American Journal on Intellectual and Developmental Disabilities

Providing care to people with Intellectual and Developmental Disabilities in medical education.

--Manuscript Draft--

Manuscript Number:	AJIDD-D-23-00032R3
Article Type:	Research Report
Keywords:	IDD; medical education; objective structured clinical examination
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Manuscript Region of Origin:	CANADA
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Tittle: Providing care to people with Intellectual and Developmental Disabilities in medical education.

Running title: Virtual OSCE with individuals with IDD

Abstract word count: 120

Manuscript word count: 4999

ABSTRACT:

Medical professionals commonly report having inadequate training providing care for individuals with intellectual and developmental disabilities (IDD). This pilot study aimed to address this gap through a virtual Objective Structured Clinical Examinations (OSCE) with individuals with IDD as patient educators for 25 first and second-year medical students (OSCE participants). Quantitative data through the Prediger competency scale and qualitative data through a semi-structured interview were analyzed. OSCE participants reported a significant increase ($p<0.05$) in self-perceived competency scores when comparing pre and post OSCE scores. Qualitative analysis yielded themes corresponding to improving skills, practice considerations, and perspectives and biases changes. These results suggested that this virtual OSCE promoted the development of self-perceived clinical competency, and comfort providing care for individuals with IDD.

KEYWORDS: IDD, medical education, objective structured clinical examination

INTRODUCTION:

Simulation-based learning in medical education allows students to hone their clinical and communication skills for effective person-centered care (Boyd, 2016; Watson et al., 2012; Zerbo et al., 2015), enhancing the patient-physician relationship and health-related outcomes (Balogh et al., 2013; Boyd, 2016). The Objective Structured Clinical Examination (OSCE) is commonly used in teaching and assessing medical skills through simulated clinical interviews and physical examinations with standardized or simulated patient or "SP" (Harden et al., 1975). However, the role of the SP is traditionally performed by a person without a medical condition (Chianáin et al., 2021; Cleland et al., 2009; Wallace et al., 2002), which may limit the validity of these learning experiences. This is especially true when trying to portray accurately and authentically someone with an intellectual or developmental disability (IDD), carrying potential detrimental consequences to medical practice (Pelleboer-Gunnink et al., 2017; Wilkinson et al., 2012).

An SP, is an actor or lay person who is carefully trained to realistically reproduce a clinical scenario, and provide feedback on student performance (Chianáin et al., 2021; Cleland et al., 2009; Wallace et al., 2002). Yet, they cannot authentically portray the physical, cognitive, and communicative factors of someone with lived experience (Chianáin et al., 2021; Cleland et al., 2009; Wallace et al., 2002). This includes those living with IDD. Comparatively, a patient educator or PE, is a person with both lived experience and training on the simulated patient role and simulation format (Boyd, 2016; Coret et al., 2018; Duggan et al., 2009).

Despite simulation based training's significance in medical education, the literature indicates that limited exposure to individuals with IDD throughout a physician's training can leave them feeling insufficiently prepared to care for this patients population and foster unhelpful attitudes and biases (Pelleboer-Gunnink et al., 2017; Wilkinson et al., 2012). These factors can

influence and perpetuate health disparities for individuals with IDD, resulting in more complex chronic physical and mental health issues (Balogh et al., 2013; Chianáin et al., 2021; Lewis et al., 2019), poorer overall health outcomes and mortality at younger ages (Lin et al., 2019).

However, in-person medical training may present some barriers. For instance, in terms of including individuals with IDD, it is important to consider that this patient population may experience mobility and transportation issues including reliance on the support of their primary caretaker for transportation, which often represents a significant barrier to accessing various community services (Ann Bross et al., 2023). Furthermore, the limitations imposed by the COVID19 pandemic highlighted the importance and catalyzed the interest on virtual education and virtual platforms (Chan et al., 2023; Hilburg et al., 2020; Mahtta et al., 2021), including an increased uptake in Telehealth to support healthcare service accessibility (Mahtta et al., 2021). In response to these limitations, the virtual OSCE is a novel adaptation to the traditional in-person OSCE which follows the same validated principles (Harden et al., 1975) and offers several benefits including enhanced accessibility, comparable effectiveness, development of skills relevant to telehealth, and cost-effectiveness. It is worth noting that proponents and users of this novel virtual OSCE modality, have cautioned against the use of a virtual OSCE to replace in-person training, instead supporting a more complementary role (Chan et al., 2023).

Therefore, this study sought to evaluate the effects of a virtual OSCE, a novel extracurricular learning experience that included individuals with IDD as PEs, which provides first- and second-year medical students with the opportunity to practice basic clinical interviewing skills with this patient population. Incorporating individuals with lived experiences in medical training has been shown to enhance learning, by fostering confidence, and important care perspectives (Chianáin et al., 2021). Consequently, we hypothesized that participation in the

proposed virtual OSCE would enhance self-perceived clinical competency and comfort providing care for individuals with IDD.

