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Review Article

Environmental barriers and facilitators to the participation of children with cerebral palsy in recreational and leisure activities: an integrative review

Barreiras e facilitadores ambientais na participação da criança com paralisia cerebral em atividades de recreação e lazer: uma revisão integrativa

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Abstract

The participation of children with cerebral palsy (CP) in recreation and leisure activities can be influenced by environmental factors. The recognition and understanding of these factors as barriers or facilitators of these activities are essential to guarantee the right of these children to participate on equal terms with other people in society. In this context, the objective of this integrative review was to identify environmental barriers and facilitators in the participation of children with CP in recreation and leisure activities. The integrative review method proposed by Whittemore and Knafl (2005) was used. Studies published between 2011 and 2022 in Portuguese and/or English were selected from MEDLINE indexing sources via PubMed, EMBASE, SciELO, LILACS, SCOPUS and Web of Science. Nine studies were included in the review – most of them cross-sectional in design and qualitative in approach. The following participation facilitators were identified: support from parents, peers and teachers; interaction with adults; therapies; material conditions; activities at home, school and in the community; diversity of toys; and cultural activities. The following barriers to participation were identified: lack of access to public transport; negative attitudes; lack of choice and less parental interaction; and lack of adequacy of activities. The Classification of Functioning, Disability and Health (ICF) and the concepts of participation pyramid and family of constructs were fundamental in identifying environmental barriers and facilitators in the participation of children with CP. It is suggested that future studies be conducted to assess the quality and strength of the evidence for participants under 11 years of age.

Keywords: Social Participation, Child, Cerebral Palsy, Leisure Activities, Recreation.

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Resumo

A participação de crianças com paralisia cerebral (PC) em atividades de recreação e lazer pode ser influenciada por fatores ambientais. O reconhecimento e compreensão desses fatores como barreiras ou facilitadores dessas atividades são essenciais para garantir o direito de participação dessas crianças em condições de igualdade com as demais pessoas da sociedade. Neste contexto, o objetivo desta revisão integrativa foi identificar as barreiras e facilitadores ambientais na participação de crianças com PC em atividades de recreação e lazer. Utilizou-se o método de revisão integrativa proposto por Whittemore e Knafl (2005). Estudos publicados entre 2011 e 2022 nos idiomas português e/ou inglês foram selecionados a partir das fontes de indexação MEDLINE via PubMed, EMBASE, SciELO, LILACS, SCOPUS e Web of Science. Nove estudos foram incluídos na revisão – a maioria de desenho transversal e abordagem qualitativa. Os seguintes facilitadores da participação foram identificados: apoio dos pais, pares e professores; interação com adultos; terapias; condições materiais; atividades em casa, na escola e na comunidade; diversidade de brinquedos; e atividades culturais. As seguintes barreiras à participação foram identificadas: falta de acesso a transportes públicos; atitudes negativas; falta de escolha e menor interação dos pais; e falta de adequação das atividades. A Classificação de Funcionalidade, Incapacidade e Saúde (CIF) e os conceitos pirâmide de participação e família de constructos foram fundamentais para identificar as barreiras e facilitadores ambientais na participação de crianças com PC. Sugere-se que estudos futuros sejam conduzidos para avaliar a qualidade e a força da evidência para participantes com 11 anos de idade incompletos.

Palavras-chave: Participação Social, Criança, Paralisia Cerebral, Atividades de Lazer, Recreação.

Introduction

Cerebral palsy (CP) is characterized by disorders in movement, tone and posture caused by non-progressive disorders that occur, in most cases, in the development of the fetal or infant brain (Patel et al., 2020). Maternal factors, such as thyroid disorders, pre-eclampsia, and bleeding, are the main risk factors for developing CP (Novak, 2014). Premature birth (gestational age <37 weeks) and full-term birth with encephalopathy are also considered significant risk factors for the development of CP in newborns (Novak, 2014).

International epidemiological data indicate that CP is the most common cause of physical disability in childhood, affecting approximately 1.6 in every 1,000 live births in high-income countries (McIntyre et al., 2022). Despite data limitations, in low and middle-income countries the prevalence of CP is 3.4 per 1,000 live births (McIntyre et al., 2022). In the Brazilian context, there is still a lack of data on the prevalence and incidence of CP (Chagas et al., 2020). However, researchers from the Participa Brasil project seek to identify and outline a profile of functionality, disability, activity performance and participation of Brazilian children and adolescents with CP (Chagas et al., 2020).

