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ORIGINAL RESEARCH

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Wheelchair service provision education for healthcare professional students, healthcare personnel and educators across low- to high-resourced settings: a scoping review protocol

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ABSTRACT

Purpose: Appropriate wheelchair provision is necessary for addressing participation barriers experienced by individuals with mobility impairments. Health care professionals involved in the wheelchair service provision process require a specific set of skills and knowledge to enable wheelchair use that meets individual posture, mobility and daily living requirements. However, inconsistencies exist in academic programmes globally about providing comprehensive education and training programmes. The planned scoping review aims to review and synthesize the global literature on wheelchair service provision education for healthcare professional students, healthcare personnel and educators offered by universities, organizations and industries.

Methods: This scoping review will be guided by the Joanna Briggs Institute (JBI) methodological framework. Comprehensive literature searches will be conducted on various global electronic databases on health to seek out how wheelchair service provision education is organized, integrated, implemented and evaluated. Two independent reviewers will perform eligibility decisions and key data extractions. Data from selected studies will be extracted and analysed using conventional content analysis. Information related to wheelchair service provision education including curriculum development, content, teaching methods, evaluation and models of integration will be synthesized.

Implications and dissemination: The planned scoping review will be the first to examine all aspects of wheelchair service provision education across professionals, settings and countries. We anticipate that results will inform the content of a Wheelchair Educators' Package, and if appropriate, a follow-up systematic review. An article reporting the results of the scoping review will be submitted for publication to a scientific journal.

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Wheelchair service provision; wheelchair skills; clinical competence assessment; education; training; continuing professional development; healthcare personnel; healthcare professional students

➤ IMPLICATIONS FOR REHABILITATION

- A comprehensive examination of wheelchair service provision education could help develop strategies to address the unmet need for wheelchair services globally.
- Findings for this review will facilitate the planning and development of an evidence-based education package that could bridge the existing knowledge gaps related to safe and effective wheelchair service provision among health professionals involved.
- This review will also inform the potential barriers and enablers for effective integration and implementation of wheelchair service provision education worldwide.

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Introduction

Personal mobility impairment restricts individual development and active participation in family and social roles and negatively impacts the quality of life [1,2]. Assistive products, such as a wheelchair, can be instrumental in addressing participation barriers; however, access to wheelchair products and associated services are limited globally [3,4]. Evidence suggests that only 5–15% of the 115 million people worldwide who would benefit from the use of a wheelchair for mobility and function have access to one that meets their needs [5–8]. The unmet needs are particularly higher in Low- and Middle-Income Countries (LMICs) where the access to quality wheelchairs is limited, there is less available skill health personnel, the incidence of disability is higher and more prevalent in vulnerable groups and there is an interconnection between poverty and disability [5,9–13].

The United Nations Convention on the Rights of People with Disabilities (UNCRPD), an international instrument that promotes human rights for people with disabilities, included that personal mobility is a fundamental and basic human right [14]. States Parties are committed to promote personal mobility and support the training of personnel providing services to people with disabilities to fulfil the mandate of the UNCRPD [14]. However, promoting personal mobility through qualified personnel needs to be systematic and organized, addressing appropriate assessment, prescription, configuration and training to fully enable and empower wheelchair users [15,16].

Wheelchair products and services cannot be delivered generically as needs, environments and available support systems are unique for all people as wheelchair users [17]. For example, a farmer with a bilateral lower-limb amputation living in a remote region of Kenya without access to hospital services will have different needs than an accountant with tetraplegia living in a large urban city in the United States. Therefore, those directly involved in wheelchair assessment, selection and provision processes from referral to follow-up management must possess specific and comprehensive knowledge, skills and competencies for best practice [18,19]. These services are highly recommended to be delivered by either individual healthcare professionals or teams including occupational therapists, physiotherapists, prosthetists, orthotists, rehabilitation engineers and physiatrists as they are expected to have the requisite knowledge and skills [20]. However, evidence suggests that the extent and scope of education and training related to wheelchair service provision varies considerably in entry-to-practice professional programmes, particularly in LMICs that bear a substantial proportion of need [10,20]. Recent training interventions in low- to High-Income Countries (HIC) have to measure pre-training knowledge in groups of wheelchair service providers; the results reinforce the need to support the training of personnel involved in wheelchair service provision [21–23]. Consequently, even if the availability and affordability of wheelchairs in low resource settings were successfully addressed, a large gap would remain in developing or strengthening the systems for professional wheelchair service provision worldwide especially in low resource settings [10,20].

