

# Treating children with physical disabilities: a video-based educational resource using simulated participants

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## Research Article

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# Abstract

**Introduction:** Children with physical disabilities (CWPD) have historically experienced inadequate and insensitive care across medical settings. A lack of comfort and knowledge about CWPD is prevalent amongst healthcare provider trainees. We developed a new, readily distributable educational resource about CWPD for healthcare professions students and conducted a preliminary study to determine its efficacy in addressing student attitudes towards CWPD.

**Methods:** We collaborated with a working group of stakeholders in the disability community to develop an educational resource for healthcare students. We developed 9 short video clips (with a cumulative duration of 27 minutes) of a primary care visit using simulated participants and embedded them into a 50-minute workshop. We conducted a preliminary study of the workshop for volunteer healthcare professions students using synchronous videoconferencing. Participating students completed assessments at baseline and after the workshop. Our primary outcome measure was change in the Attitudes to Disabled Persons - Original (ATDP-O) scale.

**Results:** Forty-nine healthcare students participated in the training session: 29 (59%) from medicine, and 21 (41%) from physician assistant or nursing programs. The materials were easy to deliver virtually. The workshop resulted in measurable changes in attitudes regarding physical disabilities, with improvement in ATDP-O scores between baseline (M=31.2, SD=8.9) and endpoint (M=34.8, SD=10.1) scores ( $t_{(49)}=3.28$ ,  $p = 0.002$ , Cohen's  $d = 0.38$ ).

**Conclusions:** This video-based educational resource on CWPD is readily distributable and can be delivered virtually as a workshop. In our preliminary study, the workshop improved healthcare students' perceptions and attitudes toward CWPDs. All materials are available to view, download, or adapt by end-use instructors.

## Full Text

Over sixty million people in the US have some form of disability, comprising 26% of the general population [1]; those with serious physical disabilities impacting mobility represent half of the total. During 2008-2010, there were 2.9 million children with one or more disabilities, or 4% of all US children under the age of 18. [2] Despite such high prevalence, patients with physical disabilities have historically experienced inadequate and insensitive care from physicians across medical settings, including primary care. [3,4] Surveys of adult patients with disabilities have shown many are less likely to be asked about health promotion, including functional assessments, inquiries about emotional status, or screening for physical or sexual violence. [5,6] Similar disparities in quality of primary care exist for children with physical disabilities (CWPD), particularly in the areas of screening, prevention, and chronic illness management. [7] There have been improvements in the primary care of CWPD using a family-centered care model [8], but many areas of dissatisfaction persist.

Primary care physicians have demonstrated widely varying levels of comfort in treating CWPDs and report lack of knowledge and skill as contributing factors. [9,10] In turn, patients with disabilities and their families have attributed difficult healthcare experiences to providers' unfamiliarity with their unique clinical needs. [11,12] A similar lack of comfort and knowledge about patients with disabilities prevails among trainees across healthcare fields, including medical students. [13,14] Female gender and direct personal experience have been shown to predict increased comfort with disability among medical students. [15] Direct clinical exposure to patients with disabilities is a modifiable factor in education that can ameliorate fear and increase positive attitudes toward improving the quality of care for this segment of the population. [16]

In 2005, the Surgeon General of the United States issued a call for improved care for people with disabilities, including the development of medical school curricula to teach clinicians about best practices. [17] In response, some medical schools and residency programs have developed targeted curricula focusing on treating patients with disabilities. One noteworthy yet resource-intensive approach consists of a multi-year curriculum that incorporates clinical training and simulations. [18] Others have found that even a 30-minute lecture and patient panel can increase medical student knowledge and comfort levels. [19] As recently as 2016, a Task Force on Disability Education of Medical Students was formed to provide recommendations to address the problem of insufficient medical education on the treatment of patient with disabilities. [20]

Despite these efforts, most medical school curricula still lack educational content focused on *children* with physical disabilities. To address this gap, we sought to 1) develop a new educational resource for healthcare students focused on children with physical disabilities that incorporates embedded videos featuring simulated participants (SPs), 2) ensure our new educational resource would be distributable to and adaptable by end-use instructors, and 3) conduct a preliminary study to evaluate the effect of the resource on healthcare student attitudes towards and perceptions of children with physical disabilities.

