

Perceived barriers and facilitators to physical activity for children with disability: a systematic review

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ABSTRACT

Aim The aim of this systematic review was to investigate the perceived barriers and facilitators to physical activity among children with disability.

Methods 10 electronic databases were searched from the earliest time available to September 2010 to identify relevant articles. Articles were included if they examined the barriers or facilitators to physical activity for children with disability and were written in English. Articles were excluded if they included children with an acute, transient or chronic medical condition, examined sedentary leisure activities, or societal participation in general. Two reviewers independently assessed the search yields, extracted the data and assessed trial quality. Data were analysed descriptively.

Results 14 articles met the inclusion criteria. Barriers included lack of knowledge and skills, the child's preferences, fear, parental behaviour, negative attitudes to disability, inadequate facilities, lack of transport, programmes and staff capacity, and cost. Facilitators included the child's desire to be active, practising skills, involvement of peers, family support, accessible facilities, proximity of location, better opportunities, skilled staff and information.

Conclusion Personal, social, environmental, and policy and programme-related barriers and facilitators influence the amount of activity children with disability undertake. The barriers to physical activity have been studied more comprehensively than the facilitators.

INTRODUCTION

Physical activity is integral to a child's health, fitness and well-being.¹ Regular participation in physical activity enhances body composition,² skeletal health,^{3,4} and contributes to the prevention or delay of chronic disease.⁵ It also improves several aspects of psychological health including self-esteem^{6,7} and promotes social contacts and friendships.⁸ Participation in physical activity is particularly important for children with disability as it can have a positive impact on their development, quality of life and future health and life outcomes.^{1,9}

Children with disability often undertake low levels of physical activity.¹⁰ A systematic review suggested children with intellectual disability were less active than their typically developing peers¹¹ and similar findings have also been reported for children with physical disability.^{12,13} Youth with physical disability are also reported to have less variety in their recreation and leisure participation, spending

more time in sedentary recreational activities than their typically developing peers¹⁴ and in slower tempo skills-based activities and sports.¹²

The reasons for the low levels of participation in physical activity among children with disabilities are complex. They are thought to include social, cultural and environmental factors that can act as barriers to a child's participation.¹⁵ A full understanding of potential factors that hinder and assist participation is essential for parents, teachers, health professionals and those working in the health, recreation and leisure industries who are involved in the design, organisation and delivery of effective exercise opportunities. This information is also important for clinical intervention programmes that promote physical activity, active recreation, active leisure and exercise for children with disability.^{5,16}

In order to increase participation in activity, we must understand the reasons why children with disability do not participate and identify what factors might enable or prevent their participation. Therefore, we undertook a systematic review as the available literature has not been previously collated. The aim of this review was to identify perceived barriers and facilitators to physical activity for children with disability.

METHOD

Search strategy

A search of the following 10 electronic databases was undertaken to identify relevant studies: Embase (1988 to September 2010), Medline (1950 to April 2010), AMED (1985 to September 2010), PsychINFO (1967 to September 2010), CINAHL (1982 to September 2010), SPORTDiscus (1830 to September 2010), ERIC (1966 to September 2010), PubMed (1950 to September 2010), Australian Education Index (1978 to September 2010) and Proquest Central (1923 to September 2010). A comprehensive search strategy for each database was developed around four main concepts and their synonyms: barriers and facilitators, physical activity, children and disability. Additional relevant studies were identified by manually searching the reference lists of included studies and by citation tracking using the Web of Science, Google Scholar and Scopus.

Inclusion and exclusion criteria

Original research studies and systematic reviews were included if they were written in English and examined either the perceived barriers or

facilitators to exercise, physical activity or physically active recreation pursuits in children with disability. Physically active recreation included active play. Where a study examined different types of recreation pursuits (active and sedentary), at least 75% of the specified activities had to have been active pursuits in order for the study to be included. The study participants had to include either children (a group mean age <18 years) with disability (physical, intellectual or sensory impairment including vision and hearing impairment), parents of children with disability under 18 years or support people of children with disability (coaches, policy makers). Systematic reviews needed to have provided a transparent and reproducible protocol, that is, at least reported on databases searched, search dates and inclusion criteria.¹⁷ Studies that examined the experiences of physical activity among children with disability and their parents or support people were included only if they explored the perceived barriers to or facilitators of physical activity as a major theme of the study.

Studies were excluded if they examined the perceived barriers and facilitators to physical activity or exercise in children with typical development or in children with an acute, transient or chronic medical condition or disease such as obesity, juvenile chronic arthritis, heart failure, asthma or cancer. Studies were also excluded if they if they examined sedentary leisure activities (eg, watching TV or art), functional competency, societal participation in general (eg, access to public transport), participation in school-based physical education classes or if it was unclear what type of leisure or recreational activity (active or sedentary) was being investigated. Studies were also excluded if they were narrative literature reviews. Where the results of a study were duplicated, the most comprehensive publication was included in the review.

Two reviewers (NS, AJS) independently applied these criteria to the titles and abstracts of the studies identified. When a decision regarding the relevance of the study could not be made based on the title and abstract alone, the full text of the article was obtained. Discrepancies in the decisions made were discussed until a consensus was reached.

Quality assessment

The quality of the included articles was assessed using the McMaster Critical Review Forms for qualitative and quantitative research.^{18, 19} These forms were chosen because they are accompanied by guidelines on how the items should be interpreted,^{20, 21} have demonstrated inter-rater agreement of 75–86%²² and have been previously used to assess the quality of studies undertaken using qualitative and non-experimental quantitative methods.²³

As the McMaster Forms provide a narrative assessment only, the scoring criteria developed by Imms²³ for these guidelines was used. Qualitative studies were scored on a checklist of four criteria: credibility, transferability, dependability and confirmability (table 1). Quantitative studies were scored on three criteria: sample, measure and analysis (table 1). Each criterion was scored as one star (no evidence of study meeting criterion), two stars (some evidence or unclear reporting) or three stars (evidence of study meeting criterion).