More recently, particularly in HICs, evidence has emerged demonstrating the importance and benefits of including systematic and comprehensive wheelchair service provision education in academic curricula for professions, such as occupational therapy (OT), physiotherapy (PT) and prosthetics, and orthotics [24,25]. This evidence includes an emphasis on the core competencies of wheelchair service provision that such healthcare professionals should acquire during formal education and training programmes [26]. However, implementation and integration of comprehensive andragogical strategies and content is limited in HICs, but especially so in LMICs [20,24,26].

International organizations, academic institutions, civil societies and government agencies have been working towards bridging the gap between the demand and supply of wheelchair services [27]. One such organization the World Health Organization (WHO), has developed the Guidelines for the provision of Manual wheelchairs in less resourced-settings and a series of Wheelchair Service Training Packages (WHO WSTPs) to support the training of personnel involved in wheelchair service provision worldwide [6,28–30]. More recently, the WHO published the "Training of Trainers" to provide the necessary knowledge, competencies and skills among those who deliver wheelchair services [28,31]. In 2015, the International Society for Wheelchair Professionals (ISWP), was formed with the aim to serve as a global resource for wheelchair service standards and provision through advocacy, education, standards, evidence-based practice, innovation and a platform for information exchange [31,32]. ISWP has developed the Wheelchair Service Provision Basic Test (Basic Test) aligned with the WHO Guidelines to help assess the global training need [33]; the Hybrid Course on Wheelchair Service Provision [18,21,22], and more recently SMART an international knowledge test to support the provision of wheelchair education within the academic programmes for the rehabilitation professionals [28–30]. SMART relies extensively on the user's contribution and ISWP is currently advancing with its strategic initiatives to improve the reach and user contributions for SMART to meet the needs of wheelchair educators globally [28–30].

Despite such efforts to promote wheelchair education and build capacity in appropriate wheelchair service provision, there remains a need to improve consistency in the preparation of professionals delivering wheelchair services particularly given the significant global variations in needs, service provision systems, supplies, governance policy and mechanisms and in-country context [34–36]. Wheelchair service provision education is poorly regulated and without mandate worldwide. Evidence shows that 21% of academic rehabilitation programmes do not teach wheelchair related content [19,26]. Although wheelchair topics are part of the curriculum in the professional educational programmes, competencies for appropriate wheelchair service provision are not intensively covered during the teaching [19,26]. Educators are often not aware of existing open-sourced, evidence-based resources for wheelchair service provision education [10,20,37]. About 70% of academic programmes use their own content for teaching wheelchair service provision within their curriculum [10,20], resulting in considerable variability of content, teaching methods, evaluations and approaches across academic programmes. Hence it is highly pertinent to investigate and understand what approaches are available to develop, integrate, implement and evaluate the effectiveness of professional programmes that offer wheelchair service provision education.

The goal of the proposed scoping review which this protocol refers to is to review and synthesize the global literature on wheelchair service provision education of healthcare professional students, healthcare personnel and educators as offered by universities, organizations and industries from low- to HICs. Information synthesized in this review will inform the development of evidence-based content for a Wheelchair Educators' Package as well as evaluation of its implementation effectiveness.

Methods

Protocol design

This scoping review follows the 6-stage Joanna Briggs Institute (JBI) methodology for conducting a scoping review [38]. That

Table 1. Example of our search strategy.

