

Disability Training for Health Workers: A Global Evidence Synthesis

ABSTRACT

Background: Health worker training on disability is a recognized component of achieving high standards of health for people with disabilities, given that health worker's lack of knowledge, stigma, and negative attitudes towards people with disabilities act as barriers to high quality health care.

Objective: To understand the published literature on training health workers about disability.

Methods: We searched five databases for relevant peer-reviewed articles published between January 2012 and January 2021. Studies that focused on training health care workers to improve knowledge, confidence, self-efficacy, and competence to support people with physical, sensory, or intellectual impairments were included. Data about the details of the intervention (setting, participants, format, impact assessments, etc.) and its effects were extracted.

Results: There is an array of highly local tools to train health workers across stages of their training and careers (pre-service, in-service, and continuing professional development). Studies involving people with disabilities in the training, community placements, simulations, or interactive sessions were found to be most effective in improving knowledge, confidence, competency, and self-efficacy.

Conclusions: As part of initiatives to build inclusive health systems and improve health outcomes for people with disabilities, health workers around the world need to receive appropriate and evidence-based training that combine multiple methods and involve people with disabilities. To monitor progress on the impact of these trainings, there should also be a standardized measure of impact on core outcomes.

26 **BACKGROUND**

27 Human resources for health are at the heart of high-quality health systems. It is critical to
28 improve health worker training to improve health care for populations that are systematically
29 marginalized by health systems, such as people with disabilities. The World Health Organization
30 (WHO) estimates that people with disabilities make up 15% of the world's population.¹ People
31 with disabilities often face significant barriers to health care, including lack of accessible
32 transport and facilities, limited financial protection, poor health worker attitudes that result in
33 worse outcomes or limited health worker training on disability.² Even in countries where there is
34 guaranteed universal access and financial protection, health workers' unfamiliarity with
35 disability, or negative attitudes towards people with disabilities, can not only foster an
36 unwelcoming environment, but also contribute to high rates of patient safety issues and poor
37 quality care.¹

38

39 Health worker training on disability is a recognized component of achieving high standards of
40 health for people with disabilities. While the UN Convention on the Rights of Persons with
41 Disabilities (UNCRPD) Article 25³ has specific requirements on access to health care and SDG
42 monitoring on health worker disability training, the recent World Health Assembly resolution
43 most eminently highlights the role of health worker training in removing barriers to health care
44 for people with disabilities.⁴ In addition, recent studies have highlighted the need to improve
45 health care workers' attitudes, knowledge, and competency to provide care for people with
46 disabilities. For example, a US study illustrated that just 40.7% of physicians were confident
47 about providing care to patients with disabilities and most (82.4%) perceived that people with
48 significant disabilities have worse quality of life.⁵ Similarly, a study found that 87% of nursing

students implicitly associated negative traits with physical disability,⁶ which may influence clinician behaviour. These studies illustrate the need to improve health workers' confidence, competency, attitudes, and comfort in treating patients with disabilities. Given these international agreements and recent studies, it is important that countries around the world begin to integrate disability training systematically and use examples of successful interventions as models.

This review directly builds on a previous review by Shakespeare and Kleine that explored health worker training on disability between 2000 and 2011.⁷ The study found that, while there are numerous interventions to teach medical professionals about disability, there are few common philosophical underpinnings, insufficient hands-on experience, and more opportunities to incorporate disability across the curriculum.⁷ Since this review, additional systematic reviews have examined health worker training on people with disabilities for certain populations of health workers⁸, certain impairments,⁹ or geographic areas. The existing fragmented approach to disability inclusion in curricula limits the understanding and goal of having all health workers trained on disability. The broader definition of cadre, impairment, and geography used in this review is necessary to understand the full scope of best practices within health care on this topic. In addition to these reviews, there have been several calls to action to strengthen curricula around disability,^{10,11} yet a concerted effort to integrate disability training into health worker curriculums around the world is still needed.

Given renewed international commitments to health worker training on disability and country-level plans in Australia¹² and the UK¹³ to train health workers on specific types of disability, it is important to update Shakespeare and Kleine's review⁷ and outline the types of interventions to

improve health worker's knowledge, confidence, self-efficacy, and competence in treating patients with disabilities. This study seeks to understand how all types of health workers are trained on disability. By understanding what training is available to health workers, we can evaluate the impact on key learner outcomes to further refine training. In turn, this can be evaluated in terms of patient health outcomes and econometric evaluations to adjust system-level policies and individual-level practices to improve care for people with disabilities. Ultimately, this review will help to understand the types of training that support positive and sustained improvements in service delivery for health workers serving people with disabilities.