All included articles were assessed independently by two assessors (AJS, MB). Any disagreements were resolved by discussion until a consensus was reached. If agreement could not be reached, the results were discussed with a third assessor (NS), who made the final decision.

Table 1 Quality assessment process adapted from Imms²³ and Letts²¹

Research design	Criterion	Satisfied if	
Qualitative	Credibility	Collection of data over a prolonged period and from a range of participants Use of a variety of methods to gather data Use of a reflective approach through keeping a journal of reflections, biases or preconceptions and ideas Triangulation was used to enhance trustworthiness through multiple sources and perspectives to reduce systematic bias. Main types of triangulation are by sources (people, resources); by methods (interviews, observation, focus groups); by researchers (team of researchers vs single researcher) or by theories (team bring different perspectives to research question) Member checking	
	Transferability	Can the findings be transferred to other situations? Has the researcher described participants and the setting in enough detail to allow for comparisons with your population of interest? Are there concepts developed that might apply to your clients and their contexts? Were there adequate (thick) descriptions of sample and setting?	
	Dependability	Is there consistency between the data and the findings? Is there a clear explanation of the process of research including methods of data collection, analysis and interpretation often indicated by evidence of an audit trail or peer review? An audit trail described the decision points made throughout the research process	
	Confirmability	What strategies were used to limit bias in the research, specifically the neutrality of the data not the researcher? For example, was the researcher reflective and did they keep a reflective journal, peer review such as asking a colleague to audit the decision points throughout the process (peer audit) and checking with expert colleagues about ideas and interpretation of data, checking with participants (participant audit) about ideas and interpretation of data and having a team of researchers.	
	Quantitative	Sample	Sample is representative or has comparison group Selection bias reduced population based representative convenient Size of study in relation to design and question (power) Clearly described participant characteristics
		Measure	Measure is valid for purpose and reliable Measurement bias is reduced validity of tool for purpose reliability of tool recall/memory
Analysis		Analyses are appropriate to the research question and outcome measure statistical significance reported point estimates and variability provided clinical importance discussed	

Data extraction and analysis

A standardised form was developed to extract the relevant data about the following: study design, participant details (including the number of participants and their sex, age and type of disability or relationship to the child with disability), method of data collection and the identified barriers and facilitators to exercise and physical activity. Data extraction was conducted by two reviewers independently (NS, AJS). Any disagreements were resolved by discussion until a consensus was reached. The authors of included articles were contacted for additional data where this would inform the results of the review. A content analysis of the extracted data was conducted, whereby the reviewers agreed on a structure to help categorise the results. This consisted of four themes: personal (relating to personal, physical or psychological factors of children), social (relating to people the child would come in contact with), environmental (structural elements such as facilities and transport) and policy and programme (relating to programmes, organisations and staff). This structure was based on the physical activity for people with disability model

proposed by van der Ploeg *et al.*²⁴ An inductive approach was used to further categorise these data into subthemes within each main theme. Meta analysis of studies using quantitative designs was not performed because of the heterogeneity of the included studies.

RESULTS

The search strategy for the electronic databases yielded 2363 articles, of which 2270 were excluded based on their title or abstract. Full text copies of 93 articles were obtained and a further 79 articles were excluded. The references for excluded articles and the associated reasons for exclusion are provided in figure 1 and table 2. Reference checking and citation tracking of the included articles and contact with authors of included articles identified 57 additional items that were potentially relevant. However, none of these items met the inclusion criteria.

Fourteen studies investigating barriers and facilitators to physical activity for children with disability were included