Number	Searches
1	exp Wheelchairs/
2	(wheelchair* or wheel chair* or scooter*).ab,kw,ti.
3	((wheeled or motorized or motorized) adj2 mobility).ab,kw,ti.
4	1 or 2 or 3
5	exp Education, Professional/
6	exp Competency-Based Education/
7	exp Clinical Competence/
8	exp Health Personnel/ed [Education]
9	((educat* or teach* or learn* or train* or mentor* or professor* or pedagog* or programme*) adj2 (universit* or academ* or curricul* or student* or personnel* or professional* or clinician* or physical therap* or physiotherap* or occupational therap* or nurse* or physician* or recreation therap* or physiatrist* or prosthetist* or orthotist* or technician* or develop* or integrat* or implement* or framework* or frame work* or model* or approach*)).ab,kw, ti.
10	((rehab* or physical therap* or physiotherap* or occupational therap*) adj2 (assistant* or aid*)).ab,kw,ti.
11	(((clinical or clinician* or assess* or eval*) adj2 (skill* or competen* or outcome*)).ab,kw,ti.
12	((wheelchair* or wheel chair*) adj2 (service provision* or care deliver* or service deliver* or care provision*)). ab,kw,ti.
13	5 or 6 or 7 or 8 or 9 or 10 or 11or 12
14	4 and 13
15	limit 14 to (yr = "1993 –Current" and (English or French))

framework builds upon the work of Arksey and O'Malley [39] that was later expanded by Levac et al. [40]. The JBI stages of conducting a scoping review include: (1) Identifying the research question, (2) Identifying the relevant studies, (3) Study selection, (4) Charting the data, (5) Collating, summarizing and reporting the results and (6) Consultation (optional) [39]. As all 15 authors of this review are experts in the wheelchair service provision domain and represent a variety of professions (i.e., occupational therapist, physiotherapist, physiatrist and prosthetist/orthotist), organizations (i.e., academic, governmental and non-governmental organizations) and settings (i.e., high- to middle- to low-resourced) the optional consultation stage will not be required.

PRISMA-ScR checklist will be used. Measures will be taken to prevent reporting bias (e.g., authors whose publications may be included in the scoping review will not be involved in screening or data charting; authors whose publication's content is to be analysed will not take part in that task). As an analysis of pre-existing available data in the literature, ethical approval is not required for this study.

Stage 1: Identifying the research question

An exploratory literature scan was conducted in order to focus on the research question [38]. This process informed the decision to keep parameters loosely defined to ensure thorough coverage of existing publications [39]. The sub-questions were developed based on previous research highlighting inconsistencies in the education and training of wheelchair service providers [26]; they aim to further describe how education and training of wheelchair skills vary across multiple settings and countries. Key concepts (curricula development, integration and delivery; skills, competencies; educational effectiveness, clinical impact) were identified as categories of interest for describing existing curricula and how they are evaluated, which led to the development of sub-questions that will help extend our current knowledge [41]. The following research questions were subsequently identified:

Primary question

What is known about wheelchair service provision education for healthcare professional students, healthcare personnel and educators as offered by universities, organizations, and industries?

Sub-questions

- How are wheelchair service provision education curricula developed, integrated and delivered?
- What are the expected skills and competencies after wheelchair service provision education and how are these evaluated?
- What is the evidence for educational effectiveness and clinical impact, and how are these measured?

Stage 2: Identifying relevant studies

An initial limited search for articles relevant to wheelchair service provision education was conducted using MEDLINE, Cochrane, Academic Search Complete and OTSeeker databases [38,39]. Relevant keywords were harvested from titles and abstracts of pertinent studies [39] and, in consultation with an academic Librarian, a comprehensive search strategy was constructed. The comprehensive search strategy will be subsequently implemented and tailored for use in six electronic databases: Medline, Embase, EBM Reviews, CINAHL, SCOPUS, ERIC, Web of Science and Academic Search Complete. Table 1 reveals the search string that will be implemented for MEDLINE (Ovid). This particular search on 16 July 2020, identified 348 records to be screened for eligible inclusion.

Additionally, a grey literature search will be conducted using similar search strings in the following online databases: ERIC, PAIS Index, Dissertations & Theses Global, Canadian Research Index and Dissertations & Theses @ Université de Montréal.

