

# Do parents of children with cerebral palsy express different concerns in relation to their child's type of cerebral palsy, age and level of disability?

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## Abstract

**Objectives** To investigate the range of parents' concerns for their children with cerebral palsy, and whether concerns varied according to type of cerebral palsy, age and level of disability.

**Design** A retrospective study was undertaken analysing information from past medical records of children with cerebral palsy. Information was collected from 170 visits, including child's age, type of cerebral palsy, level of disability and the parents' current concerns. Data were analysed using conceptual analysis to search for common themes, and quantitatively using cross-tabulation and Chi-squared tests to determine if differences existed between the concerns for different ages, diagnoses or disability levels.

**Participants** Parents of children with cerebral palsy from 121 families who attended for therapy between January 2003 and December 2004.  
**Setting** Bobath Centre, London.

**Results** Twelve specific categories of concerns were identified: activities of daily living; hand function; eating/drinking; floor mobility; sitting; standing/walking; transfers; stiffness; communication; therapy; visual perception; and behaviour. Significant differences were found to exist between the concerns of parents of children of different ages, diagnoses and levels of disability. For example, parents of children with spastic diplegia expressed more concerns about standing/walking [ $\chi^2 = 41.45$ , degrees of freedom (df) = 3,  $P < 0.001$ ], whereas concerns about sitting ( $\chi^2 = 17.65$ , df = 3,  $P = 0.001$ ), communication ( $\chi^2 = 32.28$ , df = 3,  $P = 0.0001$ ), floor mobility ( $\chi^2 = 16.89$ , df = 3,  $P < 0.001$ ) and eating/drinking ( $\chi^2 = 10.06$ , df = 3,  $P = 0.018$ ) were more common among parents of children with spastic quadriplegia and athetosis.

**Conclusion** Within this sample, parents demonstrated that they have specific concerns, with clear themes emerging about parents' concerns related to their child's diagnosis, age and level of disability.

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*Keywords:* Cerebral palsy; Parent; Child; Allied health professionals; Concern

## Introduction

It is important for health professionals to be aware of which issues parents consider priorities for their child's therapy. This information would be useful in understanding the needs of families and planning treatment [1,2]. Currently, there is little information within the published literature on this topic. A few investigations exist about parents' concerns for their children with disabilities [1,3], current expectations of therapy [2,4–6] or include both concerns and expectations [5]. Concerns often relate directly to expectations, such as a parent being concerned about reduced mobility and hav-

ing the expectation of improving mobility. If a parent only expresses an expectation of improving mobility, there is the suggestion of a concern about reduced mobility. Due to the scarcity of existing studies, investigations pertaining to both concerns and expectations were reviewed by the author in April 2005, including all literature found in Medline and Cinahl (searching from January 1990 to April 2005) matching the following key terms: cerebral palsy, parents, child, disability, concern, expectation and therapy.

Parents' expectations for their children with disabilities fall into several broad areas. These include functional improvements [1,2,4,5], integrating therapy into daily life, information on children's services [7], their child's condition, likely future development [7] and how their child is performing compared with peers with similar disabilities [1].

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Examples of specific expectations include ‘to hold their head up’ and ‘how to eat on her own’ [2].

Concerns and expectations can be dependent upon several factors, such as type and level of disability [2–4], age of child [3], type of intervention [2], parental knowledge about the intervention [6], potential for improvement [2], behaviour problems [4] and degree of social isolation of parents [7].

Literature specific to cerebral palsy is limited. Expectations of parents of children with cerebral palsy were studied during communication and conductive education programmes [2]. Initially, parents in the communication programme displayed unrealistic expectations, such as expecting their child to talk at the end of the intervention. In the study on conductive education, parents of children with more severe impairments recorded more realistic expectations. As the programmes progressed, all parents felt clearer about their child’s needs, developing more realistic aspirations. This suggests that knowledge gained through interventions can affect parents’ expectations of the outcome.

Participation by parents of children with cerebral palsy in home therapy was investigated through interviews and observation [6]. Initially, parents had few expectations as they were dealing with the shock of receiving the initial diagnosis. Once some of these feelings were resolving, parents became more realistic and could set specific goals. This demonstrates that expectations for children with cerebral palsy change over time, related to the parents’ stage within the grieving process and ability to focus on their child’s development.

