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RESEARCH ARTICLE

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Undergraduate physiotherapy students' basic wheelchair provision knowledge: a pilot study in two universities in Colombia

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ABSTRACT

Purpose: Access to an appropriate wheelchair is a human right. Only between 5–15% of people who need a wheelchair have access to one. One of the key barriers to access is the lack of appropriately trained rehabilitation professionals. The objective of this study was to evaluate basic manual wheelchair provision knowledge in final-year physiotherapy undergraduate students in two programs in Colombia.

Materials and methods: Students took the International Society of Wheelchair Professionals Wheelchair Service Provision – Basic Test which was administered online and in Spanish. The minimum score to pass the test is 70%; it assesses seven domains: Assessment; Prescription; Products; Fitting; User training; Follow-up, maintenance, and repairs; and Process.

Results and conclusions: One-hundred sixteen students took the test and no one passed the test. The highest median domain scores were in Assessment and Process while the lowest were in Fitting and Products. The limitations of this study include that this sample does not represent all physiotherapy programmes or students in Colombia, there may be potential errors in the Spanish translation of the outcome measure, and students encountered Internet connectivity issues during the test that may have impacted their scores. Immediate interventions are required to improve teaching and students' learning outcomes related to basic manual wheelchair provision in these two programs. This study may serve as a foundation for future regional or national studies that assess the situation of wheelchair provision training in rehabilitation programs that will inform improvement actions. This manuscript is also available in Spanish as Supplemental Material.

➤ IMPLICATIONS FOR REHABILITATION

- This study indicates that students' current knowledge on basic appropriate manual wheelchair provision from two physiotherapy programs in Colombia is insufficient. Students' knowledge does not align with the minimum guidelines recommended for wheelchair service provision by the World Health Organization.
- Objectively identifying the gap in knowledge in rehabilitation trainees (i.e., physiotherapy students) is a strategy to promote the inclusion of assistive technology related content in formal academic training.
- The need to include formal training of appropriate wheelchair provision persists and without this training, people with disabilities who require a wheelchair for mobility will continue to face barriers to full participation in society.

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Physical therapy; appropriate wheelchair provision; undergraduate education; world health organization guidelines

Introduction

The World Health Organization (WHO) estimates that 15% of the world's population lives with a disability [1] and 70 million people need a wheelchair for their primary means of mobility [2]. In developing countries, where the majority of people with disabilities live, only between 5–15% have access to the wheelchair they need to fully realize their human rights [2]. One of the key factors that contribute to this situation is the lack of personnel trained in wheelchair provision [2,3]. In 2018, the 71st World Health Assembly recalled that access to assistive technology and associated services are human rights [4] and recognized that the inclusion of assistive technology – such as wheelchairs – in universal health coverage efforts is essential for achieving the Sustainable Development Goals and "leaving no one behind" [5,6]. Consequently, the resolution WHA71.8 urged Member States to ensure that adequate personnel for the provision of assistive technology is available at all levels of healthcare [6].

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To promote appropriate wheelchair provision globally, WHO published the "Guidelines on the Provision of Manual Wheelchairs in Less-Resourced Settings" in 2008 [2]. Based on these guidelines, a series of training packages [7–10] and one knowledge test at the basic level were developed [11]. As of January 2019, this basic test was taken by 3101 people from 90 countries across 14 languages (Arabic, Albanian, English, French, Hindi, Khmer, Lao, Mandarin, Romanian, Russian, Portuguese, Spanish, Urdu and Vietnamese) [12]. This test is administered by the International Society of Wheelchair Professionals (ISWP) that was created in 2015 with the mission "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" [13].