The inclusion criteria are based on the Population—Concept—Context (PCC) framework, as recommended by The JBI for scoping reviews [38]. The following inclusion criteria were agreed upon:

- Type of publication: peer-reviewed articles, programme and policy documents, position papers and statements, audit reports and theses/dissertations.
- Study design: any

Table 2. Data extraction framework.

Main category	Sub category	Description
1. Authors		
2. Title		
4. Year of publication		
5. Objective		
6. Study design		
7. Study population	a. Target population	
	b. Sample size	
	c. Other characteristics	
8. Study context		Specify if education is offered by university or organization
9. Location	a. Country	Specify if delivered in a low/middle/high resource setting
	b. Setting	Specify if university-based, rehabilitation centre-based or community-
10. Definition of concepts		Specify how pedagogical approach(es), framework(s), etc., are defined
11. Curriculum development	a. How	How the curriculum was/is being developed
	b. Who	Who are the developers of the curriculum
	c. Skills and competencies	What are their skills and competencies
12. Framework		What frameworks are used to guide the organization of the education within a curriculum
13. Resources		What resources are used to inform the content of the education
14. Integration into curriculum		How is the education integrated into curricula
15. Levels of education		Undergraduate, graduate, continuing education
16. Delivery of education	a. Andragogical approaches	Describe the andragogical approaches
	b. Approach effectiveness	How is the angrological approach effectiveness evaluated
	b. Delivered by	By whom is the education delivered
	c. Delivery effectiveness	How is education delivery effectiveness measured
17. Learning outcomes		What are the students' and healthcare personnel expected skills and competency
18. Evaluations		How is students' and healthcare personnel competency evaluated
19. Competency		How competent are the students and healthcare personnel
20. Educational effectiveness	a. Reported outcomes	What evidence is there for the effectiveness of the education
	b. How is the effectiveness measured	How is the education in curricula evaluated
21. Clinical Impact	a. Reported outcomes	What are the reported clinical impacts of this education in curricula
	b. How is the impact measured	How are the clinical impacts of this education measured

- Time frame: 1993 to July 2020
- Language: English, French
- Population: students or practicing professionals in the following domains: OT, PT, physiatry; nursing; prosthetics and orthotics (P&O) and other medical students or professionals; rehabilitation engineers and technicians; community-based rehabilitation (CBR) workers; educators involved in wheelchair education.
- Concept: Articles that address framework (approaches and models of teaching and integration of wheelchair service provision education into curricula), curriculum development (e.g., andragogical approaches, content), implementation, integration, and/or evaluation (of curricula, of competency) of wheelchair service provision education.
- Context: Healthcare personnel education programmes (academic and continuing education) offered by universities, organizations, and industries from low-to-high income countries.

Only languages in which both of the study reviewers are proficient were considered to avoid them not being able to agree or disagree on study inclusion due to language barriers. The time frame limit was set to 1993 in accordance with the publication of the Standard Rules on the Equalization of Opportunities for Persons with Disabilities [42]. As recommended by Arksey and O'Malley [39], key terms, such as "education", "educators", "andragogical approaches", "community-based workers" were purposely not defined in order to take a more comprehensive approach. Studies will be excluded should they meet any of the following criteria:

- Training of wheelchair users, training of caregivers/care providers.
- Articles in the newspaper, conference abstracts.
- Studies that look exclusively at increasing awareness/sensitivity or attitudes of service providers towards people with disabilities, rather than wheelchair service provision education.

Publications will be selected using database-specific search strings based on the inclusion criteria. The results will first be imported into an online reference management programme, and then Covidence software will be used for duplicate removal, screening and data extraction [43].

Stage 3: Study selection

To be included, any publication needs to:

1. Explicitly relate to the wheelchair service provision education programme;
2. Explicitly relate to the education programme for OT, PT, physiatry; nursing; P&O and other medical students or professionals; rehabilitation engineers and technicians; CBR workers; educators involved in wheelchair education; and
3. Explicitly relate to academic and continuing education programme settings offered by universities, organizations and industries from low-to-high income countries.

