Prevalence of Physical Disability and Accommodation Needs Among Students In Physical Therapy Education Programs

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Abstract

Most research on graduate students with disabilities (SWDs) has focused on medical education. The purposes of this study were to: (1) estimate the prevalence of students with physical disabilities (SWPDs) in physical therapy programs, (2) identify common types of physical disabilities, (3) document the types of accommodations requested by SWPDs, (4) describe perceptions of faculty and students related to the impacts of accommodations, (5) describe the success rate of SWPDs, and (6) compare perceptions of faculty and students regarding potential employment opportunities and licensure restriction for SWPDs. Two surveys were created to gather quantitative and qualitative data from program directors, faculty, and students from the 210 PT and 280 PTA programs accredited by the Commission on Accreditation in Physical Therapy Education. Respondents included 190 faculty and 720 students and results indicated that there are fewer SWPDs in physical therapy programs than in all graduate programs nationwide (5%, 7% respectively) and a small number of them experience some form of discrimination. The physical disabilities encountered are mostly sensory and half receive accommodations with little impact on other students or faculty. While more programs are providing students with information on the essential functions for PTs/PTAs, more data are needed to inform the academy about factors influencing whether or not SWDs pursue careers in physical therapy, clinical instructors' and patients' perceptions, and resources used to foster success.

Keywords: Functional limitation, essential functions, physically demanding, human performance

According to the World Health Organization (2011) Report on Disabled Persons, over one billion people worldwide are affected by a disabling condition. In addition, the National Center for Education Statistics (Institute of Education Services, 2011) reports that 7.6% of post-baccalaureate students have some form of disability, and many physical therapy educators are observing an increase in the number of students with disabilities (SWDs) who are applying to physical therapy graduate programs (Francis, Salzman, Polomsky, & Hufman, 2007; Madriaga et al., 2010). Given the nature of the physical therapy profession and its core values, educators have a social responsibility to advocate for the rights of SWDs. However, there is insufficient information on the prevalence of SWDs who are entering graduate level physical therapist (PT) and undergraduate level physical therapist assistant (PTA) education programs and whether their accommodation needs, if any, are being met.

While the term *disabilities* is broad by definition and encompasses physical and mental impairments, this study focuses on students with physical disabilities (United States Department of Justice, 2009). Specifically, the aim of this survey study was to explore the attitudes and perceptions of physical therapy educators and students in the United States related to the accommodation of students with physical disabilities (SWPDs) and determine what impact, if any, these

accommodations had on their educational experience. The objectives were to (1) estimate the prevalence of physical disabilities among students enrolled in PT and PTA education programs, (2) identify common types of physical disabilities among PT and PTA students, (3) document the types of accommodations requested by SWPDs, (4) describe perceptions of faculty and students related to the impact these accommodations have on the teaching-learning experience, (5) describe the academic success rate of SWPDs, and (6) compare perceptions of faculty and students regarding employment opportunities and potential licensure restrictions for PTs and PTAs with physical disabilities.

Review of Literature

The rights of persons with disabilities have been legally defined and refined by various legislative acts and court cases. The Rehabilitation Act of 1973 was intended to reduce discrimination in admission to federally funded education programs for persons with disabilities (United States Department of Justice, 2009). According to this legislation, clinical sites affiliated with education programs were expected to uphold the same standards for all students. Furthermore, this act stated that a person with a disability could not be denied access to education based on his or her disability alone; thus, it encouraged programs to develop eligibility standards that were applied equitably to all matriculating students (Francis et al., 2007; Van Matre, Nampiaparampil, Curry, & Kirschner, 2004). In the court case of Southeastern Community College v. Frances B. Davis (1979), the U.S. Supreme Court reinforced the education programs' authority to generate eligibility standards for admission. These technical requirements were designed to help faculty and staff make admission decisions based on applicants' abilities rather than their physical disabilities (Ingram, 1994; Ingram, 1997).

The Americans with Disabilities Act (ADA) of 1990 (United States Department of Justice, 2015a) extended the Rehabilitation Act to incorporate public and private education programs. The ADA encouraged education programs to select the most highly qualified students and required them to justify the basis for their selections (Francis et al., 2007; Grossman, 2001; Hollwitz, Goodman, & Bolte, 1995; Kornblau, 1995; Van Matre et al., 2004). Schools could arrange accommodations for selected SWDs provided those accommodations did not fundamentally alter the program or create an "undue burden" for the school (Van Matre et al., 2004). The ADA also addressed protection from discrimination for people with disabilities seeking employment opportunities, transportation, and access to programs and services (Ingram, 1994). One of the most important aspects of the ADA was the requirement that employers develop and define job descriptions and essential job functions (Losh & Church, 1999). The ADA defined disability as "a physical or mental impairment that substantially limits a major life activity" (United States Department of Justice, 2015a, p.7.). Following several unsuccessful lawsuits filed by people with disabilities, Congress passed the ADA Amendments Act of 2008 (United States Department of Justice, 2015b) to clarify and broaden the definition of disability in an attempt to reduce discriminatory practices that persisted in many employment settings.

The majority of published studies on people with disabilities in health care professions have targeted medical programs. These studies provide data on the number of medical students who have disabilities, eligibility requirements to be accepted into medical school, and various obstacles faced by these students once they matriculate. Multiple studies suggest that acceptance of one SWD into an education program will cultivate further acceptance of other SWDs (Moore-West & Heath, 1982; Wu, Tsang, & Wainapel, 1996). Schools that accepted SWDs were more likely to be well-established programs with larger class sizes and the willingness of these programs to accept SWDs has been attributed to positive experiences with both students and staff who have disabilities (Moore-West & Heath, 1982).

Survey results demonstrate variability among the perceptions of which abilities and skills are most critical to students' successful completion of medical school. Observation and communication skills are consistently reported to be of the highest importance; however, the importance of motor skills is more controversial (Van Matre et al., 2004). Some medical SWDs reported that they faced animosity among their classmates; in one study, more than one-third of medical students expressed negativity regarding the use of medical assistants to perform sensory and motor tasks that the SWD was unable to perform independently (Van Matre et al., 2004).