CP is a heterogeneous condition regarding its etiology and pathophysiology (Rosenbaum et al., 2007). Therefore, in the clinical context, CP is commonly classified according to topography and motor functionality (Graham et al., 2016). According to the Surveillance of Cerebral Palsy Europe, CP is classified based on the topography of the affected limbs as follows: monoplegia, hemiplegia, diplegia, triplegia and quadriplegia (Graham et al., 2016). Regarding motor functionality, CP can be classified using standardized instruments, such as Gross Motor Function Classification System (GMFCS), Functional Mobility Scale (FMS), Manual Ability Classification System (MACS), Communication Function Classification System (CFCS), Visual Function Classification System (VFCS) and Eating and Drinking Ability Classification System (EDACS) (Dornelas et al., 2014; Baranello et al., 2020).

Among instruments, the GMFCS is considered the gold standard for classifying and predicting long-term gross motor functionality according to the age of children with CP (Graham et al., 2016). The GMFCS describes five levels of gross motor function: I) independent walking; II) independent walking with limitations; III) walking with walking aids (e.g., walker); IV) independent mobility with mobility aids (e.g., motorized wheelchair); V) wheelchair mobility led by others (Palisano et al., 2008).

Participation in recreation and leisure activities is a guaranteed right for children (Lopes & Berclaz, 2019). However, the daily lives of children with CP are permeated by contextual factors that can favor or disfavor participation in these activities (van der Kemp et al., 2022). Recognizing these factors provides an understanding of the complex relationships between body structure and function, activity, and participation (Lopes & Berclaz, 2019; van der Kemp et al., 2022). Therefore, it is necessary to recognize and understand the contextual factors in recreation and leisure activities in order to guarantee the right to participation of children with CP on equal terms with other people in society (Lopes & Berclaz, 2019; van der Kemp et al., 2022).

According to the International Classification of Functioning, Disability and Health (ICF), participation is involvement in daily life situations (Classificação Internacional de Funcionalidade, Incapacidade e Saúde, 2020). The participation of children with CP in recreation and leisure activities can be influenced by environmental factors (Pashmdarfard et al., 2021). These factors include the physical, social and attitudinal environment where people lead their lives, being considered external to individuals in a positive (facilitators) or negative (barriers) way (Pashmdarfard et al., 2021).

Recreation is understood as the action of entertaining oneself through a pastime or search for pleasure. Furthermore, the result of participation and maximum experience of self-satisfaction can be considered as an activity. While leisure is related to time, activity, and environment, describing what, when and how people enjoy leisure. Otherwise, leisure is understood by the way of thinking and feeling before, during and after the leisure experience (McLean & Hurd, 2011).

The ICF (Classificação Internacional de Funcionalidade, Incapacidade e Saúde, 2020) considers the following as recreation and leisure activities: games, sports, physical exercise programs, relaxation, fun, art galleries, museums, cinema, theater, crafts, hobbies, reading for pleasure, practicing musical instruments, excursions and tourism, or traveling for pleasure. Carrying out recreation and leisure activities are fundamental and must be part of the child's daily life, as playing is the child's main occupation and a right to be exercised regularly (Pratt et al., 2008).

Recently, alternative structural schemes to the ICF have been discussed (Borg, 2018; Heerkens et al., 2018a, 2018b). Critics argue that the presence of the health condition at the top of the ICF scheme reflects the dominance of the biomedical model (Borg, 2018; Heerkens et al., 2018a, 2018b). Alternative schemes, such as the participation pyramid, proposed by Heerkens et al. (2018a, 2018b) and Borg (2018), highlight participation as central and interrelated to the other components (activities, structures and function and personal factors), emphasizing the factors environmental issues to the detriment of disability.

Other experts have deepened studies on participation by describing the "Family of Constructs Related to Participation". Two components are essential to understanding it: attendance and engagement. Attendance is being present at some activity, being characterized by presence and frequency, while involvement is the experience during attendance, being represented by other elements, such as engagement, motivation, persistence, social interaction and affection (Imms et al., 2016).

Due to changes in health guiding models, literature review studies discussed the influence of various environmental factors on the participation of children with CP in recreation and leisure activities (Shikako-Thomas et al., 2008; van der Kemp et al., 2022). However, despite notable and promising contributions to the scientific literature, these reviews use primary sources, with samples made up of individuals over 11 years of age, and exclude studies with a qualitative approach.

