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REVIEW

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How are medical students learning to care for patients with intellectual disabilities? A scoping review

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Abstract

Background: Individuals with intellectual disabilities experience barriers to quality healthcare. To reduce this disparity, equipping medical trainees with the knowledge and skills required for treating this patient population is critical. Our aim is to describe the breadth of instructional interventions and identify gaps in intellectual disability medical education curricula.

Method: Using scoping review methods, the intellectual disability programmes described in 27 articles were evaluated and their coverage of the six core competencies on disability for health care education was examined.

Results: The most frequently represented core competencies were disability conceptual frameworks, professionalism and communication, and clinical assessment, which were, in most programmes, fulfilled by activities involving individuals with intellectual disabilities. Uneven competency coverage warrants consideration.

Conclusions: Considerable variabilities exist in medical school curricula on intellectual disabilities. Using core competencies on disability for health care education for curricular design and evaluation would provide a coherent training experience in this important area.

KEYWORDS

core competencies on disability for health care education, curriculum, developmental disability, intellectual disability, medical students, scoping review

1 | INTRODUCTION

The concept of human diversity is embraced in our society, and on the whole, concerted efforts have been made to achieve inclusivity of varied groups of individuals in many different spheres of the society. Yet, persistent biases, both conscious and subconscious, sustained at the levels of institutions as well as individuals continue to negatively impact the daily life experiences of individuals not considered as mainstream. A clear manifestation of these biases is the resulting health disparities affecting individuals with intellectual disabilities. It has long been recognised that individuals with intellectual disabilities experience poorer health outcomes than the general population (Johnston et al., 2022; Krahn & Fox, 2014). Intellectual disabilities are classified as 'Disorders of Intellectual Development' by the World Health Organisation and defined as 'a group of etiologically diverse conditions originating during the developmental period characterized by significantly below average intellectual functioning and adaptive behavior' in the International Classification of Diseases 11th Revision (World Health Organization, 2018).

Although progress has been made in caring for this patient population (e.g., Lalive d'Epinay Raemy & Paignon, 2019), there exists a significant body of evidence demonstrating that individuals with intellectual disabilities still face substantial inequity in healthcare. Two instances in particular, one historical and the other recent, illustrate this inequity. Due to the improvements in public healthcare in industrialised countries, life expectancy, in general, started to increase in the mid-1900s, including individuals with intellectual disabilities (Bittles & Glasson, 2004). Despite this improvement, the average life expectancy of this population in the United States is still ~20 years shorter than the general population (Lauer & McCallion, 2015). During the recent COVID-19 pandemic, individuals with intellectual disabilities experienced significantly more adverse health outcomes (Gleason et al., 2021). The reported causes for this inequity include healthcare providers' negative attitudes leading to undertreatment and neglect as well as a lack of relevant knowledge and skills in treating these patients (Hemm et al., 2015; Lauer et al., 2015; Ouellette-Kuntz et al., 2012; Phillips et al., 2004; Wilkinson et al., 2012; Zerbo et al., 2015). Another emerging issue is the difficulties and barriers they face during the transition from paediatric to adult healthcare (Varshney et al., 2022). To improve healthcare for this population, therefore, equipping a new generation of physicians with the necessary attitudes, skills, and knowledge is becoming even more crucial.

This imperative led to publications such as: (1) an ideal curriculum on intellectual disability (Lennox & Diggens, 1999), (2) recommended pedagogies and learning objectives for teaching intellectual disability (Havercamp & Macho, 2016; Holder, 2016), (3) a perspective on medical education regarding the healthcare needs of individuals with intellectual disabilities (Tracy & McDonald, 2015), and (4) a summary of UK national reports for intellectual disability training in psychiatry (Spackman et al., 2016). More recent efforts are embodied in the publication by Havercamp et al. (2021) of the 'Core Competencies on Disability for Health Care Education' formulated by gathering a national consensus from multiple stakeholders on disability competencies for healthcare education. The competencies consist of 6 domains and 59 sub-competencies, multiple elements of which are aligned with relevant U.S. Liaison Committee on Medical Education (LCME) standards. Although there is a drive to improve the medical curriculum on intellectual disabilities, there is simultaneously a sentiment that the curricular content dedicated to intellectual disability is still limited and inadequate (Moyle et al., 2010; Stillman et al., 2021; Trollor et al., 2016, 2020; Van Wieringen & Ditlopo, 2015). Furthermore, attitude surveys published thus far show that more training for medical students is warranted to prepare them to effectively care for patients with intellectual disabilities (Kritsotakis et al., 2017; Ryan & Scior, 2014, 2016). Therefore, an evaluation of the current state of intellectual disability education of medical schools will aid medical educators in revitalising their efforts in designing and implementing effective intellectual disability curriculum to train the next generations of physicians. To this end, we chose the scoping review methodology to closely examine published literature on the intellectual disability education programmes delivered to medical students, focusing on instructional materials and pedagogies, intended outcomes, method of assessment, and reported effectiveness.

In the series of audit reports of Australian medical schools on intellectual disability curricula, Trollor et al. identified: (1) a misalignment between medical school intellectual disability curricula and the actual healthcare needs of individuals with intellectual disabilities, (2) significant variability in the curricula, and (3) an overall lack of progress in medical school intellectual disability curricula since the mid-1990s (Trollor et al., 2016, 2018, 2020, respectively). Systematic reviews (Adirim et al., 2021; Ceglio et al., 2020; Vi et al., 2023) and a scoping review (Towson et al., 2023) of intellectual disability curricula for medical personnel and students also underscore the lack of consistency in the content and evaluation of the curricula, which hinders adoption of well-structured intellectual disability curricula across schools. In this scoping review, the 'Core Competencies on Disability for Health Care Education' (Havercamp et al., 2021) was used as a framework to evaluate the selected intellectual disability programmes in an effort to motivate the use of a common framework for the future curricular design and introduce consistency to the curriculum evaluation. The use of the core competencies in this review allows us to: (1) evaluate intellectual disability education programmes viewed through the lens of well-established disability competencies, (2) identify teaching and assessment methods aligned with the competencies, and (3) identify competencies undertaught in medical school intellectual disability curricula.

2 | METHODS

Methods for this scoping review were based on the *JBI Evidence Synthesis Manual* (Aromataris et al., 2020) and are reported in this review according to the *PRISMA Extension for Scoping Reviews* (*PRISMA-ScR*) (Tricco et al., 2018). Before starting the review, the authors created an unpublished a priori protocol, which was revised several times during the review accordingly as the authors' comprehension of the literature content developed.

We chose the scoping review methodology since this approach is considered ideal for providing an overview of the subject under review to identify gaps in knowledge and relevant literature which could be heterogenous in nature. Scoping reviews contrast with systematic reviews whose objectives are more narrowly set to answer defined questions such as the efficacy of an intervention in a specific population (Munn et al., 2018; Tricco et al., 2018). Accordingly, we chose the scoping review format since our aims were to identify intellectual disability education programmes in medical schools to summarise their current status and identify gaps in the curricula. As such, driven by our aim of describing the breadth of intellectual disability education in medical school curricula, we did not conduct a critical appraisal (i.e., risk of bias assessment) for the selected articles. While critical appraisal is an essential component of systematic reviews, it is not a requirement for scoping reviews (Munn et al., 2018).

2.1 | Eligibility criteria

Eligibility criteria included peer-reviewed journal articles that described instructional sessions or academic programmes in undergraduate medical education curriculum (otherwise known as medical school) which targeted medical students and focused on teaching knowledge, developing skills, or improving attitudes that are essential for providing care for people with intellectual disabilities. Articles published prior to 1980 as well as non-English articles were excluded.

Articles were included if the research study assessed or discussed medical education curriculum interventions (e.g., session or programme) aimed at medical students (e.g., allopathic or osteopathic) related to the medical management and healthcare services for patients with intellectual disabilities (e.g., autism, developmental delay/disorder, Down Syndrome), as reported by the authors. Articles were excluded if the educational interventions were primarily directed at practicing physicians or residents. Review articles were set aside at the full-text screening stage but utilised for background information and to identify additional potential studies.