Two authors (MN and SB) will independently screen all titles and abstracts on Covidence for full-text retrieval based on the inclusion criteria [43]. Publications retrieved in full-text will then be reviewed against the same eligibility criteria. Discrepancies between reviewers will be discussed until consensus is reached, and a third author (KS) will serve as an arbitrator should any disagreements need to be resolved. Inter-rater agreement for study inclusion will be calculated using the percent agreement [44,45]. The full-text screening will begin only after sufficient agreement (i.e., percent agreement $\geq$ 80%) has been obtained during title/abstract screening [44,45]. If a lower agreement is observed, the eligibility criteria will be reviewed [45]. When sufficient agreement (i.e., percent agreement $\geq$ 80%) is obtained during full-text screening, the reviewers will proceed to the next stage [44,45].

Once the screening process is completed, a supplemental grey literature search on OpenGrey, Campbell Collaboration, Health Systems Evidence, WHO Library and key websites involved in or related to wheelchair service provision will be undertaken to identify any publications that may have been missed in previous searches. The reference lists of the selected publications will be scanned for more relevant studies [38]. A timeline will be established to conduct the hand-searching of a select group of rehabilitation and educational journals to identify additional studies [46]. A PRISMA flow diagram will be used to report final numbers in the resulting study publication.

Stage 4: Charting the data

Based on our preliminary search, a data extraction framework was developed to document selected studies into an electronic spreadsheet. The initial framework was piloted by two author reviewers and modified based on feedback from the team. A table detailing the modified data extraction matrix is shown below.

Four authors (DR, JP, JM and MG) will independently extract the data for a sample of 5% of articles of the included studies and compare the four sets of data [44]. If sufficient agreement is obtained (i.e., percent agreement $\geq$ 80%), they will divide the remaining articles between them [40,44]. If a lower agreement is observed, the four reviewers will continue to independently read each article and extract the relevant data. The guarantor (SK) will check and ensure for consistency and quality of the extracted data. Data will be narratively synthesized based on thematic analysis [47]. An assessment of the evidence quality will be performed using the JBI manual for evidence synthesis [38]. However, methodological quality or risk of bias of the included articles will not be appraised as scoping reviews are designed to provide an overview of the existing evidence regardless of quality [45,48]. As necessary, primary authors will be contacted for further clarification or information on the data.

Stage 5: Collating, summarizing and reporting the results

Considering the variety of types of data, content analysis was chosen for data summary. Qualitative content analysis is an approach to synthesizing data in which text is condensed into content-related categories [41,49]. Content analysis will be used to describe the literature on wheelchair service provision education using a deductive approach based on the study sub-questions [41,50]. More specifically, findings will be summarized within tables using the data charting framework that reflects the sub-questions (Table 2) and, when pertinent, a qualitative synthesis provided in the text. New categories will be made should any data encountered not fit into any predetermined category within the data charting framework [41].

Implications and dissemination

The planned scoping review will be the first effort to examine wheelchair service provision education comprehensively across professional backgrounds, settings and countries. The study findings will provide a foundation for what exists and what needs to be yet developed. It will identify ideas and focus areas for education strategies and assessments that will inform the content of a Wheelchair Educators' Package of the ISWP, as well as additional projects or directions for future research and development. This package would have benefits for empowering educators and educational institutions to develop and/or enhance their current wheelchair service provision content to future service providers and will guide the integration of wheelchair service provision education into professional academic rehabilitation programmes and regional training centres globally (e.g., help to set up education in locations where none exists, expand to a broader set/scope of disciplines, increase the comprehensiveness where education currently exists and ultimately impact delivery to clients). The results of the scoping review will be disseminated through a peer-reviewed publication and shared with stakeholders engaged in wheelchair service provision through meetings, workshops and presentations. Additionally, it could inform a systematic review that further informs the content of the Wheelchair Educators' Package.

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Disclosure statement

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