Evidence-based practice (EBP) consists of understanding current evidence on a given topic in order to improve and guide professional decision-making during clinical practice. The integrative review — EBP method — simultaneously includes experimental and non-experimental studies, through the search, analysis and presentation of results in a synthesized way, in order to explain the phenomena and interest and solve problems in the health area (Whittemore & Knafl, 2005).

Using the integrative review method, it is believed that this study will provide information about the environmental factors that permeate the daily lives of children with CP from the perspective of the ICF participation model, participation pyramid and family of constructs. It is hoped that the findings of this review will encourage family members, educators and health professionals, such as occupational therapists and physiotherapists, to develop strategies and interventions that minimize the identified barriers and maximize environmental facilitators, enabling greater participation of children with CP in recreational activities. and leisure. Therefore, this integrative review aims to identify environmental barriers and facilitators in the participation of children with CP in recreation and leisure activities.

Method

This study was carried out based on the integrative review method proposed by Whittemore & Knafl (2005). The integrative review is carried out in five stages: 1) Identification of the problem; 2) Search in literature; 3) Data evaluation; 4) Data analysis; 5) Presentation. The guiding question for identifying the problem was formulated using the PICo (Population, Interest, Context) mnemonic method (Lockwood et al., 2015). The following terms were used: P= children with cerebral

palsy; I = environmental facilitators and barriers; Co= participation in recreation and leisure activities. Therefore, the following question was formulated: What are the environmental barriers and facilitators that influence the participation of children with CP in recreation and leisure activities? The eligibility criteria were formulated a priori based on the terms used in the PICo mnemonic method:

Inclusion criteria:

- Population: children with CP up to 11 years of age;
- Interest: environmental facilitators and barriers (physical, social and attitudinal);
- Context: participation of children with CP in recreation and leisure activities;
- Study design: cross-sectional, case-control, cohort, case series, case report, randomized or non-randomized clinical trial; studies with stratified results for children with CP; quantitative and qualitative studies; publication date between 2011 and 2022; studies published in Portuguese and/or English;
- Publication type: peer-reviewed empirical studies.

Exclusion criteria:

- Population: participants with other diagnoses and children over 12 years of age.
- Interest: not applied;
- Context: not applied;
- Study design: review studies, opinions and editorials;
- Type of publication: theses, dissertations, conferences, preprints and government documents.

In the screening process, by reading titles and abstracts, two reviewers independently selected the studies based on the eligibility criteria established a priori. Discrepancies between these two reviewers were resolved by a third reviewer. After screening, the three authors read the texts in full to determine their inclusion or exclusion in this review.

The study search process was carried out based on the PRISMA flow diagram model (Page et al., 2021). The searches were conducted in six electronic indexing sources: MEDLINE via PubMed, EMBASE, SciELO, LILACS, SCOPUS and Web of Science. Furthermore, a manual search for potentially eligible studies was carried out on Scholar Google. Based on the eligibility criteria, the search was carried out on the first 10 pages of results provided using the Google Scholar relevance order filter (Bramer et al., 2017). Manual search is essential to identify studies that were not found in the search process in pre-established databases (Bramer et al., 2017). The search took place on December 30, 2022. The search strategy was designed to identify studies in MEDLINE via PubMed and adapted for other indexing sources. Based on the study question, the following MeSH (Medical Subject Headings) controlled vocabularies were used: cerebral palsy; social participation; child; leisure activities; recreation (recreation). The study screening and selection process was conducted using the Rayyan tool (Ouzzani et al., 2016). Table 1 illustrates the search strategy used to identify the studies.

Table 1. Search strategy.