2.2 | Search strategy

A comprehensive, reproducible search strategy was developed using keywords and Medical Subject Headings (MeSH), including synonyms and related concepts, based on the following concepts: *medical students*, *undergraduate medical education*, *medical school*, *intellectual disability*, *Down syndrome*, *developmental disabilities*. The search was first created and run in Ovid MEDLINE® ALL (1946 to 28 August 2023). The search strategy was translated for Scopus (Elsevier), date coverage 1966 to 28 August 2023, using The Polyglot Tool from SR Accelerator (link: https://sr-accelerator.com/#/polyglot) to partially automate the process (Clark et al., 2020). No additional filters were applied to the database results (e.g., date, language, publication type, or specific study designs, e.g., randomised control trial, observational, or qualitative). See Data S1 File A for the detailed search strategy documentation. In addition to the database searches, authors hand-searched the table of contents of *MedEd Portal* and the reference lists of articles that met inclusion criteria after full-text review.

2.3 | Data extraction

Citation data was uploaded into Covidence software for automatic deduplication, title/abstract screening, and full-text review by the two authors. Differences of opinion were reconciled by discussion. The articles that met the inclusion criteria initially were further classified into two tiers by their relevance to medical school intellectual disability curricula: Tier 1 of high relevance and Tier 2 of auxillary value. The details of the tier classification are described in the Results section. Tier 1 articles' data were extracted into summary tables (Table 1 and Table 2). Tier 2 articles are listed in Supplemental Material B.

2.4 | Appraisal of articles

We used Kirkpatrick's four-level evaluation model to classify the learner outcomes described in the Tier 1 articles. Four hierarchical levels of educational programmes recommended by Kirkpatrick are: (1) learner satisfaction, (2) measures of learning directly attributable to the educational programme (e.g., changes in attitudes, newly acquired knowledge), (3) behavioural changes of learners in the context at which the educational programme aimed (e.g., application of knowledge and skills in relevant clinical context during training), and (4) learner outcomes observed in a larger context indicating a lasting impact (Kirkpatrick & Kirkpatrick, 2006).

The programmes' intellectual disability content coverage was assessed using the six core competencies on disability for health care education (Havercamp et al., 2021). The goals and objectives described for learning sessions were used to identify which core competencies were covered in each programme.

3 | RESULTS

Database searches yielded 1552 unique references. After title/abstract screening, we examined 189 full text articles and identified 58 articles that met the inclusion criteria. These articles were further evaluated for their relevance to designing and implementing intellectual disability curriculum for medical students. The relevance criteria included one or more of: comprehensive descriptions of the intellectual disability educational programme, well-defined programme assessment(s), or at least one documented descriptive evaluation of the programme. Twenty-seven articles fulfilled the criteria and were classified as Tier 1, which were deemed beneficial to medical educators who are interested in designing and implementing intellectual disability programmes. The remaining articles were classified as Tier 2 (31 articles) (Data S1 File B), which included reviews of intellectual disability education for health professions trainees and practitioners, perspectives and opinion pieces on intellectual disability education, intellectual disability curriculum proposals, and reports of intellectual disability programmes that did not fulfil the relevance criteria. We regarded Tier 2 articles as good general background resources for intellectual disability education in medicine. The screening process is summarised in a PRISMA Flow Diagram (Figure 1).

Below, we describe the following for the 27 Tier 1 articles: (3.1) overall characteristics of the identified programmes, (3.2) content materials delivered in the programmes, (3.3) assessment methods used to measure the efficacy of the programmes, and (3.4) coverage of the six core competencies on disability for health care education.

3.1 | Overall characteristics of the 27 intellectual disability programmes

3.1.1 | The learners

The educational stages of learners reported in the 27 programmes are: pre-clerkship (first–second year), 10 programmes; clerkship

TABLE 1 Summary of overall characteristics.

Authors, year of publication, country of origin	Stage and number of medical students participating in programmes	Attendance (R/NR)	Role of individuals with intellectual disabilities or their parents in programmes	Individuals with intellectual disabilities directly involved?	Characteristics of instructors who facilitated training sessions in programmes	Is the programme stand-alone module?
Abdi & Metcalf, 2020, United Kingdom	MS4 ($N = 100$)	R	SP	Yes	Speech and language therapist	Yes
Akbulut Zencirci et al., 2022, Turkey	Senior medical students ($N = 139$)	NR	SP in recorded videos; Patient for immersive learning	Yes	Professionals from public health, psychiatry, and special education	Yes
Berger et al., 2023, Canada	MS1 ($N = 33$)	R	Patient for immersive learning (virtual visit)	Yes	Faculty	Yes
Brown et al., 2010, United States	Longitudinal. MS2 to MS3 ($N = 146$)	R	SP	Yes (for assessment)	Faculty (who is a parent of an adult child with an intellectual disability)	No (Disability curriculum)
Burge et al., 2008, Canada	Longitudinal. MS1 to MS3 ($N = 196$)	R	Patient for immersive learning	Yes	Faculty	No (including Psychiatry clerkship)
Clarke & Tabor, 2023, United States	MS3 ($N = 85$)	R	Participant in discussion	Yes	Faculty	Yes
Coret et al., 2018, Canada	MS1 ($N = 27$)	NR	SP; Patient educator	Yes	Faculty	Yes
Garavatti et al., 2018, United States	MS2 ($N = 20$)	NR	Model patient for a neurological exam	Yes	Administrators of the training facility; Faculty	Yes
Harnett et al., 2013, Ireland	MS4 ($N = 80$)	NR	A parent of children with intellectual disability as presenter	No (parent participated)	Faculty	Yes
Harper & Wadsworth, 1992, United States	MS2 ($N = 12$)	NR	SP in pre-, post-intervention and follow-up role-plays	Yes (for assessment)	Health providers (video only)	Yes
Havercamp et al., 2016, United States	MS3 ($N = 99$)	R	Panellist (both patients and parents)	Yes	Developmental-behavioural paediatrician	Yes
Hoang et al., 2023, United States	Mix (MS2, MS3, MS4) ($N = 7$)	NR	SP (limited)	Yes	Faculty	Yes
Jackson et al., 2020, United States	MS1 ($N = 290$)	R	A family of a child with Down syndrome as panellists	No (family participated)	Faculty and parents (developing a web-based learning tool)	No (Genetics course)
Jacob et al., 2022, United States	Mix (MS1, MS2) ($N = 40$)	NR	Patient for immersive learning	Yes	Trainer from a local developmental disabilities institute	Yes
Jones & Donald, 2007, Australia	MS4 ($N = 26$)	NR	Patient for immersive learning	Yes	Paediatricians	No (Paediatrics and Child Health)
Jones et al., 2015, Canada	MS2 ($N = 100$)	R	Patient for interview; Presenter	Yes	Faculty, clinicians	Yes
Laking, 1988, United Kingdom	MS4 ($N = 58$)	R	Patient for immersive learning	Yes	Faculty	Yes
May, 1991, United Kingdom	Preclinical ($N = 26$)	R	Patient for immersive learning	Yes	Faculty	No (Behavioural Sciences)
Rogers et al., 2016, United States	Preclinical ($N = 192$)	R	Panellist	Yes	Faculty	Yes

TABLE 1 (Continued)

Authors, year of publication, country of origin	Stage and number of medical students participating in programmes	Attendance (R/NR)	Role of individuals with intellectual disabilities or their parents in programmes	Individuals with intellectual disabilities directly involved?	Characteristics of instructors who facilitated training sessions in programmes	Is the programme stand-alone module?
Sinai et al., 2013, United Kingdom	MS4 ($N = 387$)	R	Patient for immersive learning (elective, 14 students participated)	Yes	Faculty	No (Neurosciences block)
Taslibeyaz et al., 2017, Turkey	Mix (MS1-MS4) ($N = 60$)	NR	Being recorded in the training video	No (recorded in the video)	Psychiatrist (developing a web-based learning tool)	Yes
Thacker et al., 2007, United Kingdom	MS2, MS3, MS4 (unknown)	R	SP	Yes	Faculty (recruiting and training SPs with intellectual disabilities)	No (ageing, impairment and disability module, community disability module)
Thomas et al., 2014, United Kingdom	MS4 ($N = 47$)	NR	SP	Yes	Speech and language therapist, psychiatrist	No (Neurosciences block)
Tracy & Graves, 1996, Australia	MS1 ($N = 25$)	NR	Patient for immersive learning	Yes	Faculty	Yes
Tracy & Iacono, 2008, Australia	MS4 ($N = 128$)	NR	Tutor (patient educator)	Yes	Faculty	Yes
Watkins & Colgate, 2016, United Kingdom	Medical students ($N = 45$)	NR	Presenter; SP	Yes	Trainers (with intellectual disabilities) and support advocates	Yes
Woodard et al., 2012, United States	MS3 ($N = 245$)	R	Model patient; Panellist; Patient for immersive learning	Yes	Faculty; Americans with Disabilities Act liaison officer; Recreational therapist	No (Ambulatory Care Clerkship)

Abbreviations: MS, medical school student followed by the year; NR, not required; R, required; SP, standardised patient.

