

# Experiences and Perceptions of Nurses Participating in an Interprofessional, Videoconference-Based Educational Programme on Concurrent Mental Health and Substance Use Disorders: A Qualitative Study

Gabrielle Chicoine (✉ [gabrielle.chicoine@umontreal.ca](mailto:gabrielle.chicoine@umontreal.ca))

Faculty of Nursing, Université de Montréal

José Côté

Faculty of Nursing, Université de Montréal

Jacinthe Pepin

Faculty of Nursing, Université de Montréal

Louise Boyer

Faculty of Nursing, Université de Montréal

Geneviève Rouleau

Women's College Hospital

Didier Jutras-Aswad

Faculty of Medicine, Department of Psychiatry and Addiction, Université de Montréal

---

## Research Article

**Keywords:** Competencies, Competency Development, Continuing Education, Co-occurring Disorders, Interpretive Description, Project ECHO, Virtual Communities

**Posted Date:** February 23rd, 2022

**DOI:** <https://doi.org/10.21203/rs.3.rs-1321590/v1>

**License:** © ⓘ This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

---

# Abstract

## Background

Individuals with co-occurring mental health and substance use disorders (i.e., concurrent disorders) remain a challenge for the nurses attempting to care for them. They require nurses to constantly adapt themselves and develop high-level competencies despite the limited resources they have and the isolated settings in which many of them work. The Extension for Healthcare Community Outcomes (ECHO®) is a promising collaborative learning and capacity building model that uses videoconference technology to support and train healthcare professionals in the management of complex and chronic health conditions. The aim of this study was to explore the experiences and perceptions of nurses participating in a Canadian ECHO programme on concurrent disorders about the competencies they developed and mobilized in their clinical practice, and which factors have influenced this process.

## Methods

The study was qualitative, guided by an interpretive descriptive approach. Individual semi-structured interviews were held with ten nurses who had participated in the programme for the 2018–2019 and 2019–2020 curricula. A thematic analysis was conducted iteratively using an inductive approach to progressive data coding and organization.

## Results

Four themes and eighteen sub-themes emerged. During their participation in ECHO, the nurses perceived as having further developed and mobilized eight clinical nursing competencies. Nurses viewed ECHO as a unique opportunity to open themselves to their peers' experiences and reflect on their own knowledge. Learning from experts in the field of concurrent disorders helped them to build their confidence in managing complex clinical situations. The nurses' sense of belonging to a community further enhanced their engagement in the programme, and learning was facilitated through the programme's interprofessional environment. Nevertheless, the lack of contextualized educative content linked to local realities, the limited resources in concurrent disorders and time constraints were experienced as factors limiting competency development.

## Conclusions

ECHO is a promising alternative to conventional, in-person continuing education programmes to improve the development of advanced competencies and clinical practice among nurses providing care to individuals with chronic and complex health conditions. These findings can inform clinicians, educators,

researchers, and decision makers who are developing, implementing, evaluating and escalating future educational interventions in the field of CDs.

## Introduction

Concurrent disorders (CDs) refer to the simultaneous occurrence of mental health and substance use disorders. Individuals with CDs often experience poorer physical health and social outcomes, and greater psychological distress than do people with a single disorder (1). Besides their high prevalence, CDs are strongly associated with an increased risk of suicide, poorer compliance to treatment, violence/delinquency, as well as greater risks for infection such as HIV and hepatitis (2). Further, people with CDs have poorer social outcomes including homelessness, social isolation, stigma and care access inequities (3). Failure to address the complex healthcare needs of this subpopulation can lead to high relapse rates, long hospital stays and increased health care costs (4).