Previous related studies in physical therapy consist primarily of subjective reports of experiences and attitudes toward SWDs in physical therapy education programs, and most revealed positive feedback from the colleagues and patients of physical therapy clinicians and SWDs (French, 1987; French, 1988; Satchidanand et al., 2012). One study reported that "scores on the Attitudes Toward Disabled People Scale" were significantly higher among PTs in practice than among classroom teachers (Satchidanand et al., 2012). Several studies determined that PTs with disabilities were bet-

ter able to empathize with patients and felt competent to meet their daily work obligations. However, these studies also noted that PTs with disabilities were limited in their ability to pursue specialization post-graduation (French, 1987; French, 1988; Ingram, 1997; O' Hare & Thomson, 1991). Collectively, these studies have reported on a variety of student disabilities. Some studies' definitions of disability include learning and mental disorders as well as less observable disabilities such as arthritis (French, 1987; French, 1988; O' Hare & Thomson, 1991). In one study that explored the attitudes of PTs toward colleagues with disabilities, the author observed that certain characteristics that defied the popular stereotype of a PT (e.g., obesity, short stature, a dislike of sports) were perceived more negatively than major physical disabilities such as a limb amputation or blindness (French, 1987).

The American Physical Therapy Association has not adopted a standardized list of technical standards required of PT and PTA students (American Physical Therapy Association, 2013; Ingram, 1997). Ingram (1994) reported that only a minority of physical therapy programs had a predetermined list of technical standards. Furthermore, she found that only a few of those programs addressed technical standards during their admissions process. In a follow-up study, Ingram (1997) used a Delphi technique to survey physical therapy program directors in an effort to establish some consensus regarding what they considered to be the technical standards that all physical therapy students must be able to perform, with or without accommodations. She reported a high level of agreement among these educators with the top two standards being (1) the ability to practice in a safe, legal, and ethical manner, and (2) utilization of appropriate communication skills with patients, families, and others. These findings are supported by findings from another study that identified effective communication skills as being a requisite for practicing in a safe, legal, and ethical manner (French, 1988).

Some investigators have addressed the attitudes and anxiety surrounding accommodations given to students who have learning disabilities (Houch, Asselin, Troutman, & Arrington, 1992; Velde, Chapin, Wittman, 2005). Peers of these students have reported unfair treatment in favor of students with learning disabilities because they perceived that these students received greater individual time and attention from faculty. Although the SWDs appreciated the extra assistance from their professors, they indicated that they would rather not have their academic needs isolate them from their peers. Interestingly, Francis et al. (2007) reported that a majority of schools found similar levels of academic performance between SWDs and their non-disabled peers.

As is legally mandated, SWDs have the right to request reasonable accommodations that remove disability-related barriers so that they may have equal access to both the academic and clinical learning environments of a physical therapy education program. As clinician-employees, people with disabilities have the legal right to request reasonable accommodations that remove disability-related barriers, which would otherwise impede their job performance. There is inadequate information in the literature regarding the prevalence of SWDs in physical therapy education programs, the types of accommodations needed to ensure the success of these students, and the potential impact these accommodations have on the SWD, their non-disabled peers, and the faculty. The purpose of this study was to provide insight into part of this picture: that involving students with physical disabilities (SWPDs). Thus, this study informs the academy about the prevalence and issues surrounding the accommodation of SWPDs who have been admitted to PT/PTA education programs so that we may fulfill our obligation to advocate for the optimal performance of all members of society, including our own aspiring colleagues. Multiple research questions were posed for this study which primarily related to the prevalence and type of physical disabilities encountered by PT/PTA faculty and students; the type of accommodations provided to SWPDs and how these accommodations affected the classroom learning experience; the academic success rates for SWPDs; and perceptions of practice opportunities for SWPDs following graduation.

Methods

Study Design

This descriptive study used both quantitative and qualitative methods to collect and analyze the data needed to answer the multiple research questions. The investigators created the faculty and student survey instruments. As a means for establishing validity of the survey items, a panel of four experts in disability rights and education were consulted and were instrumental in finalizing the survey items. Each survey was developed using the Survey Monkey® web site (www.surveymonkey.com). The study design and survey instruments were approved by the University Research Review Committee at Hardin-Simmons University in Abilene, Texas.

The faculty survey (Appendix A) consisted of 10 demographic questions and up to 16 additional questions depending on each respondent's experience with

SWPDs. Subsequent items were designed to gather information about the faculty member's experience with SWPDs, types of accommodations provided, impact on teaching, and opinions about practice opportunities and licensure restrictions for SWPDs who graduated from his or her PT/PTA program.

The student survey (Appendix B) consisted of six demographic questions and up to 16 additional questions depending on the respondent's disclosure of a disability or interaction with one or more SWPDs. The subsequent items were designed to gather information about the perceived impact that a SWPD had on the learning experiences of classmates regardless of whether the SWPD required accommodations. Opinions on practice opportunities and licensure restrictions were also gathered from student respondents. In both surveys, most items either gave the respondent an option to provide clarification through additional text boxes for "other" (if they could not associate with any predetermined options) or asked respondents to provide more information to support their "yes-no" answers to a given item.

Subject Recruitment

A list of accredited PT and PTA programs in the U.S., including the contact information for program directors, was obtained from the Commission on Accreditation in Physical Therapy Education database. At the time of this study, the sampling frame included 210 PT and 280 PTA programs. The term "faculty" was operationally defined to include academic program directors, directors of clinical education, and all other full- or part-time instructors. The term "student" was operationally defined as those individuals currently enrolled in an accredited PT or PTA education program in the U.S. This group included both students with and without physical disabilities. "Physical disability" was defined as any condition resulting in a sensory or motor impairment such as, but not limited to, vision or hearing limitation, limb loss, excessive pain or fatigue, uncontrolled seizures, breathing difficulties, and abnormal or limited movement, for a continuous or indefinite period of time. This definition intentionally and overtly excluded mental impairments or learning disabilities such as dyslexia, attention deficit disorder, or memory loss.