(third–fourth year, or senior), 11 programmes; mixed or longitudinal, 5 programmes; unknown, 1 programme (Table 1). Twenty-six articles reported the number of the learners who participated in their programmes. These numbers varied significantly (between 7 and 387, Median = 70), reflecting the attendance requirement and the curricular stage when the programme was delivered. The median number of learners was 100 for programmes with required attendance (R, Table 1), whereas that of the elective/volunteer-based programmes was 40 (NR, Table 1). Regarding the curricular stage, the median number of participants of pre-clerkship programmes was 30 and that of clerkship programmes was 99.

3.1.2 | The overall programme structures

Of the 27 programmes, 18 were stand-alone and 9 were non-stand-alone (Table 1). Of the stand-alone programmes, four programmes were done remotely, two programmes delivering instructional materials asynchronously using video-recordings (Harper & Wadsworth, 1992; Taslibeyaz et al., 2017), one programme providing individual remote training synchronously (Hoang et al., 2023), and one programme, due to the COVID-19 restrictions, conducting virtual visits with individuals with intellectual disabilities (Berger et al., 2023).

Of the non-stand-alone programmes, three programmes were a component of a multi-year curricular structure (Brown et al., 2010; Burge et al., 2008; Thacker et al., 2007), and six programmes belonged to a larger course structure (Jackson et al., 2020; Jones & Donald, 2007; May, 1991; Sinai et al., 2013; Thomas et al., 2014; Woodard et al., 2012).

Reported lengths of the programmes ranged between a few hours (Clarke & Tabor, 2023; Harnett et al., 2013; Havercamp et al., 2016; Tracy & Iacono, 2008), a day (Abdi & Metcalf, 2020; Garavatti et al., 2018; Thomas et al., 2014), a few days (Akbulut Zencirci et al., 2022; Berger et al., 2023; Coret et al., 2018; Jackson et al., 2020; Laking, 1988), and multiple weeks (Hoang et al., 2023; Jacob et al., 2022; Jones et al., 2015; Jones & Donald, 2007; May, 1991; Sinai et al., 2013; Tracy & Graves, 1996; Woodard et al., 2012).

TABLE 2 Instructional design, assessment, and evaluation.

Authors	Instructional design, pedagogy	Assessed characteristics	Assessment instruments	Assessment results	Kirkpatrick score
Abdi & Metcalf, 2020	Communication skills workshop with speech and language therapy team; Case studies with individuals with intellectual disabilities	Attitudes	*ATDP-B* (pre-post intervention, validated); Interviews and focus group	'Significant Improvement' in attitudes	2
Akbulut Zencirci et al., 2022	Didactic seminars; Case studies; Role-play (faculty playing the patient role); Simulation videos (SP with intellectual disability); Visit to special education and rehabilitation centre	Attitudes	*ATTID-Short Form* (pre-post intervention, validated); Attitude self-assessed by survey	'Significant Improvement' in attitudes	2
Berger et al., 2023	Pre-visit tutorial; Virtual visit with individuals with intellectual disabilities; Post-visit tutorial with discussion	Confidence; Comfort, Feeling of competence; Knowledge	Author-generated survey questionnaire (pre-post intervention, not validated)	'Significant Improvement' in confidence and feeling of competence; No significant change in knowledge	2
Brown et al., 2010	Lectures of a disability curriculum (disability prevalence, disability culture, patients with mobility, sensory, and intellectual disabilities)	Skills in patient care (history taking, physical exam, test ordering, interpersonal, counselling)	OSCEs with SPs with intellectual disabilities (during the Family Medicine clerkship)	Scores in history taking, physical exam, and test ordering was significantly lower for SP with intellectual disabilities; Scores in interpersonal skills and counselling were similar for SP with and without intellectual disabilities	2
Burge et al., 2008	Lecture (prior to psychiatry clerkship); A day trip to a residential institution for adults with intellectual disabilities (clinically focused); A community-based day on caring for individuals with intellectual disabilities (1/4 of the class). Some students did PBL on intellectual disability prior to clerkship.	Learner satisfaction	Author-generated survey questionnaire	Favourable response	1
Clarke & Tabor, 2023	Didactic case-based presentation followed by small group discussions participated by individuals with intellectual disabilities	Confidence; Learner satisfaction	Author-generated survey questionnaire (pre-post-intervention, not validated)	'Significant Improvement' in confidence	2
Coret et al., 2018	Didactic introductory video (both control and experimental groups watched); Narrative videos of patients with intellectual disabilities (only the intervention group watched); Patient encounters (individuals with intellectual disabilities and their care givers)	Attitudes; Communication skills; Learner satisfaction	Attitudes scored by author-generated survey questionnaire (pre-post intervention, not validated); Communication skills scored by learners themselves, patient educators and senior students. Scores were compared between the control and experimental groups.	Improvement in attitudes (not statistically significant); Communication skills scores were higher for the cohort that watched patient narrative videos.	2
Garavatti et al., 2018	IPE clinical experience (neurological examinations) with patients with intellectual disabilities, Group discussion	Attitudes; Comfort	Attitudes by *ATDP* and *IDP*; Comfort by *RSI* (pre-post intervention, validated)	'Significant Improvement' in comfort (RSI); No significant changes in attitudes (ATDP, IDP)	2

TABLE 2 (Continued)

Authors	Instructional design, pedagogy	Assessed characteristics	Assessment instruments	Assessment results	Kirkpatrick score
Harnett et al., 2013	Classroom-based course (Best practice guidelines for informing families of their child's disability); Presentations by faculty on the research and guidelines, and by a parent on receiving a child's disability diagnosis; DVD film; Group discussion	Confidence; Knowledge	Author-generated questionnaire (pre-post intervention, not validated)	'Significant Improvement' in both confidence and knowledge	2
Harper & Wadsworth, 1992	Asynchronous self-directed learning (self-study instructional text, 20-min companion video)	Communication skills; Knowledge	Knowledge quiz, pre- and post-intervention; Communication skills scored by observers using learners' videotaped role-play with an individual with intellectual disability (pre- and post-intervention, follow-up)	'Significant Improvement' in communication skills; No significant change in knowledge gain	2
Havercamp et al., 2016	Online lectures; Patient panel (adults with autism spectrum disorder, parents of children with autism spectrum disorders)	Confidence; Comfort, Knowledge; Learner satisfaction; Skills	Author-generated survey questionnaire (not validated). Self-assessed post-intervention	No pre- and post-intervention comparison was made. Perceived post-intervention changes reported by learners.	2
Hoang et al., 2023	Synchronous virtual behavioural skills training sessions using role-play (faculty playing simulated patient)	Behaviour management skills in wellness examinations of patients; Learner satisfaction	Pre- and post-intervention test of student's behavioural management skills observed in role-play (faculty playing simulated patient or individuals with intellectual disabilities playing the patient role); Students' application of the learned behavioural response outside of the training environment (post-intervention period)	'Significant Improvement' in correct responses to patients' anxiety and problem behaviours after intervention. Learners reported they used the strategies during their own clinical rotations with patients they encountered after the intervention (range 2–30 patients per learner).	3
Jackson et al., 2020	Lecture; Web-based interactive tutorial on providing Down syndrome diagnosis; Patient panel with a family of a child with Down syndrome	Comfort; Knowledge; Learner satisfaction	Comfort and Knowledge by situation inventory and questionnaire (pre-post-intervention, previously published, not validated)	'Significant Improvement' in both comfort and knowledge	2
Jacob et al., 2022	Training session on communication; Case study on a model home visit; 2 home visits with interviews with families of children with developmental disabilities (standardised interview questions and surveys about families' trust in physicians)	Comfort; Confidence	*MSPDA* (adopted from a validated instrument, pre-post intervention)	'Significant Improvement' in both comfort and confidence	2
Jones & Donald, 2007	Placement at the special school for children with physical disabilities or severe autism; Hospital rotation (paediatric ward); Problem based learning and bedside teaching	Learner satisfaction	Author-generated questionnaire (post-intervention, not validated)	Favourable response	1