In Canada, most people experiencing CDs are managed within primary healthcare settings (5), yet the majority of nurses working in these clinical contexts have limited or no specific education to do so (6). Previous studies highlighted that nurses often perceived themselves as deskilled and ill-equipped, particularly for competencies such as screening mental disorders in active users, managing recurrent psychotic symptoms, offering appropriate interventions in crisis situation and coordinating care between clinical team and agencies (7). Research has also indicated that some nurses hold counterproductive and stigmatizing attitudes when caring for individuals with problematic alcohol or drug use (8). Moreover, feelings of frustration, hopelessness, exhaustion, powerlessness, and isolation are common among nurses who encounter people living with CDs (9, 10).

These challenges contribute to the pressing need for further educational opportunities that align with public health organizations' guidelines on integrated mental health and substance use care in order to help nurses develop their competencies in this field (11). To this end, this paper reports on an innovative videoconferencing educational programme based on the Extension for Community Healthcare Outcomes (ECHO®) Model that seeks to improve the knowledge and competencies of nurses in safely and effectively managing individuals with CDs.

## Background

Continuing professional education is universally agreed upon by researchers, clinical leaders and practitioners as a fundamental strategy for enhancing and sustaining the competencies of nurses (12). For instance, professional education opportunities all through their career continuum have been identified as an important means of fostering life-long learning and practice renewal (13). In recent decades, advances in technology have brought new ways of offering a wide range of continuing educational interventions. Technology-enabled educational interventions have become an increasingly popular alternative because of their ease of delivery, low cost, high accessibility and greater flexibility (14). One such promising educational intervention, the ECHO Model, uses videoconference technology to offer

ongoing support and education to healthcare professionals managing patients with complex and chronic health conditions through scheduled case-based discussions held remotely. The model was launched in 2003, in the United States, under the name of Project ECHO® at the University of New Mexico (UNM), in Albuquerque, New Mexico; its initial objective was to improve access to Hepatitis C treatment in rural New Mexico (15). Since then, there have been over 590 replications of ECHO in 34 countries, covering up to 68 disease-related topics (16). ECHO typically involves pairing an interprofessional team of experts from academic healthcare centres with many other healthcare professionals, regardless of geographical barriers. It provides them with the chance to learn from one another, create a knowledge network, and build a stronger team dynamic.

There is growing evidence showing the ECHO Model's acceptability, feasibility and positive impact on both healthcare professionals and patients' outcomes (17, 18). With respect to provider-related outcomes, one recent systematic review highlighted that most of the existing empirical research on ECHO have shown favourable results across three domains: satisfaction, increased knowledge, and increased confidence (19). Arguably, the most desirable outcomes are the changes in clinical practice, by virtue of the capacity-building orientation of the ECHO Model. Five studies have examined the impact of ECHO on behaviour change among healthcare professionals, based on data gathered via medical chart reviews or self-reported surveys (20–24). Overall, those studies suggested that healthcare professionals had or would have altered care provision as a result of presenting patient-cases and being offered concrete recommendations from both peers and experts. For example, Komaromy et al. (22) found that 77% of participants from an ECHO programme on behavioural health reported that case discussion changed their patient care plan. Likewise, Catic and colleagues (20) observed from an ECHO programme in geriatric long-term care that recommendations for treatment were incorporated by presenters 89% of the time.

Despite this breadth of evidence, the nursing perspective is sparse and under-represented within the ECHO literature, even though nurses play a critical role in the early recognition and management of CDs because they have the most frequent contact with patients with CDs and they are centrally responsible for ensuring the continuity of care (25). Indeed, only two studies of ECHO programmes focusing on nurses' outcomes and/or perceptions have been published to date (26, 27). In the first study, a formative evaluation of an ECHO programme was conducted among 34 primary care nurses and reported that most respondents agreed that the educational content was very or extremely meaningful to their work (26). In the second study, a six-month prospective longitudinal cohort study ( $n = 28$ ) was piloted in a community palliative care setting and found that nurses' mean score for knowledge and skills improved significantly –by 11.3% from baseline to post-ECHO (27). This study also showed significant improvements in all domains of nurses' self-efficacy, with the greatest degree of change in the domain of “symptom management, maintaining comfort and wellbeing”.

