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A scoping review exploring wheelchair and seating provision for children and its implications for occupational performance.

Abstract

A scoping review exploring wheelchair and seating provision for children and its implications for occupational performance.

Background: There have been great advances in technology and choice of wheelchair and seating available, yet acquiring these devices has become more challenging. Children need mobility for normal development, and failure to provide an appropriate wheelchair can affect the trajectories of their development.

Objectives: To develop an understanding of the vital role that wheelchair provision plays in meeting the basic needs of a child, and to determine the factors of the provision process that impact on their occupational performance.

Methods: A scoping review guided by Arksey and O'Malley (2005) methodological framework: 1) identification of research question; 2) identification of relevant studies; 3) selection of studies to include; 4) charting of data; and 5) collating, summarizing and reporting.

Results: From the extensive literature available on the topic of wheelchairs in relation to children, eighteen sources were selected for review. The findings identified four main factors of wheelchair provision that impact on children: 1) provision is designed on the needs of adults; 2) variations in seating assessment for children; 3) choice and availability of equipment for children; and 4) the perception of practitioners and parents. However, presently there is a lack of existing guidelines, standards, legislation, and policy relating to the provision of wheelchairs for children in Ireland.

Conclusions: This study advocates for the opportunity and fulfilment of the rights of children to participate in health-building occupations. There is a need for the development of service quality standards in the provision of wheelchair services to enable children to achieve their potential.

1. Introduction

In a recent national newspaper article (Clonan 2014), a father spoke of his son's 'heart-breaking' wait for almost twelve months for a wheelchair to be provided. As with all eleven year old children, his son continued to grow and develop as he waited for this vital equipment. This detrimental delay led to the contractures in his limbs deteriorating with his legs beginning to curl backwards and inward, as he was 'obliged' to use a wheelchair that was too small for him. Currently, the experience of many children is that they are unable to get a wheelchair suitable for their needs, when they need it (Sharma and Morrison 2007). Children need mobility for normal development, and failure to provide an appropriate wheelchair can affect the trajectories of their development into adulthood (Rosenbaum and Gorter 2012).

The ability to enhance lifespan development through occupation is one of the core beliefs of the occupational therapy profession. Occupations are the "patterns of action that emerge through transaction between the child and environment and are the things the child wants to do or is expected to do" (Case-Smith and O'Brien 2013, p. 62). With an effective and efficient wheelchair service children with mobility impairments can experience social inclusion, independence, and the ability to perform all the activities that are meaningful to them. The construct of occupational justice refers to the importance of equitable opportunities and resources to enable engagement in meaningful occupations (Townsend and Wilcock 2004). However, political commitment from those that limit equitable opportunities and resources is required, which has been reiterated in recent research advocating for the prioritisation of wheelchair provision to be part of a national government policy (Gowran et al. 2011).

1.1 Research question, purpose and aims

The purpose of this study is to develop an open understanding of the vital role wheelchair provision plays in meeting the basic needs of a child. This research aims to review and reflect on the literature concerning wheelchair and seating provision for children, and to heighten awareness on the importance of national policy for prescription of wheelchairs. Drawing from both local and international literature, this article reviews the current literature with the following questions in mind. Firstly, what wheelchair and seating provision guidelines exist specifically for children in Ireland and abroad? Secondly, what are the factors that impact on children who use wheelchairs and their quality of life?

2. Literature Review

2.1 The Wheelchair

An appropriate wheelchair, defined by the World Health Organisation (2008), meets the user's needs in accessing their environment, provides postural support, and is safe and durable. There have been great advances in technology and choice of wheelchair and seating available, yet acquiring these devices has become more challenging (Batavia 2010, p. xiii). The term wheelchair provision will be used in this article, referring to the overall process of wheelchair design, production, supply and service delivery reflecting the definition provided by the WHO (World Health 2008). Wheelchair prescription is a complex intervention (Gowran et al.). The difficulties arise in the relationship between i) the wheelchair user, their needs, abilities and preferences; ii) the available technology; and iii) the demands of the wheelchair user's environment which is continually changing (Di Marco et al. 2003). An appropriate wheelchair and seating intervention will be a holistic approach and unique to each individual. As stated by Zollars (2010, p. 130) it is essential to fit the seating system to the person and not the person to the seating system. This will enable wheelchair users to achieve optimum postural support, provide pressure relief and improve function (Trefler and Taylor 1991, Green and Nelham 1991). This paper is part of a larger project on wheelchair provision across the lifespan, together with wheelchair provision education, training, and policies. This paper will address wheelchair and seating provision specifically for children.

2.2 The Child

The United Nations Convention on the Rights of the Child (United Nations 1989) defines the child as every human being below the age of eighteen years, and this paper will research wheelchair provision for service users of the same age. It is impossible to envision life span development occurring without occupation. From birth we begin to develop as occupational beings and this evolves and adapts throughout our lifespan. Childhood occupation is receiving more attention in the occupational science literature, and this trend corresponds with a global interest on child health and well-being (Lynch 2009, Wiseman et al. 2005). The theme of 'becoming' through occupation is evident across the literature, as all children are in a constant state of 'becoming' as they grow and develop (Hasselkus 2011). When a child's mobility is significantly impaired, their physical, cognitive and sensory development is affected, subsequently impacting their quality of life and health and wellbeing (Case-Smith and O'Brien 2013). Research on child development has emphasised the beliefs of theorists such as Piaget and Vygotsky's, and the importance of a child's social and experiential

learning (Rodger and Ziviani 2006, p. 136). Children have an innate urge to explore and master their environment, however if there is an absence of mobility and they are unable to interact independently, it can result in a destructive cycle of deprivation (Nisbet et al. 1996), Figure 1).