(Continues)

TABLE 2 (Continued)

Authors	Instructional design, pedagogy	Assessed characteristics	Assessment instruments	Assessment results	Kirkpatrick score
Jones et al., 2015	Independent learning (online case module, reading assignment); Group didactic lectures; Clinical skills seminars (interviewing skills); Informal interviews with individuals with intellectual disabilities; Patient presentations; IPE case study and TBL	Attitudes; Skills; Knowledge	Author-generated multiple-choice questionnaire (pre-post-intervention, not validated)	No change in attitude; Positive trend in skills; 'Significant Improvement' in knowledge	2
Laking, 1988	Lectures; Contact with services (team meeting, visits to homes, hotels, community unit); Seminars (home visits, meeting with parents, films, discussions, role-play); Ethics debate.	Attitudes	*ATDP* (validated, scores compared between control and experimental groups)	No significant difference	2
May, 1991	Seminars (some didactics combined with community placements followed by student discussions); Meeting with individuals with intellectual disabilities in an informal setting	Attitudes; Learner satisfaction	Author-generated questionnaire of word association (pre-post-intervention, not validated)	No significant difference	2
Rogers et al., 2016	Facilitated discussions with didactic component; Student small and large group discussions; Panel discussions with individuals with a variety of disabilities including intellectual disability	Learner satisfaction	Author-generated questionnaire (post-intervention)	Favourable response	1
Sinai et al., 2013	Lectures; Optional 3-week placement at learning disability services (Elective)	Attitudes; Knowledge	Attitudes by a short form of *CLAS-MR* (validated); Author-generated knowledge-based questions (not validated) (Pre-post-intervention for both measures)	No significant difference in attitude; 'Significant Improvement' in knowledge	2
Taslibeyaz et al., 2017	Web-based videos of children with autism spectrum disorder (interactive and non-interactive videos)	Diagnostic skills (of autism spectrum disorder)	Author-generated knowledge test to identify autism spectrum disorder symptoms (pre-post intervention, not validated)	'Significant Improvement' in scores on diagnosis of autism spectrum disorder. The interactive video was more effective than the non-interactive video.	2
Thacker et al., 2007	Role-play workshop with individuals with intellectual disabilities	Communication skills, Learner satisfaction	Communication skills by OSCEs with individuals with intellectual disabilities	In the pilot study, students who had attended a role-play workshop (N = 26) showed 'significantly better' communication skills in OSCEs with SPs with ID compared to students who had not (N = 14)	2
Thomas et al., 2014	Lecture; Placement in a community intellectual disability service (elective); Training session with speech/language therapist; Common clinical scenario role-playing with SPs with intellectual disabilities	Comfort; Perceived Skills; Type of clinical approach; Learner satisfaction	*The healthcare provider questionnaire* (pre-post intervention, validated)	'Significant Improvement' in all (comfort, perceived skills, approach)	2

TABLE 2 (Continued)

Authors	Instructional design, pedagogy	Assessed characteristics	Assessment instruments	Assessment results	Kirkpatrick score
Tracy & Graves, 1996	Visiting a service for individuals with intellectual disabilities; Pre- and post-visit discussions; Presentations by family members of individuals with intellectual disabilities; Role-play	Attitudes; Learner satisfaction	Author-generated questionnaires (separate for pre- and post-intervention)	Improvement reported (not statistically analysed)	2
Tracy & Iacono, 2008	Lecture; Tutoring sessions with individuals with intellectual disabilities; Role-play with peers (disability awareness exercise)	Attitudes; Learner satisfaction	Attitudes by *IDP* (pre-post intervention, validated)	'Significant Improvement' in attitudes	2
Watkins & Colgate, 2016	Interactive presentation by individuals with intellectual disabilities (trained actors); Simulated patient experience with individuals with intellectual disabilities	Attitudes (affect and understanding domain, knowledge and skills domain); Learner satisfaction	Author-generated questionnaire (pre-post intervention, not validated)	'Significant Improvement' in attitudes	2
Woodard et al., 2012	Introductory video; Model patient experience (communication and examination); Lecture; Patient panel discussion with advocates with disabilities; Sensitivity session (experiencing disabilities); Case study; Community-based activities (community site visits, service learning, home visits); IPE with physical therapy students	Attitudes; Comfort; Knowledge	Author-generated Knowledge inventory; Attitudes by *MAS* and *the healthcare provider questionnaire* (validated) (Pre-post-intervention for both measures)	'Significant Improvement' in attitudes, comfort, and knowledge	2

Abbreviations: ATDP, Attitudes Towards Disabled Persons; ATTID, ATTitudes towards Intellectual Disability questionnaire; CLAS-MR, Community Living Attitudes Scale-Mental Retardation; IDP, Interaction with Disabled Persons Scale; IPE, interprofessional education; MAS, Multidimensional Attitudes Scale Towards Persons With Disabilities; MSPDA, Medical Students Perceptions of Disability and Definitions and Criteria Associated with Disabilities Assessments; OSCE, objective structured clinical exam; RSI, Rehabilitation Situations Inventory; SP, standardised patient.

3.2 | The instructional goals and pedagogical designs

The instructional goals of the 27 programmes can largely be grouped into four domains: (1) changing students' affective traits such as attitudes and confidence towards people with intellectual disabilities, (2) improving students' knowledge on intellectual disabilities, (3) improving students' skills in communicating with people with intellectual disabilities, and (4) teaching students the clinical skills required for treating patients with intellectual disabilities. Below we describe the instructional methods used to achieve these goals. Table 2 provides a summary of each programme.

3.2.1 | Changing students' affective traits by interaction with individuals with intellectual disabilities and their families

In this subsection, we describe how people with intellectual disabilities and their families were involved in the programmes aiming at changing medical students' affective traits regarding this patient population.

Immersive, experiential learning

Visiting the homes of families with children with intellectual disabilities, local healthcare/service facilities for this patient population, or special education centre/school was incorporated into 11 programmes (Akbulut Zencirci et al., 2022; Berger et al., 2023; Burge et al., 2008; Jacob et al., 2022; Jones & Donald, 2007; Laking, 1988; May, 1991; Sinai et al., 2013; Thomas et al., 2014; Tracy & Graves, 1996; Woodard et al., 2012). In Sinai et al. (2013), the placement of students into intellectual disability services was elective and only a fraction of the enrolled students participated (14 out of 387). In Jacob et al. (2022), students used preformulated interview questions to conduct structured interviews of families of children with developmental disabilities.

By exposing students to the lived experiences of people with intellectual disabilities, these experiential learning activities principally aimed at: (1) generating affective ties with individuals with intellectual disabilities, (2) increasing awareness of the health