Parents of children with other disabilities, such as Down’s syndrome, expressed concerns over social interaction with peers, communication, toilet training and behaviour [1]. Parents of children with sensory modulation disorders expected to see improvements in social participation, self-behaviour regulation and self esteem [5]. The healthcare concerns of parents of children with cognitive difficulties were investigated [3], raising issues relating to service delivery, professionals’ competency and hospital admissions.

This study investigated the range of concerns of parents for their children with cerebral palsy. The hypothesis was that there would be differences between the type of parents’ concerns according to the child’s age, diagnosis and level of disability.

## Method

This was a retrospective study analysing past medical records for parents’ stated main concerns for their children, expressed at the onset of a therapy intervention.

### *Participants*

The study population consisted of all the parents of children with cerebral palsy who attended the Bobath Centre,

London for therapy between January 2003 and December 2004. This included 270 families. Children typically attend after initial diagnosis. Occasionally, a baby will attend with a provisional diagnosis of cerebral palsy. These babies were included if their presentation was typical of a child with cerebral palsy. Children who had a diagnosis other than cerebral palsy were excluded.

Children are referred to the Bobath Centre via their consultant paediatrician or general practitioner. The original request for referral may have originated with a doctor, a therapist or a parent. Parents attending the Bobath Centre have varied ideas of what therapy may offer, from having very specific hopes to being unsure if anything can change. Parent characteristics such as educational background are not recorded. Parents were contacted about the research study and asked if they wished to be included; if so, they were asked for permission to use their child’s medical notes.

### *Procedure*

Information was collected from the medical notes by the main researcher, including the date of the visit and whether it was for a 2-week therapy block or a single consultation appointment. Therapists ask parent(s) on the first day of their visit to state their main concerns for their child, in relation to what might be addressed within therapy. The answers were recorded. Guidelines exist about entering this information on to an assessment form. The question is open-ended and therapists do not prompt parents for responses. If a parent makes a general response such as ‘everything’, the therapist will ask about the child’s daily routine to see if the parent volunteers more specific concerns spontaneously. This information is used as a basis for setting therapy goals in collaboration with parents.

The child’s age was recorded and this information was placed into bands (>2 years, 2–4 years, 4–6 years and  $\geq 6$  years). The child’s Gross Motor Function Classification System (GMFCS) level was also recorded. The GMFCS classifies children with cerebral palsy into one of five levels according to their ability to sit and move independently [8]. Level I children walk and run independently but balance is limited. Level II children walk independently with limitations on uneven surfaces and stairs. Level III children walk with aids, but may require transport over long distances. Level IV children walk with aids over short distances, but are transported in the community. Level V children require pelvic and trunk support to sit and usually have no independent means of mobility [8]. There is good evidence of reliability from research demonstrating inter-rater reliability coefficients of 0.84 [9] to 0.93 [10]. Therapists at the Bobath Centre receive regular training in using the GMFCS, view a training video that allows self testing, and use it on a daily basis.

Informed consent was obtained from all the parents involved in the project and anonymity was protected.

**Data analysis**

Data were analysed using conceptual analysis, which is a form of content analysis, to detect the existence and frequency of concepts and themes expressed by parents. To make valid deductions from the text, the procedure for identifying concepts and categories of data must be consistent to ensure reliability [11]. Text from the medical notes about parents' main concerns was coded by single words and phrases into different concepts (concerns) [12]. Concerns were recorded as the same, even when they appeared as different forms, e.g. move and movement. Concepts were stated in terms that were as specific as possible in order to reduce the frequency of a main concern appearing to fit several concepts.

Specific themes (categories) were then identified. The categories were predefined by the author and a colleague, who initially looked at a small data sample (20%) to determine the most commonly expressed concerns. Final categories were then defined. Text from all the data was coded manually for the frequency of appearance of the concepts (concerns) in the different categories. If it was possible to place concerns into more than one category, the most appropriate category was selected.

The author coded all of the data, and a colleague also coded 20% of the data to check reliability. The data were recorded in an Excel spreadsheet and examined for possible trends.

