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Research Article

Pediatric Physical Medicine & Rehabilitation Program Directors' Involvement in Training Provided to Pediatric Residents: A Longitudinal National View Conducted Over a Decade

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Abstract

Objective

To assess if training programs are taking full advantage of educational partnerships available between pediatric physical medicine and rehabilitation and pediatric residency programs.

Introduction

Examine the formal educational involvement of rehabilitation programs in training pediatric residents and compare the trend over an 11 year period.

Method

Program directors for physical medicine and rehabilitation were sent a 22-page questionnaire in the continental United States.

Results

Three rounds of mailing and telephone follow-up showed a 68% (n=52/76) response rate in 2010; 77% (n=56/73) in 1999. In 2010, 8 PM&R programs were involved with training pediatric residents versus 14 programs reporting such involvement in 1999. The involvement of PM&R program faculty in the training of pediatric residents has not changed over the 11 year time period between 1999 and 2010 ($P = NS$). Total number of hours where pediatric PM&R faculty are involved with

training pediatric residents, the mean for 2010 is 47.5 hours versus the 1999 mean of 70.6 which does not reach statistical significance ($P = NS$). Less than half of the PM&R program directors indicated that they perceived that pediatric residents viewed rehabilitation training as important (37% in 2010; 45% in 1999). While in both survey years, more than half of the PM&R program directors indicated that written materials including manuals, syllabi, and/or electronic media were available to the pediatric residents (62% in 2010; 57% in 1999 ($P = NS$)) only 25% of the 2010 respondents reported having a written curriculum for pediatric residency training in their program versus 36% in 1999 ($P = NS$)

Discussion/Conclusion

Despite relatively few programs where PM&R are formally involved in the training of pediatric residents, namely 8 programs in 2010 and 14 in 1999, great opportunity remains in strengthening the collaboration between PM&R and pediatric residency programs to meet the training needs of the next generation of pediatricians who will be called upon to increasingly care for children with medical complexity who will certainly have rehabilitation needs.

Keywords: Pediatric; Physical Medicine; Training; Children with Special Health Care Needs

Introduction

Professionals interested in the ideal care of children and youth with special health care needs (CYSHCN) should assess whether training programs are fully taking advantage of the educational partnerships possible between pediatric physical medicine and rehabilitation (PM&R) and pediatric residency programs to prepare the physician workforce of tomorrow in order to enhance the care for CYSHCN around their chronic health issues and rehabilitation needs. PM&R residency training programs house faculty and staff with significant expertise in the care of CYSHCN and would likely serve as a valuable resource to their counterparts in pediatric residency programs to optimize training of pediatric residents in best practices around the care for CYSHCN as well.

The care of CYSHCN is often uncoordinated and fragmented within the health care system and there are few financial incentives for health care providers within the healthcare system to manage the multiple problems that arise when caring for children with complex medical needs as well as those with rehabilitation needs [1]. In a commissioned report, the Children's Hospital Association (CHA) recommended that reform of health care delivery to children with medical complexity would involve an approach that clearly defines their health care needs, identifies the evidence-based care that will provide the best impact on functional and health outcomes,

and an ability to determine what types of health care savings can be achieved with specific improvements in health care delivery [1]. Specifically, this CHA report recognizes the lack of a standard definition for children with medical complexity and characterizes four cardinal domains, namely:

1. Chronic, severe health conditions
2. Substantial health services needs
3. Functional limitations which are often severe
4. High health resource utilization [1]

Ideally, physicians, as recognized leaders of the health care team, would best benefit CYSHCN if they received the necessary training to allow them and the teams they lead to be able to identify, treat and manage the care of medically complex children in an evidence-based, efficient manner.