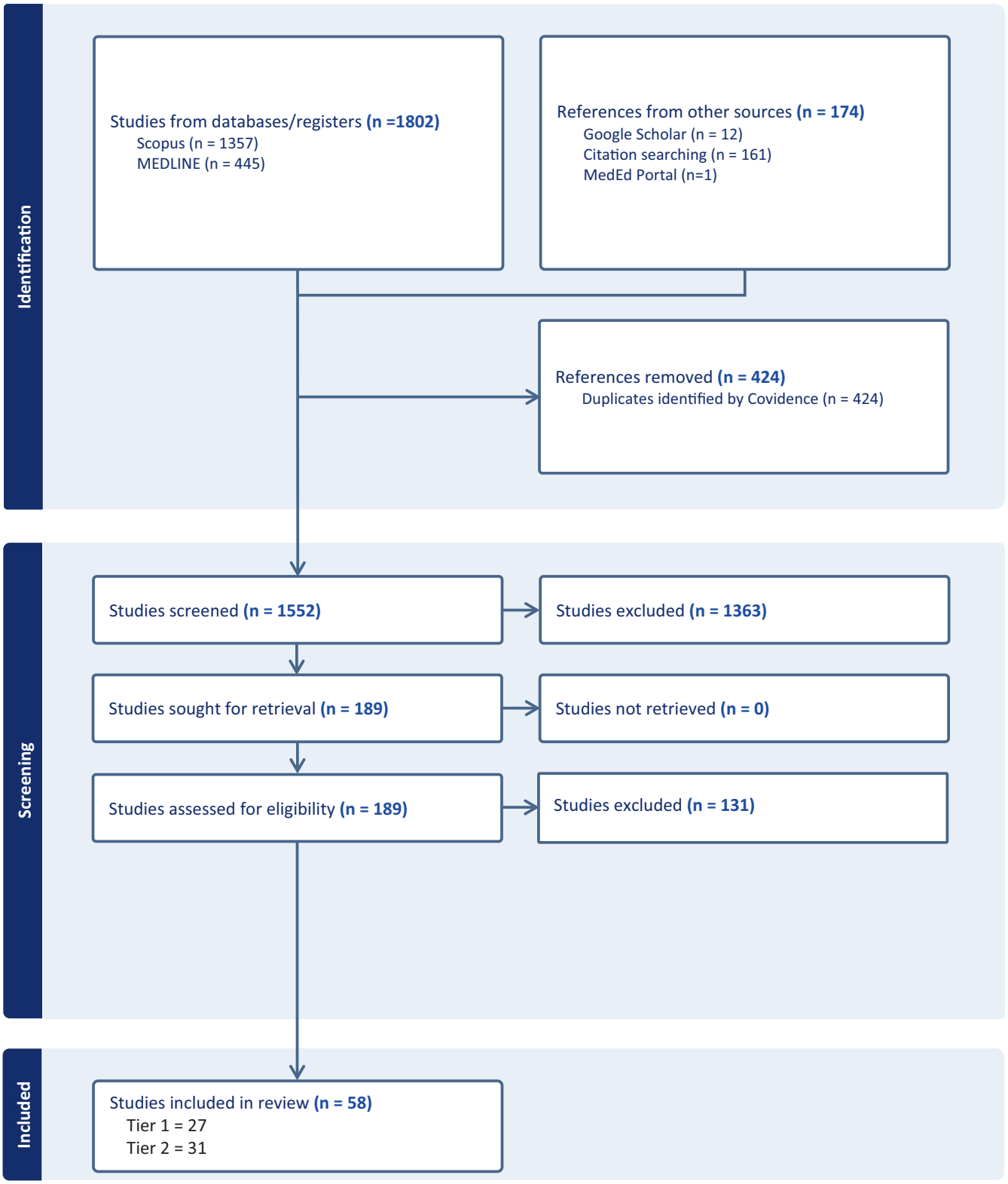

FIGURE 1 PRISMA flow diagram. A summary of the screening process.

barriers this patient population faces such as access to healthcare and unfavourable interactions with healthcare providers, and (3) developing confidence and comfort in interacting with people with intellectual disabilities.

Patient presentations and discussions

In the classroom setting, presentations and discussions involving patients with intellectual disabilities and/or their families were used to convey their life experiences. These instructional approaches were

employed to achieve aims similar to the ones described above. A facilitated patient panel was used by four programmes (Havercamp et al., 2016; Jackson et al., 2020; Rogers et al., 2016; Woodard et al., 2012), and patient presentations were incorporated into five programmes (Clarke & Tabor, 2023; Harnett et al., 2013; Jones et al., 2015; Tracy & Graves, 1996; Watkins & Colgate, 2016). In Harnett et al. (2013), a parent described her experience of receiving a child's disability diagnosis, and in Watkins and Colgate (2016), trained actors with intellectual disabilities joined as guest speakers. In one programme, medical students and young adults with intellectual disabilities met in a one-on-one, informal 'get-together' in one afternoon (May, 1991).

Patient narratives

Recorded patient narratives were another way for students to learn from the lived experience of people with intellectual disabilities and their families. In one programme, medical students watched the narrative videos in which patients and their families recounted their experiences with healthcare systems (Coret et al., 2018).

3.2.2 | Improving medical students' knowledge about intellectual disabilities

In most of the programmes, instruction to impart knowledge about intellectual disabilities took place in a classroom setting, including lectures and seminars, interactive sessions combining didactic and group discussions, and student discussions with or without people with intellectual disabilities. A few programmes employed self-directed learning. A summary of these instructions is provided in Table 2.

Lectures and seminars

Didactic sessions in the form of lectures and seminars were commonly used to teach foundational knowledge on intellectual disabilities. These didactics were either integrated in a larger curricular framework (e.g., part of a clerkship, longitudinal curriculum, or course) or were integral components of intellectual disability modules.

The integrated approach was taken by five programmes (Brown et al., 2010; Burge et al., 2008; Jackson et al., 2020; Sinai et al., 2013; Thomas et al., 2014). In these circumstances, general information on intellectual disabilities (e.g., epidemiology, medical information, and special needs of this patient population) was typically delivered. A detailed description of the didactic content was available for Burge et al. (2008), in which students were given a wide range of topics on intellectual disabilities they could choose from during the curriculum. The topics included: (1) diagnosis of intellectual disabilities, (2) communication problems, (3) clinical care, (4) attitudes towards disability, and (5) life stage-specific care of individuals with intellectual disabilities.

In the other five programmes, lectures or seminars delivered content tailored to the programmes' objectives; Tracy and Iacono (2008) instructed the impact of intellectual disabilities on communication, Jones et al. (2015) taught healthcare delivery and interprofessional care for this patient population, Woodard et al. (2012) provided conceptual frameworks of intellectual disabilities using topics such as stigmatisation and isolation experienced by this patient population, person-centred care, and healthcare disparities, and Akbulut Zencirci et al. (2022) taught the characteristics of intellectual disabilities, health needs, communication, and patient rights of people with intellectual disabilities. Lecture content description was not available for Laking (1988).

Student discussions

As another classroom instructional format, small-group peer discussion was incorporated in five programmes allowing students to share their reflections, experiences, and thoughts with peers (Berger et al., 2023; Harnett et al., 2013; Laking, 1988; Rogers et al., 2016; Tracy & Graves, 1996). In other programmes, student discussed patient cases designed by instructors (Akbulut Zencirci et al., 2022; Jacob et al., 2022; Jones et al., 2015). In Jones et al. (2015), comprehensive assessment and treatment plans for patients with intellectual disabilities were discussed among interprofessional student groups. In Akbulut Zencirci et al. (2022), diagnostic approaches to intellectual disabilities were discussed by students using case studies. In Jacob et al. (2022), the case studies were used for students to reflect on the difficulties faced by families with children with Down syndrome and identify available healthcare resources.

Self-directed learning

Self-directed learning was also used to teach students foundational knowledge before in-person sessions. In two programmes, a pre-session introductory video was provided (Coret et al., 2018; Woodard et al., 2012), and in one programme online lectures were given to prepare students for the patient panel (Havercamp et al., 2016). Jones et al. (2015) provided the pre-session case module and reading assignment that were later used at in-person group discussions. Jackson et al. (2020) used a web-based interactive tutorial as the primary means to teach diagnosing of Down syndrome and communicating the diagnosis to the family.

3.2.3 | Improving skills in communicating with people with intellectual disabilities

To meet the greater healthcare needs of patients with intellectual disabilities, training students to communicate effectively with this patient population is essential. Twelve programmes provided instructions to improve this important skill.

Learn to communicate by communicating with people with intellectual disabilities

The best way to learn something is often by doing it. In eight programmes, students were given opportunities to practice communicating with people with intellectual disabilities in a structured environment. Three programmes involved individuals with intellectual disabilities who acted as model/standardised patients for students to practice communications in a quasi-clinical environment (Abdi &

Metcalf, 2020; Watkins & Colgate, 2016; Woodard et al., 2012). Thacker et al. (2007) reported communication skills workshops where students did role-playing exercises with individuals with intellectual disabilities who were also trained actors. Also, in Thomas et al. (2014), individuals with intellectual disabilities participated in role-playing as standardised patients. In the following programmes, people with intellectual disabilities not only participated as communication partners but also provided feedback to students: in Tracy and Iacono (2008), acting as tutors during the communication tutoring sessions; in Jones et al. (2015), providing formative feedback on students' performance at informal interviews; and in Coret et al. (2018), giving rubric-based assessment on students' communication skills at clinical encounters.