While these results lend support to the benefits of ECHO, there remain important gaps in our understanding of how ECHO contributes to nursing competency development, including a dearth of studies in the field of CDs (22, 28–32). In this regard, it has been robustly documented that little scientific

attention has focused on what factors influence competency development among ECHO participants (16), while such factors are crucial to leveraging potential strategies that might reinforce learning and sustain changes in clinical practice. Therefore, we aimed at studying the experiences and perceptions of nurses who participated in a Canadian ECHO programme for CD management (i.e., ECHO-CD) about the competencies they developed and mobilized in their clinical practice, and at exploring the factors that have influenced this process, whether positively or negatively.

## **Philosophical and conceptual underpinnings: a socio-constructivist approach to competency development**

A holistic, context-bound, and experientially based conceptual perspective of competency development informed this study (33). Situated within a socio-constructivist epistemology, competency development is understood as an evolutive and infinite process of learning occurring within the context of social and environmental interactions. This perspective also suggests that learning is a subjective experience, whereby nurses are actively engaged in building new knowledge upon existing knowledge and personal experiences to develop themselves in a unique way. A competency is viewed as “a complex knowledge in action” (34), based on the effective mobilization and combination of a variety of coordinated resources (e.g., skills, attitudes, material resources), each of them fundamental for competent nursing practice. Hence, learning and competency development are intertwined; nurses progressively develop their competencies as they engage in meaningful learning situations throughout their professional career.

## **Methods**

This qualitative study was part of a larger mixed methods research project that sought to develop a comprehensive understanding of the impact of a Canadian ECHO program for CD management on the competency development and clinical practice of nurses (35). Its aim was to explore their experiences and perceptions about the competencies they developed and mobilized in their clinical practice, and what factors have influenced this process. It was guided by the following two-fold research question:

- How did the nurses mobilize, in their clinical practice, the competencies they perceived as having developed through their participation in ECHO, and what factors have influenced this process?

This research article was developed and organized in accordance with the Consolidated Criteria for Reporting Qualitative Research (COREQ) checklist (36) (Additional file 1).

## **Research design**

This study employed an interpretive description (ID) methodology (37). ID offers an appropriate and theoretically flexible approach to collecting, analyzing and interpreting qualitative data within applied health disciplines by addressing complex experiential questions while producing practical evidence (38). Within this study, ID was used to structure the research procedures, illuminate themes and

patterns/discrepancies in the perspectives of the participants, and provide an integrative description of the learning experience obtained by the nurses through their participation in ECHO.

## **Setting and educational intervention**

This study was conducted in a tertiary academic hospital centre in the province of Quebec, Canada. Table 1 describes the ECHO-CD Programme using the Guidelines for Reporting Evidence-based practice Educational interventions and Teaching (GREET) (39).

Table 1  
Description of the educational intervention using the GREET

<b>BRIEF NAME: ECHO for CD management (ECHO-CD)</b>	
<b>1 INTERVENTION</b>	
<b>WHY - this educational process</b>	
<b>2 THEORY</b>	This educational intervention was developed according to the ECHO Model (40, 41), which is rooted in three established social educational theories: 1) Bandura's Social Cognitive Theory (42); 2) Lave and Wenger's Situated Learning Theory (43); and 3) Wenger's Theory of Communities of Practice (44).
<b>3 LEARNING OBJECTIVES</b>	<p>The educational intervention embraced three distinct, but related learning objectives: 1) to enhance participants' knowledge in CD EBP; 2) to amplify participants' competencies in addressing CDs and facing complexity; and 3) to build a learning community in which healthcare professionals can receive support in working with challenging situations of patients with CDs.</p> <p>The educational intervention also included specific learning objectives based on the case-based discussion and the didactic presentations for each session of a curriculum. These learning objectives were developed to match the NICE 2016 guidelines on CDs. Learning objectives were applicable to all professional groups. An example of the learning objectives for the 2018–2019 curriculum can be found in the study protocol published elsewhere (35).</p>
<b>4 EBP CONTENT</b>	Each session included a didactic presentation comprising of a specific EBP content. The didactic presentations' content covered mental health and psychiatric-related topics (e.g., psychotic disorders, anxiety disorders, eating disorders), addiction-related topics (e.g., opioid use disorder, withdrawal management), co-occurring medical issues (e.g., HCV), as well as other psychosocial-related topics (e.g., homelessness, legal and ethical issues, referral pathways). It also included broader topics related to CDs such as basics in integrated care treatment, core values, attitude and relational skills to hold towards people with CDs and planning and coordinating care between healthcare professionals, teams and agencies.
<b>WHAT</b>	