METHODS

Search Strategy

Electronic searches were conducted for the EMBASE, Global Health, Medline, CINAHL, ASSIA and Web of Science databases between 18-19 January 2021. Search terms were developed in three domains: disability, health education, and health workers. Disability terms were general, focusing on various types of impairments; health education terms targeted aspects of health training (i.e., 'core competency', 'patient encounter', 'standardized patient', etc.); and health worker terms were developed using key terms from WHO's International Classifications of Health Workers.¹⁴ Terms were developed using MeSH, keywords, or equivalent as well as from other reviews on similar topics and searches were limited to papers in English, French, or Spanish. A full sample search strategy can be found in the ancillary materials (Supplementary Material File 3). These parameters and strategy were agreed upon by the authors and a research librarian before the search was conducted to ensure there were adequate words to capture articles across the three domains examined. The Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) statement was followed for conducting and reporting the review

(PROSPERO Registration: CRD42021231120). All studies identified by the review were exported into an EndNote database (version X20, Clarivate Analytics, Philadelphia, PA, USA) and then exported into Rayyan (Qatar Computing Research Institute, Qatar) for screening.¹⁵

Selection Criteria

Our search strategy sought to identify peer-reviewed articles from around the world published between January 2012 and 2021. Given a previous systematic review covered this topic until 2011⁷, the search included articles published from 2012-January 2021 and included all health worker types, health education levels, and disability globally. The inclusion criteria required that studies were: qualitative and/or quantitative in methods; included a complete description of the intervention; explicit evaluation of the training's impact (i.e., pre- and/or post-training evaluations, follow-up surveys, etc.); and had a particular focus on improving disability competency, knowledge, confidence, self-efficacy, curricula, or teaching methods. Studies examining health worker attitudes towards people with disabilities were excluded on the basis that a positive attitude does not necessarily guarantee improved competency or care outcomes. Studies that measured attitudes alongside other criteria were included. Finally, given the abundance of articles on training health workers about mental health, the authors decided that this topic merited further, independent exploration, and, therefore, we excluded papers that trained health workers only about mental health. Only papers that looked at physical, sensory, intellectual or developmental impairments were included.

118 *Data Extraction*

119 **Fig 1. Flow chart of selected studies to review health worker training on disability** ¹⁶

120
121
122
123
124
125
126
127
128
129
130
131
132
133
134
135
136
137
138
139
140
141
142
143
144
145
146
147
148
149
150
151
152
153

¹⁵⁴
155 All data were extracted into a Google Sheet developed for this review. 78 full-text articles
156 underwent data extraction, following a title, abstract, and full-text review by two reviewers (AA
157 and BB). An additional three reviewers (AA, DD, EE) extracted data related to the general study
158 information, setting, country, health worker cadre, number of participants, type of disability,

features of the intervention, impact measurement, and outcomes. The extraction was double-checked by a second reviewer and collectively checked again by the extractors (AA, DD, EE). Any conflicts in inclusion or extraction were resolved through discussion with a third and/or fourth member of the review team.

Given the wide array of study instruments and outcomes used to assess training impact, a meta-analysis could not be conducted, and a narrative synthesis was conducted instead. Quality and bias assessments were conducted by at least two reviewers in accordance with the SIGN50 (Scottish Intercollegiate Guidelines Network Checklists). In-line with the guidelines, the papers were assessed on their study design; sampling method and sample size calculation; clearly defined and reliable measure of impact; disability definition; response rate; presence of confidence intervals and significance; and whether confounders/limitations were considered. In addition, case-control studies were assessed on whether or not the cases and controls were clearly defined and comparable.^{17,18}

Studies were rated as low bias, if all or almost all of the criteria were fulfilled, and those that were not fulfilled were thought unlikely to alter the conclusions of the study; medium, if some of the criteria were fulfilled, and those not fulfilled were thought unlikely to alter the conclusions of the study; or high, if few or no criteria were fulfilled, and the conclusions of the study were thought likely or very likely to alter with their inclusion (Supplementary Material File 2).