Quantitative analysis was also used. Data were divided into subgroups of children of different age bands, diagnoses and GMFCS levels of disability. These groups were analysed to determine whether there were similarities or differences between parents' concerns within these groups. As the data were nominal, initial analysis was undertaken by cross-tabulation and Pearson's Chi-squared tests.

**Results**

From the population of 270 families who attended between January 2003 and December 2004, 121 consented to participate in the study (see Fig. 1).

The characteristics of the individual children and the characteristics of each child for each therapy visit are displayed in Table 1.

Analysis focused on the individual visits to the centre for different episodes of therapy. The GMFCS level and different diagnoses for individual visits of children are shown in Table 2.

Text from the medical notes was coded representative of the different concepts (concerns). Examples included 'stiffness in legs', 'coughing on eating', 'improve standing balance', 'dressing' and 'sitting posture in buggy'.

Parents expressed a wide range of concerns, but clear categories emerged. In the predefinition of categories on the smaller sample of data, the author defined 14 categories

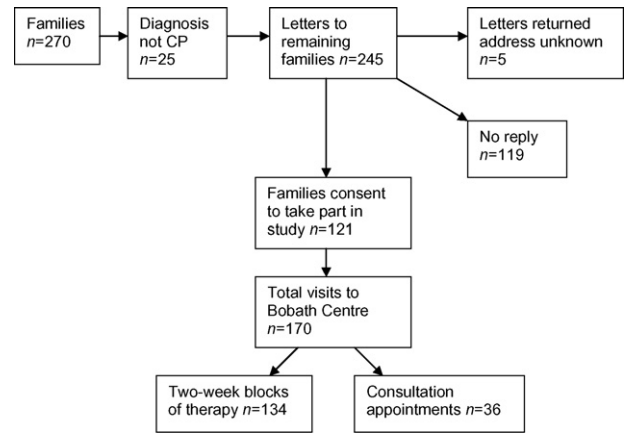


Fig. 1. Final sample derived from population of families attending the Bobath Centre between January 2003 and December 2004. CP, cerebral palsy.

and the colleague defined 15 categories. There was complete agreement on 10 categories, with two more categories only having differences in the chosen title but including the same concepts. The other categories differed, although

Table 1  
Characteristics of sample: individuals and total number of therapy visits

Characteristic	Individuals n = 121		Total visits n = 170	
	n	Percent	n	Percent
<b>Sex</b>				
Male	59	49	77	45
Female	62	51	93	55
<b>Diagnosis</b>				
Spastic quadriplegia	44	36	59	35
Spastic diplegia	29	24	46	27
Spastic hemiplegia	12	10	17	10
Athetosis	29	24	41	24
Ataxia or hypotonia	7	6	7	4
<b>Age band</b>				
<2 years	18	15	23	13
2–4 years	37	31	56	33
4–6 years	27	22	39	23
≥6 years	39	32	52	31
<b>GMFCS level</b>				
I	18	15	24	14
II	14	12	23	13
III	19	16	28	17
IV	27	22	38	22
V	43	35	57	34
<b>Associated problem</b>				
Any	96	79	132	78
Visual impairment	51	42	74	44
Hearing impairment	6	5	8	5
Epilepsy	32	26	49	29
Perceptual difficulties	9	7	16	9
Learning difficulties	24	20	29	17
Eating/drinking difficulties	49	40	71	42
Communication impairment	43	36	55	32
Other	5	4	6	4

GMFCS, Gross Motor Function Classification System.

Table 2  
Gross Motor Function Classification System (GMFCS) level of children according to diagnoses

GMFCS level	Spastic quadriplegia		Spastic diplegia		Spastic hemiplegia		Athetosis		Ataxia or hypotonia	
	n	Percent	n	Percent	n	Percent	n	Percent	n	Percent
I	1	2	9	20	11	65	1	2	2	29
II	4	7	13	28	5	29	1	2	0	0
III	5	8	17	37	1	6	2	5	0	0
IV	24	41	7	15	0	0	5	13	3	42
V	25	42	0	0	0	0	32	78	2	29
Total	59	100	46	100	17	100	41	100	7	100

these were, in essence, subcategories. For example, both the author and the colleague defined hand function, with the author including items related to play within that category, and the colleague having a separate category of play. Following the preliminary definition of categories, the data were viewed again and where there was overlap, categories were combined in order to improve the reliability of concept fit. Twelve final categories emerged: activities of daily living; hand function; eating/drinking; floor mobility; sitting; standing/walking; transfers; stiffness; communication; therapy; visual perception; and behaviour. An example of one of the categories including concepts is shown in Table 3.