*Note.* CDs: Concurrent Disorders; EBP: Evidence-Based Practice; ECHO-CD: Extension for Community Healthcare Outcomes Programme for Concurrent Disorder management; HCV: Hepatitis C Virus; HD: High Definition; HIV: Human Immunodeficiency Virus.; NICE: National Institute for Health and Care Excellence; VC: Videoconference.

**BRIEF NAME: ECHO for CD management (ECHO-CD)**

**5 MATERIALS**

**Materials provided to learners:**

- An electronic document explaining the educational intervention's purpose, the sessions' functioning, the learning objectives, and the activities was provided to each participant at the time of their registration.
- One week prior to each session, an electronic document detailing the clinical situation to be discussed is sent by email to all participants. This document has predetermined sections, which are fulfilled by the healthcare professionals who presents the chosen clinical situation.
- Didactic presentations are supported with a PowerPoint presentation and shared to participants through emails after each session.
- The programme has a web site containing several resources in CDs that participants can consult at any time.
- Emails are sent to all participants each month from a scientific librarian to share scientific articles and clinical tools in the field of CDs.
- A written summary that combines recommendations and guidance from the team of experts was sent to the healthcare professional (or team of healthcare professionals) who has presented the clinical situation. This electronic document generally consisted of interventions to add to their patient's care plan.

**Materials used for instructors:** A paper-version document detailing the ECHO Model learning principles (i.e., learning objectives and strategies, functioning) is provided to each member of the team of experts to provide guidance on EBP teaching methods. This document also included a step-by-step approach on how to replicate the ECHO Model in other contexts.

**VC equipment:** To run a session online, the team of experts used a *Logtech Group ConferenceCam* kit that is connected to a Lenovo Windows PC with two 55" screen mounted on a support. In this study, nurses were able to join VC sessions via a desktop or laptop computer, phone, tablet or any other mobile device. Nurses were equipped by their employer for the minimum technical equipment required to run a virtual session online (i.e., desktop or laptop computer, internet connection, speakers and microphones). Some nurses did not have access to a webcam or HD cam.

*Note.* CDs: Concurrent Disorders; EBP: Evidence-Based Practice; ECHO-CD: Extension for Community Healthcare Outcomes Programme for Concurrent Disorder management; HCV: Hepatitis C Virus; HD: High Definition; HIV: Human Immunodeficiency Virus.; NICE: National Institute for Health and Care Excellence; VC: Videoconference.

**BRIEF NAME: ECHO for CD management (ECHO-CD)**

**6 EDUCATIONAL STRATEGIES** The following three educational strategies were used concurrently, at each VC session:

- **Case-based discussion:** A clinical situation is selected from a healthcare professional (or team of healthcare professionals), and then presented to all participants at each session. Prior to the session, the healthcare professional is asked to prepare a summary of the chosen clinical situation by detailing the patient's biopsychosocial needs, and by identifying questions for the group to consider about that clinical situation. Following that, a discussion period allowed for questionings, reflections as well as knowledge and personal experiences' sharing. Finally, recommendations and guidance from the team of experts and peers are provided, in writing and then during the presentation.
- **Traditional lecture:** Didactic presentations on CD EBP.
- **Reflective practice:** In weeks to months after the case-based discussion, participants where often ask to re-present their selected clinical situation, whereby the implementation and impact of the recommendations provided during the sessions were reviewed and assessed. All participants had the opportunity to complete an online knowledge test in CDs every six months, which allowed them to receive feedback from the team of experts regarding their learning needs. In this study, research interviews with nurses allowed them to reflect on their learning progress during their participation in ECHO and how this learning experience contributed to their clinical practice.