Indexing source	Search strategy	No
MEDLINE via PubMed	((("cerebral palsy"[MeSH Terms] OR ("cerebral"[All Fields] AND "palsy"[All Fields]) OR "cerebral palsy"[All Fields]) AND ("social participation"[MeSH Terms] OR ("social"[All Fields] AND "participation"[All Fields]) OR "social participation"[All Fields]) AND ("child"[MeSH Terms] OR "child"[All Fields] OR "children"[All Fields] OR "child s"[All Fields] OR "children s"[All Fields] OR "childrens"[All Fields] OR "childs"[All Fields]) AND ("leisure activities"[MeSH Terms] OR ("leisure"[All Fields] AND "activities"[All Fields]) OR "leisure activities"[All Fields])) OR ("recreation"[MeSH Terms] OR "recreation"[All Fields] OR "recreations"[All Fields] OR "recreational"[All Fields] OR "recreator"[All Fields] OR "recreators"[All Fields])) AND ((y_10[Filter]) AND (clinicaltrial[Filter] OR meta-analysis[Filter] OR randomizedcontrolledtrial[Filter]) AND (humans[Filter]) AND (allchild[Filter] OR newborn[Filter] OR allinfant[Filter] OR infant[Filter] OR preschoolchild[Filter] OR child[Filter]))	3571
SCOPUS	(TITLE-ABS-KEY (cerebral AND palsy) AND TITLE-ABS-KEY (child) AND TITLE-ABS-KEY (social AND participation) AND TITLE-ABS-KEY (recreation) OR TITLE-ABS-KEY (leisure AND activities))	85
SciELO	(cerebral palsy) AND (social participation) AND in:("scl") AND year_cluster:("2013" OR "2009" OR "2014" OR "2012" OR "2015" OR "2017" OR "2019" OR "2021")	12
BVS/LILACS	(cerebral palsy) AND (social participation) AND (child) OR (leisure activities) AND (recreation) AND (db:("MEDLINE") AND type_of_study:("qualitative_research" OR "observational_studies" OR "prognostic_studies" OR "clinical_trials" OR "prevalence_studies" OR "risk_factors_studies")) AND (year_cluster:[2012 TO 2022])	0
BVS/MEDLINE	(cerebral palsy) AND (social participation) AND (child) OR (leisure activities) AND (recreation) AND (db:("MEDLINE") AND type_of_study:("qualitative_research" OR "observational_studies" OR "prognostic_studies" OR "clinical_trials" OR "prevalence_studies" OR "risk_factors_studies")) AND (year_cluster:[2012 TO 2022])	8
EMBASE	(('cerebral palsy'/exp OR 'cerebral palsy' OR (cerebral AND ('palsy'/exp OR palsy))) AND ('social participation'/exp OR 'social participation' OR (('social'/exp OR social) AND ('participation'/exp OR participation))) AND ('child'/exp OR child) OR 'leisure activities'/exp OR 'leisure activities' OR (('leisure'/exp OR leisure) AND activities)) AND ('recreation'/exp OR recreation) AND (2012:py OR 2013:py OR 2014:py OR 2015:py OR 2016:py OR 2017:py OR 2018:py OR 2019:py OR 2020:py OR 2021:py OR 2022:py OR 2023:py) AND ([child]/lim OR [infant]/lim OR [newborn]/lim OR [preschool]/lim OR [school]/lim) AND 'Article'/it	1447
Web of Science	cerebral palsy (Todos os campos) and social participation (Todos os campos) and child (Todos os campos) or leisure (Todos os campos) and recreation (Todos os campos) and 2023 or 2022 or 2020 or 2021 or 2019 or 2018 or 2017 or 2016 or 2015 or 2014 or 2013 or 2012 (Anos da publicação) and Artigo (Tipos de documento) and English or Portuguese (Idiomas)	2384
Total	-	7507

Source: own elaboration.

Data were extracted independently by two reviewers and tabulated in an Excel® spreadsheet in order to describe the characteristics of the included studies (author and year, origin, objective, study design, sample characteristics) and categorize environmental factors, relating them to the components of participation (attendance and involvement) described by (Imms et al., 2016).

The environmental factors were identified based on the concepts of the ICF (Classificação Internacional de Funcionalidade, Incapacidade e Saúde, 2020): (1) Products and technology: assistance products and technologies adapted or designed to provide functionality to the person; (2) Natural environment and environmental changes made by humans: animate or inanimate elements of the natural or physical environment and its components modified by people, as well as characteristics of human populations in that environment; (3) Support and relationships: people or animals who provide practical physical or emotional support, education, protection and assistance, and relationships with others at home, work, school, play or other daily activities; (4) Attitudes: observable consequences of customs, practices, ideologies, values, norms, factual beliefs and religious beliefs; (5) Services, systems and policies: services that are the provision of benefits, structured programs and operations; administrative control systems and organizational mechanisms; policies, rules and regulations.

Environmental factors were categorized according to the components of the family of constructs related to participation (Imms et al., 2016) and their respective elements (Levac, 2023). The environmental factors related to the attendance component were categorized by presence and frequency elements (Imms et al., 2016; Levac, 2023); while environmental factors related to the involvement component were categorized by elements of engagement, motivation, persistence, social connection, and affection (Imms et al., 2016; Levac, 2023). Table 2 illustrates the definition of the components and their respective participation elements.