The need for attention to robust training during rehabilitation and pediatric training is clear. Mulvihill et al. (2007) [8] found that CYSHCN have greater difficulty accessing services including equipment and specialty care than their routinely developing counterparts without chronic conditions, while CYSHCN who receive their care in a medical home setting reported fewer delays and unmet medical needs [9,10]. Residents tend to feel unprepared in the systems-based practice core competency, and called for more focused lectures and workshops in the teaching process [11]. Other areas for improvement include knowledge and training in how best to work with an interdisciplinary team [12, 13], and in cultural and disability sensitivity [5,14] which are all essential to rehabilitation competency of which the PM&R physician faculty have extensive expertise [16,17].

Pediatric PM&R physicians have an excellent background in addressing the range of needs of CYSHCN. Given the identified medical needs and potential gaps in care experienced by CYSHCN, PM&R faculty oversee the training of their own PM&R colleagues in training AND they can make a valuable contribution to also equipping future primary care pediatricians in many aspects of care required by CYSHCN as well. Since pediatricians will organize and oversee the primary care medical homes in which CYSHCN will ideally receive coordinated comprehensive health care, it would be optimal for them to be exposed to the expertise of the PM&R faculty who understand the rehabilitation needs of this vulnerable patient population. PM&R faculty members focus on the prevention, diagnosis, and treatment of brain, muscle, and bone conditions including traumatic brain injury as well as conditions associated with pain. PM&R physicians work in systems of integrated care where the needs of patients with complex medical and rehabilitation needs are paramount.

Pediatric PM&R training programs offer a potential resource to

pediatric residency programs for the training of the pediatric residents around the range of care needs for CYSHCN.

Study Question

The purpose of the study is to examine the formal educational involvement of PM&R program faculty in the training of pediatric residents and compare the educational trend over an 11 year period.

Method

A 22-item questionnaire was sent to program directors of physical medicine and rehabilitation (PM&R) residency programs in the continental United States first in 1999 and then repeated in 2010. There were up to three rounds of mailings for both the 1999 and 2010 surveys, and the non-responding program directors received a telephone call to request participation in the study. Return of the completed survey to the researchers was evidence of consent to participate. The 1999 and 2010 studies were approved by the institutional review boards (IRB) at the principal investigator's (APG) primary institution at the time.

Sample

The study used a purposive sampling method where the researchers contacted every physical medicine and rehabilitation program director in the continental US. The 1999 mailing was sent to the 73 physical medicine and rehabilitation programs listed in the *American Medical Association (AMA) 1998-1999 Directory Graduate Medical Education (GME)* (response rate 77% n=56/73), while the 2010 survey was sent to the program directors in all 76 physical medicine and rehabilitation programs listed in the *American Medical Association (AMA) 2009-2010 Directory Graduate Medical Education (GME)* (response rate = 68%; n=52/76).

Data Analysis:

Data analyses were performed using Social Sciences Predictive Analytics Software (SPSS) Statistics 18. Descriptive statistics (means and frequency) were calculated for each item on the two surveys where respondents reported involvement of the PM&R faculty with pediatric residency training as determined by responding "yes" to the question, "Do you or your PM&R program have any involvement with the training of pediatric residents?" The 2010 survey data was compared to the 1999 data using statistical procedures appropriate to the nature of the question, including Mann-Whitney Test and Fisher Exact Test.

Results

After three rounds of mailing and telephone follow-up for the respective 1999 and 2010 surveys, the 2010 response rate

was 68% (n=52/76) and the 1999 survey response rate was 77% (n=56/73). In 2010, 8 PM&R programs were involved with training pediatric residents versus 14 programs reporting such involvement in 1999. The involvement of PM&R program faculty in the training of pediatric residents has not changed over the decade plus time period between 1999 and 2010 ($P = NS$).

Table 1 presents the institutional characteristics associated with both the PM&R and associated pediatric residency programs. The size of the programs rose over the study's time period with total house staff for the PM&R residency showing 10% increase from 1999 to 2010 while that the pediatric house staff showed a slightly higher increase (14%).