Despite this progress, too few service providers are trained and aware of best practice which impacts service quality [14]. Additionally, little research is available regarding the effectiveness of assistive technology training interventions, including those related to wheelchairs [15]. Recent global assistive technology stakeholder meetings acknowledge these challenges and recommend actions to improve capacity [14,15]. For example, in 2017, global stakeholders at the WHO Global Research, Innovation, and Education in Assistive Technology Summit recommended a formal qualification pathway to increase capacity in and improve assistive technology service provision, including provision of wheelchairs [15]. One way to improve the quality of the workforce is to include wheelchair service training in the formal rehabilitation curriculum [14]. It is necessary to understand which rehabilitation professionals (e.g., occupational therapists, physical therapists, physiatrists, prosthetists/orthotists) have wheelchair provision within their scope of practice in various contexts to implement targeted evidence-based training interventions [3,16,17].

Colombia may serve as an interesting example to study this topic as it is in a post-armed conflict era which is focused on building a peaceful environment by including vulnerable groups that have been traditionally discriminated against and marginalized [18], including people with a mobility-related disability that need a wheelchair [19]. In addition, the Disability Law was enacted in 2013 after the ratification of the United Nations Convention on the Rights of Persons with Disabilities (CRPD) and commits to granting people access to appropriate assistive technology to promote social inclusion, participation, habilitation and rehabilitation [20]. Contradictorily, the country has a universal health plan that explicitly excludes funding for wheelchairs and mandates the local authorities to fund them [21]. A medical doctor must prescribe wheelchairs, but there is no specific mandate related to assistive technology provision. Therefore, there is no clear pathway to access these devices and users have to pay out-of-pocket, rely on donations, or use legal appeal [22]. The district of Bogota is the only local authority that has guidelines, where "Assistive Technology Banks (ATB)" provide assistive technology, including wheelchairs, only to their poorest residents [23]. In the ATBs, only rehabilitation professionals are permitted to provide wheelchairs [23]. Specific to physiotherapy practice, Law 528 mandates that Colombian physiotherapists design, execute, direct, and control intervention programmes including wheelchair provision [24,25]. This suggests that all academic physiotherapy programmes should include wheelchair provision content. However, of the 24 out of 33 undergraduate physiotherapy degree programmes that have their plan of studies online, only six explicitly have courses related to rehabilitation technology [26–31]. It is likely that the rest of the programs have the content within other courses but is not explicitly mentioned in their courses' names. There is no obligation to have this level of detail available to the general audience (i.e., website). Last, in Colombia undergraduate physiotherapy programmes vary in duration from 4–5 years [32] and they solely require a professional card to practice which is obtained by graduating from a program recognized by the Ministry of Education [24]. This practice is in contrast to the additional requirement of passing a board examination which is mandated to become a licensed practitioner in the United States [33] and Canada [34].

Given the need for qualified personnel, the variable amount and quality of wheelchair provision training worldwide [35], and the Colombian law requiring physiotherapists to provide wheelchairs [24], the objective of this pilot study was to assess final-year physiotherapy students' wheelchair provision knowledge in two Colombian universities. Specifically, the study intended to measure knowledge at the basic level of manual wheelchair provision defined by WHO for wheelchair users that can sit upright without additional postural support [11].

Methods

A descriptive cross-sectional pilot study was conducted in July, 2016 (at a private university in the city of Medellin, University A) and August, 2017 (at a private university in the city of Bogota, University B). We employed a convenience sample as University A had an established relationship with the International Society of Wheelchair Professionals (ISWP). University A and B developed a joint research agenda around this project in 2016. Both universities are accredited by the Colombian Ministry of Education.

With regards to the wheelchair content taught at the time of the pilot study, University A had one required course, "Practicum II", for 3rd year students. This course was hosted at two clinics that serve wheelchair users but did not include explicit teaching on appropriate wheelchair provision [36]. University B, included one module in one course in the 4th year that dedicated 2 h to mobility aids [6].