Parents' concerns for each visit were coded by the author as concepts and placed in categories. Twenty percent of the data was also coded by a colleague to check the reliability of the final coding system, coding the concerns into specific categories. There was complete agreement for 93% (100/108) of coding within categories.

For each visit, each category that included one or more identified concerns was counted. The most frequently reported concerns from the entire sample were standing/walking (108/170, 64%) and stiffness (76/170, 45%), followed by communication (61/170, 36%) and sitting (56/170, 33%).

Further analysis by cross-tabulation and Pearson's Chi-squared tests took place to detect if any trends existed within the different subgroups of children. As only seven visits involved children with hypotonia and ataxia, these were excluded from the analysis of diagnoses.

Table 3  
Transfer category with coded concepts

	Transfers
1	Improve transfers: increase participation, increase speed, spatial awareness, maintain ability to help
2	Floor into sitting
3	Sit to stand, floor to stand
4	Get on/off bench independently
5	In/out of walker/standing frame
6	Potty/toilet transfers
7	Bath transfers
8	In/out of car/car seat
9	Advice regarding: lifting/carrying/handling; handling more difficult due to increased height/weight

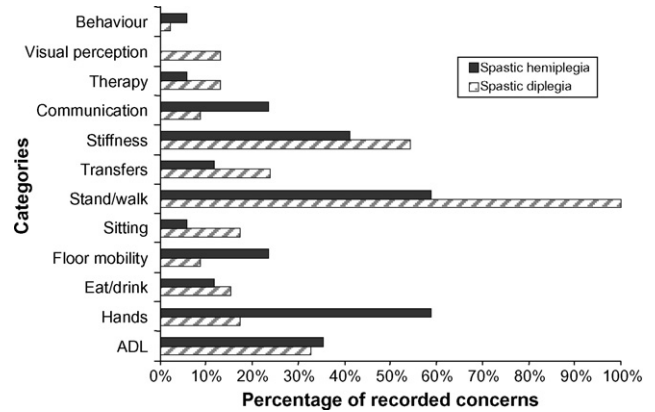


Fig. 2. Spastic hemiplegia and spastic diplegia: concerns reported by parents. ADL, activities of daily living.

Diagnoses

Data showing the percentage of recorded concerns within the different categories for children with different diagnoses shown in Figs. 2 and 3.

Pearson's Chi-squared tests were undertaken to test for significant differences in the number of recorded concerns relative to diagnosis. These showed significant differences within the following categories: standing/walking [ $\chi^2 = 41.45$ , degrees of freedom (df) = 3,  $P < 0.001$ ]; communication ( $\chi^2 = 32.28$ , df = 3,  $P < 0.001$ ); floor mobility

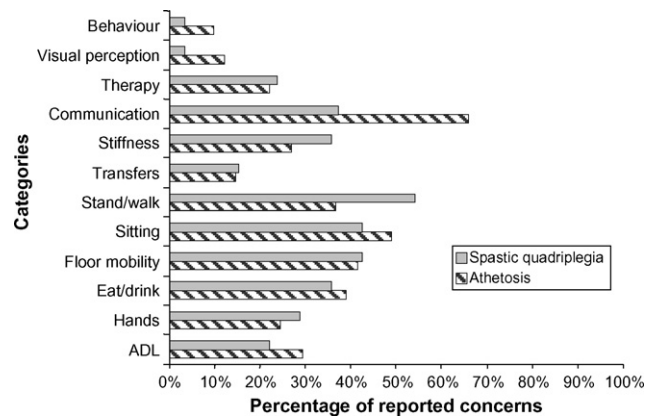


Fig. 3. Spastic quadriplegia and athetosis: concerns reported by parents. ADL, activities of daily living.