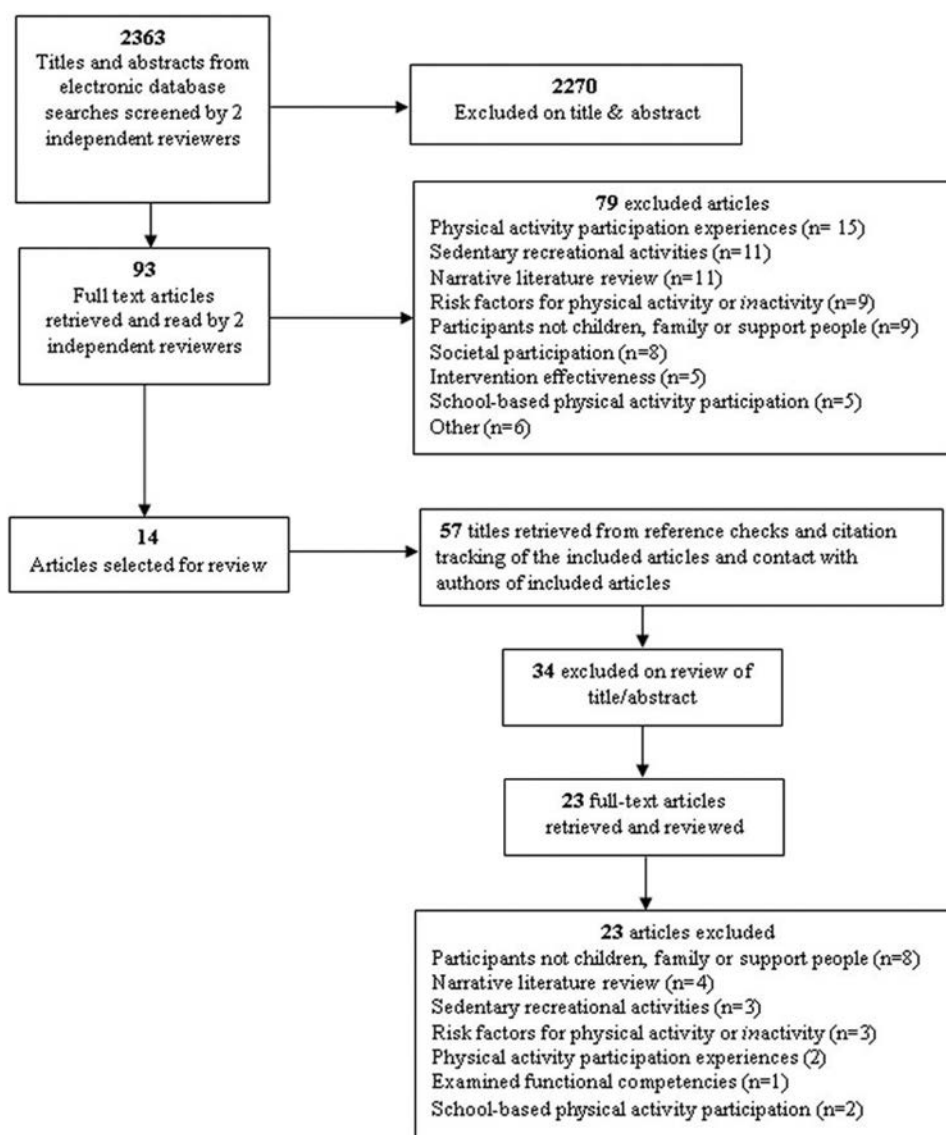


Figure 1 Study selection process.

Table 2 Excluded articles and reasons for exclusion

Reasons for exclusion	Articles from electronic searches (n=79)	Articles from reference checks, citation tracking and contact with experts (n=23)
Examined the perceived barriers and facilitators to physical activity or exercise in children with an acute, transient or chronic medical conditions or diseases	Pittet <i>et al</i> ⁴⁷	–
Examined sedentary leisure activities (eg, watching TV, art) or it was not clear what type of recreation or leisure activities (active or sedentary) were investigated	Shikako-Thomas <i>et al</i> ⁴⁸ Dattilo <i>et al</i> ⁴⁹ Wilhite ⁵⁰ Buttimer and Tierney ⁵¹ Heah <i>et al</i> ¹⁵ King <i>et al</i> ⁹ Majnemer <i>et al</i> ⁵² Rosenberg ⁵³ Thomas and Rosenberg ⁵⁴ Wilhite <i>et al</i> ⁵⁵ Eriks-Brophy <i>et al</i> ⁵⁶ Modell ⁵⁷	Sloper <i>et al</i> ⁵⁸ Matthews ⁵⁹
Examined functional competencies	–	Patel and Greydanus ⁶⁰
Examined societal participation in general (eg, access to public transport)	Law <i>et al</i> ⁶¹ Dumas <i>et al</i> ⁶² Harding <i>et al</i> ⁶³ Hemmingson and Borrell ⁶⁴ Kroksmark and Nordel ⁶⁵ Lawlor <i>et al</i> ⁶⁶ Mihaylov <i>et al</i> ⁶⁷ Pretty <i>et al</i> ⁶⁸ Rosenbaum ⁶⁹ King <i>et al</i> ^{9a} Sugden ⁷⁰ Keeton and Kennedy ⁷¹ Lotan <i>et al</i> ⁷² Majnemer ⁷³ Lane and Misrett ⁷⁴ Poulson and Zivani ⁷⁵ Menear and Shapiro ⁷⁶ Michelsen ⁷⁷ Moran and Block ⁷⁸	–
Was a narrative literature review	–	Lukey ⁷⁹ Coates and Vickerman ⁸⁰ Fitzgerald <i>et al</i> ⁸¹ Micacchi <i>et al</i> ⁸²
Examined the effect of an intervention to improve participation	Dattilo ⁸³ Scholl <i>et al</i> ⁸⁴ Kristen <i>et al</i> ⁸⁵ Kristen <i>et al</i> ⁸⁶ Fennick and Royle ⁸⁷	–
Investigated risk factors of physical inactivity or factors that predict participation in physical activity, or investigate the relationship or level of association between a specific variable(s) (such as age, gender, weight) and participation in physical activity	Pumphrey <i>et al</i> ⁸⁸ White and Duda ⁸⁹ Morris <i>et al</i> ⁹⁰ Ellis ⁹¹ Poulsen <i>et al</i> ⁹² Lee ⁹³ Gutierrez <i>et al</i> ⁹⁴ Martin ⁹⁵ Majnemer ⁹⁶ Lin ⁹⁷	Ellis <i>et al</i> ⁹⁸ Longmuir and Bar-Or ⁹⁹ Pan and Frey ¹⁰⁰
Examined the participation experiences of children with disabilities, their families or other support people such as teachers or coaches	Mandich <i>et al</i> ¹⁰¹ Fogarty <i>et al</i> ¹⁰² Clark and Macarthur ¹⁰³ Antle <i>et al</i> ¹⁰⁴ Anderson <i>et al</i> ¹⁰⁵ Babkes ¹⁰⁶ Nixon ¹⁰⁷ Kozub ¹⁰⁸ Kozub and Poretta ¹⁰⁹ Skar ¹¹⁰ Taub and Greer ¹¹¹ Groff <i>et al</i> ¹¹² Eminovic <i>et al</i> ¹¹³ Anderson ¹¹⁴ Spencer-Cavaliere ¹¹⁵	Brasile and Hendrick ¹¹⁶ Hutzler <i>et al</i> ¹¹⁷