## Methods

### Development of the educational resource

In keeping with the tenets of participatory research [21] and the notion of “nothing about me without me” [22], we designed the curriculum in conjunction with a working group of multiple stakeholders in the disability community. The group was formed by direct recruitment of members of the disability community, including disability advocates, adult patients with physical disabilities, and parents of CWPD, as well as faculty with complementary expertise in caring for CWPD, clinical skills education, and curriculum design using SPs.

We conducted individual interviews with each member of the curriculum working group, asking questions such as “What do you think medical students should know about taking care of patients with disabilities?” We took extensive notes during the interviews and used them to identify important themes

and learning points that could then be demonstrated in the videos or serve as topics for discussion. The key points identified are listed in **Table 1** and were highlighted throughout the videos and workshop materials.

The educational resource includes video clips that depict a detailed, model primary care visit conducted by one of the coauthors (EN), a pediatrician experienced in treating CWPD. We chose a primary care setting as it provides an opportunity to demonstrate proper screening and prevention behaviors in the outpatient setting, as provision of care in these areas of care is often lacking for patients with disabilities.

The patient and parent in the video depictions are hired professional actors familiar with working in medical settings. We followed accepted best practices for simulated participants [23], taking particular care to abide by the additional practical, legal, and ethical considerations for working with underage actors. [24] The actors were recruited from a local community acting group.

The video-based component consists of nine clips, ranging from 50 seconds to 5 minutes in length, for a cumulative duration of 27 minutes. An optional additional video clip featuring an interview with a disability advocate, and one of the coauthors, who uses a wheelchair was also created. The different components and their respective lengths are described in **Table 2**. A slide deck contains suggestions of important points to highlight and discussion questions in the “Notes” section of each corresponding slide. A facilitator guide provides variations to conduct the session. Both the slide deck and the facilitator guide can be accessed as supplementary materials through this link:  
<https://doi.org/10.6084/m9.figshare.13635107.v2>.

## Study design and participants

Participants were healthcare students enrolled in the Yale School of Medicine, Yale School of Nursing, and the Yale Physician Assistant online program. We recruited volunteer learners via emails sent to members of relevant medical student interest groups, as well as to the students in the nursing school and online physician assistant programs.

The study was deemed exempt from review by the Yale Human Investigations Committee (Protocol # 2000028161). Participation was voluntary, responses were anonymous, and individual survey results were not accessible to faculty responsible for any course evaluations. We did not collect personally identifying information that could compromise anonymity.

## Measures

Participants completed the *Disability Attitudes in Health Care (DAHS)* [25] at baseline to ensure our sample was consistent with published norms for healthcare students. The DAHS is a 17-item instrument used to measure baseline attitudes unrelated to curricular content and has good internal consistency (Cronbach  $\alpha$ , 0.74).

Participants also completed the *Attitudes to Disabled Persons - Original (ATDP-O)* [26] scale at baseline and endpoint to assess change in attitudes following the workshop. The *ATDP-O* is a widely used instrument shown to have good internal consistency (Cronbach  $\alpha$ , 0.91) and sensitivity to change. The *ATDP-O* has 20 items, for which respondents indicate how strongly they agree or disagree with statements about individuals with disabilities; some of the items are reverse-coded to prevent response acquiescence bias.

Finally, we asked learners to provide the first three words or short phrases “that come to mind when hearing ‘child on a wheelchair’”.

## Data collection and statistical analysis

We conducted the workshop during the COVID-19 pandemic, delivering content virtually through the video-conferencing platform Zoom (San Jose, CA). Participating students were given ten minutes before and after the workshop to complete the study surveys. Responses were collected securely using Qualtrics (Provo, UT). We analyzed data using SPSS version 25 (Armonk, NY). We calculated the mean score and standard deviation for each item of the *ATDP-O*. We then compared the *ATDP-O* composite change score using a paired-t test and Cohen’s  $d$  for effect size. We used word cloud generator software (wordclouds.com; Zygomatic Inc., Vianen, The Netherlands) to visually depict participants’ word choices before and after the workshop. We manually coded the words into three emotional valence categories.