Learn to communicate through simulation exercises

Simulated role-playing without involving individuals with intellectual disabilities was also employed to teach students the awareness for the effective communication. In Akbulut Zencirci et al. (2022), special education faculty played the role of individuals with intellectual disability and simulated the communication problems predicted for interacting with this patient group. In Tracy and Graves (1996) and Tracy and Iacono (2008), peer role-playing between medical students was incorporated as a communication exercise.

Learn to communicate through self-directed learning modules

Two programmes used a self-study tool to teach communication skills. In Harper and Wadsworth (1992), self-directed study was the sole instructional material and consisted of a reading assignment and a companion video on how healthcare providers manage patients with intellectual disabilities. In Jackson et al. (2020), a web-based interactive tutorial was used to improve students' knowledge and comfort in delivering a diagnosis of Down syndrome to new parents.

3.2.4 | Learning clinical skills to care for people with intellectual disabilities

Like communication skills, acquiring skills that are required for performing physical examinations on individuals with intellectual disabilities or making a diagnostic decision for these patients is heavily reliant on experiential learning.

Clinical encounters with individuals with intellectual disabilities

In five programmes, individuals with intellectual disabilities acted as model/standardised patients in the setting of physical examinations (Brown et al., 2010; Thacker et al., 2007; Thomas et al., 2014; Watkins & Colgate, 2016; Woodard et al., 2012). On the other hand, in Garavatti et al. (2018), students were trained in a specialised setting with the additional aspect of interprofessional patient care. In this programme, teams of medical and physical therapy students performed neurological examinations on individuals diagnosed with various disabilities including intellectual disabilities and motor-neurodegenerative conditions. In Jones and Donald (2007) students' clinical experience was provided through problem-based learning and bedside teaching at the rural hospital.

Training of clinical skills in virtual environments

Two programmes took a fully remote approach to train students in clinical skills. In Taslibeyaz et al. (2017), students were assigned to watch web-based videos of children with autism spectrum disorder and learn about its diagnosis. In Hoang et al. (2023), role-playing was used in synchronous virtual sessions to teach students behavioural skills for conducting physical examinations on individuals with intellectual disabilities. For their role-play training, faculty simulated the patient role to highlight the key learning points. In Akbulut Zencirci et al. (2022), students watched videos of individuals with intellectual disabilities acting as standardised patients for physical examination.

3.3 | Assessment of intellectual disability programmes

To assess the effectiveness of their programmes, programme instructors used one or multiple of the following evaluation measures: (1) learner satisfaction, (2) changes in learners' affective traits (e.g., attitudes, comfort, and confidence towards individuals with intellectual disabilities), (3) improvement of learners' knowledge about intellectual disabilities and patients with these conditions, and (4) learners' attainment of skills for managing patients with intellectual disabilities. Assessed characteristics, assessment instruments and results reported for the 27 programmes are summarised in Table 2. Kirkpatrick's four-level evaluation model was used to identify the highest level of learner outcome for each programme; 3 programmes were classified as Level 1, 23 programmes were classified as Level 2, and one programme was classified as Level 3 (Table 2).

3.3.1 | Learner satisfaction

Fourteen programmes assessed learner satisfaction using author-generated surveys, all of which showed an overall favourable response (Burge et al., 2008; Clarke & Tabor, 2023; Coret et al., 2018; Hoang et al., 2023; Jackson et al., 2020; Jones & Donald, 2007; May, 1991; Rogers et al., 2016; Thacker et al., 2007; Thomas et al., 2014; Tracy & Graves, 1996; Tracy & Iacono, 2008; Watkins & Colgate, 2016; Woodard et al., 2012). Of these, three programmes used learner satisfaction as the only programme assessment (Burge et al., 2008; Jones & Donald, 2007; Rogers et al., 2016).

3.3.2 | Change in affective traits

Changes in learners' affective traits were measured by 19 programmes using learners' survey responses. Of these, nine programmes used previously validated instruments in a pre- and post-intervention format. These validated instruments are listed in italics under

'Assessment Instruments' in Table 2. They are the Attitudes Towards Disabled Persons (ATDP) scales (Kritsotakis et al., 2017; Yuker, 1970; Yuker et al., 1960), the ATTitudes towards Intellectual Disability questionnaire (ATTID)-Short Form (Morin et al., 2019), the Interaction with Disabled Persons Scale (IDP) (Gething, 1993, 1994), the Rehabilitation Situations Inventory (RSI) (Dunn, 1996), the Medical Students Perceptions of Disability and Definitions and Criteria Associated with Disabilities Assessments (MSPDA) based off the previously published survey instrument (Symons et al., 2012), an amended short form of the Community Living Attitudes Scale-Mental Retardation (CLAS-MR) (Henry et al., 1996), the health care provider questionnaire (Robey et al., 2001), and the Multidimensional Attitudes Scale Towards Persons With Disabilities (MAS) (Findler et al., 2007). The remaining 10 programmes used surveys independently generated by instructors.

Of these 19 programmes, all except two (Havercamp et al., 2016; Tracy & Graves, 1996) assessed quantitative changes in affective trait scores. Those reporting statistically significant improvements are indicated in Table 2 under 'Assessment Results' as 'Significant Improvement' in attitudes. In four programmes, changes in attitude did not reach statistical significance (Coret et al., 2018; Jones et al., 2015; Laking, 1988; Sinai et al., 2013). Garavatti et al. (2018) used different instruments to assess comfort and attitudes and reported learners' improvement of comfort but not of attitudes towards patients with intellectual disabilities. One programme performed qualitative analysis using word-association questionnaires and reported no qualitative changes in learners' attitudes (May, 1991).

3.3.3 | Changes in knowledge and skills

Assessment of knowledge gain

Learners' knowledge gain was assessed by eight programmes, of which seven programmes performed a quantitative analysis by comparing pre- and post-intervention test scores. While 6 of them reported statistically significant improvement (indicated as 'Significant Improvement' in knowledge, Table 2) (Berger et al., 2023; Harnett et al., 2013; Jackson et al., 2020; Jones et al., 2015; Sinai et al., 2013; Woodard et al., 2012), one programme reported no significant change (Harper & Wadsworth, 1992). Havercamp et al. (2016) described perceived knowledge gains based on the learners' post-intervention feedback.

Assessment of skills required for patient management

Nine programmes assessed learners' improvement in skills to manage patients with intellectual disabilities. The breakdown is as follows: three programmes assessed learners' perceived changes in their skill levels using a post-session survey only (Havercamp et al., 2016) or pre- and post-intervention surveys (Jones et al., 2015; Thomas et al., 2014); two programmes evaluated learners' performance during physical examinations (Brown et al., 2010; Hoang et al., 2023); one programme measured the accuracy of learners' diagnostic decision-making for autism spectrum disorder (Taslibeyaz et al., 2017); three programmes evaluated learners' improvement in communication skills with simulated patients with intellectual disabilities (Coret et al., 2018; Harper & Wadsworth, 1992; Thacker et al., 2007).

In Brown et al. (2010), the effectiveness of the lecture-based intervention was assessed using objective structured clinical exams (OSCEs) which was part of the Family Medicine clerkship. In this study, OSCEs in scenarios of common chronic condition were given using three groups of standardised patients: those with intellectual disability, those with a spinal cord injury, or those without any disability. On history-taking, physical exam, and ordering lab, the students assigned to standardised patients with intellectual disabilities scored lower than those assigned to standardised patients without disability; however, for patient counselling and interpersonal skills, no performance difference was observed. In Hoang et al. (2023), the learners were trained through remote synchronous sessions and their correct behavioural responses during simulated physical examinations were compared between pre- and post-interventions. Overall, correct behavioural responses increased more than two-fold after the training. Furthermore, all learners reported applying the acquired skills to the patients they encountered outside of the training sessions. In Taslibeyaz et al. (2017), using pre- and post-intervention test scores, the effectiveness of interactive and non-interactive web-based videos was compared for teaching diagnosing autism spectrum disorder (ASD). While both formats improved learners' scores, the interactive format was more effective.

Of the three programmes assessing communication skills, Coret et al. (2018) used rubric-based evaluations given by learners, patient educators, and senior medical students. Students who watched patient video narratives scored better than those who did not, but the difference was not statistically significant. In Harper and Wadsworth (1992) and Thacker et al. (2007), students' pre- and post-intervention scores on communication skills were compared using role-playing and OSCEs, respectively. Both programmes garnered statistically significant improvement.