Continued

Table 2 Continued

Reasons for exclusion	Articles from electronic searches (n=79)	Articles from reference checks, citation tracking and contact with experts (n=23)
The study participants were NOT either children (a group mean age < 18 years) with a disability, parents of children with a disability under 18 years or support people of children with a disability (teachers, coaches, policy makers)	Sparrow <i>et al</i> ¹¹⁸ Ponchillia <i>et al</i> ¹¹⁹ Tasiemski <i>et al</i> ¹²⁰ Shifflet <i>et al</i> ¹²¹ Dowler and Jordan-Simpson ¹²² Tsai and Fung ³⁹ Buffart <i>et al</i> ⁴² Van Narden Braun <i>et al</i> ¹²³ Wu and Williams ¹²⁴	Santiago and Coyle ¹²⁵ Putnam <i>et al</i> ¹²⁶ Anderson and Heyne ⁴⁰ Goodwin <i>et al</i> ¹²⁷ Brasile <i>et al</i> ⁴³ Schleien <i>et al</i> ⁴¹ Berry ¹²⁸ Fu ¹²⁹
Study is a duplicate studies of a previously obtained study	Wilkinson ¹³⁰	Modell ⁵⁷
The article is not written in English	Robitaille <i>et al</i> ¹³¹ Martin Ginis and Hicks ¹³²	–
Examined the barriers and facilitators to participation in school-based physical activity, such as physical education classes	An and Goodwin ¹³³ Hutzler <i>et al</i> ³⁵ Lieberman <i>et al</i> ¹³⁴ Lieberman <i>et al</i> ²⁹ Zwald ¹³⁵	Columna <i>et al</i> ¹³⁶ Sato and Hodge ¹³⁷

in the review (table 3). Four studies focused on children with physical disability,^{1 16 25 26} one study on children with intellectual disability,²⁷ one study on children with vision impairment,²⁸ seven studies on children with mixed disabilities^{10 28–34} and one study did not specify the type of disability.⁶ The authors of seven of the papers were contacted to clarify participant demographic information (n=3), provide further information about the results (n=2) or both (n=2). Six of the seven authors provided a response.

Five studies included only children with disability as participants,^{1 16 32–34} seven studies included only parents (usually mothers) of children with disability,^{10 25–27 29–31} one study included both parents and children²⁸ and one study included staff from organisations that work in disability or manage play environments.⁶ Data were collected in the included studies using interviews,^{1 6 26 30–32} postal questionnaires,^{10 25 29} interviewer-assisted questionnaires^{16 28 33 34} and focus groups.²⁷

Quality assessment

Qualitative studies

Seven studies used a qualitative research design.^{1 6 26 27 30–32} Two studies^{26 30} scored the maximum ranking in all four components of quality assessment. These studies triangulated their data from multiple sources, using multiple researchers and multiple methods. They also provided in-depth descriptions of participants, methods and data analysis and both used member checking to verify their findings. With the exception of one study,⁶ all studies demonstrated evidence of trustworthiness. Four studies^{1 27 31 32} met at least one of the components of quality assessment and provided some evidence of meeting at least one other component. In general, these studies did not report either member checking, triangulation of sources or lacked an adequate description of the sample and setting. One study⁶ provided no evidence of meeting any of the quality-assessment criteria.

Quantitative studies

Seven studies used a quantitative research design.^{10 16 25 28 29 33 34} Overall, the quality of the quantitative studies was not

Table 3 Summary of included studies

Study	Year	Quality assessment	Study design	Participant details (age and sex refers to the children)					
				Sample size	Mean age (years)	Age range (years)	Sex	Type of participants	Type of disability
Anderson <i>et al</i> ¹	2005	Cred.* Trans.† Depend.† Confirm.†	Semistructured interviews	14	13.6±2.4	10–16	14 F	Children	Physical (n=6 cerebral palsy, n=5 spina bifida, n=4 other)
Columna ³⁰	2007	Cred.† Trans.† Depend.† Confirm.†	Semistructured interviews	12	8.7±2.5	5–14	3 F, 8 M	Parents (9 F, 3 M)	Intellectual (n=4 autism, n=2 Down syndrome), Physical (n=3 cerebral palsy, n=1 spina bifida) and other health impairment (n=1)
Field and Oates ²⁵	2001	Sample‡ Measure* Analysis‡	Questionnaire (postal)	97	9.9	5–15	–	Parents§	Physical (spina bifida)
Hunter ²⁶	2009	Cred.† Trans.† Depend.† Confirm.†	Semistructured interviews	23	13.6±2.0	9–17	10 F, 13 M	Parents (18 F, 4 M)	Physical disability (n=16 spina bifida, n=4 cerebral palsy, n=1 each calder regression, spinal cord injury and multiple spinal leaks)
Jones ³¹	2003	Cred.† Trans.* Depend.† Confirm.*	Semistructured Interviews	37	<18	5–35¶	–	Parents (30 F, 7 M)	Developmental, learning and physical disabilities, autism, emotional and behavioural disorders
Kang <i>et al</i> ¹⁶	2007	Sample‡ Measure* Analysis*	Questionnaire (interviewer assisted)	145	16.9	12–19	28 F, 117 M	Children	Physical (NWBA classification I n=24, II n=53, III n=57)
Levinson and Reid ¹⁰	1991	Sample* Measure* Analysis*	Questionnaire (postal)	105	7 and 15	4–10 11–21	33 F, 72 M	Parents§	Physical and intellectual (developmental delay, emotional disturbances, autism, cerebral palsy)
Lieberman and MacVicar ²⁹	2003	Sample‡ Measure* Analysis*	Questionnaire (postal)	54	12.5	3–22	20 F, 34 M	Parents§	Deaf-blindness (some also had cerebral palsy n=11, developmental delay n=8 and multiple disabilities n=11, intellectual disabilities n=6)
Menear ²⁷	2007	Cred.† Trans.* Depend.† Confirm.†	Focus groups	21	9.8	3–22	8 F, 13 M	Parents (16 F, 5 M)	Intellectual (Down syndrome n=21)
Prellwitz and Skar ³²	2007	Cred.* Trans.† Depend.† Confirm.*	Semistructured Interviews	15	9.6±1.9	7–12	7 F, 8 M	Children	Restricted mobility (n=5) Severe vision impairment (n=5), Moderate developmental disabilities (n=5)
Sit <i>et al</i> ³³	2002	Sample‡ Measure* Analysis‡	Questionnaire (interviewer assisted)	237	13.5±2.0	9–19	94 F, 143 M	Children	Mild mental disability (n=78), physical disability (n=61), vision Impairment (n=27), hearing impairment (n=41), maladjustment (n=30)
Stuart <i>et al</i> ²⁸	2006	Sample* Measure* Analysis*	Questionnaire (interviewer assisted)	50	–	10–12	11 F, 14 M	25 Children 25 Parents§	Vision impairment
Tsai and Fung ³⁴	2005	Sample* Measure† Analysis‡	Questionnaire (interviewer assisted)	94	–	12–17	49 F, 45 M	Children	Hearing impairment (some also had intellectual disabilities, learning difficulties and/or behavioural problems)
Wilkinson ⁶	1983	Cred.‡ Trans.‡ Depend.‡ Confirm.‡	'Formal' interviews	–	–	'Children'	–	Personnel from institutions dealing with disabilities and play environments§	Not specified