Table 4  
Gross Motor Function Classification System levels: percentage of parents reporting concerns

Categories	Level I		Level II		Level III		Level IV		Level V	
	<i>n</i>	Percent	<i>n</i>	Percent	<i>n</i>	Percent	<i>n</i>	Percent	<i>n</i>	Percent
Activities of daily living	7	29	9	39	8	29	8	21	17	30
Hand function	12	50	5	22	8	29	10	26	13	23
Eating/drinking	6	25	7	30	4	14	10	26	22	39
Floor mobility	2	8	3	13	9	32	14	37	24	42
Sitting	4	17	2	9	5	18	13	34	32	56
Standing/walking	14	58	22	96	27	96	27	71	18	32
Transfers	2	8	3	13	9	32	7	18	9	16
Stiffness	7	29	12	52	14	50	11	29	21	37
Communication	6	25	7	30	7	25	11	29	30	53
Therapy	1	4	4	17	6	21	10	26	9	16
Visual perception	2	8	0	0	5	18	1	3	6	11
Behaviour	1	4	1	4	0	0	1	3	5	9
Number of children	24	14	23	13	28	17	38	22	57	34

( $\chi^2 = 16.89$ ,  $df = 3$ ,  $P = 0.001$ ); sitting ( $\chi^2 = 17.65$ ,  $df = 3$ ,  $P = 0.001$ ); hand function ( $\chi^2 = 10.95$ ,  $df = 3$ ,  $P = 0.012$ ); and eating/drinking ( $\chi^2 = 10.06$ ,  $df = 3$ ,  $P = 0.018$ ). On visual inspection, it was apparent that parents of children with spastic diplegia reported more concerns about standing/walking, and parents of children with hemiplegia showed more concerns about hand function. More concerns about communication, floor mobility, sitting and eating/drinking were recorded for children with spastic quadriplegia and athetosis.

#### GMFCS levels

Data showing the percentage of recorded concerns within the different categories for children of different GMFCS levels are shown in Table 4.

Pearson's Chi-squared tests were undertaken to test for significant differences in the number of recorded concerns relative to GMFCS levels. These showed significant differences within the following categories: sitting ( $\chi^2 = 25.79$ ,  $df = 4$ ,  $P < 0.001$ ); standing/walking ( $\chi^2 = 49.65$ ,  $df = 4$ ,  $P < 0.001$ ); floor mobility ( $\chi^2 = 13.23$ ,  $df = 4$ ,  $P = 0.01$ ); and communication ( $\chi^2 = 10.72$ ,  $df = 4$ ,  $P = 0.03$ ).

On visual inspection of the data, it was apparent that floor mobility became a greater concern as the GMFCS level rose. Standing/walking was a concern for parents with children in all levels. For parents with children in level I, the most frequent concerns related to standing/walking and hand function. For parents with children in levels II–IV, standing/walking was the major concern (II = 22/23, 96%; III = 27/28, 96%; IV = 27/38, 71%), followed by stiffness, and for parents with children in levels III and IV, floor mobility was also reported frequently. For parents of children in level V, the most frequent concerns were sitting, communication and floor mobility.

#### Age bands

Pearson's Chi-squared tests were undertaken to test for significant differences in the number of recorded concerns

relative to age bands. These showed significant differences within the following categories: stiffness ( $\chi^2 = 13.49$ ,  $df = 3$ ,  $P = 0.004$ ); floor mobility ( $\chi^2 = 12.39$ ,  $df = 3$ ,  $P = 0.006$ ); communication ( $\chi^2 = 10.67$ ,  $df = 3$ ,  $P = 0.014$ ); and standing/walking ( $\chi^2 = 8.47$ ,  $df = 3$ ,  $P = 0.037$ ). On visual inspection, it was apparent that parents' concerns about standing/walking show two peaks, for parents of children aged 2–4 years and children aged  $\geq 6$  years. Concerns about stiffness increase with age. Concerns about floor mobility are most apparent in parents with children below the age of 2 years, remain a concern for parents with children aged 2–4 years, and then reduce. Communication concerns increase and peak for parents of children aged 4–6 years.

#### Discussion

Although all GMFCS levels, diagnoses and age bands are represented in this sample, a larger number of children had athetosis than might be expected and a larger proportion of children were from GMFCS levels IV and V. Children under 1 year of age, with a lower level of disability and with hemiplegia were under-represented. This is typical of the population of children seen at the Bobath Centre, with more referrals for severely affected children. In a study of 14 cerebral palsy registers in Europe, the overall percentage of children with dyskinetic (athetoid) cerebral palsy was 6.5% (310/4792) [13], whereas in this sample, the percentage was 24% (41/170). In future research, it may be beneficial to use a random sample of parents attending different therapy centres, ensuring that all types of cerebral palsy are represented fairly.