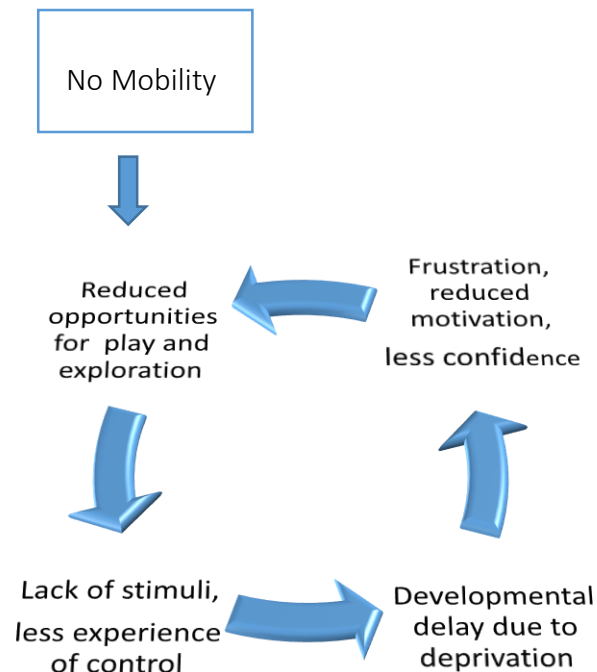


Figure 1. Cycle of deprivation (Nisbet et al. 1996)

Play is considered a primary occupation of childhood and is essential for development (Missiuna and Pollock 1991). Therefore if a child's opportunity for play and exploration is reduced due to inadequate provision of a mobility aid, the child will experience social exclusion and restrictions, such as deprivation of full participation in everyday occupations, also known as occupational deprivation (Nilsson and Townsend 2010). When a child is issued a wheelchair at the optimum time, it can make a positive contribution to improving cognitive and perceptual skills, reducing learned helplessness, and aid the holistic development of a child (Rosen et al. 2009, Fernandes 2007, Kolb 1984). Mobility is a prerequisite for accomplishing other activities of daily life and social roles, therefore a wheelchair not only aids locomotion, but promotes social inclusion and active participation (Rousseau-Harrison and Rochette 2013). Participating in one's own social environment allows for the development of competencies and skills, relationships, mental and physical health, and personal identity (Tisdall 2006, Law 2002). Participation in a full life is the human right of every child (Novak 2013).

2.3 The Child's Right to Mobility

In Ireland there is no national register of wheelchair and special seating (Work Research Centre 2012), and according to the National Physical and Sensory Disability Database (NPSDD) in 2011, there were 8,034 children under eighteen registered as having a 'physical and/or sensory disability' (Doyle 2012). The mobility and independence children experience from the provision of an appropriate wheelchair is believed to benefit their development of cognition, psychosocial skills, self-worth, confidence and the ability to socialise, which are important rights outlined in the UN Convention on the Rights of the Child (United Nations 1989, Jupp 1990). The Irish government, and all governments that ratified the Convention on the Rights of the Child have made a promise to uphold the principle that they would put the best interest of the children first. The Irish National Children's Strategy (Department of Health and Children 2000) states all children will have access to play, sport, recreation and cultural activities to enrich their experience of childhood (Objective L) and all children will be entitled to the service they need to achieve their full potential (objective J). In their study, Craddock *et al.* (2002) refers to the Commission on the Status of People with Disabilities, established by the Irish government in 1993, resulting in the recognition that 'people with disabilities' are not without hope, goals or dreams; stating "such hope does not centre on finding a 'cure', but on the possibility of improving quality of life through changes in existing attitudes and improvements in services which will, together, allow them to develop their own potential". With these constitutional rights and national strategies in place, are the needs of children with mobility impairments being met so they can enjoy the same privileges as their peers?

2.4 Conceptual Framework

The Person-Environment-Occupation (PEO) model (Christiansen *et al.* 2005), suggests occupational performance is the result of the dynamic relationship of the unique person, their environments in which they live, play and grow, and the occupations they engage in across the lifespan. For a child growing up, they interact and are influenced by their social, economic, physical, cultural and technological environments (Law *et al.* 1996, Strong *et al.* 1999). It is necessary to move beyond the single physical aspect of providing a wheelchair, and to consider the compatibility of that wheelchair with the child's needs, therefore enabling optimal occupational performance. The PEO model will be utilised as an analytical tool and as an underpinning framework in researching the current literature, focusing on the factors of wheelchair provision that facilitate or hinder a child's occupational performance.