Survey web links for both faculty and student surveys were emailed to program directors who were asked to complete the survey and distribute the links to the appropriate target group (i.e., full-time and part-time program faculty or students). A cover letter explaining the purpose of each survey was included. Consent of respondents was implied when they submitted the completed survey. Follow-up reminders were sent out to program directors five weeks after the initial email. As a means of protecting the identities of respondents and their respective programs, settings were adjusted in the Survey Monkey® website to prevent any personal identifiers, including respondents' IP addresses, from being downloaded into the database.

Data Analysis

Frequency analysis and other descriptive statistics were used to analyze most survey responses. Additionally, qualitative review of narrative responses to open-ended survey items (i.e., items describing the types of disabilities students and faculty had encountered) was performed. Narrative answers were reviewed with similar answers for each question grouped together so that answer categories or themes could be identified. For example, question 12 on the faculty survey asked, "Briefly describe the nature of the disability(ies) you've encountered" (Appendix A). Answers such as "impaired vision," "visual impairment," "vision problems," and "severe visual deficits" were categorized together as vision limitation. Similarly, question 18 of the student survey asked "Have you had any interactions with a PT/PTA student who has a physical disability? If YES, what was the nature of his/her disability?" (Appendix B). Answers such as "hearing loss," "decreased hearing," "hearing impairment," and "hearing impaired" were categorized together as hearing limitation.

Results

Faculty Survey Responses

A total of 190 faculty members completed the survey. The actual return rate could not be calculated due to the manner of distribution and protection of respondent identity. There was no way to determine which program directors forwarded the survey link to their faculty. Faculty respondents were split between accredited PT programs (50%, n=95) and PTA programs (40%, n=75). Some faculty (10%, n=19) came from institutions with multiple types of programs (PT, PTA, and post-professional) and one came from an institution that only offered a post-professional degree. As this was not the intended population, the sole respondent's data were excluded. Faculty respondents ranged from 25 to 68 years of age (M=49.3, SD=9.6) and the majority were female (77%). Nearly half (45.3%) were serving as program directors, approximately 18% were directors of clinical education, 30% were other core faculty, and the remaining were adjunct faculty. Their length of academic experience ranged from less

Figure 1. *Geographical representation of faculty and student respondents.*

than one year to 34 years (*M*=11.2, *SD*=8.2). Because one item asked specifically about the region of the respective program, the data indicated that the sample included a broad geographic representation (Figure 1).

Of the 56% (*n*=105) faculty respondents who reported their programs had admitted one or more SWPDs in the past 10 years, the majority (70%) indicated that they only had experience with one or two students (*n*=32 and *n*=34, respectively). There was no significant difference between PT (46%, *n*=48) and PTA (39%, *n*=41) programs' admissions of SWPDs. Of the programs that admitted SWPDs, 80% (*n*=83) granted the provision of accommodations for the didactic portion of the curriculum and 56% (*n*=59) granted the provision of accommodations during clinical education experiences.

Ninety-seven faculty respondents (51%) reported encounters with students having disabilities, which primarily included hearing (*n*=38) and vision (*n*=28) limitations (Table 1). Other students' disabling conditions cited by multiple respondents included traumatic brain injury (*n*=19), cervical/lumbar spine pain (*n*=16), upper and lower extremity amputation (*n*=11), and cerebral palsy (*n*=9).

Ninety-nine faculty respondents (52%) replied to the question regarding specific types of accommodations extended to SWPDs during the didactic phase of education (Table 2). The use of adaptive equipment was the most common type of accommodation (*n*=25) and included "special microphone" and speaker systems, "braille goniometers," "rolling computer carts," automatic blood pressure devices, "LiveScribe™ pen" and Dragon speech recognition software, magnifying glasses, and specialized stethoscopes for students with hearing limitations. Enlarged print on handouts, quizzes, and exams was also a frequently cited accommodation (*n*=20) as well as extended time for exams (*n*=19). Modifications with "lab activities" such as range-of-motion measurements/exercise, transfers, gait training, soft tissue mobilization, manual muscle testing, and unspecified manual techniques were reported by 19 respondents. Expectations for some of these techniques were adjusted so that SWPDs were assessed on their ability to instruct others in the performance of tasks rather than the student completing the tasks independently. Additional classroom accommodations included designated seating within the classroom (*n*=13), assistance with note taking (*n*=8), sign language interpreters (*n*=7), and adjustments in faculty position within the classroom to facilitate lip reading (*n*=6). Seventeen faculty respondents reported that no accommodations were required and only one respondent reported that a student had been dismissed from their program due to an inability to "perform essential functions".

Ninety-eight faculty members responded to survey items regarding accommodations during the clinical phase of the education program (Table 3). Of these, 31% (*n*=30) reported that no accommodations were necessary and 10% (*n*=10) indicated that their SWPD had either not yet reached the clinical phase or had left the program prior to reaching the clinical phase. As with didactic education, utilization of adaptive equipment was the most common type of accommodation requested during clinical education experiences. Adaptive equipment included the use of "magnifying" glasses, specialized "stethoscopes" for students with hearing limitation, computer screen magnifiers, computer software to assist with documentation, and "vibrating alerts." Additional accommodations echoed

Table 1

Types of Physical Disabilities Encountered by PT/PTA Faculty

Type of Disability*	# Programs Reporting
Hearing limitation	38
Vision limitation	28
Traumatic brain injury	19
Cervical/lumbar spine pain	16
Amputation LE/UE	11
Unspecified decreased strength/mobility	11
Cerebral palsy	9
General neurological disorders	6
Temporary (pregnancy, fracture)	5
Brain tumor	5
General orthopedic/joint replacement	4
Stroke	3
Spinal cord injury	3
Cardiopulmonary issues	3
LE bracing/AFO	2
Vocal impairment	1
Other (chronic pain/fatigue, diabetes, dwarfism, eating disorder, fibromyalgia, multiple sclerosis, obesity, rheumatoid arthritis)	12

Note. *Each program could report more than one type of disability.

those cited during didactic learning experiences including assistance with transfers (*n*=13), lifting limitations (*n*=7), and gait training (*n*=5), as well as increased time to complete general tasks (*n*=4) and the instruction of others to help perform selected manual skills. One faculty respondent reported being able to place a student only in areas where "public transportation was safe/convenient/reasonable" due to the student's inability to drive. Another reported selecting a slower paced clinical site with "minimal distractions" for a student who needed extended time to complete tasks. Only one SWPD was reported to have failed a clinical education course and this was due to problems encountered with "gait training."