**7 INCENTIVES** Continuing education credits were given to participants after each completed session.

**WHO PROVIDED**

**8 INSTRUCTORS** **Instructors:** A team of experts that included psychiatrists, physicians with a specialization in substance-use disorders, registered nurses, pharmacists, social workers, psychologists, occupational therapists and a scientific librarian.

**Other professionals included in the intervention:**

- In case of a specific health-related issue, specialists from the tertiary hospital centre were invited to join the team of experts for further guidance (e.g., hepatologist, physician with expertise in HIV treatment).

- A project manager was assisting the team of experts during each session to coordinate the participants' interactions. This implicated to answer the participants' questions within the forum application, and to ensure that each participant had the opportunity to ask questions or to share their knowledge/experiences/ideas.

- Additionally, a computer scientist offered in-person support during each session to resolve technical issues.

*Note.* CDs: Concurrent Disorders; EBP: Evidence-Based Practice; ECHO-CD: Extension for Community Healthcare Outcomes Programme for Concurrent Disorder managagement; HCV: Hepatitis C Virus; HD: High Definition; HIV: Human Immunodeficiency Virus.; NICE: National Institute for Health and Care Excellence; VC: Videoconference.

**BRIEF NAME: ECHO for CD management (ECHO-CD)**

**Experience and expertise:** All healthcare professionals from the team of experts had expertise in CDs and/or at least six months of experience in working with patients with CDs. All registered nurses from the expert team had at least a bachelor's degree with at least six months of clinical experience in CDs. According to their discipline, the healthcare professionals from the expert team had different specializations such as motivational interviewing, relapse prevention, cognitive and behavioral therapy, working with vulnerable population (e.g., youth, homeless people, pregnant women), Hepatitis C treatment or treatment for opioids use disorders.

**Roles:**

- Facilitator: During each session, the same psychiatrist from the expert team acted as a facilitator. This role included to introduce each member of the expert team, to make sure that all participants had time to introduce themselves, to summarize the expert recommendations at the end of a session, and to ensure that the session goes smoothly and that the schedule is well-respected. The facilitator also gave feedback to participants throughout the sessions.

- Team of experts: Healthcare professionals from the team of experts are invited to ask questions regarding the clinical situation for further information and/or clarifications. They were also providing in-session recommendations and/or feedback in relation to their discipline or area of expertise. Each session, a healthcare professional from the team of experts delivered a didactic presentation on CD EBP.

**Training related to the educational intervention provided to instructors:** As a requirement for ECHO-affiliated programmes, two healthcare professionals from the team of experts attended a four-day immersion given by the ECHO Ontario Mental Health (ECHO-OMH) Programme at the Center for Addictions and Mental Health (CAMH) in the province of Toronto, Canada (32). The objectives of the immersion training were to offer guidance on how implementing the ECHO Model in other contexts, and to ensure that future ECHO programmes are delivered in accordance with the highest standards of continuing education. During this immersion, training on learning methods, teaching strategies and core pedagogical skills were provided. The immersion was originally developed at the ECHO Institute in New Mexico, US, to ensure fidelity between the ECHO Model and future replications.

**HOW**

*Note.* CDs: Concurrent Disorders; EBP: Evidence-Based Practice; ECHO-CD: Extension for Community Healthcare Outcomes Programme for Concurrent Disorder management; HCV: Hepatitis C Virus; HD: High Definition; HIV: Human Immunodeficiency Virus.; NICE: National Institute for Health and Care Excellence; VC: Videoconference.