Table 2. Definition of components and their respective participation elements based on studies by Imms et al. (2016) and Levac (2023).

Components	Elements	Definition
Attendance		Being present in some activity, being characterized by presence and frequency
	Presence	Being physically present at a given time, place and context
	Frequency	It is the number of repetitions of a specific behavior, task or activity
Involvement		It is the experience during attendance, represented by elements such as engagement, motivation, persistence, social interaction and affection
	Engagement	It is an internal individual state of directing energy and effort towards a task or activity
	Motivation	Mental function that produces the incentive to act and influences goal-directed behavior
	Persistence	It is the continuous effort to maintain and progress during an activity, even in the face of challenges and obstacles
	Social connection	It is the degree to which children feel connected to others in their social environment, including family, peers and healthcare professionals
	Affection	It is the emotional experience characterized by valence (unpleasant to pleasant) and arousal (energetic to lethargic)

Source: Imms et al. (2016) and Levac (2023).

The data was presented in the form of a diagram, in order to show the factors related to the elements and components of participation, using the Whimsical (2023) software. Each environmental factor was represented by a color, being related through lines to the respective element of participation. There is a subtitle in the upper left corner of the diagram figure with the color representation of each factor. Environmental factors identified as barriers were represented by dotted lines, while environmental factors identified as facilitators were represented by solid lines. The identified references for each factor were also represented in the image by gray lines and the authors' description.

Results

Database searches identified 7,507 studies. After excluding 198 duplicates, 7309 studies were selected for reading the title and abstract and 32 of them were chosen for reading the full text. After applying the eligibility criteria, 28 studies were excluded and four were included in the review (Bult et al., 2012; Ferm et al., 2015; Mei et al., 2015; Pasculli et al., 2012). In addition to these, five studies selected in the manual search were also included (Hsieh et al. 2017; Chiarello et al., 2012; Graham et al., 2014; Rocha & Deliberato, 2012; Rocha et al., 2018). Therefore, nine studies were included in this integrative review. Figure 1 presents the flowchart for identifying, screening, and selecting studies.

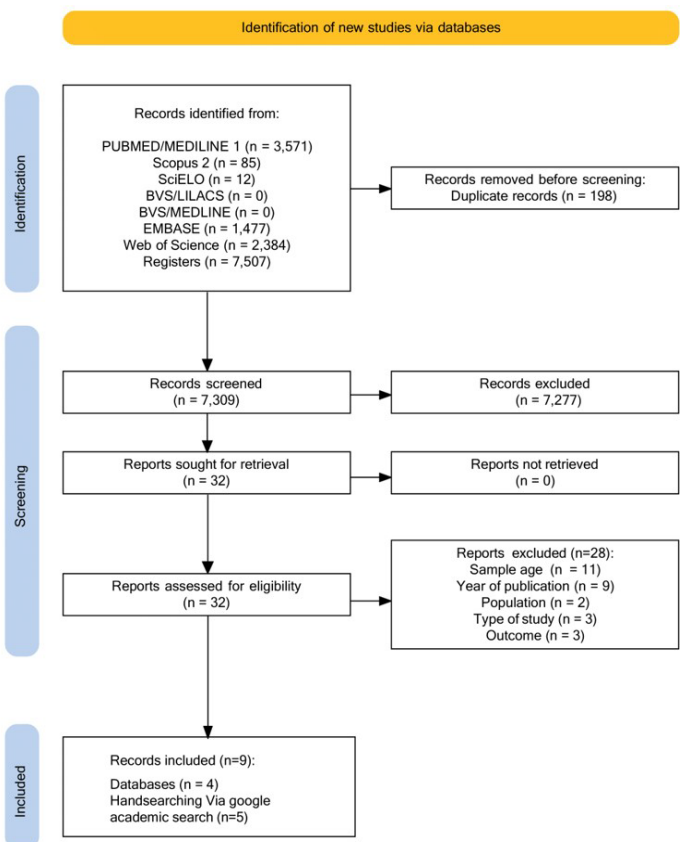

Figure 1. Flowchart of identification, screening, and selection of studies. **Source:** adapted from Page et al. (2021).