*Some evidence of the study meeting the criterion or unclear reporting.

†Evidence of the study meeting the criterion.

‡No evidence of the study meeting the criterion.

§Ratio of the number of female to males was not reported.

¶Majority of children were aged under 18, however the author no longer had a record of the individual data.

–, no data; F, female; M, male; NWBA, National Wheelchair Basketball Association.

Table 4 Barriers to physical activity

Personal barriers	Social barriers	Environmental barriers	Policy and programme barriers
<p>Lack of skill (physical)</p> <p>Lack of athletic ability, coordination and skills^{10 16 27 28 31 33 34}</p> <p>Child's disability²⁸⁻³⁰</p> <p>Issues related to toileting (ie, incontinence, catheters)^{6 27}</p> <p>Poor physical condition or poor health¹⁶</p> <p>Children are too big and strong to play with children who are of equivalent mental age²⁷</p> <p>Time taken to shower and change postexercise¹⁶</p> <p>Required exercise intensity seems too high¹⁶</p> <p>Inconvenience of perspiration or preparation¹⁶</p> <p>Lack of skill (social)</p> <p>Self-conscious or embarrassed¹⁶</p> <p>Previous unpleasant experience¹⁶</p> <p>Children felt discouraged about exercise¹⁶</p> <p>Lack of confidence²⁸</p> <p>Child's behavioural problems or lack of social skills³¹</p> <p>Lack of independence²⁸</p> <p>Inability of child to adapt on his own²⁸</p> <p>Inability to navigate unfamiliar areas²⁸</p> <p>Lack of self-discipline¹⁶</p> <p>Preferences for activities other than physical</p> <p>Lazy child or preference for sedentary activity^{27 28 34}</p> <p>Prefer to do their own thing or other leisure activities^{16 33}</p> <p>Have other priorities or commitments^{33 34}</p> <p>Lack of interest, motivation or enjoyment¹⁶</p> <p>Fear</p> <p>Fear of being stigmatised or teased^{1 32 34}</p> <p>Fear of injury¹⁶</p> <p>Fear of incontinence¹⁶</p> <p>Fear of being out of control²⁸</p> <p>Lack of knowledge or awareness about exercise</p> <p>Not knowing how to exercise or 'what to do'^{16 28}</p> <p>Not knowing how to use equipment^{16 32}</p> <p>Lack of awareness about options and where to exercise¹⁶</p> <p>Don't like to exercise alone³⁴</p> <p>Other</p> <p>Lack of time^{16 34}</p> <p>Pain or discomfort^{16 34}</p>	<p>Parental actions, behaviours or concerns</p> <p>Time constraints (ie, travel time)^{10 26 27 29 30}</p> <p>Lack of (parental) support/encouragement^{16 30 34}</p> <p>Parental concerns about safety^{6 28 30}</p> <p>Overprotective parents^{1 6}</p> <p>Physical activity is not part of the family's daily life or they have other family priorities^{6 30}</p> <p>Lack of parental knowledge of physical activity opportunities available (integrated and segregated)^{6 25 26}</p> <p>Financial constraints^{29 30}</p> <p>Family has a lack of energy to engage in activity³⁰</p> <p>Parental concerns about child's behaviour³¹</p> <p>Having to balance the needs of children with and without disability^{27 30}</p> <p>Family restrictions³⁴</p> <p>Parental fear of child being isolated⁶</p> <p>Lack of friends or unsupportive peers</p> <p>Being teased, stared at by peers^{1 28 32}</p> <p>Peers view them as helpless or doubt their abilities¹</p> <p>Lack of friends to be active with or friends do not participate^{10 28 34}</p> <p>Lack of other children who are blind locally²⁸</p> <p>Lack of people to exercise with¹⁶</p> <p>Negative societal attitudes</p> <p>Negative/unfriendly attitudes others^{16 31}</p> <p>Negative attitudes of parents of non-disabled children⁶</p> <p>People's misconceptions of child's physical condition or ability¹⁶</p> <p>Other</p> <p>Lack of role models¹</p> <p>Lack of adequate communication between staff, interpreter and child²⁹</p>	<p>Inadequate facilities</p> <p>Inaccessible facilities^{6 16 29 31}</p> <p>Lack of appropriate facilities^{16 30 32 34}</p> <p>Locations are inconvenient, or too far away^{32 34}</p> <p>No space to exercise¹⁶</p> <p>Lack of place to exercise with peers¹⁶</p> <p>Obstruction or physical obstacles or unfamiliar territory²⁸</p> <p>Uneven or inappropriate surfaces at home and in playgrounds^{28 32}</p> <p>Playground equipment too small, too technical or poorly coloured³²</p> <p>Lack of adaptive equipment¹⁶</p> <p>Transport</p> <p>Lack of transport^{6 16 28 29}</p> <p>Other</p> <p>Weather¹⁶</p>	<p>Lack of appropriate physical activity programmes</p> <p>Lack of opportunities to participate^{1 25 28 33}</p> <p>Lack of appropriate programmes/activities^{10 26-28 30}</p> <p>Lack of variety in activities available^{25 29}</p> <p>Lack of recreation opportunities that involve the whole family²⁵</p> <p>Fewer programmes for older children.</p> <p>Those that are offered focus on team sports³¹</p> <p>Lack of inclusive programmes³¹</p> <p>Programmes are short-lived^{27 31}</p> <p>Lack of learn to exercise programme¹⁶</p> <p>Lack of friendship building programmes³¹</p> <p>Lack of transition programme from rehab to community setting¹⁶</p> <p>Lack of staff capacity</p> <p>Lack of staff training in, or knowledge about disability and child's needs^{6 29-31}</p> <p>Lack of staff knowledge of how to adapt programmes^{27-29 31}</p> <p>Lack of (trained) staff^{6 16 28 31}</p> <p>Lack of volunteers^{6 16}</p> <p>Emphasis on employing teenage staff to run summer programmes was seen as unsuited to handling children with disability⁶</p> <p>Lack of leaders¹⁰</p> <p>Lack of interpreters²⁸</p> <p>Negative staff attitudes towards working with people with disability</p> <p>Negative attitudes by staff³¹</p> <p>Lack of adequate staff who are willing to work with children with disabilities²⁹</p> <p>Staff fear of isolating children or risk of physical harm⁶</p> <p>Staff feel working with children with disability more difficult⁶</p> <p>Staff too focussed on competitive sports⁶</p> <p>Staff fear of legal implications of an accident in integrated programmes⁶</p> <p>Institutional conservatism⁶</p> <p>Cost</p> <p>Cost (of travelling, equipment and facilities)^{16 26 27 32}</p> <p>Other</p> <p>Focus on competitive team sports^{6 31} or activities not competitive enough³³</p> <p>Lack of funding^{6 31}</p> <p>Lack of information about the benefits of physical activity³⁰</p> <p>Lack of information available for parents about opportunities to participate^{6 27 34}</p> <p>Rules and regulations (ie, no motorised wheelchairs on basketball court)¹</p> <p>Deficiency of guidance²⁸</p> <p>Lack of agreement between organisations about who is responsible for integration and whether integration or segregation was preferable⁶</p>