3.4 | Alignment with the 'Core Competencies on Disability for Health Care Education'

Despite an agreement on the need for preparing healthcare professionals to care for patients with intellectual disabilities, a consensus on the curriculum needed to achieve this has not been clearly established. Aiming to fill this gap, Havercamp et al. (2021) recently proposed six core disability-related competencies for healthcare education (Table 3). Drawing upon their proposal, we identified the coverage and teaching methods of each programme associated with these six competencies (Table 4). Sinai et al. (2013) are not included in the table since their brief programme description did not allow us to do the analysis. It should be noted that Clarke and Tabor (2023) used these core competencies to design their programme learning objectives.

Among the six core competencies, 'Contextual and Conceptual Frameworks on Disability' (Competency 1) and 'Professionalism and Patient-Centered Care' (Competency 2) were most frequently

TABLE 3 Core competencies on disability for health care education.

Competency 1: Contextual and Conceptual Frameworks on Disability Introduces disability as a demographic characteristic as opposed to a negative health outcome. The learner acquires a conceptual framework of disability in the context of human diversity, the lifespan, wellness, injury, and social and cultural environments.
Competency 2: Professionalism and Patient-Centred Care Addresses professionalism and the need to mitigate implicit bias against people with disabilities. The learner demonstrates mastery of general principles of professionalism, communication, respect for patients, and recognises optimal health and quality of life from the patient's perspective.
Competency 3: Legal Obligations and Responsibilities for Caring for Patients with Disabilities Disability accommodations are introduced as a civil right, not merely the right thing to do. The learner will understand and identify legal requirements for providing health care in a manner that is, minimally, consistent with federal laws such as the Americans with Disabilities Act (ADA), Rehabilitation Act, and Social Security Act to meet the individual needs of people with disabilities.
Competency 4: Teams and Systems-Based Practice The learner will engage and collaborate with team members within and outside their own discipline to provide high-quality, interprofessional team-based health care to people with disabilities.
Competency 5: Clinical Assessment Clinical assessment for people with disabilities requires the integration of functional status in clinical decision-making to develop a coordinated plan. Learner will collect and interpret relevant information about the health and function of patients with disabilities and engage patients in creating a plan of care that includes essential and optimal services and supports.
Competency 6: Clinical Care Over the Lifespan and during Transitions Clinical care for people with disabilities requires the integration of functional status and life course transitions in clinical decision-making to develop a coordinated care plan. Learners will demonstrate knowledge of effective strategies to engage patients with disabilities in creating a coordinated plan of care with needed services and supports.

Source: Havercamp et al. (2021) Table 3. (An open access article under the CC BY-NC-ND licence).

covered, each by 19 programmes. The most common approach to cover these competencies is the involvement of individuals with intellectual disabilities (Table 4). The outcome assessments associated with these competencies included affective trait changes and communication skills. The next most prevalent competency, 'Clinical Assessment' (Competency 5), was covered by 14 programmes, of which 5 programmes used physical examinations engaging patients with intellectual disabilities (Brown et al., 2010; Garavatti et al., 2018; Thacker et al., 2007; Watkins & Colgate, 2016; Woodard et al., 2012). The outcome assessments associated with these sessions were learners' knowledge gain and mastering of skills required to care for patients with intellectual disabilities. 'Teams and Systems-Based Practice' (Competency 4) was covered by 3 programmes incorporating interprofessional training (Garavatti et al., 2018; Jones et al., 2015; Woodard et al., 2012) and 'Clinical Care Over the Lifespan and During Transitions' (Competency 6) was also covered by three programmes incorporating the topics of life stage-specific healthcare needs of patients with intellectual disabilities (Burge et al., 2008; Havercamp et al., 2016; Tracy & Graves, 1996). Lastly, 'Legal Obligations and Responsibilities for Caring for Patients with Disability' (Competency 3) was covered least, only by two programmes (Akbulut Zencirci et al., 2022; Rogers et al., 2016).

4 | DISCUSSION

To improve healthcare for individuals with intellectual disabilities, equipping health professionals with the right attitudes, knowledge, and skills is essential. Medical students are aware of the insufficiency of their training and express low confidence in caring for this patient population (Clarke, 2023; Ryan & Scior, 2016). Despite assorted efforts in implementing intellectual disability programmes as described in the Results section, medical schools as a whole are still lagging in establishing effective curricula on this subject (Trollor et al., 2016, 2020). This situation may stem from the lack of consensus on a curriculum for teaching disabilities in general (Havercamp et al., 2021).

In this scoping review, we aimed at identifying intellectual disability programmes that provided enough programme information for medical educators to use in designing their own curriculum. Using the criteria described in the Method section, we selected 27 articles for in-depth review. To determine what pertinent content of intellectual disability education is covered in each programme, we utilised the 'Core Competencies on Disability for Health Care Education' as a framework (Havercamp et al., 2021). Of the 26 programmes that covered at least one core competency, 10 programmes stood out by covering multiple competencies—five programmes covering four competencies (Akbulut Zencirci et al., 2022; Burge et al., 2008; Havercamp et al., 2016; Jones et al., 2015; Woodard et al., 2012) and five programmes covering three competencies (Clarke & Tabor, 2023; Garavatti et al., 2018; Jones & Donald, 2007; Thomas et al., 2014; Watkins & Colgate, 2016) (Table 4). There seems no correlation between the higher competency coverage and the duration of the programme. For example, Clarke and Tabor (2023) delivered a 55-min-long module covering three core competencies, and Havercamp et al. (2016) covered four competencies by combining online lectures and panel discussions lasting 1 h. Effective competency coverage, therefore, can be achieved through a deliberate design of learning objectives.

'Contextual and Conceptual Frameworks of Disability' (Competency 1) and 'Professionalism and Patient-Centred Care' (Competency 2) were the most well-covered competencies. Twenty-four programmes delivered learning activities aiming at improving affective traits such as attitudes, comfort, and confidence, which align well with these two core competencies. Additionally, programmes aiming at improving communication skills also align with Competency 2.

It should be noted that all but one of the 19 programmes that align with Competency 1 involved individuals with intellectual disabilities (Table 4). The exception was the curriculum reported by

TABLE 4 Core competency coverage.

Authors	Competency 1	Competency 2	Competency 3	Competency 4	Competency 5	Competency 6
Abdi & Metcalf, 2020	Case studies with individuals with intellectual disabilities	Communication skills workshop with speech and language therapy team; Case studies with individuals with intellectual disabilities				
Akbulut Zencirci et al., 2022	Visit to special education and rehabilitation center	Role-play	Seminar		Seminars; Case studies, Simulation videos (SPs with intellectual disabilities)	
Berger et al., 2023	Virtual visit with individuals with intellectual disabilities	Virtual visit with individuals with intellectual disabilities; Pre- and post-virtual visit tutorials				
Brown et al., 2010	Lectures				Lectures; OSCEs with SPs with intellectual disabilities	
Burge et al., 2008	Lectures on response and attitudes towards disability; A community-based day on caring for individuals with intellectual disabilities (1/4 of the class)	Lectures on communication			Lectures on diagnosis and medication; A day trip to a residential institution for adults with intellectual disabilities (clinically focused)	Lectures on care of individuals in different life stages
Clarke & Tabor, 2023	Didactic case-based presentation; Small group discussions with individuals with intellectual disabilities	Didactic case-based presentation; Small group discussions with individuals with intellectual disabilities			Didactic case-based presentation; Small group discussions with individuals with intellectual disabilities	
Coret et al., 2018	Narrative videos of patients with intellectual disabilities	Introductory video; Patient encounters				
Garavatti et al., 2018		IPE clinical experience with individuals with developmental disabilities		IPE clinical experience	IPE clinical experience with individuals with developmental disabilities	
Harnett et al., 2013		Classroom-based course: Presentations by faculty and parents, DVD film; Group discussion				
Harper & Wadsworth, 1992		Asynchronous self-directed learning (reading, patient video)				
Havercamp et al., 2016	Patient panel discussions (effect of diagnosis, misconceptions, stigmas associated with autism spectrum disorder diagnosis)	Online lecture (patient-centred care); Patient panel discussions (healthcare experiences, community services, healthcare financing)			Lecture (features of autism spectrum disorder); Patient panel discussions (medications, therapy)	Patient panel discussions (topic transition to adult services)
Hoang et al., 2023					Virtual behavioural skills training for physical examinations	
Jackson et al., 2020	Patient panel with a family of a child with Down syndrome	Web-based interactive tutorial on providing a Down syndrome diagnosis				
Jacob et al., 2022	Case study; Home visits and interviews with families of children with developmental disabilities.	Training session on communication; Home visits and interviews				