RESULTS

The preliminary search identified 5,665 articles for title and abstract screening, after 1,527 duplicates were removed. Following screening, 247 articles were included for full-text review. Twelve studies were excluded because full-texts could not be retrieved and a further 154 studies did not meet the inclusion criteria as shown in Fig.1., and 3 articles included in the review were

excluded during extraction because of an unclear intervention (n=1) and wrong population group (n=2).¹⁹

Included studies (n=78) represented a range of geographies, health workers, and intervention types. Among these, there were studies from 19 countries, including seven low- and middle-income countries.²⁰ Most studies took place in the United States (n=35), followed by the United Kingdom (n=13). Among the studies included, 30 were rated as low, 43 as medium, and five as high risk of bias [Supplementary Material File 2]. Studies varied in whether they were mandatory or optional; free or paid; and for certification or elective; however, many studies did not include this information. Various cadres of health workers were included in the study; doctors, medical students or residents (n=37), and nurses or nursing students and occupational/physical therapists (n=17, respectively) were the main recipients of training. These health workers were generally trained in the pre-qualification stage (n=52), though there were several in-service (n=7) and continuing professional development (CPD) programs (n=19). The review included studies across disability groups; the most common focus was training about people with intellectual and developmental disabilities (n=41), followed by general programs about people with disabilities (n=16). Most studies measured improvements in knowledge (n=57) and competence (n=42) outcomes, yet most studies used a self-designed evaluation instrument (n=54). There was a wide variety of techniques to train health workers about disability, including lectures or other didactic methods (n=65), and case studies (n=28); the majority of studies (n=58) used multiple teaching modalities [Supplementary Material File 1].

Lecture/Didactic Methods

Most (n=65) studies included lectures or didactic methods, such as videos, multi-media formats,

205 or online coursework. Many studies used these opportunities to introduce health professionals to
206 the topic of disability from a rights-based perspective to enhance attitudes, awareness, and
207 knowledge about disability. Some studies also taught particular skills that could be applied in-
208 practice, such as an elective sign language class for medical and pharmacology terms²¹ to
209 improve skills for engaging with d/Deaf or hard of hearing individuals. Lectures were often
210 combined with some other intervention (case study or simulation) to apply knowledge learned
211 from the lecture. Participants in combined programs identified the content to be quite engaging
212 and contributed to greater improvements in key outcomes. However, for those who only
213 completed lecture or didactic-based methods, there were still improvements in the general
214 outcomes, but it was often less substantial than studies that combined multiple methods^{19,22,23}.
215 Finally, some programs utilized novel, innovative technology and multimedia tools to teach
216 about disability in a more engaging method than traditional lectures or didactic methods. For
217 example, one study designed multi-media tools (MMLTs) to teach medical students about
218 common visual impairments and compared the knowledge scores with those who had read a
219 textbook. The findings highlight the importance of engaging material, as while there was no
220 significant difference in knowledge (except for cataract recognition), the MMLT took less time
221 and 87% of individuals found it more enjoyable than traditional teaching methods.²⁴

222 ***People with Disabilities as Teachers***

223 Recognizing the important role of self-advocates and patients as educators⁷, several studies
224 (n=19) invited people with disabilities to share their experiences in the health system, portray
225 standardized patients, or give a lecture. Some universities hired people with disabilities to
226 participate in simulated patient programs, while others asked patients to participate voluntarily.
227 Many others found creative ways of engaging with people with disabilities. Cardiff University,

228 for example, hired a self-advocacy theatre group to run a simulation and icebreaker activity.²⁵
229 These activities added a non-clinical dimension to medical training about disability, as it allowed
230 participants to explore disability outside the health worker-patient relationship and engage in
231 dialogue. Studies that measured participants comfort and attitudes before and after a person with
232 a disability as a teacher demonstrated that participants felt the non-clinical interaction enhanced
233 their comfort and attitudes towards people with disabilities.^{26, 27}