All final-year students (41 at University A and 84 at University B) were invited to take the Wheelchair Service Provision – Basic Test in Spanish provided by the International Society of Wheelchair Professionals (ISWP Basic Test) [11]. At the time of recruitment, University A had 440 physiotherapy students in total and University B, 560 students. Students were invited by their academic coordinator in-person and by email to take the test. At University A, a computer laboratory was reserved for the purpose of administering the test at a time and date that the final-year students were available. At University B, students took the test at their own time and space following the instructions received by email. The test is based on WHO Guidelines for the Provision of Manual Wheelchairs at the basic level [11]. The test has 100 questions that the test.com (online testing platform) system randomly selects from a pool of 135 questions [11]. It evaluates seven wheelchair provision domains and each represents the following portions of the test: User assessment (user's needs), 28%; Wheelchair and cushion prescription (specifications, characteristic, and modifications of devices), 16%; Wheelchair and cushion product preparation before delivery (device assembly and safety), 9%; Fitting (ensuring wheelchair fits user's needs), 14%; User training (mobility skills, transfer, etc.), 19%; Follow-up (maintenance, repairs, and follow-up procedure), 3% and Process (referral, assessment, funding and ordering), 12% [9]. A score of 70% or above is required to pass the test [11].

In accordance with the ISWP Basic Test procedures, each student received an individual username and password to access the test.com platform and had to complete the test in under 105 min. The student was also asked to complete demographics questions. Descriptive statistics were calculated for the test demographics and scores. A normality test (Kolmogorov–Smirnov) of the scores was conducted and Mann–Whitney U-test was computed to explore if there were differences between universities ($\alpha = 0.05$). The Ethical Committees from both universities approved the study protocol.

Results

Demographic characteristics

A total of 116 final-year students completed the test ($n = 36$ University A and $n = 80$ University B). Of the respondents, 82.8% were women and the median age was 23 years (range 20–37). Out of a total pool of 123 possible respondents, 92.8% of students took the test. We did not follow up with the students that decided not to take the test.

Total and domain scores

Total and domain scores were not normally distributed ($p < .05$). None of the students passed the test, Median = 54.5 IQR [46.8–61.0]. With regards to the overall specific domain scores, this pilot study suggests that final-year physiotherapy students have insufficient basic knowledge in most of the domains. We present the results from the highest to the lowest domain score and Figure 1 illustrates the overall total and domain scores. The "Process" domain presented the most favourable outcome, Median = 70.0 IQR [50.0–80.0], suggesting that there is basic knowledge of the referral, assessment, and funding and ordering process. As this is a general test used globally, it does not measure knowledge specific to the process in the Colombian context. The "Assessment" domain results (Median = 68.4 IQR [57.9–73.7]) indicate insufficient knowledge to understand the user's physical and contextual needs. "User training" scores (Median = 46.7 IQR [36.0–60.0]) suggest that the students in this pilot study lack the minimum knowledge on manual wheelchair mobility skills, transfers, and wheelchair handling. The "Prescription" domain scores (Median = 50.0 IQR [41.7–58.3]) suggest lack of basic knowledge on manual wheelchair and cushion specifications and characteristics required to match the user's needs (as measured in the "Assessment" domain) with what the device has to offer. The "Follow-up, maintenance and repair" domain presented the same median score as the "Prescription" domain but with a wider dispersion of scores (Median = 50.0 IQR [25.0–75.0]), indicating insufficient basic knowledge on the vital process of conducting follow-up to identify if the manual wheelchair is meeting the user's needs and referring to the appropriate services as needed, for example, maintenance or repairs. The results in the "Products" domain suggest insufficient basic knowledge in selecting a device according to the user's needs (Median = 40.0 IQR [20.0–60.0]). Last, the "Fitting" domain had the poorest outcome (Median = 30.0 IQR [20.0–40.0]), suggesting that the final-year physiotherapy students in this pilot study lack the basic knowledge to ensure that a new wheelchair and cushion fit the user's needs.