(Continues)

TABLE 4 (Continued)

Authors	Competency 1	Competency 2	Competency 3	Competency 4	Competency 5	Competency 6
Jones & Donald, 2007	Placement at the special school	Placement at the special school			Hospital rotation (paediatric ward); Problem-based learning and bedside teaching	
Jones et al., 2015	Patient presentations	Clinical skills seminars (interviewing skills); Patient interviews; Patient presentations		Online case module; Lectures; IPE case study and TBL	Online case module; Lectures; IPE case study and TBL	
Laking, 1988	Lectures; Contact with services; Seminars					
May, 1991	Seminars (some didactics combined with community placements followed by student discussions); Meeting with individuals with intellectual disabilities in an informal setting					
Rogers et al., 2016	Facilitated discussions; Student discussions; Panel discussions with individuals with disabilities		Facilitated discussions led by faculty			
Taslibeyaz et al., 2017					Web-based videos of children with autism spectrum disorder	
Thacker et al., 2007		Interview practice sessions with individuals with intellectual disabilities			OSCEs with individuals with intellectual disabilities	
Thomas et al., 2014	Placement in a community intellectual disability service (elective)	Training session with speech/language therapist; Common clinical scenario role-playing with SPs with intellectual disabilities			Lecture; Common clinical scenario role-playing with SP with intellectual disabilities	
Tracy & Graves, 1996	Service visits; Pre- and post visit discussions; Family presentations					Service visits; Pre- and post visit discussions
Tracy & Iacono, 2008		Lecture; Tutoring sessions with individuals with intellectual disabilities; Role-playing with peers				
Watkins & Colgate, 2016	Interactive presentation by individuals with intellectual disabilities	Simulated patient experience with individuals with intellectual disabilities			Simulated patient experience with individuals with intellectual disabilities	
Woodard et al., 2012	Lecture; Panel discussion with advocates with disabilities; Sensitivity session; Case study; Community-based activities	Model patient experience (individuals with intellectual disabilities); Community-based activities		IPE with physical therapy students	Model patient experience (individuals with intellectual disabilities)	

Abbreviations: IPE, interprofessional education; OSCE, objective structured clinical exam; SP, standardised patient; TBL, team-based learning.

Brown et al. (2010), which used didactic sessions to cover the relevant content and individuals with intellectual disabilities were part of the assessment OSCEs. In the case of 19 programmes that aligned with Competency 2, 15 programmes delivered sessions involving individuals with intellectual disabilities or their families. Although communication skills were the emphasis of these sessions, engaging with people with intellectual disabilities can introduce additional aspects of patient-centred care, such as mitigating implicit bias (Table 3). Our observation that the inclusion of individuals with intellectual disabilities is the primary instructional approach aligns with the report by Trollor et al. (2020) that described an increase in inclusive teaching during 20-years (1995–2014). We speculate that this trend may reflect an increase in positive attitudes towards intellectual and developmental disabilities in general, as has been

reported for developed countries in recent years (Conrad, 2020; Scior, 2011).

The four programmes using alternative approaches focused more on the technical aspects of communication; Akbulut Zencirci et al. (2022) taught communication skills by student role-playing, Burge et al. (2008) used didactics to teach the relevant content, Harper and Wadsworth (1992) employed self-directed learning to teach communication methods, and Jackson et al. (2020) used a web-based module to teach how to deliver a Down Syndrome diagnosis to families.

Reflecting patient-centred care as a key element of Competency 2, 8 of 12 programmes that taught communication skills involved people with intellectual disabilities. However, detailed descriptions on how practical communication skills were taught, such as the use of accessible language, were generally not provided in these reports. Thacker et al. (2007, p. 16) is the only report which explicitly mentioned that 'we teach our students to use simple, everyday language as much as possible'. While two studies reported communication skills sessions led by speech therapists (Abdi & Metcalf, 2020; Thomas et al., 2014) and another study reported the session led by a special education professional (Akbulut Zencirci et al., 2022), the use of accessible/plain language was not mentioned in these reports. This may reflect a current emphasis on affective learning when communication skills instructions are conceived for medical school curricula. In the future, inclusion of the methodological details of communication skills training would help improve the design and outcome analysis of intellectual disabilities curricula.

Similar to Competencies 1 and 2, of the 14 programmes that align with Competency 5 'Clinical Assessment', 10 programmes involved individuals with intellectual disabilities as standardised patients or through emersion experiences (Table 4). Taken together, the participation of individuals with disabilities in learning activities proves highly beneficial owing to learners' exposure to the patients' lived experiences (Lauckner et al., 2012; Long-Bellil et al., 2011). This is especially applicable when affective elements are an integral part of the learning experience as in Competencies 1 and 2 (Table 3).

The remaining three Core Competencies were covered significantly less (Table 4). Competency 3, 'Legal Obligations and Responsibilities for Caring for Patients with Disabilities', was covered by Akbulut Zencirci et al. (2022) in the seminar format to discuss the capacity and rights of people with intellectual disability and by Rogers et al. (2016) as part of a didactic presentation introducing three key U.S. federal laws, the Rehabilitation Act, Individuals with Disabilities Education Act, and Americans with Disabilities Act. Competency 4, 'Teams and Systems-Based Practice', was covered by three programmes incorporating interprofessional training: Garavatti et al. (2018) trained medical and physical therapy students as a team; Jones et al. (2015) engaged medical, nursing, clinical psychology, and rehabilitation sciences graduate students in TBL; and, Woodard et al. (2012) engaged medical and physical therapy students in model patient sessions. Competency 6, 'Clinical Care Over the Lifespan and During Transitions', was addressed in three programmes instructing the life stage-specific needs of individuals with intellectual disabilities (Burge et al., 2008; Havercamp et al., 2016; Tracy & Graves, 1996). The underrepresentation of these three core competencies may stem from the limited content expertise and infrastructural resources necessary to provide training aligned with these competencies.

4.1 | Strengths and limitations

We followed the scoping review methodology described in the *JBI Evidence Synthesis Manual* (Aromataris et al., 2020) and reported the results according to *PRISMA-ScR* (Tricco et al., 2018). We created an a priori protocol which was revised accordingly during the review. We identified 27 intellectual disability educational programmes providing practical information that can be applied by medical educators to design intellectual disability curricula. Using the *Core Competencies on Disability for Health Care Education* (Havercamp et al., 2021), we were able to identify significant gaps in their coverage in the intellectual disability curricula for medical students.

Possible limitations for this review include: (1) though we built our search strategy carefully, there is still a chance that we missed relevant articles, (2) as such, we did not identify articles whose studies were conducted in developing/low-income countries despite higher incidents of developmental disabilities in those countries (Dunkin, 2002), which may stem from the paucity of such studies originating from these countries (Lim et al., 2023; Maulik & Darmstadt, 2007), and (3) evaluation of the intellectual disability programmes was entirely reliant on the descriptions provided by authors; therefore, the analysis of core competencies coverage could be underestimated. Albeit with these limitations, a competency-based evaluation of intellectual disability programmes provides a needed consistency for educators in any part of the world to evaluate and exchange programme content using a common frame of reference.

5 | CONCLUSIONS

Using the scoping review methodology, we identified and evaluated 27 articles describing intellectual disability educational programmes for medical students. Of the 27 programmes, 24 programmes involved individuals with intellectual disabilities in some capacities, epitomising the medical educators' effort to introduce lived experiences of this patient population. To assess programme effectiveness, 19 programmes measured changes in affective traits, 8 programmes measured knowledge gain, and 9 programmes assessed improvement in skills required for patient management. As a framework for evaluating the programmes' coverage of intellectual disability content, we applied the Core Competencies on Disability for Health Care Education (Havercamp et al., 2021). The result revealed gaps in the coverage of the six core competencies. Designing learning objectives and instructional content based on such a framework will bring needed consistency and strength into the intellectual disability curricula for medical students.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

Supplemental Data File A describes detailed search strategy documentation.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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