234

235 **Table 1: Characteristics of Included Studies**

Variable	Number	Percentage (%)
Training Location		
North America	40	51.2
Europe	22	28.2
Asia	6	7.7
Oceania	4	5.1
Africa	4	5.1
South America	2	2.5
Disability Focus of Training**		
Intellectual and developmental	41	51.9
All types of disabilities/unspecified	16	20.3
Physical/motor	13	15.2
Communication	9	11.4
D/deaf and hard of hearing	8	10.1
Visual impairment	3	3.8
Sensory impairment	2	2.5
Health Worker Type**		
Medics	37	35.2
Nurses	17	16.2
Occupational and Physical Therapists	17	16.2
Allied Health Professionals	8	7.6
Dentists	7	6.7
Audiologists and Speech Language Pathologists	6	5.7
Psychologists	4	3.8
Personal Care Workers	5	4.8
Community Health Workers	2	1.9
Pharmacists	2	1.9
Teaching Method*		
Lecture/didactic methods	65	34.7
Case study	28	14.9
Clinical encounter	26	13.9
Placements, experiential, and community-based learning	25	13.4
Simulation	24	12.8
People with disabilities as a teacher	19	10.1
Intervention Outcomes*		
Knowledge	57	28.4
Competence	42	20.9
Attitudes	31	15.4
Confidence	24	11.9
Comfort	15	7.5
Communication skills	12	6.0
Self-Efficacy	11	5.5
Other related outcomes	9	4.5
*Total number is greater than 78 because studies included multiple variables		
†categories include students and residents who are in training to become fully qualified as this type of health worker		

236

237

238 *Case Studies*

239 Case studies are a common tool in health education to prepare health workers holistically for
240 their education where a patient's medical history are presented without their presence. Case
241 studies have a clear structure, details, and clinical observations to teach students about the
242 topic.²⁸ Accordingly, many studies used case studies (n=28) as a way of learning how to improve
243 care for people with disabilities. These tools were especially common in continuing professional
244 development, as some programs ask patients to bring case examples to review anonymously to
245 improve care ^{29,30} or were to spur reflection on their own work. Several case studies were
246 conducted through online learning or innovative interactive methods. For example, the City
247 University of London created CitySCaPE, which is a multi-media simulation that simulated
248 different patient cases of people with intellectual disabilities with nursing students. ³¹ These types
249 of case studies that blended the traditional case study and simulation aspects created greater
250 engagement in settings where in-person or clinical encounters were not possible.

251 *Placements, experiential, and community-based learning*

252 Placements, experiential, and community-based learning (n=25) methods were sustained
253 opportunities (i.e. multiple clinical sessions with patients, a term placement, or residential
254 program) to engage with people with disabilities in clinical and alternative settings that were
255 common in in-service and pre-qualification training. For example, some studies examined the
256 impact of clerkship placements in specialized clinics for people with disabilities,³² while others
257 looked at nurses and occupational therapists' improvements after participating in a week-long
258 summer camp for children with disabilities.³³ In the clinical setting, students found that they
259 improved skills because they were able to engage with people with disabilities for extended
260 periods, rather than a singular interaction. Furthermore, the out-of-clinic engagement, such as at

261 camps, schools, or residential settings helped illustrate the non-medical and everyday lives of
262 people with disabilities.

263 *Simulations*

264 Simulations were single-session events that either used actors or volunteers with disabilities to
265 act as patients in a devised scenario to support skill development and learning outside of health
266 worker-patient interactions. Many speech-language pathology, nursing, and medical student
267 programs used simulations (n=24) as tools to develop confidence and communication skills when
268 treating patients with communication disorders.^{34,35, 36} In addition, several medical schools
269 integrated disability training into existing clinical simulation skills labs to improve care for
270 people with disabilities. For example, at the University of Gothenburg medical students were
271 videotaped during a simulated patient exercise to reflect on improving communications skills,
272 particularly for the simulated patient with an acquired communication disorder.³⁶ Overall, the
273 simulations were useful tools for improving knowledge, comfort, and competency in a low-
274 pressure environment that is applicable to serving people with disabilities.

276 *Clinical Encounters*

277 Several programs (n=26) included singular clinical encounters with patients with disabilities as
278 part of their disability training. These were often day-long programs to familiarize students with
279 providing care in a clinical setting, often under supervision of a fully qualified doctor or expert,
280 and were predominantly focused on improving knowledge and competency.³⁷ Most students who
281 participated in these programs were advanced (i.e., penultimate or final year students) who had
282 previously had some education on providing care to people with disabilities. These opportunities
283 focused on practicing clinical skills to treat patients with disabilities, and, despite the short

exposure, did significantly affect participant's key outcome scores. For instance, clinical encounters used in CPD, such as in Rwanda, where instructors in a physiotherapist training program went to participants' clinics to provide immediate feedback on their practice.³⁸

