '*are not active, potentially due to cost and time, the children are crankier and irritated as they have not burnt their energy*' (Se3, P3).
Outdoor space	'*The outside space could be larger*' (Se1, P1; Se3, P1). '*Having a larger outdoor area, would prevent not allowing children on the climbing frame due to health and safety reasons*' (Se3, S1).
Inside space	'*Inside is a barrier due to chairs, so children cannot run around*' (Se1, S1), '*on a safety point we have to stop them running inside*' (Se4, S2). '*Some children prefer to stay inside and not go outside, this is because the child is so active outside of the nursery they 'relax' at nursery*' (Se3, S1). This is positive in terms of this setting feeling that some of their children are active at home, but then a barrier for the setting as they struggle to involve some children in PA during preschool time.
Health and Safety	The barrier due to health and safety appears to '*depend on the member of staff, as I am happy for them [children] to climb and some staff members get nervous at this*' (Se4, S1), staff interpretation of health and safety can therefore be a key barrier.

Paperwork	We '*have a lot to try and fit in to assess the children*' (Se3, S2). We 'have *a lot more paperwork to complete on the children*' (Se3, S1). Lack of time spent devoted to PA was a problem in some settings as '*staff's time has to be spent devoted to learning as well*' (Se4, S2).

Table 3. Knowledge of the environment and facilities for PA – promoters of PA, individual settings are identified first as Se, followed by staff and parents as S and P respectively.

Promoters of PA	Currently in settings	How settings could be adapted
Equipment	'*We have a slide, climbing frame and soft area with matting (outside)*' (Se1, S2). '*Bicycles, scooters, trikes*' (Se2, P2). '*Slide, climbing activities*' (Se2, P3). '*Outdoors area for the trikes, climbing area*' (Se3, P1). '*Slides, hoops, bean bags, climbing frame. Shaded area where they can move, yet slower movements happen under there*' (Se4, S2). All of the equipment mentioned in relation to promoting PA was linked with the outdoors.	'*We could have more climbing equipment. Inside more equipment is needed, however we tried soft play inside and it created more accidents as children went over the top of each*' (Se1, S1). '*Extend the outdoor area so the children can use the climbing frame and bikes at the same time*' (Se3, S1).
Facilities	'*The outside area for running, the climbing frame and slide*' (Se1, S1). '*We have room to roam and be active*' (Se1, S2). '*Indoors is not a rigid environment, they do have free play and movement. They are not cooped up and sedentary, they can use building blocks and develop their exercise and motor skills*' (Se2, P3). '*Get to use the school hall on occasions for PE*' (Se3, P1). '*We use the school fields more in the summer*' (Se3, S1). '*We have room to play outdoors. Indoors is a calm area due to 40 children. Door is open so the children are free flowing*' (Se4, S1).	'*I would like to extend the outdoor area and use more grass area*' (Se3, S2). '*Work around the school next door to use the playground more*' (Se3, P2). '*We could use the school fields as we are joined with the schools. They are not used currently due to safety reasons and we do not want a child to walk off*' (Se4, S1).
Projects	'*A company delivers drama one day a week and football one day a week*' (Se1, S1). '*We have participated in sport relief and a sport relief, sponsored bounce*' (Se2, P2). '*The children have been involved with a sponsored walk. June is a be fit and healthy month, this includes sports day, walk to nursery, even if you*	'*If we had more training we could run the football*' (Se1, S1).

	park a street away and then walk in as effort made, [cooks name] the cook is sending menus to parents to look at healthy foods at home and how to cook them' (Se2, S1). '*The children have the opportunity for walks, challenges for PA, paths to follow for balance, games such as chasing, traffic lights, parachute games, duck and goose. Movement opportunities also exist inside for example 'wake up shake up' in the morning, which links to growing and being the seed and growing into trees*' (Se2, S1). '*Healthy eating week which promotes exercise, sponsored trundle'* (Se3, S1). '*Forest schools, get to climb, there are 6/7 sessions per child for this, sometimes they get to do the course two times*' (Se3, S2). '*The 'ladder man' comes in, he uses ladders and children move in and out of the ladders*' (Se4, S2).

PA: Physical Activity PE: Physical Education

Table 2. Knowledge and beliefs about obesity, individual settings are identified first as Se, followed by staff and parents as S and P respectively.

Reasons preschool children become obese			What can be done to resolve the obesity epidemic
Lifestyle	Lack of exercise	'*Links to an unhealthy lifestyle with no exercise*' (Se3, S2). '*The children are more sedentary'* (Se3, S1). '*Children follow their parents, so if they [parents] are overweight and do not exercise, then the children are probably overweight and do not exercise...it is due to a lack of education'* (Se3, P2). '*It is a mixture of lack of exercise, unhealthy eating and parents working'* (Se4, S2). '*Parents lifestyles affect children's obesity as parents have to work, they have chores to complete around the house and it is easier to put a child in front of the television as opposed to spend time exercising with them'* (Se1, P2).	Keep promoting exercise '*the local swimming centre has been taken over and it is promoting being active 5 times a week*' (Se1, P1). '*More government exercise campaigns e.g. exercise at least 5 times a week and 180 hours a day for preschool children would be good*' (Se1, S1; Se, P1; Se, P2). '*If people don't visit gyms and swimming pools, would they be aware of some campaigns?*' (Se1, P2). Therefore publicity not just in sporty places is required. Emphasis needs to be on '*engaging the children not eating correctly and not being physically active, yet hard to educate children*' (Se2, S1). '*I would love to mirror what happens in Holland with bikes*' (Se2, P1). '*Family incentive with exercise is imperative*' (Se2, P1; Se, P2). '*We need to be more active and have free activities*' (Se3, S2). '*Exercise should be free for all of the family*' (Se4, S1). '*There is a need to target the parents more as they are the instigators at home*' (Se3, S2).
	Modern lifestyle	'*[Child's name] will play with older siblings on computer games, yet we (parent) try to get him out'* (Se1, P1). '*Some children play x-box and do not go out to play*' (Se3, S1).	Safe walk to nursery schemes were considered good. However, '*some people use the nursery as it is on their way to work, therefore, it is very hard to adopt these schemes for all parents and children*' (Se1, S2). Promotion of cycle schemes was seen as a good idea, however they are '*very hard to do as I leave the house at 7.30 a.m. and*