Table 1. Institutional Characteristics of Physical Medicine and Rehabilitation (PM&R) and Pediatric Residency Program.

Size of House staff : PM&R Residency	2010			1999		
	Average	Min	Max	Average	Min	Max
Total House staff	13.88	8	19	12.62	5	25
PG-Y1	1.75	0	4	0.64	0	3
PG-Y2	4.25	2	6	3.91	2	9
PG-Y3	4.13	2	6	4.40	3	8
PG-Y4	3.75	2	6	4.10	2	8

Size of House staff : Pediatric Residency	2010			1999		
	Average	Min	Max	Average	Min	Max
Total house staff	36.71	0	100	32.10	12	63
PL1	9.50	0	24	10.63	4	21
PL2	8.67	0	19	10.38	4	21
PL3	8.83	0	20	10.38	4	21

The study addressed the number of hours of training for pediatric residents that involved PM&R faculty. For first year pediatric residents, the involvement with PM&R did not change at a statistically significant level with a mean of 2.75 hours in 2010 versus 1.61 hours in 1999 ($P = NS$). For PL2, there was a decrease over time with the mean of 1.25 hours per year in 2010 versus 46.75 hours in 1999 ($P = 0.0188$). For 3rd year pediatric residents the involvement with PM&R faculty did not significantly change, despite the number of training

hours in 2010 with a mean of 43.5 hours per year versus 24.88 hours per year in 1999 ($P = NS$). Regarding the total number of hours where pediatric PM&R faculty are involved with training pediatric residents, the mean for 2010 is 47.5 hours versus the 1999 mean of 70.6 which does not reach statistical significance ($P = NS$).

Table 2 describes the type training experiences of rehabilitation training that pediatric residents received during their rehabilitation rotation broken down by didactic versus clinical care (with or without direct precepting). Involvement in clinical care was the most frequent approach to training followed by didactic presentations and there was no significant difference between the type of training by year or by the residency level ($P = NS$).

Table 2. Types of involvement with Pediatric Residents.

Type of training	Residency Level	2010 Mean (SD)	1999 Mean (SD)	P-value
Didactic				
	PL1	22.00 (43.82)	31.82 (44.62)	0.9481
	PL2	8.00 (13.04)	23.18 (32.73)	0.5039
	PL3	4.00 (5.48)	29.09 (40.73)	0.4163
Clinical care with preceptor				
	PL1	10.00 (22.36)	13.00 (31.55)	0.7532
	PL2	24.00 (33.62)	54.50 (42.06)	0.1837
	PL3	48.00 (47.64)	40.50 (43.93)	1.0000
Clinical care without preceptor				
	PL1	10.00 (22.36)	4.55 (10.36)	0.8031
	PL2	10.00 (22.36)	11.82 (20.89)	0.8225
	PL3	10.00(22.36)	9.55 (17.39)	0.8815

In both survey years, the majority of PM&R program directors indicated that there is "little time or too little time" dedicated to pediatric rehabilitation training for pediatric residents (63% in 2010 and 58% in 1999 ($P = NS$)). A smaller number of PM&R program directors answered that there is "just the right amount of time" dedicated to pediatric rehabilitation training of pediatric residents (13% in 2010 and 42% in 1999 ($P = NS$)). A majority of respondents in both survey years indicated that pediatric residents received "inadequate training" in the area of pediatric rehabilitation (63% in 2010 vs. 67% in 1999 ($P = NS$)) while approximately half of the PM&R program directors in both years responded that they perceived that pediatric residency faculty viewed pediatric rehabilitation training as

an important component for pediatric resident training (50% in 2010; 46% in 1999 ($P = NS$)). Less than half of the PM&R program directors indicated that they perceived that pediatric residents viewed rehabilitation training as important (37% in 2010; 45% in 1999).