Multi-pronged approach

Approximately 75% of papers utilized a combination of methods to have impact on training participants. These multi-pronged approaches helped reach various learning styles and cement learning. Two papers included in this review utilized all of the interventions measured in this paper. For example, two State University of New York medical colleges demonstrated the importance of integrating disability across health worker curricula, as all participants significantly improved their knowledge, attitudes, and core competencies in treating patients with disabilities.³⁹ Similarly, the University of South Florida had a 12-week clinical clerkship that involved classroom simulations, lectures, case studies, people with disabilities as teachers, and a twice-weekly placement in a community clinic that served people with disabilities. The immersion helped to significantly improve knowledge, attitudes, and comfort.⁴⁰

Training Effectiveness

While the diversity of outcome measures did not allow us to conduct a meta-analysis,⁴¹ it is important to note that almost all papers included in this review improved the outcomes they measured. Since every paper had improvements in at least one outcome of interest, we examined how intervention effectiveness varied by outcome of interest for each study that included it. 100% of studies that sought to improve and measure confidence, communication skills, and competence demonstrated that the intervention improved these outcomes. Studies that looked at knowledge demonstrated improvements in 94.7% of studies, while comfort improved in 93.3%

and self-efficacy improved 90.9% of studies. Studies that included participants' attitudes as an outcome had the lowest number of studies with improvements at 80.6% of studies. Only seven studies looked at long-term follow-up (three months or more after the intervention). None of the studies showed continued improvement on any of the outcomes between post-test and follow-up. While 51.7% of these studies sustained learning at the long-term follow-up point, 42.9% reported lower follow-up scores than post-test scores.

DISCUSSION

Numerous studies and examples serve as successful models to train health workers about disability and improve knowledge, competence, skills, self-efficacy, and confidence to treat patients with disabilities. All teaching methods had some positive impact on the outcomes measured in this study, regardless of health worker type, location, or training stage, though the most commonly used were lecture/didactic methods and case studies. Part of the success of these programs was the multi-pronged nature of the approach, as 75% of studies used multiple teaching methods. The two examples that utilized all teaching interventions demonstrate the importance of a multi-pronged approach that emphasizes mainstreaming disability in health curricula, either through sustained engagement in a curricula³⁹ or an intensive placement.⁴⁰ However, limited information about commonalities in curricula could be extracted from the data, given the diversity of interventions methods and topics.

It is important to note that these findings are not substantially different from the 2011 review.⁷ Similar methods are still used to teach health workers on disability and each example is highly localized, within either a certain school or region, other than two studies that examined national-

level training programs.^{38, 42} The limited evidence of systemic integration of disability training within health worker practices is concerning in this context as the current status of training appears to depend on where you received your training, where you live, or where you work. Enacting systemic-level change to ensure all health workers have the same level of high-quality training on disability will contribute to providing consistent, high-quality care and outcomes for people with disabilities.

Similarly, there was limited standardization in tools used to measure the impact of disability training on health workers. Of the 78 studies, nearly 70% designed their own instruments, and only two studies included the same standardized measure of outcomes.^{43,44} Few studies measured the longevity of the intervention's impact, though those that did demonstrated both sustained or decreases in the outcomes measured. Sustained approaches that mainstream disability should help to ensure learning is not performative for post-intervention evaluation, but actually effect change in practice. This finding was previously noted⁷, yet there has been little improvement in the past decade. The diversity of tools to assess impact of training limits our ability to assess effectiveness and compare training methods across geography, health worker cadres, and training stages hampers progress on this important topic. Developing—and using—a common, standardized cross-disability tool or protocol for evaluating immediate and long-term intervention impact may help support monitoring and evaluation efforts to further refine and improve training.

While the review uncovered many examples of disability training, one of the main limitations of the study is that it only highlights published examples of studies, which can leave out

unpublished examples. Since nonsignificant or negative findings are unlikely to be published in academic journals, there is likely some publication bias in this review. This is particularly evident with the didactic methods, where there are plausibly hundreds of other interventions or examples that are integrated into the health curricula around the world, but, perhaps, with less promising or measured results. Furthermore, without greater follow-up evaluation or standardization in evaluation, it is difficult to assess the longevity and quality of impact to understand impact of training definitively. On the other hand, this study reveals some adaptable examples of how to integrate disability training into all stages of health worker training and development, which can serve as models for inclusion efforts around the world.