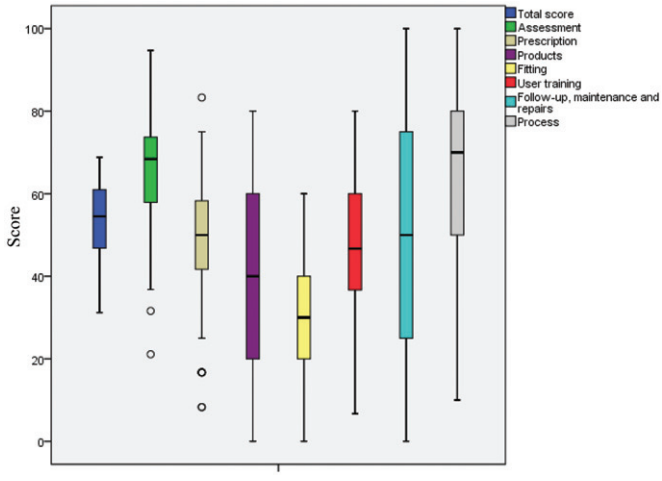

Figure 1. Total and domain scores for the entire sample.

When comparing the outcomes by program, students from University A scored significantly higher than the students from University B on the total score and in the domains: Assessment, User training, and Follow-up, maintenance, and repairs (Table 1).

Students from both universities reported having connectivity issues including some images that did not load completely that were required to answer a question. Additionally, some participants reported that there were grammatical errors in some questions, which may have resulted in misinterpretation of the question or answers' meaning.

Discussion

Despite some limitations with the ISWP Basic Test, the extremely low test scores in this study suggest that current wheelchair provision content taught in University A and University B physiotherapy programs is insufficient to prepare students to meet the basic knowledge requirements recommended by the WHO Guidelines. Our results align with a recent study's findings that reported insufficient integration of wheelchair provision content across 72 education institutions from 21 countries representing different resource settings [37]. We believe that our results may be an indication of the lack of awareness among physiotherapy professionals and instructors on the importance of appropriate wheelchair provision and the current international guidelines on the topic. It might also suggest that these physiotherapy programmes are still strongly focused in the body structures and function components of rehabilitation with less emphasis on the individual's activities, participation and the context (e.g., environment and assistive technology) [3]. This proposed rationale could be investigated more deeply.

Even though the median total and subdomains scores were not at the passing threshold for the ISWP Basic Test, University A students scored significantly higher in the total score and the "Assessment" and "Follow –up, maintenance, and repairs" domains than University B students. This could be explained due to University A's capacity of offering a clinical practicum at a

Table 1. Total and domain scores by university.

	University A ($n = 36$)			University B ($n = 80$)			
Item	Median	Q1	Q3	Median	Q1	Q3	p value
Total score	58.4	53.2	63.28	53.2	44.2	58.4	.001
Assessment	68.4	63.2	77.6	63.2	52.6	73.7	.018
Prescription	50	41.7	64.6	50	33.3	58.3	.105
Products	40	25	60	40	20	60	.631
Fitting	30	20	47.5	30	20	40	.36
User training	53.3	46.7	66.7	46.7	33.3	60	.017
Follow-up, maintenance, and repairs	75	50	75	50	25	75	.002
Process	70	60	80	60	50	80	.21

rehabilitation facility that has a person with disability training wheelchair users on mobility skills. This might have increased the awareness level of University A students, although still insufficiently as the results demonstrated. Our poor results on the "User training" domain are in line with those of a study in Canada that reported varied level of training, across 11 occupational therapy and 10 physiotherapy programs. Only 16 programmes taught some wheelchair skills and 10 did so in activities involving 6 or more hours [38].

The lowest subdomain scores for both programmes were "Product preparation" and "Fitting" scores. First, "Product preparation" may require product technical training and expertise, which may be thought to be outside of the scope of physiotherapy practice and not taught. Conversely, fitting the product to meet the user's needs is an important step to promote his/her mobility, independence, and quality of life – a goal of the rehabilitation process that requires clinical input. Understanding basic manual wheelchair and cushion device assembly and safety is required so the wheelchair professional (in this case a physiotherapist) is able to provide an appropriately fitted and safe device according to the user's needs. Therefore, the low score indicates that this wheelchair provision service step is not taught at all. Immediate actions are necessary to improve the training that physiotherapy students are receiving in this topic to ensure they are well-equipped to meet wheelchair users' needs as required by their scope of practice [35].