3. Methods

3.1 Approach

A scoping review was conducted. Scoping reviews are a relatively new and increasingly popular approach providing a tool for summarising literature in an area such as health system quality (Levac et al. 2010, McKinstry et al. 2013). This method is useful when the: a) research question is broad: what are the factors of wheelchair provision that facilitate or hinder a child's occupational performance? ; b) studies have utilised a range of data collection and analysis techniques; c) inclusion/ exclusion can be developed post hoc; and d) quality of the studies is not an initial priority (Armstrong et al. 2011). According to Davis et al. (2009) scoping reviews encompass extensive overview of research and non-research documents, necessary to explore current guidelines of the wheelchair and seating provision in Ireland and abroad. Scoping reviews can influence policy and practice, as it goes beyond exploring the literature and identifies gaps (Rumrill et al. 2010, Anderson et al. 2008).

Arksey and O'Malley (2005) provide a methodological framework to carry out the scoping review, and this paper followed the suggested five stages: 1) identification of the research question to be addressed; 2) identification of studies relevant to the research question; 3) selection of studies to include in the review; 4) charting of information and data within the included studies; and 5) collating, summarising and reporting results of the review (see Figure 2 for a visual representation of the progression of information through the scoping review).

3.2 Search strategy

In order to identify the existing wheelchair provision for children, the researcher undertook a comprehensive search of several literature sources, including electronic databases, peer-reviewed and grey literature, reference lists of relevant literature, hand-searching key journals in the university library, and relevant organisations websites. The search strategy omitted time period restrictions or filters to avoid missing any relevant studies or documents. The electronic databases searched included MEDLINE, The Cochrane Library, PubMed Central, AMED, CINAHL, EMBASE and Google Scholar. The search terms included 'wheelchair', 'seating', 'children', 'assistive technology', 'paediatric mobility', 'child development and growth', and 'participation'. In addition, manual searches of the *International Journal of Therapy and Rehabilitation* and the *Assistive Technology Journal* were carried out. The search was completed between March 2013 and December 2013.

3.3 Selection of the grey and scientific literature

Use of broad terms in the electronic database searches generated a list of over 10,000 abstracts. To eliminate the irrelevant material from this list, a review of the abstract was carried out if the title was considered relevant. Only studies written in English were included. The abstracts were retrieved, read and assessed on the criteria of 1) does the article make reference to wheelchair and/ or seating provision?; 2) is the focus of the article based on young wheelchair user's under the age of eighteen?; and 3) are the issues that impact children who use wheelchairs addressed? Peer-reviewed articles, research reports, theses, and policy analyses were included if they met the inclusion criteria. To remain relevant and recent, only articles from the last ten to fifteen years were included. Excluded were articles where the full document wasn't available, or if the researcher deemed the documents as unreliable or invalid. Also excluded post hoc were documents which addressed one specific condition, as the aim was to remain broad and focus on the overall needs of a child wheelchair user and how service provision addresses needs.

3.4 Data extraction

Following the inclusion process, the included studies were imported into an Endnote database. A spreadsheet was created to chart the information that contributed to answering the research questions. As described in Arksey and O'Malley's (2005) collating and summarising stage in the framework, it states that researchers should describe the characteristics of included studies. The purpose of the final stage of scoping is to provide a structure to the literature uncovered. Details such as general citation information, author, year and title, and the research objective, country of origin, study design, and the key findings were assessed and recorded to create a detailed spreadsheet database (see Findings; Table 1 for scientific literature and Table 2 for grey literature).

3.5 Ethical Considerations

A number of ethical principles are adhered to in conducting of the data collection, and the interpretive and critical approach towards literature and researchers. This study presumes a moral ethic, and the researcher is 'anchored in a specific community of moral discourse' (Denzin and Lincoln 2002). It should also be noted that any recommendations provided could influence future decisions around wheelchairs for children, and with this arises the responsibility to report on literature, methodology and findings with honesty and integrity.