Future Directions

The lack of progress on training methodology since Shakespeare and Kleine's review demonstrates the need for further work in this area. The fragmented nature of disability training creates disparities in provider competency and quality health care for people with disabilities around the world. While focusing on training by impairment is useful, there is also a need to have holistic disability training. Improving the standardization of core competencies that training on disability should address and measures of impact for disability training can further improve progress in this area. Having some standardized outcome measures to compare effectiveness of training and evaluate impact on patient outcomes will allow for further evidence to impact system-level changes on this topic. Furthermore, the limited evidence on long-term follow-up suggests the need to have sustained engagement on disability throughout training and health worker professional development as part of building disability-inclusive health systems. Therefore, working to include disability in training and better understand its impact through standardized outcomes are key areas to improve integration of disability training for health

376 workers.

377

378 **CONCLUSION**

379 Significant health disparities and poor-quality health care still exist for people with disabilities

380 around the world. These studies demonstrate that health worker training can be a useful tool to

381 improve health workers knowledge, self-efficacy, attitudes, comfort, and competency to treat

382 people with disabilities Ensuring training centres the voices of people with disabilities, using

383 multiple modalities, and ensuring there is sustained engagement throughout a health worker's

384 stages of learning can be part of the toolkit to improve patient-centered care for people with

385 disabilities. Without normalizing disability training as part of high-quality health worker

386 training, there will continue to be limited progress on improving outcomes for people with

387 disabilities. Catalyzing the post-pandemic health systems strengthening efforts to include these

388 evidence-based and effective health worker training on disability can contribute to improved care

389 and outcomes for people with disabilities.

REFERENCES

1. World Bank, WHO. *World Report on Disability*. 2011:350. 2011.
https://www.who.int/disabilities/world_report/2011/report.pdf?ua=1
2. Kuper H, Heydt P. *The Missing Billion: Access to Health Services for 1 Billion People with Disabilities*. 2019:28. 2019/07//. <https://www.lshtm.ac.uk/TheMissingBillion>
3. Convention on the Rights of Persons with Disabilities (CRPD), (2006). Accessed 2020/07/11/20:53:45. <https://www.un.org/development/desa/disabilities/convention-on-the-rights-of-persons-with-disabilities.html>
4. A new landmark resolution on disability adopted at the 74th World Health Assembly. World Health Organization; 27 May 2021. <https://www.who.int/news/item/27-05-2021-a-new-landmark-resolution-on-disability-adopted-at-the-74th-world-health-assembly>
5. Iezzoni LI, Rao SR, Ressalam J, et al. Physicians' Perceptions Of People With Disability And Their Health Care. *Health Affairs (Project Hope)*. 2021/02// 2021;40(2):297-306. doi:10.1377/hlthaff.2020.01452
6. Lum J, Morean W, Maccarrone A, Carpenter TP, Aaberg V, Bentley JA. Implicit associations related to physical disability among nursing students. *Disability and Health Journal*. 2021/06/08/ 2021;101150. doi:10.1016/j.dhjo.2021.101150
7. Shakespeare T, Kleine I. Educating Health Professionals about Disability: A Review of Interventions. *Health and Social Care Education*. 2013;2(2):20-37. doi:10.11120/hsce.2013.00026
8. Ioeberger M, Flanders RM, French-Lawyer JR, Turk MA. Interventions to Teach Medical Students About Disability: A Systematic Search and Review. *Am J Phys Med Rehabil*. Jul 2019;98(7):577-599. doi:10.1097/PHM.0000000000001154
9. Ceglie K, Rispoli MJ, Flake EM. Training Medical Professionals to Work with Patients with Neurodevelopmental Disorders: A Systematic Review. *Developmental Neurorehabilitation*. 2020 Oct 2;23(7):463-73.
10. Bowen CN, Havercamp SM, Karpiak Bowen S, Nye G. A call to action: Preparing a disability-competent health care workforce. *Disability and Health Journal*. 2020/10// 2020;13(4):100941. doi:10.1016/j.dhjo.2020.100941
11. Ankam NS, Bosques G, Sauter C, et al. Competency-Based Curriculum Development to Meet the Needs of People With Disabilities: A Call to Action. *Academic medicine : journal of the Association of American Medical Colleges*. 2019;94(6):781-788. doi:<https://dx.doi.org/10.1097/ACM.0000000000002686>
12. Guaranteeing Medicare – Improving the health of people with intellectual disability. 2021. <https://www.health.gov.au/sites/default/files/documents/2021/05/guaranteeing-medicare-improving-the-health-of-people-with-intellectual-disability.pdf>
13. Health Education E. The Oliver McGowan Mandatory Training in Learning Disability and Autism. *Health Education England*. 2020/08/07/T15:20:04+01:00 2020;
14. World Health Organization. *Classifying health workers: Mapping occupations to the international standard classification*. 2010. 2010/04/29/. Accessed 2021/06/16/. https://www.who.int/hrh/statistics/Health_workers_classification.pdf
15. Ouzzani M, Hammady H, Fedorowicz Z, Elmagarmid A. Rayyan—a web and mobile app