When asked about the impact these learning accommodations had on their teaching, 46.9% of faculty respondents indicated that more creativity was required to help the SWPD meet learning objectives and 32.7% cited the need for more one-on-one time with these students. One faculty respondent specifically reported video training on how to assist students with vision limitation with gait assessment. Additionally, two other faculty members indicated accommodations required extra time outside of class in order to learn how to "set-up a computerized exam" and prepare additional "handouts in larger print" respectively. Interestingly, nearly one-third of respondents reported that providing accommodations had no impact on their teaching.

Forty-two percent of respondents reported that 100% of their SWPDs graduated. Another 31.6% reported that fewer than 25% of SWPDs graduated, and 11.6% reported that none of their SWPDs graduated. No single reason for attrition was reported by most respondents; however, 16% indicated that these students were either dismissed (9%) or voluntarily withdrew (7%) for academic reasons. Another 7% withdrew due to health reasons. Two faculty respondents indicated "professional behavior issues" as the reason for student dismissal, another reported a student withdrew from the program for "personal reasons" and three others stated they were "unsure" of why the SWDs withdrew.

Table 2

Faculty Reports of Accommodations Required During Didactic Phase of Curriculum

Type of Accommodation*	# Programs Reporting
Adaptive equipment	25
Enlarged print (handouts, quizzes, exams)	20
Extended time for exams (unspecified)	19
Modified hands-on skills/techniques	19
Seated in front of class	13
Lifting restrictions	12
Note-taker in the classroom	8
Sign language interpreter in the classroom	7
Instructor positioned to facilitate lip reading	6
General for vision limitation (reader, improved lighting, black/white handouts)	6
Handouts (online, early posting, instructor's copy posted, more detailed)	6
Increased rest breaks/change in position	6
Quiet environment for testing	4
Extra time for lab practice	4
Extra time for practical exams	3
Additional outside or private tutoring	3
Textbooks (audio, online, early order)	2
Canine assist	1
Oral testing	1
Lectures video recorded for review	1
Videos shown in class repeated online	1
Modified expectations on presentations	1
Clinical experiences reordered (temporary disability)	1

Note. *Each program could report more than one type of disability.

Most faculty respondents (96%) classified their programs as having a competitive admissions process, and 84% believed their programs provided information about essential functions to applicants. Only 45% (n=85) of respondents specifically described the method by which this information was shared with prospective students. Program websites were the most popular means of disseminating essential functions information (n=55); other methods included application materials (n=21), student handbooks (n=18), program acceptance packets (n=15), and preadmission advising (n=13). Over half of the respondents (n=52) utilized more than one of the reported methods to make this information available. Interestingly, two respondents were unsure of how information on essential functions was distributed (Table 4). Regardless of how this information was shared, the majority of faculty (84%) felt that the ability to perform the essential functions of a PT/PTA, with physical accommodations if necessary, should be a requisite for program admission.

When asked if they thought SWPDs who completed the program would have the same job opportunities as non-disabled students, 29.4% of the faculty said "yes," 42.2% said "no," and 28.3% were uncertain. Overall, faculty concerns were focused on patient and clinician safety with the majority of respondents stating that placement would "depend" on the "type" and "extent" of the physical disability. Respondents

Table 3

Faculty Reports of Accommodations Required During Clinical Phase of Curriculum

Type of Accommodation*	# Programs Reporting
None	30
Adaptive equipment (magnifying glass, stethoscope for hearing limitations, ocular devices, braille goniometer, banded mask, computer screen magnifiers, unspecified computer software, Dragon software, vibrating alerts)	20
Assist with transfers	13
Lifting limitations	7
Uncertain of any accommodations	6
Assist with positioning and general intervention techniques	5
Assist with gait training	5
Supervised/instructed others in completing interventions	4
Always positioned in front of patient or clinical instructor	4
Increased time (general)	4
Increased time for documentation	3
Rest breaks	3
Sign language interpreters in clinic	3
Assist with general guarding of patients	2
Assist with goniometry	1
Continuous line of site supervision of student	1
Increased lighting	1
CI speaking at increased volume	1
Slower paced clinic with minimal distractions	1
Advanced review of patient charts	1
Only placed where public transport was available	1
Other, unspecified (modifications to documentation, additional instruction)	2

Note. *Each program could report more than one type of accommodation

indicated that graduates might have to make job selection based primarily on compatibility between work environment/practice setting and physical ability rather than on interest. One faculty member indicated that employers might not hire PTA graduates that required frequent or continuous assistance with certain tasks (e.g., gait training, transfers) as these clinicians were already supposed to be the "support" staff. Another reported that it might be easier on employers to hire a PT with physical disabilities and have a PTA provide assistance. One respondent was concerned that some employers would be unable to support hiring an "extra" person to assist a PT or PTA with a physical disability.