The surveys asked PM&R program directors to identify specific situations that they perceived as being barriers to providing rehabilitation training to pediatric residents. Responses varied widely and reached statistical significance in survey years 2010 and 1999 and PM&R program directors identified competing time requirements from both residents and faculty (25% in 2010; 93% in 1999 ($P = 0.002$)) and faculty and staff resources (75% in 2010; 14% in 1999 ($P = 0.008$)). Other potential barriers identified did not vary at a statistically significant level across survey years, 2010 and 1999, and these included: administrative reporting relationships, staff resources, physical space allocated to rehabilitation services, financial resources, faculty interest level, and pediatric resident interest level at ($P = NS$).

Curricular structures and teaching materials were assessed as well and PM&R program directors identified that 25% of the 2010 respondents had a written curriculum for pediatric residency training in their program versus 36% in 1999 ($P = NS$), while in both survey years, more than half of the PM&R program directors indicated that written materials including manuals, syllabi, and/or electronic media were available to the residents (62% in 2010; 57% in 1999 ($P = NS$)). Table 3 lists what the specific tools that are used by PM&R faculty to teach pediatric residents about disability and rehabilitation.

Table 3. Educational tools used with pediatric residents about pediatric rehabilitation.

Tools	2010	1999
Textbooks	50%	60%
Videotapes/DVDs	42%	0%
Slide Programs	60%	69%
Clinical Precepting	60%	85%
Electronic Media (Online Services)	14%	20%

Note: 2010 vs 1999 responses did not reach statistical significance

Table 4 lists the specific content topics covered by PM&R faculty during their involvement with pediatric residency training. According to PM&R program directors, pediatric residents provided written course evaluations for pediatric rehabilitation training, 63% in 2010 and 29% in 1999, however this did not reach statistical significance ($P = NS$).

Table 4. Specific Topics covered during the Pediatric Rehabilitation Rotation.

Tools	2010	1999
Amputation	37%	14%
Augmentative communication	37%	28%
Bracing and Adaptive equipment	62%	78%
Burn Rehabilitation	37%	21%
Cerebral Palsy	100%	93%
Environmental modifications	25%	43%
Muscular Dystrophy	88%	50%
Orthopedic hardware	37%	43%
Scoliosis	62%	50%
Spina Bifida	75%	64%
Traumatic Brain Injury	78%	100%
Medical Home/Patient Centered Health Home	87%*	NA

*Last question only asked in the 2010 survey

Finally, regarding PM&R program directors' preference for what year of pediatric training for rehabilitation should be introduced, a majority of 2010 program directors indicated second or third year of residency as compared to the first or second year for the majority of 1999 program directors.

Discussion

This nationwide survey, repeated twice over an 11 year period of time between 1999 and 2010, found that there are relatively few programs where PM&R are formally involved in the training of pediatric residents, namely 8 programs in 2010 and 14 in 1999. Additionally, over this 11 year period of time, there has not been an increase in the number of training experiences in which PM&R faculty formal train pediatric residents. The practical nature of the clinical training is supported by the finding that the main type of training experience was in the context of actual clinical care as opposed to classroom or didactic training. The majority of PM&R program directors who responded felt there was little or too little time devoted to rehabilitation training of pediatric residents which was deemed inadequate despite a perception by the PM&R faculty that pediatric faculty view pediatric resident training in disabilities and rehabilitation as important. This is likely a recognition that many important areas of training continue to vie for precious training time in busy residency programs. The slightly over half of the PM&R faculty perceived that the actual pediatric residents viewed rehabilitation training as important. Further adding to the ambiguity of the situation is the finding that PM&R faculty identified both faculty and

staff resources as a barrier to incorporating rehabilitation experiences into the residency program as well as a number of other barriers such as physical space allocated to rehabilitation, and actual financial resources. Other barriers include lack of standardized curriculum, residency duty hours which add significant complexity to scheduling, and competing program requirements.