METHODS:

Setting and Participants

This pilot prospective observational study introduced a virtual OSCE, a novel learning experience for first- and second-year medical students (OSCE participants), incorporating people with IDD as the PEs. Participation in the OSCE was supervised and assessed by senior level medical students (third- and fourth-year medical students) and medical residents, collectively called objective observers (OO) using the Prediger scale, a clinical competency scale (Prediger et al., 2019). A 30-minute group training session was conducted a week before the virtual OSCE for all recruited OOs, which included an explanation of the Prediger scale and a practice OSCE station with the research team, during which the OOs could practice using the Prediger scale. All components of this study were conducted over Zoom teleconferencing (Yuan, 2011).

OSCE participants and the OO recruitment utilized social media advertisement, institutional emails, and peer-to-peer communication. PEs were recruited through social media advertisements, peer-to-peer communication, community programs for people with IDD, and with the help of healthcare providers within Ontario. Eligibility for the OSCE participants and OOs included reliable internet connection, consenting to participate in the study and being at the requisite level of medical education (first- and second-year medical students for OSCE participants, and third- and fourth-year medical students and medical residents for OOs). For the PEs eligibility considered diagnosis of IDD (self-reported), ability to provide consent or assent with or without caregiver assistance, and reliable internet connection. No other inclusion or

exclusion criteria were utilized. Upon consenting all participants completed a demographics form collecting: age, biological sex, and previous experiences working with individuals with IDD for OSCE participants.

Twenty-five medical (60% female, 24.44 ± 1.90 years old) students from 1st and 2nd year medical education at our institution were recruited as OSCE participants. Four senior medical students (n=3) and medical residents (n=1) were recruited as OOs. Four individuals with IDD (50% female, 30.75 ± 7.63 years old) were recruited as PEs. This study follows the standards set by the Declaration of Helsinki and approval was obtained through the institution's Health Sciences Research Ethics Board.

Role of the patient educators (PE)

Each PE participated in an individual 30-minute-long meeting with the research team, to share their lived experiences receiving healthcare and the collected information was modified or anonymized to maintain confidentiality. This information was used to develop four clinical scenarios (including brief scenario descriptions and scripts), one for each PE, based on their own lived experiences. Then, the PEs and their caregivers reviewed these materials and suggested any modifications needed to ensure that the scenarios and associated scripts accurately represented the PEs lived experiences. These scenarios explored a single medical condition covered in first year of medical education: skin infections, abdominal pain, diabetes, ear pain, and allergic reactions. None of the scenarios included conditions, consideration, or complications specific to the diagnosis of IDD, as such no IDD-specific knowledge was required. Instead, the scenarios were designed to represent common complaints that a person with or without IDD may present with to their primary care provider and assess basic clinical interviewing skills applicable to any patient

encounter. Each PE received one scenario script to practice and learn in preparation for the OSCE. The PEs were also informed that they will receive training on how to provide feedback and that they will be asked to provide feedback to the OSCE participants during the OSCE.

The research team conducted an individual 30-minute-long weekly training session, for four weeks (total 2 hours with each PE), with each PE before the first round of the virtual OSCE - with no additional training sessions between each round of the OSCE. The training sessions simulated the virtual OSCE environment and pace as closely as possible, focusing on the PEs respective scenario scripts. The PEs could refer to their scenario scripts as needed during the training session, and through they were encouraged to memorize their scripts, they could also refer to their scripts as needed during the OSCE. During the training session, a research team member would act as an OSCE participant, set up a timer and begin the clinical encounter with the PE. At the end of the encounter, the research team member encouraged the PEs to provide feedback on the encounter. After this, the research team member would provide feedback to the PE, suggest corrections, and point out areas that may need attention. This encounter was repeated two or three times as needed per training session.

Objective Structured Clinical Examination – OSCE

Each round of the virtual OSCE was carried out over Zoom teleconferencing (Yuan, 2011) and comprised, in order: 1) Brief orientation session; 2) Four clinical scenarios with the PEs and a rest station (total five stations), back-to-back; and 3) Semi-structured interview. Figure 1 shows a schema explaining the structure and organization of the OSCE. A total of five rounds of the virtual OSCE identical in structure and content were conducted, with five participants per round starting at the same time and rotating through clinical and rest stations. The five rounds were conducted

over two days (three rounds on the first day and two rounds on the second), with 1 hour in-between each round.

The brief orientation session at the beginning of each OSCE round included an explanation of the structure of the OSCE, announcements, a review of the Prediger scale, and a review of relevant clinical concepts about providing care for individuals with IDD (i.e., person centered care, communication and understanding, healthcare disparities, interprofessional care coordination, decision making, and trauma informed care) following the principles of the "Curriculum of Caring" (Boyd, 2016). After the brief orientation session, prior (pre-OSCE self-assessment) to and following (post-OSCE self-assessment) the completion of the OSCE, the OSCE participants completed a Prediger scale (clinical competency self-assessment).