- for systematic reviews. *Systematic Reviews*. 2016 2016;5(1)doi:10.1186/s13643-016-0384-4
16. Page MJ, McKenzie JE, Bossuyt PM, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ*. 2021/03/29/ 2021;372:n71. doi:10.1136/bmj.n71
17. Bright T, Wallace S, Kuper H. A Systematic Review of Access to Rehabilitation for People with Disabilities in Low- and Middle-Income Countries. *Int J Environ Res Public Health*. 2018;15(10)doi:10.3390/ijerph15102165
18. Scottish Intercollegiate Guidance Network. *SIGN50: A guideline developer's handbook* 2011. Accessed 16 November 2021. https://www.sign.ac.uk/assets/sign50_2011.pdf
19. Gilmore M, Sturgeon A, Thomson C, et al. Changing medical students' attitudes to and knowledge of deafness: a mixed methods study. *Bmc Medical Education*. Jun 2019;19:227. doi:10.1186/s12909-019-1666-z
20. Bank TW. World Bank Country and Lending Groups. World Bank Group. Accessed 16 June, 2021.
21. Bailey N, Kaarto P, Burkey J, Bright D, Sohn M. Evaluation of an American Sign Language co-curricular training for pharmacy students. *Currents in Pharmacy Teaching and Learning*. Jan 2021;13(1):68-72. doi:10.1016/j.cptl.2020.08.002
22. Dagnan D, Masson J, Thwaites R, James A, Hatton C. Training therapists to work with people with intellectual disability in Improving Access to Psychological Therapies (IAPT) services. *Journal of applied research in intellectual disabilities : JARID*. 2018;31(5):760-767. doi:<http://dx.doi.org/10.1111/jar.12427>
23. Salama FS, Al-Balkhi BK. Effectiveness of educational intervention of oral health for special needs on knowledge of dental students in Saudi Arabia. *Disability and Health Journal*. Jan 2020;13(1)100789. doi:10.1016/j.dhjo.2019.03.005
24. Steedman M, Abouammoh M, Sharma S. Multimedia learning tools for teaching undergraduate ophthalmology: Results of a randomized clinical study. *Canadian Journal of Ophthalmology*. 2012;47(1):66-71. doi:<http://dx.doi.org/10.1016/j.jcjo.2011.12.006>
25. Abdi R, Metcalf E. Exploring attitudes of medical students towards intellectual disabilities. *Advances in Mental Health and Intellectual Disabilities*. Aug 2020;14(5):125-136. doi:10.1108/amhid-01-2020-0002
26. Lynch J, Last J, Dodd P, Stancila D, Linehan C. 'Understanding Disability': Evaluating a contact-based approach to enhancing attitudes and disability literacy of medical students. *Disability and Health Journal*. Jan 2019;12(1):65-71. doi:10.1016/j.dhjo.2018.07.007
27. Iannuzzi D, Rissmiller P, Duty SM, Feeney S, Sullivan M, Curtin C. Addressing a Gap in Healthcare Access for Transition-Age Youth with Autism: A Pilot Educational Intervention for Family Nurse Practitioner Students. *Journal of Autism and Developmental Disorders*. Apr 2019;49(4):1493-1504. doi:10.1007/s10803-018-3846-9
28. Cheek C, Hays R, Smith J, Allen P. Improving case study research in medical education: a systematised review. *Medical Education*. 2018/05// 2018;52(5):480-487. doi:10.1111/medu.13469
29. Mazurek MO, Stobbe G, Loftin R, et al. ECHO Autism Transition: Enhancing healthcare for adolescents and young adults with autism spectrum disorder. *Autism*. Apr 2020;24(3):633-644. 1362361319879616. doi:10.1177/1362361319879616
30. Sohl K, Mazurek MO, Brown R. ECHO Autism: Using Technology and Mentorship to Bridge Gaps, Increase Access to Care, and Bring Best Practice Autism Care to Primary Care.