Physiotherapists, as healthcare professionals, establish strategies needed to improve the mobility of the clients they serve and their goal is to promote the human movement [17]. To be able to successfully plan and implement these strategies, physiotherapists should have satisfactory knowledge and performance in all of the ISWP Basic Test domains: User assessment, Wheelchair and cushion prescription, Product preparation, fitting, User training, Follow-up and Process. First, the programmes should inquire whether their instructors are prepared to facilitate this content. Requiring the physiotherapy instructors to take the same test used in this study, the ISWP Basic Test, could be the first step. Depending on the findings, the programme leadership can decide if the instructors need additional continuing education to strengthen their basic wheelchair provision competency such as through attending conferences like the International Seating Symposium, Latin American Seating Symposium, or WHO training facilitated by the ISWP, various NGOs, or other universities. After understanding the instructors' competency, modifications should be made to the current curricula. There are well-established and open-source programmes and strategies (e.g., boot-camps [39]) that can be adapted or modified to suit each individual programme including the WHO Wheelchair Service Training Package – Basic Level [7] and the Wheelchair Skills Training Programme [40]. Moreover, ISWP has launched the Seating and Mobility Academic Resource Toolkit (SMART) which may also be used to inform changes in the curricula [41]. Previous research that reported a gap in the wheelchair provision content taught also reported a lack of evaluation of the impact of this training on students' knowledge and skills [35]. Therefore, the ISWP Basic Test can be continuously used to evaluate whether the changes made to the programs have resulted in improvements in students' wheelchair provision knowledge. A clinical competence evaluation is also needed to assess the ability to practice [14].

The lowest average domain scores were in product preparation and fitting. Since appropriate provision requires a multidisciplinary and inter-professional approach, as cited by WHO, this study could also be expanded to include other professions such as occupational therapists, prosthetists and orthotists, and technicians [3,42,43]. In fact, the American Occupational Therapy Association [44] and the International Society for Prosthetics and Orthotics [45] recognize wheelchair provision as part of their scope practice. The ISWP Basic Test is available in 14 languages, facilitating replication of the study in other contexts and settings [12] and may motivate increased wheelchair provision training in academic rehabilitation programs. Fung and collaborators reported in a recent study that several institutions that currently do not teach wheelchair provision content were interested in doing so [14]. This is especially relevant since WHO member states have been called on to improve the access to appropriate assistive devices for those who need them [6]. To the best of our knowledge, this is the first time that the ISWP Basic Test was used to evaluate final-year physiotherapy students' knowledge. We recommend replicating this study's methods in other academic physiotherapy and rehabilitation programmes as mentioned above. The test provides quantitative data to stakeholders including academic administrators that can be used as evidence to increase the scope of wheelchair provision training provided in academic rehabilitation programs. Applying the test among different rehabilitation programmes may be the first step towards including wheelchairs – and assistive technology – as part of the recommended inter-professional education [3].

Limitations

The results cannot be generalized to other academic physiotherapy programmes in Colombia or elsewhere. Each individual programme has its own characteristics and there is some flexibility in the content that is taught. Therefore, other programmes may score higher or lower than these two specific universities. Another limitation was the connectivity and semantic difficulties that the students reported about the test. This is potentially due to issues with the Spanish translation of the original English test. However, the International Society of Wheelchair Professionals attempted to address this concern by beta testing the Spanish version which resulted in questions being re-written for clarity, following the validation process of the English version [9].

Conclusion

Final-year physiotherapy students' knowledge assessment in basic level wheelchair provision was the first step towards implementing improvements in the training related to this topic in two Colombian undergraduate physiotherapy programmes. The findings highlight the disparity between current students' wheelchair provision knowledge and the minimum expected knowledge set. This study suggests that more training in this area could help improve future providers' competency to meet users' needs and be in alignment with the WHO Guidelines and the CRPD.

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Data availability statement

The unidentified data may be made available upon request.

Disclosure statement

The authors report no conflicts of interest.

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