The five OSCE stations (4 clinical scenarios and rest station) were held in a break-out room and each lasted 10 minutes. The clinical scenario stations involved two minutes to read the brief scenario description, six minutes to develop the clinical scenario with the PE (under the supervision of the OO), and two minutes for feedback to the OSCE participant by the PE and OO. The rest station involved 10 minutes of free time for the OSCE participants to collect their thoughts. To enhance assessment reliability, each OO was assigned to assess one station across all rounds of the virtual OSCE, mitigating interrater variability.

After each round of the OSCE, the round's participants were placed in a separate breakout room to participate in a 30-minute-long group semi-structured interview. This interview was audio recorded and covered the following questions:

1. Did your perspectives providing care for individuals with IDD change through this experience?

2. Do you feel more competent or comfortable providing care for individuals with IDD after this experience?
3. What did you learn from this experience? What was easy? What was challenging?
4. What strategies and skills helped you during the clinical scenarios with individuals with IDD?
5. What changes could you implement in your future clinical practice to better support the needs of individuals with IDD?

Outcome measures

The primary objective was to determine whether participation in the OSCE resulted in improved self-perceived competency scores when comparing pre to post-OSCE Prediger competency assessments. The Prediger scale, was developed by Prediger et al. (2019) to assesses 10 core competencies of medical students: "Responsibility"; "Knowing and maintaining own personal bounds and possibilities"; "Empathy and openness"; "Structure, work planning and priorities"; "Coping with mistakes"; "Active listening to patients"; "Scientifically and empirically ground method of working"; "Ethical awareness"; and "Verbal communication". Each competency is evaluated on a scale of 1 (lowest competency) to 5 (Prediger et al., 2019). The tenth competency, "Verbal communication with colleagues and supervisors", was not applicable to this study.

The secondary objective involved comparing the OSCE participants' self-assessment competency data with the competency assessments completed by the OOs. Since this learning experienced was focused on the assessment of basic clinical interviewing skills, the OO's perspective, as a less biased and more experienced third party, provided valuable information about the OSCE participants' competency in each encounter. Considering that the self-assessment completed by the OSCE participants could be impacted by their preconceived notions and biases

around caring for individuals with IDD, differences between the OOs' assessment and the OSCE participants' self-assessment (pre- and post-OSCE), helped us determine the impact of these factors (i.e., preconceived notions and biases) on the Prediger scale scores (Dunning et al., 2004).

The tertiary objective involved the qualitative analysis of participants' experiences during the OSCE through a semi-structure interview (post-OSCE). The semi-structured interview was audio recorded and analyzed for the presence of common themes using the qualitative analysis platform NVivo (QSR International Pty ltd., 2020). This analysis was used to supplement the results of this study and to make qualitative recommendations with the aim of supporting medical education development (Fetters et al., 2013).

Statistical analysis

This was a pilot observational study. As such the literature reports that this type of study would require a minimum sample of 10 – 12 participants per treatment arm, considering a main study with a power estimate of 90% and a confidence interval of 95% (Julious, 2005; M. Dawn Teare et al., 2014; Whitehead et al., 2016). Hence, our sample of 25 participants is sufficient for this type of study. Primary and secondary outcome measures were analyzed using descriptive statistics (mean ± SD), and effect size (Cohen D) to determine the impact of the OSCE on each of the competencies assessed by the Prediger scale (Prediger et al., 2019). Three types of mean competency scores were obtained: 1) Pre-OSCE competency assessment (completed by the OSCE participants), 2) Post-OSCE competency assessment (completed by the OSCE participants), and 3) OO's assessment (i.e., competency assessment completed by the OOs during the OSCE). The pre-OSCE (m1) and post-OSCE (m2) mean competency scores were calculated by averaging all the OSCE participants' pre-OSCE or post-OSCE Prediger competency metrics respectively. The

OO's mean competency score (m3) was calculated by averaging all the OO's Prediger competency metrics collected through the OSCE (one assessment per OSCE participants, per clinical encounter). All calculations were carried out on IBM SPSS Statistics for Mac, version 24 (IBM Corp., Armonk, N.Y., USA) at a significance level of $p<0.05$ (Statistical Consulting Group, 2021). Cohen D (d) was used to calculate the effect size with 95% confidence interval (95%CI) of the descriptive statistical analysis (Lakens, 2013). The data was also assessed for normality (Shapiro-Wilk test: $p>0.05$ indicates normality), skewness (values between -0.5 and 0.5 indicates data symmetry) and excess kurtosis. Per-protocol analysis was used for all calculations. The descriptive statistical data was plotted as a histogram to visualize the primary and secondary outcome measures.