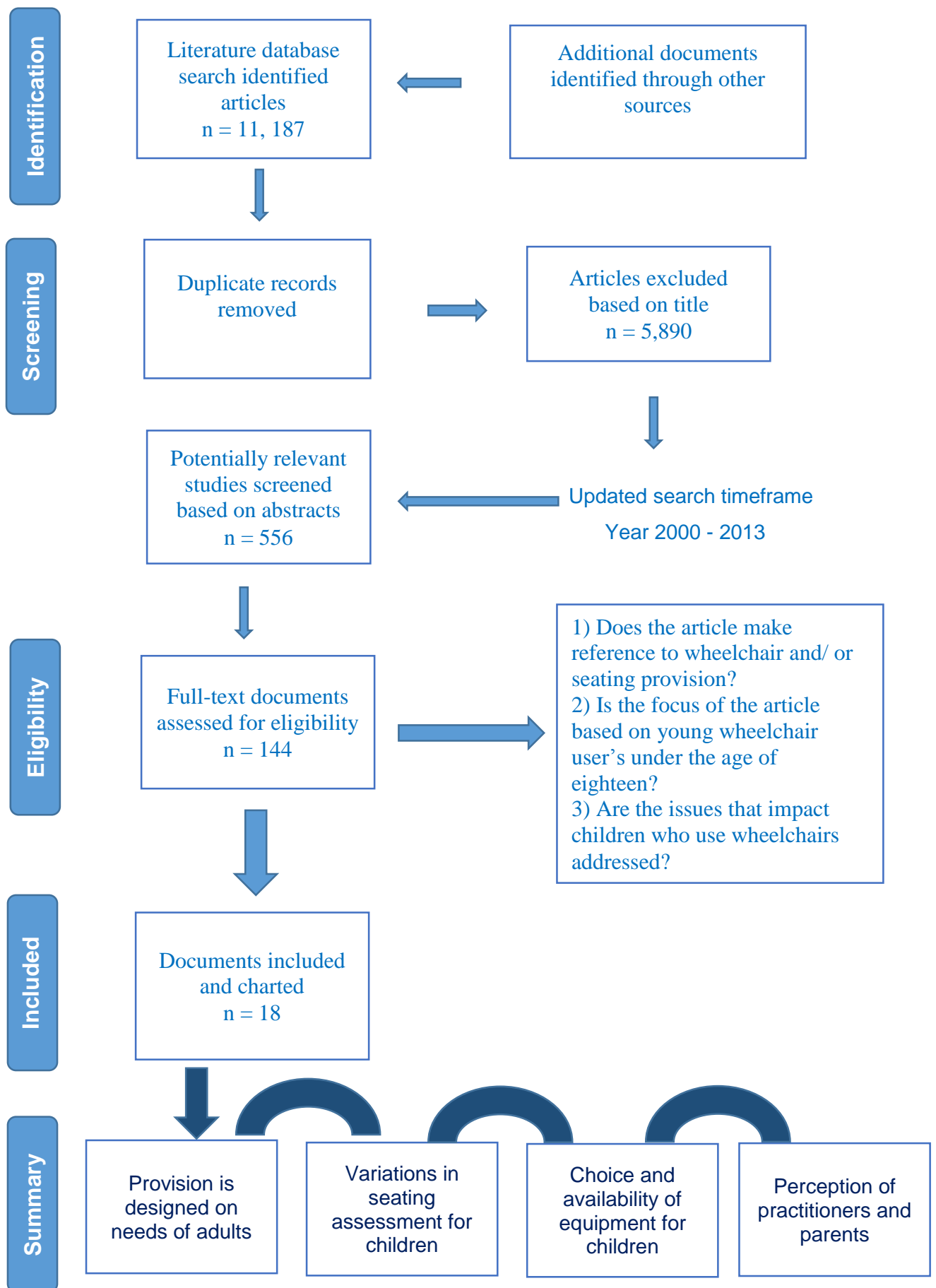


Figure 4. Flow diagram of the progression of information through the scoping review.

4. Findings

4.1 Overview of findings

The purpose of the study was to develop an open understanding of the vital role that wheelchair and seating provision plays in meeting the basic needs of a child. From the extensive literature available on the topic of wheelchairs in relation to children, eighteen sources were selected for review (Figure 4). To enable the informational points to be extracted from the sources, a spreadsheet was created. Following review of each source, information was organised relating to the author, year of publication, study title, research objective, and place of publication, the study design and main findings. Of the eighteen sources, fourteen which were retrieved are peer-reviewed articles (Table 1) with varying study designs. In addition, only five of the fourteen articles reviewed were published in occupational therapy journals or occupational science journals worldwide, indicating that the majority of the literature stems from other disciplines. The grey literature (Table 2) was sourced from additional on-line investigation into the existing guidelines for wheelchair provision for children. Furthermore, the research findings for this review comprises of literature from eight countries, with the majority carried out in the United Kingdom (n = 7). The charting process facilitated data extraction from the literature, allowing for the findings to be grouped into categories of identified factors of wheelchair provision that impact on children. The four factors identified across the sources, namely: 1) provision is designed on the needs of adults; 2) variations in seating assessment for children; 3) choice and availability of equipment for children; and 4) the perception of practitioners and parents.

4.2 Existing guidelines on provision of wheelchairs for children

It was previously widely believed that providing a wheelchair to a child with a mobility impairment would have a negative effect on the child's development. According to a Cochrane review (Casey et al. 2012), this then resulted in wheelchairs only being prescribed to a child as a last resort. McDonald et al (2007) stated that provision of wheelchair and seating systems have since focused on a medical model with the main aim being management of children's posture. However, with an increased understanding among both clinicians and parents, provision of a suitable wheelchair is now viewed for the positive contribution it provides to a child's development of self-reliance and achievement of active participation (Casey et al. 2012). Across the literature this increased awareness of the wheelchair needs for children has been commonly reported (Cox 2003, Rousseau-Harrison and Rochette 2013). Nevertheless, there is a lack of existing guidelines, standards, legislation, and policy relating to the provision of wheelchairs for children in Ireland (Gowran

et al. 2011, Tiernan 2013). The World Health Organisation (2008) states in their 'Guidelines on the provision of manual wheelchairs in less resourced settings' that the role of the policy planners is to ensure wheelchair provision is equitable and accessible to all, including children. Yet, Staincliffe (2003) found that in the United Kingdom, for example, the government strategy which is intended to promote the inclusion of all children, has failed in meeting their independent mobility needs. Charity organisations such as Whizz-Kidz focus on raising awareness of the importance of mobility and provide vital mobility equipment for children. In 2011, Whizz-Kidz sponsored a report by the All Party Parliamentary Group for Paediatric Mobility Reform, entitled 'My Wheelchair is my shoes' (Wateres and Kopff 2011). In this report, it states how essential it is for the Department of Health to work together with organisations to provide an effective implementation plan that ensures all children have access to the right equipment at the right time. Presently, the provision of a wheelchair for a child in many countries, including Ireland, is determined by the clinical recommendation at a local level (Casey et al. 2012), and without this being a priority at both local and national level there are many factors that can impact on the child.