[27, 28]

## Results

Forty-nine healthcare students completed the survey: 29 (59%) from medicine, and 21 (41%) from physician assistant or nursing programs. Twenty-nine participants (59%) had been previously involved in the care of a CWPDP; 23 (47%) had a friend or relative who is a CWPDP or a parent of a CWPDP; and 5 (10%) reported a physical disability themselves.

Baseline scores on the DAHS did not differ from published norms:  $M = 67.2$ ,  $SD = 3.9$  vs  $M = 66.5$  (single sample  $t = 1.25$ , ns). *ATDP-O* scores improved improvement in *ATDP-O* scores between baseline ( $M = 31.2$ ,  $SD = 8.9$ ) and endpoint ( $M = 34.8$ ,  $SD = 10.1$ ) with a mean difference = 3.6 [95% confidence interval = 1.4–5.8]. The paired t test of baseline and endpoint showed a significant change ( $t_{(49)} = 3.28$ ,  $p = 0.002$ , Cohen’s  $d = 0.38$ ). **Table 3** summarizes item-level scores before and after the intervention.

Figure 1 provides a visual rendering of all words written by learners before and after the workshop. Words are weighted by frequency and highlighted in colors, each of three representing a different emotional valence: red, negative; blue, positive; white, neutral.

## Discussion

We developed, through collaboration with multiple stakeholders in the disability community, a novel video-enriched curriculum for healthcare students on the treatment of children with physical disabilities.

Our curriculum can be delivered virtually and improved student attitudes about caring for children with physical disabilities.

Participation in the virtual workshop resulted in healthcare students' positive shift in attitudes. The improvement was statistically significant, with a medium effect size of 0.38. Students also exhibited a shift in views, moving from approaching CWPDs as "different" and "challenging" to seeing them "normal" and "resilient," indicating a reduction in stigmatized views. Learners gained a sense that the interpersonal approach to patients with physical disabilities need not differ greatly. Indeed, such an insight is by design at the crux of the workshop; namely, that the treatment of patients with disabilities should at its core be interpersonally the same as that for able-bodied patients, while recognizing and maintaining respect for inherent differences. This message was felt by the members of our curriculum working group, who considered this "normalizing" as perhaps the most important lesson to impart to healthcare students. At the same time, they identified considerations unique to the care of CWPD, compiled as key points which we highlighted in the workshop and include in the supplementary teaching materials.

Our materials focus on the experience of a single child who uses a wheelchair during an outpatient clinic visit. Even as this workshop enhanced healthcare students' attitudes of CWPD, we consider this but a first step in the development of a curriculum that properly prepares students to provide quality, compassionate care for patients with all forms of disabilities. Our work is aligned with the transformative potential of "disability-conscious medical education, training, and practice" [29], which draws on insights from intersectional disability justice activism. However, we do not address the many other forms of disability, including cognitive or emotional. A natural next step will be to develop additional curated materials that focus on the treatment of patients with cognitive or emotional disabilities, as well as those with concurrent physical and cognitive disabilities. We recognize the disability community is broad and varied, and that the materials developed for this study represent only a start at improving medical education efforts designed to increase the quality and sensitivity of healthcare delivered to patients with physical disabilities. We intend to develop materials that address other types of disability, particularly combined physical and cognitive.