Table 3 presents the characteristics of the included studies. Among the nine studies, three were from Brazil (Pasculli et al., 2012; Rocha & Deliberato, 2012; Rocha et al., 2018). Most studies had a cross-sectional design. Only the studies by Hsieh et al. (2017) and Bult et al. (2012) presented a longitudinal design. Six studies presented a qualitative approach (Ferm et al., 2015; Graham et al., 2014; Mei et al., 2015; Pasculli et al., 2012; Rocha & Deliberato, 2012; Rocha et al., 2018) and three quantitative (Bult et al., 2012; Chiarello et al., 2012; Hsieh et al., 2017). Only the study by Ferm et al. (2015) was carried out with children with CP and typical development. However, this study presented stratified results for children with CP and was therefore included in this review. The study samples consisted of caregivers and children with CP (Bult et al., 2012; Chiarello et al., 2012; Ferm et al., 2015; Graham et al., 2014) and exclusively children (Hsieh et al., 2017; Pasculli et al., 2012; Rocha & Deliberato, 2012; Rocha et al., 2018). Only the study by Mei et al. (2015) presented a sample consisting exclusively of caregivers. Regarding the age range of the samples, the minimum age was 3 years and the maximum was 10 years. Most studies used the GMFCS Classification to assess motor function. The samples consisted mainly of children with GMFCS IV level. some studies used other types of CP classification, such as the Hagberg Classification and SCPE (Surveillance for Cerebral Palsy in Europe). The assessment instruments were diversified. Only the study by Bult et al. (2012) used a standardized instrument for participation: the Children's Assessment of Participation and Enjoyment. Three studies used semi-structured interviews (Graham et al., 2014; Pasculli et al., 2012) and filming (Pasculli et al., 2012; Rocha & Deliberato, 2012; Rocha et al., 2018) and two studies used ICF-CY checklists (Hsieh et al., 2017; Mei et al., 2015).

Table 3. Characteristics of the included studies.

Author, year and origin	Objective	Design	Sample	CP Rating	Instruments
Bult et al. (2012) Netherlands	To determine which child, family and environmental variables are predictors of participation in formal and informal leisure activities in preschool-aged children with CP.	Longitudinal quantitative approach	N= 46 caregivers and children Age range: 5 to 8 years	GMFCS (Level I, 30,4%, n= 14)	*Children's Assessment of Participation and Enjoyment*
Chiarello et al. (2012) USA	Describe the participation of preschool children with CP.	Cross-sectional quantitative approach	N=85 caregivers and children Age range: 3 to 6 years	GMFCS (Level I, 34.2%, n=13)	Self-report on children's participation

Table 3. Continued…

Author, year and origin	Objective	Design	Sample	CP Rating	Instruments
Ferm et al. (2015) Sweden	Explore children with complex communication needs, their peers and adult support people playing with the talking, moving robot *LekBot*	Qualitative transversal approach	N= 3 caregivers N= 2 children with CP. Age range: 3 to 6 years	GMFCS (Levels III and IV)	Conversation Analysis
Graham et al. (2014) England	Explore what parents of children with CP (17 months to 6 years) understand by play and its use in therapy and home programs	Qualitative transversal approach	N=7 caregivers and children Age range (caregivers): 29 to 42 years old	GMFCS (Level IV, 57,1%, n=4) (Level V, 42,8%, n=3)	Semi structured interview
Hsieh et al. (2017) Taiwan	To evaluate the effects of hippotherapy on body functions, activities, and participation in children with CP of various functional levels using the ICF-CY	Longitudinal quantitative approach	N=14 children Age range: 3 to 8 years	GMFCS (Level III, 28,5%, n= 4; Level IV, 28,5%, n=4, Level 5, 28,5%, n=4). SCPE (Spastic quadriplegia n=6)	*ICF-CY checklists*
Mei et al. (2015) Australia	Explore parents' views on the participation of children with CP with a variety of communicative skills and the influencing factors (environmental and personal)	Qualitative transversal approach	N=13 caregivers Age range (children): 4 to 9 years	GMFCS (Level II, 38,4 %, n=5 Level III, 38,4 %, n=5) SCPE (Spastic diplegia 38,4%, n=5)	ICF-CY *checklists*
Pasculli et al. (2012) Brazil	Verify the quality of interpersonal relationships that are established between a child with CP and their classmates during group playful activities carried out in the classroom and during recess	Qualitative transversal approach	N=1 child Age: 8 years	SD	Semi-structured interview and filming

Table 3. Continued…

Author, year and origin	Objective	Design	Sample	CP Rating	Instruments
Rocha & Deliberato (2012) Brazil	Identify needs for services, resources and strategies of assistive technology for students with CPs at school	Qualitative transversal approach	N=2 children Age range: 3 to 6 years	Classificação de Hagberg and SCPE (Spastic tetraparesis, n=1; dyskinetic, (n=1)	Semi-structured interview, filming and recording in a field diary
Rocha et al. (2018) Brazil	Evaluate school accessibility in early childhood recess and analyze the participation of children with CP in recreational activities developed	Qualitative transversal approach	N=3 children Age range: 4 to 6 years old.	GMFCS (Level, II, III and IV)	Protocol for evaluating physical accessibility in Early Childhood Education schools and filming

Source: elaborated by the authors.