Finally, as part of the tertiary objective, this study adhered to the consolidated criteria for reporting qualitative research (COREQ) checklist to report qualitative findings (Tong et al., 2007). The semi-structured interview data was qualitatively analyzed using a grounded theory approach with two independent reviewers through NVivo (QSR International Pty ltd., 2020). These reviewers coded each statement of the entire semi-structured interview script applying the themes and subthemes identified by the research team (kappa interrater reliability = 0.78). For the qualitative assessment, we calculated the percent coverage of each theme and subtheme. The percent coverage corresponds to the portion of the entire semi-structured interview script that included statements associated with the identified themes and subthemes. Relevant quotes were chosen to support the description of the themes and subthemes (Tong et al., 2007).

RESULTS:

Most OSCE participants (n=20) reported having no prior experiences interacting or providing care for individuals with IDD. No concerns or adverse events were reported by the OOs during the OSCE. After the OSCE, we collected 100% of the OSCE participant pre (n=25) and post (n=25) OSCE Prediger scales. We collected 86% of the OO's Prediger scales (n=86), 14% of the OO Prediger scales were not returned or were left blank.

Medical student self-perceived competency providing care for individuals with IDD

Descriptive statistical analysis and data assessment for skewness, kurtosis and normality is presented in **Table 1**. Effect size is present in **Table 2**. The OSCE participants rated themselves significantly higher across all competencies post-OSCE compared to their pre-OSCE competency assessment with a medium to large effect size. Comparing the assessment completed by the OOs to the pre-OSCE assessment completed by the OSCE participants, we found that these scores were significantly different with a medium to large effect size across all assessed competency metrics. Similarly, comparing the assessment completed by the OOs to the post-OSCE assessment completed by the OSCE participants, we found that these scores were significantly different with a medium to large effect size for six out of the nine competency metrics assessed ("Knowing and maintaining own personal bounds and possibilities", "Empathy and openness" and "Active listening to patients" were not statistically significant). There were no statistically significant differences in Prediger scale scores, between the first and last OSCE assessed by the OOs. A histogram representing these changes in competency scores is presented in **Figure 2**.

Table 1. Descriptive statistical analysis for each competency, and data assessment for skewness, kurtosis, and normality. The number of participants (n), mean competency score (m1: OSCE participant's pre-OSCE mean competency score, m2: OSCE participant's post-OSCE mean competency score, and m3: OO's mean competency score), and standard deviation (SD) are present under "Descriptive statistics".

Competency	Group	Descriptive statistics			Data assessment		
		n	m	SD	Skewness	Kurtosis	Normality
Responsibility	Pre-OSCE (m1)	25	3.60	1.08	-0.82	0.046	0.0013
	Post-OSCE (m2)	25	4.16	0.62	-0.11	-0.27	<0.0001
	OO (m3)	86	4.56	0.54	-0.68	-0.67	<0.0001
Knowing and maintaining own personal bounds and possibilities	Pre-OSCE (m1)	25	3.48	0.87	-1.98	3.74	<0.0001
	Post-OSCE (m2)	25	4.16	0.47	0.57	1.21	<0.0001
	OO (m3)	86	4.45	0.71	-0.92	-0.45	<0.0001
Empathy and openness	Pre-OSCE (m1)	25	3.76	1.01	-0.79	0.89	0.0046
	Post-OSCE (m2)	25	4.48	0.59	-0.59	-0.54	0.000014
	OO (m3)	86	4.28	0.70	-0.44	-0.86	<0.0001
Structure, work planning and priorities	Pre-OSCE (m1)	25	2.92	0.95	-0.14	-1.33	0.00067
	Post-OSCE (m2)	25	3.64	0.57	0.14	-0.68	<0.0001
	OO (m3)	86	4.13	0.75	-0.90	2.22	<0.0001
Coping with mistakes	Pre-OSCE (m1)	25	3.08	0.95	-0.80	-0.18	0.00059
	Post-OSCE (m2)	25	3.64	0.81	-0.24	-0.15	0.0034
	OO (m3)	86	4.06	0.80	-0.11	-1.43	<0.0001
Active listening to patients	Pre-OSCE (m1)	25	3.64	0.81	-1.26	3.66	0.00012
	Post-OSCE (m2)	25	4.48	0.59	-0.59	-0.54	<0.0001
	OO (m3)	86	4.37	0.72	-0.70	-0.76	<0.0001
Scientifically and empirically grounded method of working	Pre-OSCE (m1)	25	2.56	0.77	-0.22	-0.066	0.0021
	Post-OSCE (m2)	25	3.20	0.76	0.24	-0.0048	0.0020
	OO (m3)	86	4.12	0.69	-0.38	-0.073	<0.0001
Ethical awareness	Pre-OSCE (m1)	25	3.28	0.79	-1.11	1.41	0.00011
	Post-OSCE (m2)	25	4.00	0.71	-0.77	1.72	0.00013
	OO (m3)	86	4.44	0.70	-0.86	-0.48	<0.0001
Verbal communication	Pre-OSCE (m1)	25	3.08	0.76	-0.76	1.06	0.00036
	Post-OSCE (m2)	25	4.12	0.53	0.18	0.88	<0.0001
	OO (m3)	86	4.45	0.68	-0.86	-0.41	<0.0001

Table 2. Effect size of the difference between the OSCE participant's and OO's mean competency assessments (m1: OSCE participant's pre-OSCE mean competency score, m2: OSCE participant's post-OSCE mean competency score, and m3: OO's mean competency score). Cohen-D (d), 95% confidence interval (95%CI) and significance (p) calculated for all comparisons.