- Clinical Pediatrics*. 2017;56(6):509-511. doi:<http://dx.doi.org/10.1177/0009922817691825>
31. Chiang HC, Lin FY, Hwu YJ. Disability Assessment: The Efficacy of Multimedia Interactive Nurse Education. *Journal of Nursing Research*. Jun 2013;21(2):83-93. doi:10.1097/jnr.0b013e3182921f5a
32. Watmough S, Leftwick P, Alexander-White S. An evaluation of medical students' views on the introduction of a community placement and its impact on their understanding of patients with disabilities. *Education for primary care : an official publication of the Association of Course Organisers, National Association of GP Tutors, World Organisation of Family Doctors*. 2014;25(1):36-42.
33. Hensel D, Malinowski C, Watts PA. Implementing a Pediatric Camp Clinical for Pre-Licensure Education. *Nursing education perspectives*. 2015;36(1):60-61. doi:<https://dx.doi.org/10.5480/12-871.1>
34. VandeWaa E, Bealle Rudd A, Estis JM, Gordon-Hickey S. Safe Medication Administration in Patients with Communication Disorders: A Simulation-Enhanced Interprofessional Education Approach. *Journal of allied health*. 2019;48(4):257-262.
35. Sheepway L, Lincoln M, McAllister S. Impact of placement type on the development of clinical competency in speech-language pathology students. *International journal of language & communication disorders / Royal College of Speech & Language Therapists*. 2014;49(2):189-203. doi:<http://dx.doi.org/10.1111/1460-6984.12059>
36. Saldert C, Forsgren E, Hartelius L. Teaching medical students about communication in speech-language disorders: Effects of a lecture and a workshop. *International Journal of Speech-Language Pathology*. 2016;18(6):571-579. doi:10.3109/17549507.2016.1143975
37. Keisling BL, Bishop EA, Kube DA, Roth JM, Palmer FB. Long-term pediatrician outcomes of a parent led curriculum in developmental disabilities. *Research in Developmental Disabilities*. 2017;60:16-23. doi:<http://dx.doi.org/10.1016/j.ridd.2016.11.004>
38. Clark K, Smith CNW, Kohls L, et al. A global health training model for teaching pediatric clinical decision making skills to Rwandan physical therapists: A case report. *Physiotherapy Theory and Practice*. Sep 2019;35(9):891-903. doi:10.1080/09593985.2018.1458263
39. Symons AB, Morley CP, McGuigan D, Akl EA. A curriculum on care for people with disabilities: Effects on medical student self-reported attitudes and comfort level. *Disability and Health Journal*. Jan 2014;7(1):88-95. doi:10.1016/j.dhjo.2013.08.006
40. Garavatti E, Tucker J, Pabian PS. Utilization of an Interprofessional Integrated Clinical Education Experience to Improve Medical and Physical Therapy Student Comfort in Treating Patients with Disabilities. *Education for Health*. Sep-Dec 2018;31(3):155-162. doi:10.4103/efh.EfH_177_17
41. Tufanaru C, Munn Z, Aromataris E, Campbell J, Hopp L. Chapter 3: Systematic reviews of effectiveness - JBI Manual for Evidence Synthesis. In: Aromataris E, Munn Z, eds. *JBI Manual for Evidence Synthesis*. 2020.
42. Pasco G, Clark B, Dragan I, et al. A training and development project to improve services and opportunities for social inclusion for children and young people with autism in Romania. *Autism*. Oct 2014;18(7):827-831. doi:10.1177/1362361314524642
43. Mac Giolla Phadraig C, Guerin S, Nunn J. Should we educate care staff to improve the oral health and oral hygiene of people with intellectual disability in residential care? Real world lessons from a randomized controlled trial. *Special care in dentistry : official publication of the American Association of Hospital Dentists, the Academy of Dentistry for the Handicapped, and*

525 *the American Society for Geriatric Dentistry*. 2015;35(3):92-98.
526 doi:<http://dx.doi.org/10.1111/scd.12102>
527 44. Mac Giolla Phadraig C, Guerin S, Nunn J. Train the trainer? A randomized controlled trial
528 of a multi-tiered oral health education programme in community-based residential services for
529 adults with intellectual disability. *Community dentistry and oral epidemiology*. 2013;41(2):182-
530