A few parents expressed more general concerns such as 'improve mobility', but the majority of concerns recorded were quite specific such as 'improve standing balance' or 'sitting posture in buggy'. This reflects other research where parents were able to be specific about their concerns [1].

Within the whole sample, standing/walking was the most frequently reported concern. These are familiar milestones

and the date for achieving them is well known. Parents have shown excellent recall of the date of their child's first steps [14]. Failure to achieve these milestones can be one of the first indicators of a delay in development. Stiffness was the next most frequently reported concern. This is logical for a condition where contractures can affect function and lead to deterioration in abilities [15].

Diagnosis made a difference to the type of concerns that parents reported. Parents of children with spastic diplegia reported more concerns about standing/walking and stiffness. Parents of children with spastic quadriplegia and athetosis expressed more concerns about communication, eating/drinking, floor mobility and sitting. Problems with communication [16] and eating/drinking [17] are more frequent in children with these diagnoses. This suggests that parents can be appropriate about their concerns in relation to the diagnosis of their child.

Differences were found between concerns expressed for children in different GMFCS levels. More advanced motor and independence skills were a high priority for parents with children in level I. Floor mobility became a greater concern as the GMFCS level increased, reflecting the increasing likelihood of this being a primary means of moving for a child [8]. Standing/walking was a concern across all levels. Parents of children in levels II and III expressed concerns that focused on improving balance and posture in standing/walking, whereas parents of children in level V expressed concerns relating to positioning within a standing frame and supporting stepping. Level II and III children use walking as their main means of mobility, and walk unaided with limitations or walk with an aid, whereas level V children usually have no independent mobility [8]. Sitting and communication were high priorities for parents of children in level V. Children in level V are expected to be 'restricted in their ability to maintain anti-gravity head and trunk postures' [8], and children with the most severe physical impairment are also likely to have associated difficulties with communication. Data from this study suggest that parents express concerns appropriate for their child's level of ability, as has been found in other research [2,3].

Significant differences were found between the concerns for children within different age bands. Concerns about floor mobility are most apparent in parents with children under 2 years of age, remain a concern in parents with children aged 2–4 years, but then reduce. This is age appropriate, as rapid development in floor mobility occurs below 2 years of age and may still be appropriate up until 4 years. Beyond this age, children are at school where walking may be a greater issue.

Parents across all age bands reported concerns about standing/walking, and two peaks occur, in parents with children aged 2–4 years and children aged 6 years or more. Most concerns in 2–4-year-old children were to improve standing and balance in walking. This may reflect that if a child is not walking by 2 years of age, a clear delay exists. For children aged 6 years or more, most concerns related to deterioration in gait. This may reflect that increasing muscle tightness is

seen over time [15], and gait can deteriorate in children with cerebral palsy [18,19].

Communication concerns were high in parents of children under 4 years of age and peaked in parents of 4–6-year-old children. This may be due to the start of school and therefore more emphasis on being able to communicate effectively with peers and non-familiar adults. This data supports other research [3], where age was found to affect some parental concerns.

It could be suggested that it is obvious that a parent of a child with spastic diplegia would have more concerns about walking, and a parent of a child with hemiplegia would have more concerns about hand function, and that similar assumptions could be made about other concerns expressed by parents. However, no previous research has investigated this area to determine if such assumptions may be accurate.

This information adds to our knowledge of specific parent concerns for different children with cerebral palsy, and may be helpful for therapists starting to work with this client group in promoting increased understanding of which concerns are important to parents and when determining meaningful goals in collaboration with parents. It also partly dispels the myth that parents' concerns for their children relate to unrealistic over-positive expectations.

This study used a convenience sample of families attending one centre. Just over 50% (121/245) of families consented to take part following postal contact. The results may reflect the majority opinion, but non-responders may have different views. A follow-up telephone call may have improved participation.