4.3 Provision is designed on the needs of adults

Durkin (2002) sought to identify the role assistive technology has in normal development and play, and in doing so found that wheelchair service provision has excluded many children as it has been designed around the needs of adults. In the literature reviewed on the guidelines available for wheelchair provision (World Health 2008, Sheldon and Jacobs 2006, Arledge et al. 2011), the requirement to provide a service for the changing child is acknowledged but so far national guidelines to incorporate these needs have not been established. Whizz-Kidz and Barnardo's collaborated in the production of 'Don't push me around!' (Sharma and Morrison 2007) which reports on children's experiences of wheelchair services in the United Kingdom. It states that all applicants for powered mobility need a minimum of six months experience using an electrically powered indoor chair and demonstrate road safety awareness before becoming eligible for an electrically powered indoor outdoor chair (EPIOC) assessment. This criteria does not take into account age-appropriate experiences such as how a child learns to ride a bike, as this would also be protected and supervised by their parents. In addition, Durkin (2002) found that a child is discouraged from exploring and experiencing how a wheelchair works for themselves, and the process of assessment and provision does not incorporate the child's main occupation of play. It was also found by Sawatzky et al. (2012) that the literature on the provision of adult wheelchair skills is well developed but none have yet included children. A child's wheelchair needs are pre-empted by the service providers (Gcaza and Lorenzo 2008) and ideally this provision should be tailored to the child's unique set of circumstances and preferences (Casey et al. 2012).

4.4 Variation in seating assessment for children

A study conducted by Wright et al. (2010) on the best practices in children's seating assessment in the United Kingdom and Ireland, attributed the disconnect between assessment of children's needs and the equipment provided was due to the fact that there are no standardised assessments. The authors observed expert therapists at work to determine the assessment procedures used. Limited experience and training, different service models, and the lack of national guidelines or an appropriate standardised assessment tool was found to impact on therapist's ability to meet clinical, social and functional needs of children. Field and Livingstone (2013) carried out a systematic review of nineteen clinical tools for assessing children with motor impairments, and they noted that few tools for seating intervention address participation, environmental factors, or the child's and family's perspective. With this apparent lack of suitable tools for a therapist to carry out an objective assessment, their subjective opinion is what guides clinical practice (McDonald et al. 2007).

4.5 Choice and availability of equipment for children

The important factors in the literature that impact on the choice and availability of equipment for children are: 1) eligibility criteria; 2) funding; and 3) timing. The majority of wheelchair services fail to provide necessary equipment stating that the child does not fit the eligibility criteria (Durkin 2002, Hardy 2004). This is most apparent in the provision of powered mobility for children. Staincliffe (2003) documented that children up to fourteen years of age were refused power wheelchairs, even though manual wheelchairs may not provide adequate mobility for a child with respiratory difficulties, fatigue, or limited coordination or strength (Rosen et al. 2009). The strict eligibility criteria has been as a result of the under-funding of wheelchair services (Sharma and Morrison 2007). Provision of wheelchairs is expensive, for example, in the UK, it has been estimated to cost the National Health Service up to £40 million per year (McDonald et al. 2007). Most services combine children and adult services which will receive a single, shared budget. As the service is designed on the needs of adults, the children are being provided with inadequate scaled-down versions (Sharma and Morrison 2007). A child's wheelchair needs to encourage development and respond to growth, and this requires all equipment to be updated and maintained without delay (Cox 2003). In the report 'my wheelchair is my shoes' (Wateres and Kopff 2011) the impact of the long periods of time children wait to receive their equipment is discussed, and found it often results in the child having outgrown the wheelchair. In addition to the time delays resulting in wasting money on the wrong chair, it can also lead to future developmental and participatory complications for children.

4.6 Perception of providers and parents

McDonald et al. (2007) investigated the beliefs of parents and therapists in relation to children using adaptive seating systems. The authors found through analysis of questionnaires that there are evident differences, which has a direct impact on the mobility equipment that children receive. The therapists implementing seating interventions were found to address the body function and structure, prioritising postural management. Parents were reported to concentrate on personal and environmental factors that impact on the child's participation in the family and their community. Furthermore, the parents revealed in Rousseau-Harrison and Rochette (2013) that the most difficult barrier for their child using a wheelchair is the physical environment. For the child to access their environment, the provision of powered mobility is dependent on whether the service provider is influenced by the traditional approach of it being considered the 'last resort'. Under these circumstances, it is the parent who needs to be a strong advocate for their child (Durkin 2002).

On the other hand, Wiart et al. (2004) exploring mother's perceptions of powered mobility highlighted the necessity for therapists to consider the impact its provision has on the family, and specialist housing adaptations and transportation requirements. To ensure the perceptions of therapists or parents do not hinder children acquiring vital mobility equipment, it is essential for both to collaborate and communicate effectively (McDonald et al. 2007) throughout the provision process.