Competency	Effect pre-OSCE vs post-OSCE				Effect pre-OSCE vs OO				Effect post-OSCE vs OO			
	Difference (m2 – m1)	d	95%CI	p	Difference (m3 – m1)	d	95%CI	p	Difference (m3 – m2)	d	95%CI	p
Responsibility	0.56	0.64	[0.06; 1.19]	0.030	0.96	1.38	[0.89; 1.85]	<0.0001	0.40	0.72	[0.26; 1.17]	0.0024
Knowing and maintaining own personal bounds and possibilities	0.68	0.97	[0.37; 1.54]	0.00125	0.97	1.30	[0.81; 1.76]	<0.0001	0.29	0.44	[-0.02; 0.88]	0.056
Empathy and openness	0.72	0.87	[0.28; 1.44]	0.0034	0.52	0.67	[0.21; 1.12]	0.0040	-0.20	-0.30	[-0.74; 0.15]	0.19
Structure, work planning and priorities	0.72	0.92	[0.32; 1.49]	0.0022	1.21	1.52	[1.02; 1.99]	<0.0001	0.49	0.69	[0.23; 1.14]	0.0032
Coping with mistakes	0.56	0.63	[0.06; 1.19]	0.030	0.98	1.17	[0.69; 1.64]	<0.0001	0.42	0.52	[0.07; 0.97]	0.024
Active listening to patients	0.84	1.19	[0.57; 1.77]	0.00016	0.73	0.99	[0.51; 1.44]	<0.0001	-0.16	-0.16	[-0.60; 0.29]	0.49
Scientifically and empirically grounded method of working	0.64	0.84	[0.25; 1.40]	0.0048	1.56	2.20	[1.66; 2.72]	<0.0001	0.92	1.30	[0.82; 1.77]	<0.0001
Ethical awareness	0.72	0.96	[0.36; 1.53]	0.0014	1.16	1.61	[1.11; 2.09]	<0.0001	0.44	0.63	[0.17; 1.07]	0.0063
Verbal communication	1.04	1.59	[0.93; 2.20]	<0.0001	1.37	1.96	[1.43; 2.46]	<0.0001	0.33	0.51	[0.05; 0.95]	0.026

Qualitative assessment of OSCE experience

Qualitative analysis showing the theme and subtheme prevalence (percent coverage) during the semi-structured interview is present in **Table 3**. Seven themes were identified: 1) confidence and communication, 2) applications, 3) changing perspectives, 4) unique needs of persons with IDD, 5) limited exposure to persons with IDD, 6) positive experiences and 7) identification of study constraints. We will discuss each of these themes in turn.

Theme 1: Confidence and Communication

This theme considered changes or insights related to the way that the OSCE participants interacted with individuals with IDD during this learning experience. It was present in 19.98% of the statements obtained from the semi-structured interview. The lack of confidence was often associated with the preconceived notion that interacting with individuals with IDD would present several communication barriers, and the bias that these interactions were going to be difficult. As such, when reflecting on their initial clinical encounters with the PEs, most OSCE participants reported feeling unsure about how to ask their questions (20/25 OSCE participants) or being unsure about what approach to take (22/25 OSCE participants). Eventually, by the third or fourth encounter and applying the feedback received in previous stations, they reported feeling more comfortable and confident applying a compassionate and empathetic approach with active listening (18/25 OSCE participants). Relevant quote:

> "Like I definitely feel more confident and I think that I was worried about of course like the communication uhm but I actually feel like so long as you're like being compassionate and empathetic like that gets you so far and also open to just listening." (Sub-theme: Adaptation)

Theme 2: Applications

This theme considered how this learning experience impacted the OSCE participants' perceptions of medical education and their future medical practice. It was present in 14.97% of the statements obtained from the semi-structured interview. In terms of curriculum changes, all the OSCE participants argued for the importance of including experiences like this OSCE as a mandatory component of their learning. For future practice and primary care, the OSCE participants reflected on the value of setting up their practice to best serve individuals with IDD and their needs (15/25 OSCE participants). Relevant quote:

> "I have very little experience working with people with IDD. I think this exercise highlights a loophole in our medical curriculum." (Sub-theme: Curriculum)