The final survey item asked if the PT/PTA licenses for these graduates should restrict their practice areas or skills based on their physical limitations or stipulate when accommodations were needed. Again, the responses were mixed with 43.5% of faculty believing that the PT/PTA license should not stipulate any restrictions or required accommodations, 40.1% agreeing that the license should stipulate when accommodations are required, and 2.8% indicating that the license should specify restrictions on clinical practice (e.g., certain settings, types of patients, or clinical skills). Several faculty believed that if SWPDs could successfully pass the licensing exam, then those clinicians should

Table 4

Method Used by Programs to Distribute Information on Essential Abilities/Functions

Method of Distribution	# Programs Reporting
Website	55
Application materials	21
Student handbook	18
Acceptance materials	15
Preadmission advising activities	13
Interviews	8
Orientation	4
University/college catalog	4
Upon request of the student	2
Other – unspecified	18

Note. *Each program could report more than one method of distribution

be allowed to practice without specific board-imposed restrictions with the expectation that they would self-monitor regarding the physical aspects of patient care with which they required assistance in order to practice safely – just as any licensed therapist does. Another faculty respondent reported that since physical therapy was a "visual, very kinesthetic, high touch" profession, students with limitations prohibiting this type of engagement would be unable to practice without significant changes in current practice expectations.

Student Responses

A total of 720 students completed the survey. As with faculty, the actual return rate for students could not be calculated due to the manner of distribution and protection of respondent identity and there was no way to determine which program directors actually forwarded the survey link to their students. Of the students who did respond, the majority were females (79%) enrolled in accredited PT programs (74%). Similar to the faculty sample, the student sample also demonstrated a broad geographic representation (Figure 1).

Thirty of the 720 student respondents (4.2%) indicated they had some type of chronic/permanent physical disability that was acquired before or during their enrollment in the PT/PTA education program; only 25 of these SWPDs responded to follow-up questions. Forty percent of responding SWPDs said they disclosed their disability during the admissions process (*n*=10), whereas 40% did not. Twenty-three of these students reported their specific physical disability, with rheumatic diseases (*n*=7), spinal disorders (*n*=6), and other musculoskeletal injuries or deficits (*n*=5) being cited most (Table 5). A variety of metabolic and cardiac conditions, sensory impairments, and memory loss were also reported by individual respondents.

Regarding the need for accommodations, 24% (*n*=6) indicated that they required assistance, 48% (*n*=12) said they did not require assistance, and 28% (*n*=7) were unsure. Of the six SWPDs who required accommodations, five received accommodations and indicated that these were adequate to enable them to successfully complete their learning experiences. Accommodations for these five students included "extended time" during clinical experiences and exams, specialized equipment such as a "magnifier," utilization of a "note taker" in class, and recorded lectures (Table 6).

When SWPDs were asked about the academic standards to which they were held, 72% (*n*=18) indicated they were held to the same standards as their non-disabled peers, whereas 24% (*n*=6) believed the expectations were unclear. With respect to the level of mentoring received from faculty/staff, 87.5% (*n*=21) of SWPDs indicated they received a similar level and amount of mentoring as non-disabled students. Regarding perceptions of discrimination, 75% (*n*=18) of SWPDs reported never having been discriminated against by faculty/staff or peers, and 21% (*n*=5) in-

Table 5

Types of Physical Disabilities Cited by PT/PTA Students

Type of Disability*	# Students Reporting
Rheumatic diseases (lupus, rheumatoid arthritis, osteoarthritis, fibromyalgia)	7
Spinal disorders (herniated disc, cervical radiculopathy, lumbar fusion, cervical burst fractures, lumbar sacralization, scoliosis)	6
Other musculoskeletal injuries/deficits (fractures, knee replacement, congenital and acquired amputations	5
Chronic pain disorders	2
Autoimmune thyroid disease	1
Cystic fibrosis	1
Diabetes with decreased balance	1
Hearing limitation	1
Hypothyroidism	1
Orthostatic postural tachycardia	1
Short term memory loss	1
Unspecified birth defect	1
Vision limitation	1

Note. *Each student could report more than one type of disability

Table 6

Student Reports of Specific Disabilities and Accommodations

Disability	Accommodation
Chronic pain disorder	Wheelchair for long distances, crutches for stairs
Cystic fibrosis	Extension of clinical experiences if student became ill during rotations
Combination of systemic lupus, fibromyalgia, and hypothyroidism	Extended time for exams and a note-taker in class
Short term memory loss	Recorder used during class, takes exams in disabilities office
Vision limitation	Magnifier or modified tools

Table 7

Types of Disabilities Encountered by PT/PTA Classmates

Type of Disability Classmate Had	# Students Reporting
Vision limitation	17
Hearing limitation	10
Amputations (lower extremity, partial/full hand)	10
Cerebral palsy	10
Traumatic brain injury	7
Generalized joint issues limiting motion	6
Chronic pain (cervical, shoulder, back)	5
Multiple sclerosis	5
Rheumatoid arthritis	4
Brain tumor	4
Spina bifida	4
Temporary conditions affecting weight bearing	4
Hypo/hyperthyroidism	3
Stroke	2
Foot drop	2
Scoliosis	1
Seizures	1
Carpal tunnel syndrome	1
Partial facial paralysis	1
Muscular dystrophy	1
TMJ dysfunction requiring surgery	1
Speech impediment with stuttering	1
Other nonspecific conditions	12

dicated that they had experienced some form of discrimination.

Fifteen percent (*n*=108) of total student respondents reported having interacted with a classmate who had a physical disability (Table 7). The most common types of physical disabilities peers identified were vision (*n*=17) and hearing limitations (*n*=10), amputations (*n*=10), cerebral palsy (*n*=10), traumatic brain injury (*n*=7), and generalized joint issues that resulted in restricted motion (*n*=6). The majority of these students (84%, *n*=92) felt that SWPDs participated at the same level as students without disabilities.

A total of 112 students (*n*=15.5%) responded to the question regarding awareness of SWPDs requiring accommodations during classroom or laboratory learning experiences. When asked about accommodations, 62% (*n*=69) were unaware of any accommodations required by SWPDs, whereas 38% (*n*=43) were aware. Extra time for exams (*n*=13), separate testing areas (*n*=7), enlarged print exams and handouts (*n*=7), and modified expectations for hands-on techniques during laboratory classes (*n*=6) were among the most commonly known accommodations (Table 8).