as high as the qualitative studies. Two studies^{33 34} scored the maximum ranking in two of the three components of quality assessment. Six studies^{10 16 25 28 29 34} provided either no evidence or unclear evidence of the representativeness of their participants; participants in all six studies were recruited through convenience sampling. Four studies either reported the reliability or validity of some but not all their outcome

measures,²⁵ or established face and content validity only²⁹ or reliability only.^{10 16}

Barriers and facilitators to physical activity

All of the included studies identified barriers to physical activity for children with disability, while only six studies identified facilitators (tables 4 and 5).

Table 5 Facilitators to physical activity

Personal facilitators	Social facilitators	Environmental facilitators	Policy and programme facilitators
Child's desire to be fit and active Want to be fit, healthy and active ^{28 33}	Parental or family support Parents create opportunities for their children and ensure they are physically active ^{27 31} Parents/sibling involvement (to model, initiate or encourage) ^{27 28} Family with common interests ¹⁰ Praise from parents ³³ Parental support and education ⁶	Facilities Better utilisation of existing facilities ³¹ New facilities in rural areas ³¹ Accessible and close facilities ¹⁰ Increased accessibility and modifications of playgrounds for children with impaired mobility ⁶	More and better quality programmes More community-based programmes and opportunities to be active (including summer programmes) ^{27 28 31} Better programmes, that are structured, sensitive to children with special needs, age appropriate and include a variety of things to do ^{6 10 27 31} Small-group or individual, non-competitive programmes that promote fun and socialisation ^{27 31} Programmes for older children ³¹ Programmes that are not therapy oriented ³¹ Activity relates to a game ²⁷ Programme emphasis on development of social skills and development of self-confidence ⁶ Emphasis on skill development and child's ability ⁶
Practice to gain skills Having the skills required for the activity ³³ Practice ²⁸ Competence	Involvement of peers Involvement of peers/friends/older children ^{10 27 28 33} Assistance of (able-bodied) peers ²⁸ Praise from friends ³³ Peers who won't make fun of children ²⁸ Social part to the activity or tying physical activities to social events ²⁷	Other Transport ²⁸ More safe areas ²⁸	Skilled staff Professional programme leaders and administrators are trained and knowledgeable about disability and know how to adapt programmes ^{6 27 28 31} Trained staff and support aides to facilitate inclusive programmes ³¹ Need someone else (other than parents) to provide the structured physical activity ²⁷ Careful staff selection and staff evaluation procedures ⁶
Other Gaining confidence ²⁸ Child needs to understand a reason to exercise ²⁷ Fun ³³ Using a log book to document activity ²⁷ 'If I knew what I could do' ²⁸ Introducing young child to integrated play environments ⁶	Other Increasing awareness and education of children without disabilities and their parents ^{6 31} Positive encouragement from others ²⁸ Adults with disability acting as role models ⁶		Information and Awareness Raised awareness of inclusive recreation programmes ³¹ Information on activity provided to parents by school ²⁷ Collaborative approach between organisations and communities ³¹ Dissemination networks between parents ³¹ Voluntary advocacy association to provide demonstration programmes, political lobbying and advice ⁶ Parental support and education about play options from providers, including community education campaigns ⁶ Other Organisational integration policy and support decision makers and funding agencies ⁶ Special agency support to provide information, therapeutic advice, design advice and staff training ⁶ Special participant selection and evaluation procedures ⁶ Continuum of developmental opportunities ⁶ Better funding of programmes and play areas ^{6 31} Success through demonstration ⁶ Local organisations to support athletes who are blind ²⁸ Financial assistance for parents ³¹