<b>BRIEF NAME: ECHO for CD management (ECHO-CD)</b>		
<b>9 DELIVERY</b>	<p><b>Modes of delivery:</b> The educational intervention was exclusively provided online through simultaneous VCs. All learning activities were provided in group.</p> <p><b>Ratio:</b> There were no formal limits on the number of online participants for each session. Each curriculum included up to 200 registrants and session attendance varied between 50 and 60 participants. A minimum of four healthcare professionals from the team of experts was required at each session. Attention was given to which healthcare professionals from the team of experts was present, in order to create an interdisciplinary environment of learning and to ensure that recommendations were tailored for a wide range of professional groups.</p> <p><b>Learning activities' sequence:</b> Each curriculum included an orientation session to familiarize participants with the educational intervention's structure, the programme's learning objectives, and the VC technology. Then, each other session included five main learning activities, which took place into the following sequence: 1) 10-minute introduction, in which the team of experts and participants introduce themselves to each other; 2) clinical situation presentation (15 minutes); 3) questions and discussion regarding the clinical situation (30 minutes); 4) clinical guidance and recommendations (15 minutes); 5) didactic presentation, including traditional lecture and questions (20 minutes).</p>	
<b>WHERE</b>		
<b>10 ENVIRONMENT</b>	<p><b>Location:</b> A conference room located at a tertiary academic hospital center in the province of Quebec, Canada, was provided for the team of experts (the 'Hub'). Participating health care professionals (the 'Spokes') were located in different urban and rural areas across the province, and were able to join the sessions from their work or home environment.</p> <p><b>Technical environment:</b> The Zoom platform.</p>	
<b>WHEN AND HOW MUCH</b>		
<b>11 SCHEDULE</b>	<p><b>Number of sessions:</b> 20 sessions delivered from September to June. Participants had the opportunity to register for the programme every year.</p> <p><b>Frequency:</b> Every two weeks.</p> <p><b>Timing and duration:</b> 90 minutes, from 12:00 PM to 1:30 PM.</p>	
<b>12 FACE-TO-FACE CONTACT WITH INSTRUCTORS AND/OR SELF-DIRECTED LEARNING ACTIVITIES</b>	<p>Each session consists of virtual face-to-face contact between the team of experts and other participants. Self-directed activities consist of clinical guidance and tailored recommendations.</p>	

*Note.* CDs: Concurrent Disorders; EBP: Evidence-Based Practice; ECHO-CD: Extension for Community Healthcare Outcomes Programme for Concurrent Disorder management; HCV: Hepatitis C Virus; HD: High Definition; HIV: Human Immunodeficiency Virus.; NICE: National Institute for Health and Care Excellence; VC: Videoconference.