Of the 43 students that reported awareness of accommodations, 95% (*n*=38) felt the accommodations were adequate to enable the SWPD to succeed in the program and perceived these accommodations to have a negligible effect on their own learning experiences. The majority of students believed that the SWPDs were held to the same academic standards (92%, *n*=97) as themselves and received similar mentoring from faculty/staff (95%, *n*=100).

Table 8

Student Reports of Accommodations for Peers with Disabilities

Type of Accommodation	# Students Reporting
Extra time for exams	13
Separate testing area	7
Large print tests/notes	7
Modified hands-on techniques in lab	6
Postponement of practical exams	3
Alternate assignments	2
Specific seating in classroom	2
Assistance with transfers	2
Extra practice time	2
Reader to read lab activities and exams	1
Extra office hours	1
Visual device	1
Extra time in anatomy lab	1
Altered schedule extending program length	1
Note-taker provided	1
Tutor provided	1
Large print texts	1
Lectures online to allow for changes in color/size	1
Instruments with larger displays	1
Instructor writing on board to facilitate visualization	1

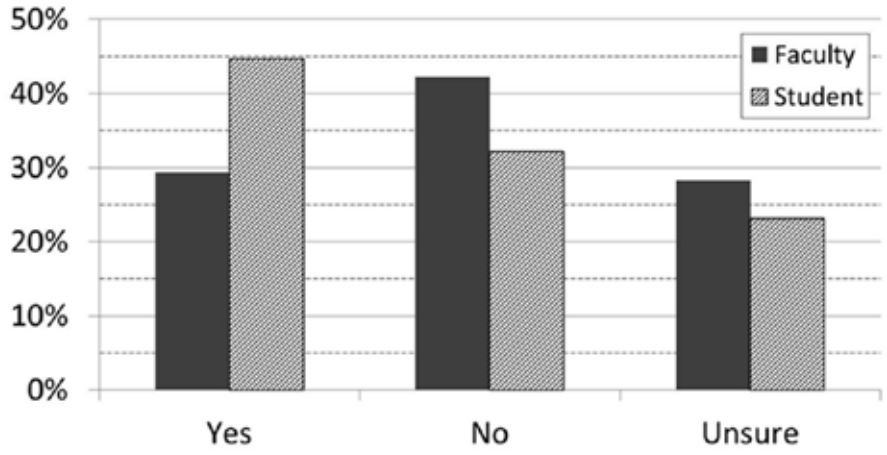

Figure 2. *Perceptions of faculty and students on equal employment opportunities for students with and without disabilities after graduation.*

Ninety-five percent (n=686) of students responded to survey items addressing admissions, employment opportunities, and licensure restrictions. Of these, 66% (n=452) believed SWPDs should be admitted into PT/PTA programs if they met all other admissions criteria, 29% (n=200) were unsure. Twice as many, 37% (n=252) versus 18% (n=124), felt that a PT/PTA with a physical disability could treat patients as safely and effectively as a PT/PTA without a disability, but 45% (n=311) were unsure. With regard to employment opportunities, 45% (n=307) expected SWPDs to have similar employment opportunities as their non-disabled peers after graduation, whereas 32% (n=221) expected inequitable employment opportunities, and 23% (n=159) were unsure. Students indicated increased physical demands of the job (n=62), safety issues (n=38), decreased effectiveness and efficiency (n=28), and discrimination (n=29) as possible employer concerns regarding hiring SWPDs. Lastly, when asked about PT/PTA licensure, 42% (n=289) believed that licenses should restrict practice areas or skills based on physical functioning or stipulate when accommodations are required for safe practice. Only 27% (n=182) believed licenses should not differ for PTs/PTAs with disabilities, and 31% (n=211) were unsure.

Student and Faculty Response Comparisons

Figure 2 compares the responses of faculty and students to the item regarding whether they believed that SWPDs would have similar employment opportunities as students without disabilities after graduation. A chi-square analysis indicated a significant difference in the proportion of students (45%) versus faculty (29%) who believed SWPDs would have similar employment opportunities (χ^2=13.77, p=0.001). To limit the effect of a discrepancy between the wording of response options to this survey item in faculty and student surveys, the data for analysis were limited to those who responded "yes" (to some type of restriction) or "no" (no restrictions). Students who responded "not sure" were not included in this analysis. Of the responses provided, no significant difference was found in the proportion of faculty and students who felt that PT/PTA licenses should or should not carry restrictions (χ^2=1.07, p=0.301). However, only 43.5% of faculty and 38.6% of students believed that PTs/PTAs with physical disabilities should have an unrestricted license to practice; more than half of respondents in each group favored some type of restricted practice, or a stipulation that required accommodation, to ensure safe practice.

Discussion

National statistics indicate that over 7% of graduate students have disabilities, with the number of physical disabilities being lower than the number of mental/emotional or learning disabilities (Institute of Education Services, 2011). This study found that the number of students with a physical disability was less than 5% and that the majority of these included sensory impairments (i.e., vision or hearing limitations). Regarding classroom accommodations, the report of faculty grading SWPDs on their ability to instruct "others" in the actual performance of certain hands-on skills was the only reported accommodation that was somewhat unclear. In these instances, the term "other" was not defined by the respondents. However, considering typical classroom practical examination procedures, it could be that faculty allowed either themselves or classmates to serve in the role of unlicensed staff in order to grade the disabled student's ability to instruct someone other than another PT/PTA in carrying out these techniques. Determining whether this type of accommodation is reasonable or not is beyond the purview of this study.

The types of accommodations that were provided to SWPDs in this study during the clinical phase of the program differed somewhat from those reported in Beckel's (2012) study, which reported accommodation requests such as reduced days in the clinic, rest periods, and schedule changes that would be beneficial to the student's health, as opposed to accommodations related to patient care procedures. Faculty respondents in our study cited a need for physical accommodations such as adaptive equipment, and manual assistance with transfers, gait training or lifting; only a few reported requests for more time or rest breaks. However, the most common accommodation reported from the five SWPDs in our study that actually received accommodations during the clinical phase was a flexible work schedule in case of illness.