Barriers to physical activity

Personal barriers

Twelve studies identified personal barriers to participation for children with disability.^{1 6 10 16 27-34} Four subthemes emerged: lack of skills (physical and social), preference for activities other than physical activities, fear and a lack of knowledge about exercise (table 4). Children with disability also disliked having to deal with negative perceptions of disability (referred to as the 'stigma of disability') or of attracting unwanted attention.^{1 35}

Social barriers

Thirteen studies identified social barriers to participation for children with disability.^{1 6 10 16 25-32 34} Three subthemes emerged: parental actions, behaviour or concerns, a lack of friends to participate with or unsupportive peers and negative societal attitudes to disability (table 4).

A number of notable findings relating to social barriers to activity participation were reported. Twenty-one per cent of parents of children with spina bifida reported that they believed recreation was more important for children without disability.²⁵ Mothers of school-aged children with Down syndrome reported their child's interest in physical activity waned as the gap between their motor skills and the motor

skills of their peers with typical development widened.²⁷ Some children with disability chose not to participate in activity because they believed their peers viewed them as helpless¹ or the parents of their peers without disability were unfriendly and had misconceptions about their ability.^{6 16 31}

Environmental barriers

Eleven studies identified environmental barriers to participation.^{1 6 10 16 25-34} Two subthemes emerged: inadequate, inaccessible or inconvenient facilities and a lack of transport (table 4). Almost 80% of parents of children with disability (mean age 7 years) reported that a lack of facilities was a major barrier.¹⁰

Policy or programme barriers

Thirteen studies identified policy or programme barriers to participation.^{1 6 10 16 25-31 33 34} Four subthemes emerged: lack of appropriate physical activity programmes, lack of staff capacity, negative staff attitudes towards working with children with disability and cost (table 4).

Between 25% and 60% of parents in four studies^{10 25 28 29} identified a lack of appropriate programmes or a deficiency in available programmes as a barrier. Forty per cent of children with disability also felt they had a lack of opportunities to be

physically active²⁸ and 35% believed there was a lack of transition programmes from the rehabilitation setting to a community setting¹⁶ or that there was a lack of 'learn to exercise' programmes.¹⁶ Some children were excluded from formal programmes because of specified rules and regulations, for example, motorised wheelchairs were not allowed in a wheelchair basketball competition.¹

Facilitators

Personal facilitators

Four studies identified personal facilitators to participation for children with disability.^{6 27 28 33} Two subthemes emerged: the child's desire to be fit and active and practice to gain skills and competence (table 5). Having fun and being fit were the main reasons given by children to be engaged in physical activity in one study.³³

Social facilitators

Six studies identified social facilitators to participation.^{6 10 27 28 31 33} Two subthemes emerged: the involvement of peers and family support (table 5). Four studies indicated children with disability were more likely to participate if the activity included interaction, encouragement and assistance with their peers, friends or siblings.^{10 27 28 33} Having a social element to the activity was a particular motivator among children with Down syndrome.²⁷ Children who had common interests with friends or family were also more likely to take part in physical activity.^{10 27} Parents reported supporting their children to engage in activity by creating opportunities for them to be active^{27 31} and through positive encouragement.^{27 28} Parents and siblings also facilitated involvement in physical activity by modelling and getting involved themselves.^{27 28}

Environmental facilitators

Four studies identified environmental facilitators to participation.^{6 10 28 31} Two studies^{6 10} identified accessible facilities (including playgrounds) and two studies reported that the proximity of facilities were important factors in engaging children with disability in physical activity^{10 31} (table 5).

Policy or programme facilitators

Five studies identified policy or programme facilitators to participation.^{6 10 27 28 31} Three subthemes emerged: a greater number of and better quality community-based opportunities sensitive to the needs to children with disability, skilled staff and information dissemination (table 5). Structured programmes with a variety of activities,²⁷ non-competitive, small group or individual programmes^{27 31} and age-appropriate programmes^{6 31} were seen as facilitators. Staff working in such programmes who were more disability-aware⁶ and more knowledgeable about how to modify activities so that children with disability could be included^{27 28 31} also facilitated engagement in activity. The provision of information about programmes to parents by schools,²⁷ by other parents³¹ and by physical activity providers⁶ were regarded as important facilitators.