From an educational structure perspective, more than half of PM&R program directors identified written materials such as manuals, syllabi and/or electronic media as educational supports that are available. Less than half of the PM&R program directors however identified a written curriculum for training experiences for the pediatric residents in rehabilitation. Formalizing a curriculum that addresses the salient issues in rehabilitation is one explicit way to recognize the importance of such training and would likely ensure that pediatric residents would receive a consistent training experience from their involvement with PM&R faculty. The list of topics covered is encouraging and as the need to cover additional topics such as the primary care role in care coordination for patients with disabilities and rehabilitation needs increases there will be additional opportunities to refine and strengthening the training experience that PM&R faculty could provide to the pediatric residents.

What is driving the need for PM&R involvement in pediatric residency training? As the number of children and youth with special health care needs (CYSHCN), essentially those children with medical complexity, in the United States (US) increases the need for rehabilitation care will also increase. The 2009-10 National Survey of Children with Special Health Care Needs found that 15.1% (1.2 million) of children and youth (birth through 17 years of age) in the US have special health care needs [2] which was a significant increase from a similar 2007 survey where the prevalence was 13.9% [3]. More than one in five US households with children have one child or youth with a special health care need ranging from those with developmental delay (17.6%) to those with Cerebral Palsy (1.6%); CYSHCN are indeed complex with 57.1% of CYSHCN having two or more comorbidities [2]. So sheer increase in the number of CYSCHN is one major factor.

Additionally, almost by definition, CYSHCN may require an array of services that go beyond what the primary care physician, often a pediatrician typically provides and these services would likely include services provided by medical/surgical specialists, occupational therapists, physical therapists, pharmacists, speech language pathologists, a range of mental/behavioral health professionals, and home health providers [4]. Given a myriad of health care needs, the health care costs of CYSHCN may be as high as three times that of routinely developing children in the general population [5]. Clearly, attention to the special health care needs of CYSHCN is essential to a highly responsive health care system. The

American Academy of Pediatrics calls for the patient and family-centered medical home as an ideal approach to providing the comprehensive and coordinated care needed for CYSHCN [6]. The medical home provides leadership in coordinating care to patients and their families that is accessible, comprehensive, family-centered, coordinated, compassionate, and culturally effective. A medical home is usually directed by primary care providers who are capable of coordinating the pediatric care in full partnership with the patient and family in a framework built upon mutual responsibility and trust. In order to prepare to lead the medical home, an AAP initiative developed a medical home curriculum for residency training programs to educate resident physicians on core tenets of the patient and family-centered medical home which includes training regarding the unique needs of CYSHCN, family-centered care, and the role of care coordination [7]. Thus, many of the aspects of the AAP medical home curriculum dealing with disability and rehabilitation needs could benefit from the sharing of the knowledge and experience of PM&R faculty with pediatric residents during their training.

Limitations

Several limitations to this longitudinal nationwide survey process over an 11 year period were identified and include the use of a non-validated questionnaire designed by the research team and the small number of PM&R program director respondents in 2010 and 1999 who actually reported involvement with the pediatric residency program. The relatively small sample size may limit the data interpretation since small numbers may lead to larger perceived variation in the responses which fail to achieve statistical significance. Of course, like many surveys, the self-reported nature of the responses without any external process to confirm the accuracy of the data reported may lend itself to a certain amount of social desirability bias in the form of providing answers that serve to minimize negative information related to the program while exaggerating or embellishing perceived positive responses related to one's program.

Conclusion

In summary, only a handful of programs appear to formally involve PM&R faculty in the training of pediatric residents on disabilities and rehabilitation. Those PM&R program directors that do provide formal training to pediatric residents don't think that the training time is adequate to meet the task and the large majority don't have a formal curriculum from which to deliver and then evaluate the training. Thus great opportunity remains in strengthening the collaboration between PM&R and pediatric residency programs to meet the training needs of the next generation of pediatricians who will be called upon to increasingly care for children with medical complexity who will certainly have rehabilitation needs.