We recognize the importance of direct student exposure to, and engagement with patients with disabilities, given that "only when healthcare providers, educators, and students are routinely and meaningfully exposed to the perspectives of people with disabilities can they develop a consistent proficiency in diagnosing and treating ableism, in their profession generally, as well as in their own practice". [30] After the didactic and collection of endpoint measures, we had an additional, 30-minute, unstructured discussion with a panel of individuals with living experience with physical disability: two adults on wheelchairs and the parents of a child with physical disabilities. Since our goal was to evaluate the new didactic materials, we excluded the panel component from our pre/post outcome measures. However, we encourage incorporating, whenever possible, a patient and/or parent panel as a synergistic complement to the videotaped materials embedded in the workshop. For situations in which access to suitable volunteer panelists or disability advocates is not feasible, instructors can use the filmed discussion about one of the co-author's experiences navigating the healthcare system as a person who

uses a wheelchair. This 9-minute video addendum is available as part of the supplementary online materials.

The video clips present multiple springboards for rich discussion, including aspects of the model visit that do not completely reflect best practices. One such point is how the guardrail on the side of the patient's bed was not raised during the physical exam to maximize patient safety. Another is that while the physician in the video is a model for interacting with a child with a physical disability, even as an expert there were instances in which she assumed the patient would be unable to perform a task before asking, such as during discussion of transfer to the exam table, when the physician asked how best to assist before confirming if any assistance was in fact needed.

This initial study represents a first step in establishing the effectiveness of our curriculum. To assess the long-term effects and clinical implications of our curriculum, we intend to expand our efforts and reach all students by incorporating the workshop into our programs' routine clinical rotation in pediatrics. As the workshop becomes formally integrated into the medical school curriculum, we will be able to measure sustainability of effects, and ultimately behavioral change.

## Limitations

We recognize several limitations. First, participating students voluntarily attended the workshop outside of classroom time and may represent a biased sample. Students with greater interest in the subject matter might have been more likely to attend, have more knowledge and less stigmatized views at baseline, and report higher satisfaction. However, despite this likely bias in sampling, we documented improvements in attitudes after participation in the workshop.

Second, we acknowledge that one of our two professional actors was an able-bodied child, a shortcoming we made explicit at the end of the workshop (and in the addendum interview). We were not able to recruit a CWPD to serve as a SP, but are committed to doing so in future iterations, following guidelines for "authentic representation" set forth in an influential white paper advocating for the employment in television of actors with disabilities. [31]

Third, we filmed the workshop during the COVID-19 pandemic. To ensure safety, all participants wore face masks. Masks veiled facial expressions and constrained non-verbal communication. At the same time, they provided a "time stamp" to the pandemic years during which these enduring videos were produced.

Fourth, we measured outcomes upon completion of the workshop, alerting to immediacy recall bias. Finally, we did not include a control group, which could have helped determine the unique pedagogic contribution of the video component.

## Conclusion

CWPDs have historically experienced inadequate and insensitive health care and many students in the health professions feel lacking in comfort with treating this important segment of the population. We sought to improve a gap in medical education by developing a video-enriched educational resource focused on the treatment of CWPDs. In our preliminary study, the workshop was easily delivered virtually and results in a change in healthcare students' attitudes towards children with physical disabilities. To ensure the educational resource is readily distributable and adaptable for end-use instructors, we have made all didactic materials available to view or download for free. We next plan to integrate this workshop into the routine clinical curriculum in pediatrics at our institution, continue to develop additional materials on other forms of disability, and to incorporate patients' and families' perspectives.

## Declarations

Please enter the following declarations: The study was deemed exempt by the Yale IRB. The underage actor's parent provided consent to participate and publish the videos under an alias. The child signed a written assent form, and was compensated at the standard approved rates of the simulated participant program.

Competing interests: The authors declare no competing interests.