DISCUSSION

Many of the perceived barriers and facilitators identified were based on similar constructs and were dependent on whether that factor was present or absent. For example, unsupportive peers acted as a barrier to activity, whereas supportive peers were perceived as facilitators to activity. Overall, the identified barriers and facilitators were consistent between the included studies. There were some inconsistencies related

to the availability and appropriateness of programmes. For example, two studies^{28 33} reported a lack of competitive sport opportunities or leagues as barriers to participation, while two studies^{6 31} identified competitive team sports as a barrier to participation. It is important to remember that the data reflect what is happening on average and that for any one individual child with disability, an individualised assessment is required to cater for his or her personal needs.^{9 27}

Overall, the perceived barriers and facilitators identified by the different groups of participants (children, parents and organisation staff) were similar, but the emphasis placed on different themes varied between groups. Children most commonly identified personal, peer-related and environmental barriers to participation such as preferences for other activities, negative behaviour of peers and a lack of adaptive equipment.^{1 16 28 33 34} Parents focused on social, policy and programme barriers or on their own involvement in their child's activity. They more frequently identified barriers and facilitators relating to the quality and availability of programmes and staffing. Support people also identified more policy and programme barriers and facilitators. The different perspectives presented by these groups are not unexpected; parents are likely to negotiate programme policies when trying to engage their child in an activity, while their child has to physically access a venue. Parents also identified more facilitators than children, but this is likely a reflection of study methods where children with disability were often not asked about facilitators of physical activity.

Many of the barriers and facilitators identified are similar to those reported for children with typical development. A review of 108 studies³⁶ found participation in physical activity by younger children with typical development was associated with a child's preference for physical activities, motivation and previous participation in physical activity. In adolescents with typical development, parental support, family involvement, opportunities to exercise, new social networks and access to programmes and facilities were strongly associated with physical activity participation.^{36 37} Other barriers to activity for children and adolescents with typical development include age, a lack of time, a lack of interest and competitive sport.³⁶⁻³⁸ Each of these constructs, whether barriers or facilitators, were also suggested as factors among children with disability in our review. This suggests that much of the published literature on barriers and facilitators to activity for children with typical development is also relevant for children with disability.

Specific barriers to physical activity were identified for children with disability that related to their impairment. These were negative societal and staff attitudes to disability, inadequate or inaccessible facilities, a lack of appropriate physical activity programmes and the lack of skilled staff who can appropriately engage them in activity. It was not possible to determine if these specific barriers to physical activity were different for children with different types of disability as most of the articles included children with a range of impairments. Negative societal attitudes,³⁹⁻⁴¹ poorly trained or inexperienced staff^{40 41} and a lack of appropriate opportunities^{5 39 40} have also been reported as barrier to physical activity by adults with disability. Adults with disability, however, have tended to cite more personal factors influencing their participation than children with disability¹⁶ including motivational factors, such as the opportunity for improvement or to test oneself, a sense of fulfilment and the benefits to physical appearance.^{42 43}

Having a social component as part of a physical activity was a strong theme that emerged both as a facilitator and a barrier when it was deficient. In general, children with disability

enjoyed participating in activity with their peers or siblings.^{10,28} This is potentially related to the social isolation that many children with disability feel.⁴⁴ For some children with disability (eg, children with Down syndrome), social interaction was their primary reason for participation.²⁷ Recreational staff, teachers, parents and programme planners should aim to promote and encourage a social element as a reason to engage in activities.¹⁰ Formal programmes have been recommended because of the structured opportunity they offer for socialisation, which can facilitate a sense of belonging.¹ This was exemplified by the participants in the Anderson *et al*¹ study, who participated in formal programmes and experienced benefits from engagement above and beyond the benefits of exercise.

The themes and subthemes identified in this review are consistent with established theories on health behaviour change including the Theory of Planned Behaviour and Social Cognitive Theory. The Theory of Planned Behaviour suggests that people are more likely to engage in physical activity if they have a positive attitude, they perceive social support to participate, and they believe they will be successful and are motivated to engage in activity.⁴⁵ The subthemes identified in this review found that physical activity was facilitated in children with disability who wanted to be active, had parental and peer support, were competent in their motor skills and had a desire to be fit. The review findings are also consistent with Social Cognitive Theory, which suggests that behaviour change is influenced through observation of behaviours.⁴⁶ Parents who were informed of the benefits of physical activity, who were physically active themselves (modelled behaviour), who initiated and encouraged their children to be active had children with disability who were more engaged in activity.

Understanding the barriers and facilitators of physical activity for children with disability is essential for designing effective interventions to promote participation in this group.¹⁶ We currently know more about barriers to physical activity than we know about the facilitators. Knowing what hinders participation provides the opportunity to modify and improve available activity programmes.¹⁶ However, it is potentially more important to understand the facilitators of physical activity as these are successful, positive strategies that improve participation and are often easier to understand.¹⁶ It is also important to remember that some barriers are fixed and impossible to change, for example, an adolescent's running ability. In this case, the focus should be on external methods to maximise participation, for example, increasing physical accessibility,

decreasing negative stereotypes and training staff members adequately. Future research should concentrate on identifying facilitators of physical activity and incorporating these strategies into activity programmes.

The strengths of this review are that it used an extensive search strategy to locate 14 articles that met the predefined eligibility criteria. In most studies, the findings were consistent, although the emphasis differed based on the participants included. The limitations of the review are that it excluded articles not written in English, therefore some relevant literature may have been omitted. Also, publication bias cannot be ruled out as although two theses were included, no systematic attempts were made to locate unpublished material due to the difficulty in identifying and locating it.

CONCLUSION

The reasons for non-participation in physical activity by children with disability are complex and multifactorial. A range of personal, social, environmental, and policy and programme-related barriers and facilitators have been identified which influence the amount of physical activity that children with disability undertake. The barriers to physical activity have been studied more comprehensively than the facilitators. It is important that future research examines the facilitators to physical activity in more detail, given the benefits of physical activity for children with disability in terms of good health and social well-being. This information will assist parents, health professionals, teachers, carers, recreational staff and policy makers in developing successful exercise programmes and clinical interventions to encourage and increase participation levels of children with disability in physical activity.

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