Author and Year of Publication	Title	Research Objective	Country	Study Design	Main Findings
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Table 1. Scientific Literature

Cox, D. L. (2003)	<i>Wheelchair needs for children and young people: a review</i>	To establish current practice in the NHS W/C service in England, the role of the wheelchair in children's mobility, the wheelchair and seating needs of children and the met and unmet need.	United Kingdom	Literature Review	The timely provision of equipment is a crucial factor. Younger users are often severely disabled and the failure to supply appropriate equipment could result in severe deformities in later life.
Rousseau-Harrison and Rochette (2013)	<i>Impacts of wheelchair acquisition on children from a person-occupation-environment interactional perspective.</i>	To explore the impacts of wheelchair (WC) acquisition on children's social participation, personal factors and social environment.	Canada	Quantitative and qualitative.	The acquisition of a mobility aid has a positive impact at different levels, i.e. on children's personal factors, participation in life habits and immediate social environment.
McDonald et al. (2007)	<i>A comparative exploration of the thoughts of parents and therapists regarding seating equipment for children with multiple and complex needs.</i>	Identify the difference in perception of children's wheelchairs and adaptive seating devices between the parents and primary therapists.	UK	Quantitative and qualitative; Questionnaire answered by parents and therapists.	The child's activity, participation, environmental, and personal factors should be considered in addition to postural management when supplying children and their families with adaptive seating systems.
Field and Livingstone (2013)	<i>Clinical tools that measure sitting posture, seated postural control or functional abilities in children with motor impairments: a systematic review</i>	To critically appraise clinical measurement tools used to assess for seating intervention, and question if components of ICF-CY addressed by tools.	Canada	Systematic Review	19 measurement tools determined. Few tools address participation, environmental factors, or the child's and family's perspective.

<i>Author and Year of Publication</i>	<i>Title</i>	<i>Research Objective</i>	<i>Country</i>	<i>Study Design</i>	<i>Main Findings</i>
Durkin (2002)	<i>The need for the development of a child led assessment tool for powered mobility users</i>	To identify gaps which need to be addressed in terms of normal development, play and the role of assistive technology.	UK	Quantitative & qualitative literature.	Many groups of children are excluded by the Wheelchair Services provision criteria which have been designed around the needs of adults who have acquired a disability, as opposed to the needs of the majority of children who have been born with a disability.
Hardy (2004)	<i>Powered wheelchair mobility: An occupational performance evaluation perspective.</i>	To examine the functional utility of powered mobility relative to individual occupational performance needs. The Occupational Performance Model provides a unique and comprehensive frame of reference for considering the prescription of a powered wheelchair mobility.	Australia	Discussion	Effective evaluation for powered wheelchair mobility should examine all elements of human performance including the contextual environment. In the case of a very young child whose primary role is play, a powered wheelchair may simply provide the opportunity for exploration of movement.
Rosen et al. (2009)	<i>RESNA Position on the Application of Power Wheelchairs for Paediatric Users.</i>	To assist practitioners in decision making and justification of power mobility (PM) for young children.	USA	Quantitative and qualitative	Without efficient, independent mobility, children may develop learned helplessness and experience delays in both physical and cognitive domains.
Wiat et al. (2004)	<i>Mothers' perceptions of their children's use of powered mobility.</i>	To explore parents' experiences and perceptions of their children's experiences with powered mobility.	Canada	Qualitative; in-depth interviews.	Powered mobility may provide mothers with hope for their children's independence, however it is still considered a last resort mobility option.

<i>Author and Year of Publication</i>	<i>Title</i>	<i>Research Objective</i>	<i>Country</i>	<i>Study Design</i>	<i>Main Findings</i>
Staincliffe (2003)	<i>Wheelchair services and providers: discriminating against disabled children?</i>	To investigate the eligibility criteria of NHS W/C services for all children's powered chairs.	UK	Quantitative and qualitative; Questionnaire (69 NHS W/C services)	Contemporary model of disability had not informed policy and children up to 14 years old were refused power W/Cs for outdoor use. Evidence for providing powered mobility for the development of children with motor impairment has been largely ignored by NHS.
Casey et al. (2012) Protocol	<i>Wheelchairs for children under 12 with physical impairments</i>	To explore the effectiveness of wheelchairs in improving the participation, performance in activities and social inclusion of children under 12 years of age with physical impairments.	UK and Ireland	Randomised Control Trials	Need to consider if the type of wheelchair affects the participation, performance in activities and social inclusion for children under 12 years.
Sawatzky et al. (2012)	<i>Wheelchair skills training programme for children: A pilot study</i>	To determine the effectiveness of a two-day modified Wheelchair Skills Programme for children.	Australia	Quantitative and qualitative; Wheelchair Skills Test 3.2 and Impact Questionnaire.	Literature on adult wheelchair skills acquisition is well developed, but none of this has yet included children. The skill training allowed the children to do more, with less pain and fatigue post-training.