Theme 3: Changing Perspectives

This theme considered the recognition of preconceived notions and biases previously held by the OSCE participants and the impact of this learning experience on those notions and biases. It was present in 13.71% of the statements obtained from the semi-structured interview. The OSCE participants reported biases revolving around thinking that interviewing this patient population was going to be difficult, despite most not having prior experienced interacting with individuals with IDD (20/25 OSCE participants), especially in the clinical context. After this OSCE, all the OSCE participants reported feeling confident and comfortable communicating their questions in an empathetic way. Also, the OSCE participants reported positive experiences learning and practicing active listening during the encounters (25/25 OSCE participants), building rapport

(19/25 OSCE participants), and promoting effective communication (25/25 OSCE participants). Relevant quote:

> "I didn't know that I had this bias going into [the OSCE] but I guess I had this preconceived notion that they would say no, that they didn't understand, or that, like, whatever I was saying was not sinking in, however I found that as I was going through the histories I was like, wow this notion is wrong and it's all, uhm, going very well." (Sub-theme: Biases)

Theme 4: Needs of Persons with IDD

This theme considered the understanding and appreciation of the unique care needs of individuals with IDD. It was present in 11.15% of the statements obtained from the semi-structured interview. The OSCE participants noticed the importance of adapting their approach (18/25 OSCE participants), checking in with the patients regularly to ensure that they have understood relevant concepts (24/25 OSCE participants), and being prepared to explain concepts in different ways to ensure effective communication (16/25 OSCE participants). For the time sub-theme, all the OSCE participants recognized that they should be prepared to allocate the necessary time to ensure an effective clinical encounter. Relevant quote:

> "In some circumstances, I felt it was very easy to keep questions very clear and simple, and to be very intentional with my communication. When it came to explaining more nuanced concepts, I found I had more trouble than expected with my verbal communication." (Sub-theme: Language)

Theme 5: Limited Exposure to Persons with IDD

This theme considered the gaps and limitations associated with a lack of exposure to the care of individuals with IDD. It was present in 4.60% of the statements obtained from the semi-structured interview. Some OSCE participants had previous experiences with individuals with IDD (20/25 OSCE participants), although not in the clinical context (25/25 OSCE participants), so these participants also reported gaps in their learning (sub-theme). All participants explained that these gaps involved learning to conduct a clinical encounter and providing care for individuals with IDD. Relevant quote:

> "Even though we talk about it a little throughout pre-clerkship, like I think we have a few lectures on it, it's all kind of theoretical and we never actually really got to meet a lot of patients with IDD." (Sub-theme: Identification of gaps)

Theme 6: Positive Experiences

This theme considered the overall benefits, insights, and positive experiences associated with this learning experience. It was present in 3.89% of the statements obtained from the semi-structured interview. All OSCE participants considered this OSCE as a positive experience for their learning and future medical careers. Most argued for curricular changes (18/25 OSCE participants) and reported perspective changes (25/25 OSCE participants), increased confidence (19/25 OSCE participants), and greater comfort interacting and providing care for individuals with IDD (25/25 OSCE participants). Relevant quote:

> "I think further exposure to activities like this will allow me to not only better engage with individuals with intellectual disabilities but, uhm, learn more about their care, their needs, their aspirations, and so, yeah, it's a good opportunity, thank you again."

Theme 7: Identification of Study Constraints

This theme considered the factors associated with this learning experience that may have negatively impacted the experience of the OSCE participants. It was present in 2.79% of the statements obtained from the semi-structured interview. The main constraint associated with the virtual format of this OSCE, as reported by the OSCE participants, resulted from unstable internet connections. As a result, three OSCE participants experienced poor audio quality resulting in significant difficulties understanding the answers provided by the PEs. Relevant quote:

> "I think the technology might've been a little bit of a barrier. I did have a couple of patient educators that, maybe it just the way it was set-up but were maybe too loud or like was getting kind of some feedback, so I don't if I would've had those problems understanding their answers if I was in person."

Table 3. Qualitative analysis – theme and subtheme prevalence during the semi-structured interview post-OSCE. The themes and their aggregated prevalence are bolded. The weighted average reflects the prevalence percentage determined by two independent reviewers.

Theme/subtheme	Percent coverage
Confidence and Communication	**19.98%**
Adaptation	4.60%
Structured Approach	3.83%
Tools	2.96%
Applications	**14.97%**
Future Practice	8.14%
Curriculum	3.76%
Primary Care	2.83%
Telemedicine	1.34%
Changing Perspectives	**13.71%**
Learning	5.78%
Biases	5.76%
Empathy	3.27%
Unique Needs of Persons with IDD	**11.15%**
Time	4.28%
Language	3.75%
Limited Exposure to Persons with IDD	**4.60%**
Identification of gaps	1.84%
Previous experience	1.08%
Positive Experiences	**3.89%**
Identification of Study Constraints	**2.79%**

DISCUSSION:

Individuals with IDD experience significant healthcare disparities which can be attributed in part to attitudes, preconceived notions, and lack of preparedness of healthcare providers (Boyd, 2016; Morris et al., 2019; Pelleboer-Gunnink et al., 2017). Aiming to address this gap in medical training, this study highlighted the importance of including individuals with IDD in clinical training to improve medical students' comfort and self-perceived clinical competency providing care to this patient population. As such, our OSCE design focused on learning relevant clinical concepts and basic clinical interviewing skills to address common primary care complaints, recognizing that individuals with IDD, like any other patient with or without IDD, may present to a healthcare provider with a common complaint such as a stomach-ache (Morris et al., 2019; Pelleboer-Gunnink et al., 2017; Zerbo et al., 2015). Additionally, this study supported the applicability and ease of implementation of a virtual learning experience such as this virtual OSCE (Harden et al., 1975; Hilburg et al., 2020).

Healthcare provider reported discomfort and lack of readiness when interacting with individuals with IDD can significantly impact their ability to provide effective care (Boyd, 2016; Morris et al., 2019; Pelleboer-Gunnink et al., 2017). For instance, a paper by Pelleboer-Gunnink et.al. (2017) reported that unfamiliarity and knowledge can lead to stigmatizing towards this patient population, resulting in stress, lack of confidence, fear, anxiety, and a tendency to treat individuals with IDD differently (Morris et al., 2019; Pelleboer-Gunnink et al., 2017; Zerbo et al., 2015).

Adding to this body of evidence, most OSCE participants reported that this virtual OSCE was their first interaction with individuals with IDD, and almost unanimously acknowledged feelings of stress, lack of confidence, and bias towards thinking that they should treat individuals with IDD

differently. These attitudes, consistent with those shown in the literature by healthcare professionals, may become ingrained through medical training and into their professional lives, impacting their interactions with individuals with IDD, and contributing to the reported health disparities in this population (Morris et al., 2019; Pelleboer-Gunnink et al., 2017). Despite these initial preconceived notions and unhelpful attitudes, every participant rated the OSCE experience as enriching and beneficial, expressing significant positive perception changes, and a significant increase in self-perceived competency scores caring for this patient population across all metrics post-OSCE. These outcomes emphasized the importance of including individuals that can accurately portray the lived experiences of marginalized patient populations, in this case individuals with IDD, in medical training (Morris et al., 2019; Pelleboer-Gunnink et al., 2017; Zerbo et al., 2015). Importantly, while this study's inclusion of PEs regardless of IDD diagnosis or severity supports a more accurate real-world representation, future studies could benefit from a more detailed reporting of IDD diagnoses and severity to enhance result generalizability. Furthermore, it is important to acknowledge that when carrying out repeated measures of a sample (pre- and post-OSCE assessments), that the effects observed may be a result of the return to the mean (RTM) phenomenon (Linden, 2013). However, the significant large effect size differences observed, suggested that the impact of the learning experience was likely not associated with random variation or RTM (Lakens, 2013; Linden, 2013). Additionally, the inclusion of the OO assessment in our analysis and the semi-structured interview, helped in the identification of biases and preconceived notions that may have contributed to the effects of RTM (Dunning et al., 2004; Linden, 2013), and provided a more nuanced and robust interpretation of the results (Dunning et al., 2004; Fetters et al., 2013; Linden, 2013).

Supporting the inclusion of patients with lived experiences in educational programs, a study by Morris et. al. (2019), found that educational programs promoting intergroup contact with marginalized patient populations, in this case gender diverse individuals, could mitigate unhelpful preconceptions and biases, and increase provider comfort (Morris et al., 2019). Likewise, the intergroup contact present in this OSCE between medical students and individuals with IDD can be hypothesized to have resulted in a similar effect dismantling unhelpful preconceptions and biases (Morris et al., 2019; Pelleboer-Gunnink et al., 2017; Zerbo et al., 2015). We can notice this evolution in the perceptions of the OSCE participants by looking at the discrepancy between their self-assessment competency scores, and the competency scores assessed by the OOs (Dunning et al., 2004). Post-OSCE, this discrepancy was significantly lower, suggesting that the self-perceived competency scores and preconceived notions prior to the OSCE may have been impacted by a lack of experience working with this patient population. The literature supports these conclusions, showing that stigmatizing attitudes, in this case the preconceived notions and biases reported by the OSCE participants in our qualitative analysis, can increase stress, anxiety, and a lack of confidence and comfort working with this patient population (Pelleboer-Gunnink et al., 2017).

Although not one of our primary outcomes, this study added support to the use of videoconferencing platforms to supporting medical education (Chan et al., 2023), offering several benefits over an in-person learning experience. For instance, this virtual OSCE facilitated the connection of individuals with IDD and medical students regardless of their geographical location, enhancing accessibility, particularly for those with mobility issues or transportation limitations (Ann Bross et al., 2023). Furthermore, the development, uptake, and implementation of telehealth, especially at the height of the COVID19 pandemic, highlighted the importance of developing effective skills delivering healthcare over a virtual platform (Chan et al., 2023; Mahtta et al., 2021).