		‘*I move children on from computers, as some would spend all day on them’* (Se4, S2). ‘*Lifestyle plays a part as parents drive to nursery*’ (Se2, S1). ‘*Poor parenting skills*’ (Se4, P1). ‘*Grandparents looking after grandchildren, tend to give more treats’* (Se4, S2).	*collect my daughter and home for 5.45p.m., therefore, hard to fit the walking and cycling in every day. When possible I take the dog for a walk and go on nature walks. My husband tried it once and it took 1 hour and 20 minutes to get to nursery and the second child to school, that involved a short cut down the canal, unfortunately cannot do this every day*’ (Se2, P3).
Foods	Convenience foods	‘*Some parents that can’t cook*’ (Se2, P3). ‘*Some parents can’t be bothered to cook a proper meal*’ (Se2, P1). ‘*Convenience foods are easier to get and cheaper’* (Se1, P1; Se1, P2). ‘*Due to using frozen foods and convenience meals and not having time and money to cook’* (Se2, P1). ‘*Preschool is more aware of healthier and nutritious food; give the children healthier foods in preschool, yet not happening at home’* (Se1, S1). ‘*I saw a documentary where M^{c} Donald’s add in all additives, so their foods will last for ever, it put me off these foods totally*’ (Se1, P2).	Having a ‘fat tax’ ‘*would be a benefit as it would allow children to eat healthier, as it is dear currently to feed a family*’ (Se1, S1). ‘*Would ensure parents provide a healthy snack for their children when at nursery*’ (Se4, S1). ‘*My children love fresh fruit and vegetables yet £20 gets you a few bits, but lots of junk foods, so making fruits cheaper would be brilliant*’ (Se2, P3). ‘*Don’t ban junk foods, because it will have the opposite effect and children will rebel*’ (Se2, P3). ‘*A recent incentive for low income families in the nursery where they could pick up a voucher and get fresh fruit and vegetables from a local farm was an excellent idea*’ (Se2, P1). ‘*Fruit is promoted well, but vegetables need to be promoted more*’ (Se3, P1).
Genetics	Medical conditions	‘*You do not always know if they have any underlying medical conditions*’ (Se1, S1). ‘*Genetics could be important’* (Se1, S2). ‘*Genetics plays a factor, yet not whole excuse…they have found a gene it could*	*‘Children could be screened at birth if certain genetics are known to cause obesity, we would know to definitely exercise with these children or monitor them closely’* (Se1, P1). *‘Information of a Childs screening at birth could be shared with nurseries and schools if needed? We would then know which children would need to focus on PA more so’* (Se2, S1).

	be related to, but lifestyle 50 years ago was also different' (Se2, P3). '*Could be genetics from my own experience, because I ate the same as my siblings and was as active as them, yet I was always bigger*' (Se3, P3).

Table 1. Knowledge, beliefs and sources of PA - individual settings are identified first as Se, followed by staff and parents as S and P respectively.

Benefits of PA		
Physiological	Weight loss	*'PA helps to burn off fat, it prevents the children from being overweight'* (Se1, S1). *'PA involves movement, it generally happens outside for example running and jumping. I believe PA helps to keep [child's name] at a healthy weight'* (Se1, P1). *'[Childs name] plays football, rugby and swims, he keeps himself very active, I believe this is essential in ensuring he keeps healthy and doesn't get too big'* (Se2, P2).
	Burn energy	*'PA is beneficial as the children burn energy and they are then less wild'* (Se1, S2). '*Uses up a lot of excess energy, wears them out, it tires them out'* (Se3, P1).
	Outside environment	'*They are calmer if they have had opportunities for exercise outside. Then calmer and more attentive, as they have burned off their energy'* (Se2, P1). '*Calmer when they come back inside, it helps with their learning'* (Se4, S1). '*Tires them out, when been on the climbing frame due to their movement'* (Se3, S2).
Psychological	Concentration/ Focused	'*When been on the climbing frame and go back inside they are more focused'* (Se3, S2).
	Happy	'*PA makes them happy and tires them out*' (Se2, P3).
	Behaviour	'*They burn off energy; get fresh air and it affects their behaviour as it makes them behave better*' (Se2, P3). '*They burn off excess energy, which improves behaviour. You see a difference if they did not get the activity'* (Se4, S2). Behaviour and concentration was viewed as reliant on the burning of energy (physiological), therefore the physiological and psychological benefits were synonymous with PA participation.
	Outside environment	'*Calmer when they come back inside'* (Se4, S1).

		‘*They are calmer if they have had opportunities for exercise outside…calmer and more attentive’* (Se2, P1).
Sociable	Meet other children	‘*PA allows children to meet each other…they become socially better’* (Se2, P1).