<i>Author and Year of Publication</i>	<i>Title</i>	<i>Research Objective</i>	<i>Country</i>	<i>Study Design</i>	<i>Main Findings</i>
Gcaza and Lorenzo (2008)	<i>Discovering the barriers that stop children with disabilities from being children: the impact of lack of access to mobility devices-a human rights perspective</i>	To identify the consequences of inadequate provision of mobility devices as perceived by disabled children.	South Africa	Qualitative	Inadequate provision of mobility devices interfered with the development of disabled children which led to severe health complications, even death. Disabled children in the study were deprived of their basic right to education, to play and to social interaction.
Wright et al. (2010)	<i>Establishing best practice in seating assessment for children with physical disabilities using qualitative methodologies.</i>	To identify best practice in children's seating assessment in the UK and Ireland.	UK and Ireland	Qualitative	Variation in seating assessment practice occurred between regions. The need for, and benefits of, a consistent approach was clearly identified.

Table 2: Grey Literature

<i>Author and Year of Publication</i>	<i>Title</i>	<i>Research Objective</i>	<i>Country</i>	<i>Study Design</i>	<i>Main Findings</i>
World Health Organisation (2008)	<i>Guidelines on the provision of manual wheelchairs in less resourced settings.</i>	The common aim is to ensure that users are given skilled assistance in selecting the most appropriate wheelchair for their needs.	Switzerland	N/A	Children's' needs change quickly as they grow; A wheelchair can enable a child to go to school, to gain an education and, when the time comes, to find a job.
Sheldon and Jacobs (2006)	<i>Report of a consensus conference on wheelchairs for developing countries.</i>	To help improve the wheelchair provision services in developing countries.	India	N/A	Services should specifically cater for the needs of children to be regularly reviewed. Re-assessment, especially of users with progressing/changing conditions, e.g. children.
Arledge et al. (2011)	<i>RESNA Wheelchair Service Provision Guide</i>	To provide an appropriate framework for identifying the essential steps in the provision of a wheelchair.	USA	N/A	Identified the necessary steps for the provision of a wheelchair and ensures that all stakeholders understand the various components in high quality wheelchair service delivery, regardless of the setting or funding. Without a change in the way wheelchairs are currently provided, disabled children will continue to lose out on vital opportunities to develop their potential and to achieve the outcomes envisaged for all children in the United Nations Convention on the Rights of the Child.
Sharma and Morrison (2007)	<i>Don't push me around! Disabled children's experiences of wheelchair services in the UK.</i>	To highlight concerns about the current state of wheelchair provision for children in the UK and the need for urgent action.	UK	N/A	
Wateres and Kopff (2011)	<i>"My wheelchair Is my shoes"</i>	<i>To highlight the need for reform of wheelchair services for children and young people.</i>	UK		Ensure that paediatric wheelchair reform is spotlighted and placed very high on the political agenda.

5. Discussion

The objective of this scoping review was to explore wheelchair and seating provision for children, and the literature reviewed confirms how complex it is for a child to acquire this vital mobility equipment. The literature also suggests that multiple individuals are involved in the process that will ultimately have a great impact on the experiences of the wheelchair user. This research has shown the factors of provision that impact on children who use wheelchairs, including: provision is designed on the needs of adults; variation in seating assessment for children; choice and availability of equipment for children; and perception of providers and parents.

5.1 Implications for children

When a child is issued a wheelchair at the optimum time it can make a positive contribution to their ability to engage in purposeful activities and tasks within in their environment (Law et al. 1996). Therefore, if a child is obliged to wait for long periods for their wheelchair or is provided with inappropriate mobility equipment, there is a risk of occupational deprivation as the ability to engage in daily activities is out of their control (Whiteford 2000). This research considered the implications of wheelchair provision on a child's occupational performance, in terms of the person, their environment, and the occupations they engage in.

Person: The growing and developing child

Each child is a unique being and through their lifespan participate in a variety of important roles (Case-Smith and O'Brien 2013, p. 34). Children with mobility impairments will need equipment that supports them to sit, mobilise, and carry out various meaningful activities as they move through all the developmental phases in their life. The literature highlighted the consequences for children having to wait to receive wheelchairs, and how equipment that was considered the right fit during assessment may subsequently be too small or unsuitable. Gcaza and Lorenzo (2008) revealed children in their South African study had died because inadequate mobility equipment led to fatal respiratory and pressure-sore complications. Early intervention and access to adequate mobility devices can minimise the risk of pain and secondary postural complications, while enhancing the child's wellbeing and quality of life (Ziviani et al. 2013). Correct prescription of a wheelchair considers the child's needs, parent and therapists goals, growth, transportation safety, future needs, cost and parental concerns (Cox 2003). These considerations are complex and very different to those of adults; however, there is not yet a document to guide service providers ensuring that a child's needs

are met. Field and Livingstone (2013) recommend that all individuals involved in wheelchair provision adopt the International Classification of Functioning, Disability and Health for Children and Youth (ICF-CY) to understand the functional role of wheelchairs for children.

Environment: Opportunity to explore and participate

The impact of the environment is a recurrent theme throughout the literature (Hardy 2004, Rousseau-Harrison and Rochette 2013, Wiart et al. 2004, McDonald et al. 2007), which must be considered in addition to postural management when providing children with wheelchairs. Children have an innate urge to explore and master their environment, and the focus of occupational therapy is to enhance their ability to participate in natural environments. If a child has no control over their environment they can develop a psychological condition; learned helplessness (Rosen et al. 2009). Studies have revealed that when children are given access to powered mobility they demonstrate less evidence of learned helplessness, as they develop greater initiative, assertiveness, communication and independence (Lynch et al. 2009, Ragonesi et al. 2010). Furthermore, age restrictions are not necessarily a good indicator of a child's suitability for powered mobility as children as young as fourteen months have successfully learned to steer (Livingstone and Paleg 2013).