This experience was cost-effective since no physical space or infrastructure was needed other than a reliable internet connection (Hilburg et al., 2020; Yuan, 2011).

However, two main limitations of this approach, as noted in our qualitative analysis, included unstable internet connections leading to audio and video issues and that inability to practice physical maneuvers (Hilburg et al., 2020). These limitations, especially the inability to conduct physical maneuvers, have also been raised by proponents and users of the virtual OSCE format in the literature, who have cautioned against the use of the virtual OSCE as a substitute to in-person medical education (Chan et al., 2023). This notion added support to our study design, which sought to implement the virtual OSCE as an extracurricular activity aimed at complementing medical education. Importantly, the majority of OSCE participants acknowledged the limitations inherent of the virtual format **(Table 3)**, while still emphasizing the value of having this first clinical encounter with an individual with IDD in their medical training and their future practices (Chianáin et al., 2021; Morris et al., 2019; Pelleboer-Gunnink et al., 2017).

Limitations and Future research:

Firstly, this study did not assess whether the observed improvements in self-perceived competency and comfort in the OSCE translated to improved skills providing care for individuals with IDD in clinic. Future studies could include a pre- and post-OSCE clinical skill assessment or collect follow up qualitative data from OSCE participants once they begin their clinical duties. Trained faculty were not included in the assessment of competency metrics during the OSCE. While trained faculty may have provided a more qualified competency assessment, peer-assessment has been supported in the literature as a reliable measurement of performance (Dunning et al., 2004). However, despite participating in a training session, the OOs had no prior experience with the Prediger scale, and

interrater agreement between OOs was not assessed. Additionally, instead of using a single assessment modality (Prediger scale), measuring cognitive load, stress, or comfort level could have provided a better understanding of the mental state of the OSCE participants pre- and post-OSCE. Lastly, the results obtained may not be generalizable, since this was a pilot observational study conducted in one Canadian institution, and only self-reported IDD diagnosis was considered for eligibility – specific IDD diagnosis and severity were not verified or recorded. Future work should validate results through randomized controlled trials, including patients with specific IDD conditions and severities, comparing clinical training outcomes including PEs (individuals with IDD) to those including SPs (individuals portraying IDD), and extending this educational approach to other medical education programs.

CONCLUSION

The results of this study strongly supported the inclusion of individual with IDD as PEs early in medical education. Medical students who participated in this virtual OSCE, experienced a significant improvement in self-perceived competency and comfort providing care for this patient population. This study also supported the use and versatility of online platforms to deliver education content. Since, the virtual format of this OSCE allowed us to create an accessible learning experience presenting authentic patient scenarios. Thus, this study successfully implemented a virtual OSCE as a powerful tool that could be implemented broadly, and that should be considered by curriculum developers to complement their in-person curriculums and expand the number and variety of clinical experiences that medical students can access.

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Figure 1. OSCE IDD session design

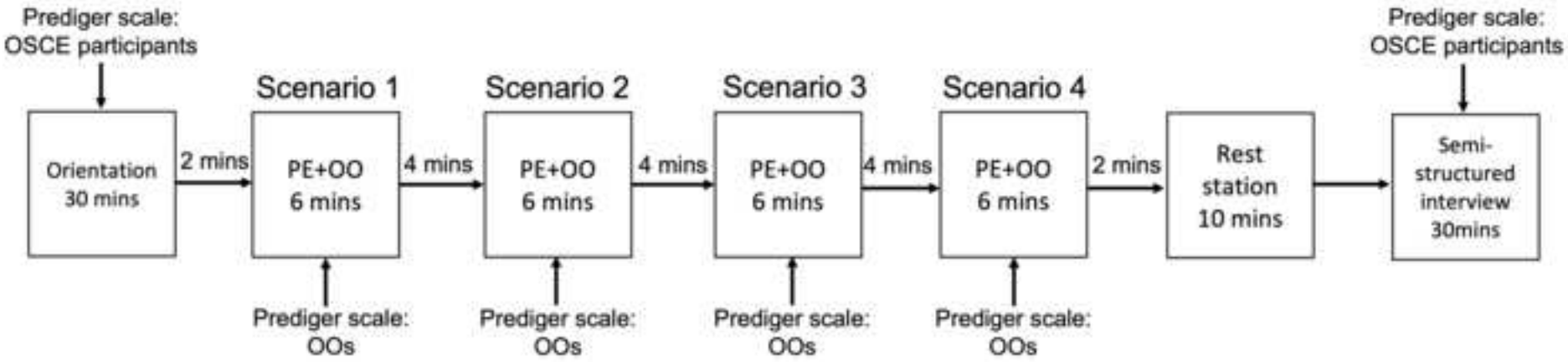

Figure 2. Histogram of the comparisons between the OSCE participant's and OO's competency assessments. * no statistically significant.