Findings from our study also differ from earlier studies regarding the number of PT/PTA programs that provide a list of technical standards to applicants during the admission process. Previous studies conducted approximately twenty years ago showed a relatively small number of programs provided this information, (Ingram, 1994; Ingram, 1997) whereas we found that 83.5% of respondents provided information regarding technical standards to students prior to admission. Perhaps the greater emphasis in current accreditation criteria on the accessibility of program information to prospective students has prompted earlier disclosure of information on these standards.

With regard to academic performance, a previous study found that students with physical disabilities were capable of performing at the same academic level as their non-disabled peers (Francis et al., 2007). The perceptions of respondents in our study generally support this claim with 42% of faculty reporting 100% graduation rates for SWPDs. Of those who reported attrition among this student population, less than 20% were cited as leaving for academic reasons; more students appear to leave voluntarily due to exacerbation of current, or development of new, health issues and other personal reasons.

In addition, previous investigators suggested that students without physical disabilities received less mentoring compared to SWPDs (Moore-West & Heath, 1982; Wu et al., 1996). Our data indicate that 95% of students without a disability and approximately 88% of SWPDs felt they received a similar amount of faculty mentoring. However, fewer SWPDs (72%) felt that they were held to the same academic standards as those without disabilities. By comparison, most students without disabilities (92%) generally felt that academic standards were equitable between the groups. This finding contrasts somewhat with results from previous studies that indicated students without disabilities felt SWD unfairly received more faculty time and attention (Houch, et al., 1992; Velde, et al., 2005). Finally, the finding that over 33% of SWPDs reported experiencing some form of discrimination from peers by Van Matre et al. (2004) was not supported with our findings, where 75% of the SWPDs who responded reported no discrimination from faculty or peers.

Perhaps due to greater familiarity with equal opportunity employment, it is not surprising that fewer faculty than students believed that SWPDs would experience limitations regarding future employment. However, the majority of both groups agreed that employment opportunities for SWPDs would likely hinge on compatibility of the work environment/setting and the type/extent of disability. Concerns regarding overall physical demands of the job, patient and clinician safety, and costs associated with providing additional assistance with routine tasks were the most popular reasons both faculty and students gave regarding possible issues with employment. Patient safety was the overwhelming concern regarding whether SWPDs should have disability-specific licensure restrictions for clinical practice. Nearly half of respondents in both groups indicated that board-imposed restrictions or stipulations were needed to ensure safe practice.

Limitations

This study has five known limitations. First, it was impossible to determine the return rate for either the student or faculty sample due to the manner in which the survey links were distributed via the program directors. Therefore, it is unknown how many faculty and students actually received the survey. Nevertheless, the data did allow for determining that there was good geographical and programmatic representation in the sample. Second, some types of impairments were likely to have been overestimated given that multiple faculty from the same program may have responded to the survey. Third, we had a limited number of SWPDs participating in the study (30/720) with only 25 of those responding to follow-up questions. Additionally, with only five students reporting the types of accommodations they received during the clinical phase, our ability to broadly determine common types of clinical accommodations is limited. Fourth, we must recognize that classmate perception of reasonable accommodation, performance expectation, and faculty mentoring of SWDs could have been distorted due to a lack of information and understanding of situation specific disabilities. Since the Family Educational Rights and Privacy Act (United States Department of Education, 2014) prohibits faculty from releasing student health information, it is possible that a lack of knowledge regarding specific health situations could contribute to misunderstandings by classmates and result in unfavorable perceptions of SWDs in the classroom setting. Nevertheless, learning about how accommodations impact the learning environment from the perspective of students without disabilities may be informative for educators and Disability Services providers. Lastly, the study would have been strengthened if we had included surveying staff from campus disability services offices.

Conclusion

In summary and in response to the initial purposes of the study, we found the prevalence of PT/PTA students with a physical disability in our sample to be 5%, and slightly lower than reported national averages of 11% for undergraduate and 7.6% for graduate student populations (Institute of Education Services, 2011). Decreased prevalence rates in PT/PTA programs could be due to the fact that the job is physically demanding, and physical limitations may deter SWPDs from pursuing this field of study. The most common types of physical disabilities among PT/PTA student respondents were rheumatic, spinal, and other musculoskeletal conditions, and the most common types of accommodations were extended time in

clinic or on exams and the use of specialized equipment. Our results suggest that approximately half of the SWPDs required accommodations and two-thirds reported those accommodations as being adequate. However, our data also suggest that many SWPDs are still not graduating, mostly due to non-academic reasons. The presence of SWPDs had little impact on the teaching-learning experience according to student and faculty respondents; however, faculty reported a need for more creativity and additional individual time when working with SWPDs.

Implications for Future Research

This study and the published findings of others reviewed in the preparation of this manuscript revealed significant potential for impactful research collaborations between scholars in physical therapy and disability services. For example, examining the factors that influence the decisions made by SWDs when considering careers in physical therapy can help us better recruit student bodies that reflect our society. Examining how faculty are utilizing campus Disability Services personnel in determining and developing appropriate accommodations will benefit programs and SWDs. With regard to the clinical setting, exploring clinical educators' perceptions about supervising SWDs, as well as patients' perceptions related to care provided by a PT/PTA with a physical disability, can help our profession create meaningful career opportunities for SWDs.

Implications for Practitioners

In this study we sought to explore perceptions of faculty and students who interact with SWPDs. In general, these perceptions reflect a positive, supportive, and largely successful approach to educating SWPDs, which speaks well for our profession. However, there remains a small percentage (25%) of SWPDs who perceive that they are held to a different academic standard and a similar number who claim that they encountered some type of discrimination while in school. Thus, we still have some issues to address related to how well we advise prospective SWPDs and whether we adequately accommodate and support those who are accepted into our education programs.