In relation to provision of powered mobility, the value and need for a family centred approach is evident. Wheelchairs can be cumbersome and difficult for families to manage on a daily basis, and the strain of transporting can have a negative effect on a child's ability to engage in community life (McDonald et al. 2007). Provision of wheelchairs require modifications in the physical environment to enable children to access schools, playgrounds and communities to increase social participation (Casey et al. 2012). It is crucial that accessibility is appropriately considered, as children's ability to engage in meaningful occupations is enhanced by the ability to explore environments independently.

Occupation: Enabling kids to be kids

It is impossible to imagine life span development occurring without occupation (Hasselkus 2011). The single most important part of childhood is healthy development, and the occupation of play is its crucial component. Children are being regarded as occupational beings in their own right, and recent research into how children play emphasizes just how individual and unique they are (Lynch 2009, Skär 2000, Missiuna and Pollock 1991). As the existing guidelines relating to wheelchair provision are designed on the needs of adults, the significant impact mobility impairment has on a child's daily activities is not considered. Play is a natural activity for children and allows them to make sense of their world. Children with impaired mobility have been found to engage in solitary activities or demonstrate passive

dependency behaviours relying on their parents to enable participation (Sawatzky et al. 2012b). However, it has been found that children who have a powered wheelchair can become more engaged and active (Rousseau-Harrison et al. 2009). As this research found, powered mobility causes many perceived uncertainties although there is an evidence base for the benefits. With parents and providers being informed, having greater collaboration and communication, both will be open to considering powered mobility if it meets the child's needs. It is essential to consider the child's own thoughts, attitudes, and feelings, as others may fear powered mobility will lead to 'laziness', the child could see it as a way of successfully accomplishing goals within their environment enabling full and equal participation with their friends (Rosen et al. 2009).

Wheelchair skills is an important factor as children grow they will be obligated to negotiate an increasing number of environments. Accessibility to these environments will impact on what new activities children will have the freedom to engage in. Wheelchair skills would also benefit health and wellbeing as secondary injuries such as shoulder and back pain can be addressed. Charity organisations such as Whizz-Kidz in the United Kingdom offer skills training programmes, however children are not always given the opportunity for development of skills (Sawatzky et al. 2012b). Children with mobility impairments are first and foremost children, and they have a right to experience stimulation, security and friendship to encourage development. The provision of appropriate and timely wheelchairs will enable engagement in meaningful occupations that can improve quality of life and enhance lifelong human development.

5.2 Limitations of Study and Recommendations for Future Research

Certain limitations of this study must be considered. Resource constraints such as one researcher working within a certain timeframe imposed significant limitations on what was feasible. The scoping review did not offer a systematic search strategy and analysis or enable meticulous quality appraisal of previous research. Wheelchair provision for children is a broad area and with the limitations it would be inappropriate to generalise the content and generate recommendations for policy or practice in an Irish context. This study took a comprehensive approach to wheelchair provision, which was in contrast to previous studies that focused on either the barriers associated with mobility impairment or how participation improves following wheelchair acquisition. Future research would need to focus on how timely and appropriate wheelchair provision does not only benefit the wheelchair user. Potential to add depth to this study would be to consider the improved quality of life for other members of the process, as access to the right equipment will benefit and impact families, service providers, and children alike.

5.3 Implications for practice

An occupational therapist is a key assessor and prescriber of wheelchairs and other mobility equipment for children. Therapists are required to balance the variation in clinical, social and functional needs of children with limitations in their assessment environment, limited experience or training, different service delivery models, and the lack of national guidelines or a suitable standardised assessment tool. Without a national review of the wheelchair and seating services, it will become increasingly difficult for occupational therapists to provide a holistic approach to wheelchair provision, meeting the unique needs of children and their families. This study highlights the complexity of wheelchair provision for children and a variety of factors, including choice and availability of wheelchairs, parent's perceptions, and accessible environments, which need to be considered alongside postural assessment. Mobility is one aspect of a child's development addressed by occupational therapy, however it is required to advocate for a socially just society where children can acquire the necessary mobility equipment they need to continue functional daily living.

6. Conclusion

Providing a wheelchair is a complex therapy intervention which aims to enhance a person's functioning. What has emerged from this research is how the existing process of providing wheelchairs can impact on children, their childhood experience and development. Through developing an understanding of the vital role that wheelchairs play in meeting the basic needs of children, this research highlights the importance of developing service quality standards so children get a wheelchair suitable for their needs, when they need it. Access to effective health care services is a right under Article 24 of the United Nations Convention on the Rights of the Child (United Nations 1989). Ireland committed to promote children's rights when it signed up to the Convention in 1992. Nevertheless, children relying on the wheelchair provision process do not have these basic rights afforded to them. Children are encouraged to believe that anything is possible, yet the current wheelchair and seating provision is limiting mobility and engagement in childhood occupations. Although occupational therapists are the main prescriber of mobility equipment for children, it is essential to develop a partnership with the government, health services, and families to work together to ensure services are appropriate in enabling children to achieve their full potential.

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