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## Tables

**TABLE 1**

## Clinical Considerations in the Care of Children with Physical Disabilities

1	Ensure the physical setting meets the child's accessibility needs.
2	Be ready to make appropriate accommodations, adjustments, or referrals.
3	Sit down to address the child at eye level; don't hover over.
4	Address the child and not only the parent or caregiver.
5	Address lifestyle questions, including SHADES (Sexual Health and Disability Education.)
6	Is the clinical setting a medical home? If not, is there one worth referring to?
7	Take note of the language the patient and family use to speak about their abilities and disability.
8	Don't hesitate to ask directly about disability.
9	Establish a clear understanding of baseline functioning and needed supports (e.g., wheelchair, feeding tube, etc.)
10	Consider the role of care coordination in child's overall care.
11	Include developmental and nutritional history; address anticipatory guidance.
12	Ensure family is aware of relevant legislation and rights, particularly the Americans with Disability Act (ADA), which prohibits discrimination and sets minimal standards for building accessibility.
13	Considerations for the physical exam. Be intentional and planful about moving to exam table; do not conduct in wheelchair; establish a thorough baseline of function, particularly on first visit; skin exam is particularly important (with special attention to pressure ulcers.)
14	What to do if you make a mistake: we are all human; recognize the error, apologize, and move on.
15	Puberty and sexuality: open channels for communication; normalize, normalize, normalize.
16	Family-centered considerations: recognition of individual strengths; each family is unique; listen thoughtfully to parent concerns; don't be afraid to ask the hard questions.
17	The most important take-aways: there are more similarities than differences; it's okay to ask; it's okay to make a mistake; the principles of providing quality, compassionate patient care are the same as with non-disabled patients.

**TABLE 2**

Video clip guide for child with physical disability educational resource

Clip	Scene / content	Duration	
		min	sec
1a	Rooming the patient	0	50
1b	Opening the interview	2	23
2a	Talking about disability	3	13
2b	Taking a history	4	3
3a	Transition to physical exam	1	10
3b	Discussion of puberty	5	6
3c	Physical exam	2	28
4	Family-centered care	3	34
5	Closing the visit	2	40
<b>Total</b>		<b>25</b>	<b>27</b>
<b>Addendum</b>	Interview with disability advocate	8	55

**TABLE 3.** Change on the Attitudes to Disabled Persons Original (ATDP-O) scale [26] after workshop (n = 49)

Item	Prompt	PRE		POST	
		Mean	SD	Mean	SD
1	Parents of disabled children should be less strict than other parents	2.8	0.4	2.9	1.2
2	Physically disabled persons are just as intelligent as non-disabled ones	2.6	0.6	2.8	0.8
3	Disabled people are usually easier to get along with than other people	2.5	0.9	2.7	1.0
4	Most disabled people feel sorry for themselves	2.5	1.2	2.5	0.9
5	*Disabled people are the same as anyone else	2.3	0.7	2.4	1.1
6	*There shouldn't be special schools for disabled persons	2.2	0.9	2.4	0.7
7	*It would be best for disabled persons to live and work in special communities	2.1	1.2	2.2	0.9
8	It is up to the government to take care of disabled persons	2.1	1.5	2.0	1.4
9	Most disabled people worry a great deal	1.9	1.3	1.9	1.2
10	*Disabled people should not be expected to meet the same standards as non-disabled people	1.8	1.1	1.9	1.1
11	*Disabled people are as happy as non-disabled ones	1.7	1.4	1.9	1.4
12	*Severely disabled people are no harder to get along with than those with minor disabilities	1.6	1.5	1.8	1.4
13	It is almost impossible for a disabled person to lead a normal life	1.5	1.7	1.5	1.9
14	You should not expect too much from disabled people	1.3	1.6	1.4	1.1
15	*Disabled people tend to keep to themselves much of the time	0.8	1.8	1.3	1.7
16	Disabled people are more easily upset than non-disabled people	0.5	1.5	0.9	1.9
17	*Disabled persons cannot have a normal social life	0.4	1.8	0.7	1.4
18	*Most disabled people feel that they are not as good as other people	0.3	1.7	0.6	1.6
19	*You have to be careful of what you say when you are with disabled people	0.2	1.5	0.6	1.5
20	*Disabled people are often grouchy	0.2	1.5	0.4	1.6

Total	Range: 0 - 60	31.2	8.9	34.8	10.1
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*(higher scores = more positive / less stigmatized attitudes)*

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*Note:* Higher values indicate more positive / less stigmatized attitudes; asterisks denote reverse scoring.

## Figures