With regard to Disability Service providers, the academic physical therapy community would benefit from outreach in the form of continuing professional education sessions to share innovative ideas and educational resources that have been developed to support SWDs as well as to create potential collaborations for the development and publicizing of technical standards and/or essential functions. Lastly, a great deal can be gained from partnering to create reasonable accommodations for students in clinical settings.

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Acknowledgment

The authors would like to thank Kelly Johnson, Morgan McCauley, Marci Murphy, and Jennifer Sammons for their assistance in collecting the survey data for this study while they were enrolled as Doctor of Physical Therapy students at Hardin-Simmons University. We are also grateful to the many students and faculty who took the time to respond to this survey.

Appendix A

Faculty Survey Items

(All faculty)

1. In which type of educational program do you teach?
2. In what region of the country is your program located?
3. What is your gender?
4. What is your age?
5. Identify your academic role.
6. How long (approximate years) have you been associated with this educational program?
7. Does your program have an open (i.e., all who apply are accepted) or a competitive admissions process?
8. Is information on essential abilities/functions made available to program applicants? If YES, how is this information shared?
9. Which of the following statements BEST represents your opinion regarding the admission of students who have physical disabilities (as defined in the opening comments)?
10. Has your program admitted one or more students with a physical disability within the past 10 years?

(Faculty who self-identified their program as having accepted students with physical disabilities)

11. State the number of students with physical disabilities who have been admitted to your program in the past 10 years.
12. Briefly describe the nature of the disability(ies) you've encountered.
13. Briefly describe the types of accommodations (if any) these students needed during the DIDACTIC phase of their educational program.
14. Briefly describe the types of accommodations (if any) these students needed during the CLINICAL phase of their educational program.
15. What was the average cost of these accommodations (per students), if known?
16. Who paid for these accommodations?
17. What impact, if any, did these accommodations have on your teaching?
18. If your program was unable to accommodate the needs of a student with a physical disability, what was/were the limiting factor(s)?
19. Identify the percentage of students with a physical disability who successfully completed your educational program (i.e., graduated at some point).
20. For students who did not graduate, what was their primary reason for leaving the program?
21. Has your educational program received a complaint, grievance, or lawsuit from an applicant or student claiming noncompliance with ADA regulations? If YES, what was the nature of the complaint/grievance/lawsuit?
22. Have you had any experience with students who acquired a long-term physical disability during their enrollment in your educational program? If YES, briefly describe the nature of this disability.
23. What accommodations, if any, were made to facilitate the student's ability to successfully complete your program?

(All faculty)

24. Would you expect students who have a physical disability to have similar employment opportunities post-graduation as students who have no physical disability?
25. In your opinion, should PT/PTA licenses either: (1) restrict practice areas or skills based on physical functioning, OR (2) stipulate when accommodations are required for safe practice?

Please provide any additional comments that you feel would help us better understand the issues related to accommodating students with physical disabilities in physical therapy educational programs. We appreciate your input.

Appendix B

Student Survey Items

(All students)

1. Indicate the type of educational program in which you are enrolled.
2. In what region of the country is your program located?
3. In what phase of your PT/PTA educational program are you enrolled?
4. What is your gender?
5. What is your age?
6. Do you have a chronic/permanent physical disability (as defined in the opening comments) that you acquired either before or during your enrollment in this educational program?

(Students with self-identified physical disabilities)

7. Please describe the nature of your physical disability.
8. Please describe the approximate date of onset for your physical disability.
9. If you had this physical disability prior to your enrollment, did you disclose it during the admissions process?
10. Have you required, or do you anticipate needing, any assistive devices or other physical accommodations to function in the classroom or clinical setting? If YES, please describe.
11. If you requested accommodations to perform the skills expected of you during your clinical rotations/experiences, did you receive those accommodations?
12. If you received accommodations for your disability in either the classroom or clinical setting, were those accommodations adequate to enable you to successfully complete the learning experiences? If NO, what has been lacking?
13. Have you been held to a different academic or clinical standard than your peers who do not have a physical disability?
14. Do you receive similar mentoring from faculty/staff as students who do not have a physical disability? If NO, in what way is their mentoring different for you?
15. During the admissions process, were you provided with a list of essential functions (i.e. listing of expected abilities needed to practice as a PT/PTA) required to complete the program and/or work as a PT/PTA?
16. Have you ever felt discriminated against by faculty/staff due to your physical disability? If YES, what type(s) of discrimination have you encountered?
17. Are there any other students with physical disabilities in your class/school who offer you support when needed or requested?

(Students without self-identified physical disabilities)

18. Have you had any interactions with a PT/PTA student who has a physical disability? If YES, what was the nature of his/her disability?
19. How would you rate the level of participation in your classes from students who have physical disabilities?
20. Are you aware of any students with physical disabilities who required accommodations to participate in classroom or laboratory learning lab experiences? If YES, please describe the type of accommodations needed.
21. Were the accommodations offered to that student adequate to enable him or her to succeed in your educational program?
22. What impact, if any, did these accommodations have on YOUR educational experience?
23. Are you held to a different academic or clinical standard than a student who has a physical disability?
24. Do you receive similar mentoring from faculty/staff as a student who has a physical disability? If NOT, how does their mentoring differ for students with disabilities?

(All students)

1. In your opinion, should individuals with a physical disability be admitted into a PT/PTA educational program if they meet all other admissions criteria? If NO, tell us why you feel this way.
2. In your opinion, can a PT or PTA with a physical disability treat patients as safely and effectively as a PT or PTA who has no physical disability? If NO, explain why.
3. Would you expect PT/PTA students who have a physical disability to receive similar employment opportunities post-graduation as students who have no disability? If NO, what types of limitations do you think they will face?
4. In your opinion, should PT/PTA licenses restrict practice areas or skills based on physical functioning, or should these licenses stipulate when accommodations are required for safe practice? Please share the rationale for your response.
5. Please provide any additional comments that you feel would help us better understand the issues related to accommodating students with physical disabilities in physical therapy educational programs. We appreciate your input.