This study was retrospective, relying on information from children's medical notes. In future, a prospective study using parent interviews might be helpful in gaining more specific information on parents' concerns. This information could be gained using an independent assessor, so reducing possible extraneous influences on parents as they start a therapy intervention. Reliability of the coding system may have been improved by having another revision of the definitions of categories and concerns after both the investigations into reliability.

## Conclusion

Within this sample, clear themes were found in parents' concerns related to their child's diagnosis, age and level of disability. Parents demonstrated that they have specific, realistic and appropriate concerns about what might be possible for their child to achieve. This information can be helpful for therapists, both to work in collaboration with parents and to set joint goals.

*Ethical approval:* Barnet, Enfield & Haringey Local Research Ethics Committee. Ref. No. 05/Q0509/62.

*Conflicts of interest:* None.

## References

- [1] Dolva A, Coster W, Lilja M. Functional performance in children with Down syndrome. *Am J Occup Ther* 2004;58:621–9.
- [2] Lindstrand P, Brodin J, Lind L. Parental expectations from three different perspectives: what are they based on? *Int J Rehabil Res* 2002;25:261–9.
- [3] Chomicki S, Wilgosh L. Health care concerns among parents of children with mental retardation. *Child Care Health Dev* 1992;21:206–12.
- [4] De Moor J, Savelberg M, Oud J. Parents' reasons for enrolment of their motor-disabled child in a Dutch therapeutic toddler class. *Int J Rehabil Res* 2002;25:1–7.
- [5] Cohn E, Miller L, Tickle-Degnen L. Parental hopes for therapy outcomes: children with sensory modulation disorders. *Am J Occup Ther* 2000;54:36–43.
- [6] Piggot J, Paterson J, Hocking C. Participation in home therapy programs for children with cerebral palsy: a compelling challenge. *Qual Health Res* 2002;12:1112–29.
- [7] Hendriks A, De Moor J, Oud J, Franken W. Service needs of parents with motor or multiply disabled children in Dutch therapeutic toddler classes. *Clin Rehabil* 2000;14:506–17.
- [8] Palisano R, Rosenbaum P, Walter S, Russell D, Wood E, Galuppi B. Development and reliability of a system to classify gross motor function in children with cerebral palsy. *Dev Med Child Neurol* 1997;39:214–23.
- [9] Bodkin A, Robinson C, Perales F. Reliability and validity of the gross motor function classification system for cerebral palsy. *Pediatr Phys Ther* 2003;15:247–52.
- [10] Wood E, Rosenbaum P. The gross motor function classification system for cerebral palsy: a study of reliability and stability over time. *Dev Med Child Neurol* 2000;42:292–6.
- [11] Weber RP. Basic content analysis (quantitative applications in the social sciences). 2nd ed. London: Sage; 1990.
- [12] Busch C, Maret PD, Flynn T, Kellum R, Le S, Meyers B, et al. Content analysis: writing @CSU. Colorado: Colorado State University Department of English; 2005. Available at: [www.writing.colostate.edu/guides/research/content](http://www.writing.colostate.edu/guides/research/content).
- [13] SCPE. Prevalence and characteristics of children with cerebral palsy in Europe. *Dev Med Child Neurol* 2002;44:633–40.
- [14] Majnemer A, Rosenblatt B. Reliability of parental recall of developmental milestones. *Pediatr Neurol* 1994;10:304–8.
- [15] Morrell D, Pearson M, Sauser D. Progressive bone and joint abnormalities of the spine and lower extremities in cerebral palsy. *Radiographics* 2002;22:257–68.
- [16] Odding E, Roebroek M, Stam H. The epidemiology of cerebral palsy: incidence, impairments and risk factors. *Disabil Rehabil* 2006;28:183–91.
- [17] Dahl M, Thommessen M, Rasmussen M, Selberg T. Feeding and nutritional characteristics in children with moderate or severe cerebral palsy. *Acta Paediatr* 1996;85:697–701.
- [18] Bell K, Ounpuu S, DeLuca P, Romness M. Natural progression of gait in children with cerebral palsy. *J Pediatr Orthop* 2002;22:677–82.
- [19] Johnson D, Damiano D, Abel M. The evolution of gait in childhood and adolescent cerebral palsy. *J Pediatr Orthop* 1997;17:392–6.

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