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References

1. Berry JG, Rishi K Agrawal, E Cohen, Kuo DZ. The landscape of medical care for children with medical complexity. Children's Hospital Association, Alexandria, VA, Overland Park, KS (2013).
2. U.S. Department of Health and Human Services. Health Resources and Services Administration, Maternal and Child Health Bureau. *The National Survey of Children with Special Health Care Needs Chartbook 2009–2010*. Rockville, Md (2013) U.S. Department of Health and Human Services.
3. U.S. Department of Health and Human Services. Health Resources and Services Administration, Maternal and Child Health Bureau. *The National Survey of Children with Special Health Care Needs Chartbook 2005–2006*. Rockville, Md (2007) U.S. Department of Health and Human Services.
4. Wells KB, Sherbourne C, Schoenbaum M, Duan N, Meredith L et al. Impact of disseminating quality improvement programs for depression in managed primary care: a randomized control trial. *JAMA*. 2000, 283(2): 212-220.
5. Newacheck PW, Kim SE A national profile of health care utilization and expenditures for children with special health care needs. *Arch Pediatr Adolesc Med*. 2005, 159(1):10-17.
6. Medical Home Initiatives for Children With Special Needs Project Advisory Committee. American Academy of Pediatrics. The medical home. *Pediatrics*. 2002, 110(1 Pt 1):184-186.
7. American Academy of Pediatrics National Center for Medical Home Implementation. A Retrospective Look at Programs and Initiatives Toward a Family-Centered Medical Home for Every Child and Youth, 2008-2013.
8. Mulvihill BA, Altarac M, Swaminathan S, Kirby RS, Kulczycki A et al. Does access to a medical home differ according to child and family characteristics, including special-health-care-needs status, among children in Alabama? *Pediatrics*. 2007, 119(suppl 1):S107-S113.
9. Strickland B, McPherson M, Weissman G, van Dyck P, Huang ZJ et al. Access to the medical home: results of the National Survey of Children with Special Health Care Needs. *Pediatrics*. 2004, 113(Supplement 5):1485-1492.

10. Turchi RM, Gatto M, Antonelli R. Children and youth with special healthcare needs: there is no place like (a medical) home. *Curr Opin Pediatr*. 2007, 19(4):503-508.
11. Elwood D, Kirschner JS, Moroz A, Berliner J. Exploring systems-based practice in a sample of physical medicine and rehabilitation residency programs. *PM R*. 2009,1(3):223-228.
12. Bonder J, Elwood D, Heckman J, Pantel A, Moroz A. Implementation of Peer Review into a Physical Medicine and Rehabilitation Program and Its Effect on Professionalism. *PM R*. 2010, 2(2):117-124.
13. Pasquina PF, Kelly S, Hawkins RE. Assessing Clinical Competency in Physical Medicine & Rehabilitation Programs. *Am J Phys Med Rehabil*. 2003, 82(6):473-478.
14. Moroz A, Gonzalez-Ramos G, Festinger T, Langer K, Zefferino S et al. Immediate and Follow-Up Effects of a Brief Disability Curriculum On Disability Knowledge and Attitudes of PM&R Residents: A Comparison Group Trial. *Med Teach*. 2010, 32(8):e360-e364.
15. Chadd EH, Pangilinan, PH. Disability Attitudes in Health Care: A New Scale Instrument. *Am J Phys Med Rehabil*. 2010, 90(1):47-58.
16. Musick DW, Bockenek WL, Massagli TL, Miknevich MA, Roduri KR et al. Reliability of the Physical Medicine and Rehabilitation Resident Observation and Competency Assessment Tool: A Multi-Institution Study. *Am J Phys Med Rehabil*. 2010, 89(3):235-244.
17. Escaldi SV, Cuccurullo SJ, Terzella M, Petagna AM, Strax TE. Assessing Competency in Spasticity Management. *Am J Phys med Rehabil*. 2012, 91(3):243-253.