Figure 2 shows the synthesis and categorization diagram of environmental factors related to participation elements and components. Regarding the attendance component, most studies presented environmental factors of products and technology and support and relationships. Environmental factors of products and technology, such as books, television, and toys, were related as facilitators to the presence element in participation. Environmental factors of support and relationships, such as support from parents and peers and teachers, were related as facilitators to the attendance element in participation. Only the service, system and policies and products factor was considered as a barrier to the element of presence in participation.

Regarding the involvement component, most studies presented environmental factors of support and relationships, which were related as facilitators to the elements of engagement, motivation, social connection and persistence, such as companions, family members, teachers, adults, lack of interaction with family members, classmates, welcoming others. The environmental factors of service, system and policies, products and technology and attitude were presented with barriers to the elements of engagement (no provision by parents), social connection (lack of social programs) and persistence (lack of accessibility and lack of adequacy of the activity). In general, the social connection element presented a greater number of environmental factors, while the affection element presented a smaller number of environmental factors (Figure 2).

Figure 2. Synthesis and categorization diagram of environmental factors related to participation elements and components. **Source:** elaborated by the authors.

Discussion

The present integrative review aimed to identify environmental barriers and facilitators in the participation of children with CP in recreation and leisure activities. The identified findings were categorized into two themes: barriers and facilitators related to attendance (1) and involvement (2) in participation. Findings on attendance were categorized by elements of frequency and diversity, while findings on engagement were categorized by the following elements: engagement, motivation, social connection, persistence, and affection.

Barriers and facilitators related to attendance at participation

Frequency

The frequency of environmental factors, such as parental perception and support and interest in peers and teachers, is fundamental for the participation of children with CP in leisure activities. Furthermore, home, school, community, and health service environments contributed to the performance of these activities.

These environments are characterized as facilitating participation as they foster relationships between children with CP and the people around them (Lawlor et al., 2006; Silva et al., 2016). Therefore, the interaction between the environment and interpersonal relationships is essential for children with CP to remain involved in recreational activities in different environments, such as home, school, the community and health services.

Diversity

The diversity of products and technology, such as toys and accessible spaces for play and cultural activities, facilitates participation in recreation and leisure activities. In the school environment, although leisure activities are encouraged, the level of independence functionality of children with CP correlates negatively with the diversity of recreation and leisure activities on offer (Sanches-Ferreira et al., 2019). According to Rocha et al. (2018), the provision of toys, with or without adaptations, is a fundamental resource as a means of increasing accessibility during play and, consequently, enabling the child to experience new, meaningful experiences.

On the other hand, Mei et al. (2015) observed that the lack of accessibility to public transport can limit access to recreation and leisure activities. Transport systems that do not meet the needs of children with CP can generate risks to their lives and feelings of concern among family members (Falkmer, 2001; Welsh et al., 2006). Means of transport that enable safe and efficient transportation are essential to increase the functional health status of people with CP (Falkmer, 2001).

Professionals' knowledge of the contextual factors that influence participation allows them to direct family members, including social supports, to access public transportation (Shikako-Thomas & Law, 2015). Therefore, it is essential to understand the needs of people with CP to facilitate the identification of everyday barriers that influence their movement and limit their autonomy and independence when participating in recreation and leisure activities.

Barriers and facilitators related to engagement in participation

Engagement

Support and relationships involving parents, family members and teachers can favor engagement in participation in recreation and leisure activities (Bult et al., 2012; Chiarello et al., 2012; Graham et al., 2014; Hsieh et al., 2017; Pasculli et al., 2012; Rocha & Deliberato, 2012). This can be explained by the triggering of feelings of confidence, increased functional capacity and interest of children with disabilities in informal activities (King et al., 2006).

Otherwise, the lack of support and relationships can negatively influence the child's participation in recreation and leisure activities. According to Mei et al. (2015), parents not offering children a choice is considered a barrier to participation. This suggests that, by not providing children with moments of choice, feelings of demotivation and loss of autonomy can be triggered when carrying out activities that do not generate pleasure.

Motivation

The support network and relationships among parents, peers and teachers contribute to motivating the involvement of children with CP in recreation and leisure activities. Motivation depends on the interaction between the intrinsic desire to act and the environmental context. This psychological driving force is associated with a decrease in communication limitations and an increase in pleasure and persistence in challenging activities for children with CP (Majnemer et al., 2010). According to Majnemer et al. (2010), parents and teachers with excessively helpful and overprotective behaviors can cause impediments to motivation and an inability to explore the environment freely. Therefore, it is essential that the child's environment is favorable to free exploration, taking into account their preferences associated with close interaction with family members and others to provide adequate support for participation.

Social connection

Interaction with adults, parental support, material conditions and therapy (equine therapy) were environmental factors that facilitated the participation of children with CP. Barriers decrease in the opportunities in which the child interacts with other people, as the established connection allows for the exchange of experiences, creativity and emotional bonds, allowing engagement in activities.

Considering the environmental factor of support and relationships, friends are considered facilitators for children's participation, especially in recreation and leisure activities. However, negative attitudes can be attitudinal barriers on the part of acquaintances, colleagues, neighbors and community members, leading to bullying and discrimination by peers and teachers (Longo et al., 2020).

On the other hand, the scarcity of social programs, less parental interaction and the negative attitudes of others were considered as barriers to participation. The scarcity of social programs described by Chiarello et al. (2012) leads to reflection on guaranteeing the right to participation of children with CP. In fact, guaranteeing this right does not only involve the desire of the child and family, requiring political actions that involve health services, government bodies and interested parties (Chiarello et al., 2021; Chiarello et al., 2012). Therefore, it is essential that rehabilitation specialists and public policy makers create strategies to reduce restrictions on participation in recreation and leisure activities (Majnemer et al., 2010).

Persistence

Welcoming children with CP and the support of teachers are essential in environments such as schools and the community, as the process of recreation and leisure activities can be facilitated by the attitude of people around them who contribute to elements such as persistence.

The products and technologies demonstrated a relationship with the persistence element. Recess games, without environmental adaptations, were characterized as a barrier to participation, especially for children with severe motor impairment. Thus, the degree of motor impairment can be an indication of the level of participation in recess activities (Alves & Matsukura, 2011); that is, the child loses the opportunity to interact and persist in recreation and leisure activities.

Affection

Affection is a fundamental element of the attendance component that characterizes the interpersonal interaction of children with CP. The child's relationship can be affectionate with an animal, as happens in the equine therapy activities described by Hsieh et al. (2017). On the other hand, there is still a lack of studies on children's affection during leisure activities, as well as children's affectionate relationship with animals, including horses (equine therapy), which represent a facilitating environment for bonding and engagement in the activity.

Conclusion

This integrative review had the guiding question: What are the environmental barriers and facilitators that influence the participation of children with CP in recreation and leisure activities? From the review of scientific productions, it was possible to verify that, of the 32 studies eligible for reading, only nine were included in the review, with a cross-sectional design and a qualitative approach with CP children aged between 3 and 10 years. Most studies pointed to the attendance component related to elements of frequency and diversity as a facilitator of participation, represented by support and relationships. Regarding engagement, most studies presented environmental factors related to engagement elements, represented by connection as a facilitator.

The ICF model combined with the reconsideration of the concept of participation, related to the participation pyramid and the family of constructs, was essential to enable a better understanding of the definitions and their relationships with the other components and, in this way, favor the participation of children. Attitudinal facilitators, from the children's perspective, are generated by family members, while increased social and environmental demands can be considered a barrier to participation in recreation and leisure activities.

This integrative review found the scarcity of studies on the child population with CP up to 12 years of age. Furthermore, it is necessary that empirical studies with a quantitative and qualitative approach are carried out with samples within the childhood age range, that is, incomplete 12 years of age, considering the essential components of participation and the ICF biopsychosocial model. In this way, it will be possible to promote the identification and understanding of the specific environmental barriers and facilitators of the target population.

Regarding the method and results, this integrative review presents limitations regarding the quality of evidence of the studies found. It is suggested that future review studies be carried out with the aim of providing evidence with a lower risk of bias and methodological quality in order to contribute to health professionals, education, family members, caregivers about the contextual factors, barriers and environmental facilitators that influence the participation of children with CP.

Due to the scarcity of studies that present samples with less than 11 years of age, it is suggested that future studies evaluate the strength and quality of the evidence, with samples made up of children in this age group.

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