<b>BRIEF NAME: ECHO for CD management (ECHO-CD)</b>		
<b>PLANNED CHANGES</b>		
<b>13</b>	<b>SPECIFIC ADAPTATION FOR THE LEARNERS</b>	<p>The educational intervention's content was adapted to the participants' needs as following:</p> <ul style="list-style-type: none"> <li>- No specific topic was planned for the last two didactic presentations of each curriculum to adapt their content with the participants' requests and learning needs. The topics of those two last didactic presentations were chosen based on the participants' responses to the after-session feedback questionnaires.</li> <li>- In case of a specific issue that has generated questions from the participants during a session, further resources and/or information were provided by a scientific librarian, during or after that session.</li> </ul>
<b>UNPLANNED CHANGES</b>		
<b>14</b>	<b>MODIFICATIONS MADE TO THE EDUCATIONAL INTERVENTION DURING THE COURSE OF THE STUDY</b>	<p>For the 2019–2020 curriculum, the following modifications were made to the educational intervention due to the COVID-19 pandemic:</p> <ul style="list-style-type: none"> <li>- Content: Two didactic presentations about COVID-19 were developed and presented to the participants (i.e., management of CDs and COVID-19 during hospitalization and issues related to people with substance use disorders and COVID-19).</li> <li>- Environment: Healthcare professionals from the team of experts attended the sessions in separate rooms instead of being grouped within a larger conference room.</li> </ul>
<b>HOW WELL</b>		
<b>15</b>	<b>ATTENDANCE</b>	Participation to each session was not mandatory. However, nurses' session attendance frequency was tracked as part of a larger mixed methods research project, and the protocol for this larger project is available elsewhere (6).
<b>16</b>	<b>PROCESSES TO DETERMINE WHETHER THE MATERIALS (item 5) AND EDUCATIONAL STRATEGIES (item 6) WERE DELIVERED AS PLANNED</b>	In this study, nurses were invited to describe their overall experience during the online sessions and to reflect on their appreciation of the educational intervention using individual semi-structured interviews. Also, an 'ECHO-CD committee' was implemented at the tertiary academic health centre for the improvement of the programme. Voluntary participants from the ECHO-CD Programme were invited to provide feedback and suggestions in order to adapt the programme and the next curriculums more appropriately to their specific learning needs (e.g., content, learning strategies) and their local realities (e.g., resource constraints).

*Note.* CDs: Concurrent Disorders; EBP: Evidence-Based Practice; ECHO-CD: Extension for Community Healthcare Outcomes Programme for Concurrent Disorder management; HCV: Hepatitis C Virus; HD: High Definition; HIV: Human Immunodeficiency Virus.; NICE: National Institute for Health and Care Excellence; VC: Videoconference.

<b>BRIEF NAME: ECHO for CD management (ECHO-CD)</b>		
<b>17</b>	<b>EXTENT TO WHICH THE EDUCATIONAL INTERVENTION WAS DELIVERED AS SCHEDULE</b>	The 2018–2019 and 2019–2020 were both delivered as schedule.
<i>Note.</i> CDs: Concurrent Disorders; EBP: Evidence-Based Practice; ECHO-CD: Extension for Community Healthcare Outcomes Programme for Concurrent Disorder management; HCV: Hepatitis C Virus; HD: High Definition; HIV: Human Immunodeficiency Virus.; NICE: National Institute for Health and Care Excellence; VC: Videoconference.		

Table 1. Description of the educational intervention using the GREET

[INSERT Table 1 HERE]

## Participants and recruitment

The inclusion criteria consisted of participating nurses from the 2018–2019 and 2019–2020 curricula of the ECHO-CD Programme ( $N = 65$ ) who attended at least one virtual session and consented to the research. Nurses with all types of professional role were recruited, including nurse practitioners, assistant head nurses, clinical nurse specialists and auxiliary nurses. Each potential participant was recruited by the primary author through email or by phone, according to the contact preference supplied at the time of their registration in the programme. A total of 32 participating nurses met the inclusion criteria and were invited to participate. The recruitment took place between May 2020 and July 2020 and 10 participants were included in the study.

In accordance with the ID approach—which recognizes that subjective human experience can theoretically possess infinite variation—data saturation was not a desired outcome in this study. Rather, we focused on obtaining a deeper understanding of participants’ experiences, and on ensuring that the data we gathered was rich enough to answer our research question. Sampling and data collection were continually evaluated, based on obtaining variation between the characteristics of the participants.

## Data collection

Individual semi-structured interviews with voluntary nurses were held between May 2020 and August 2020 via the Zoom platform (©2021, Zoom Video Communications Inc). Interviews were conducted by the primary author and lasted between 45 and 90 minutes. To facilitate a consistent flow to the participants’ responses, a semi-structured interview guide was developed based on topics generated from the study aim and the research question (Additional file 2). The interview schedule format was structured into four main sections, each of them entailing prompts and open-ended questions that encouraged participants to share and elaborate on their ideas. Probes, clarification, and paraphrasing were used for verification of the themes emerging during data collection. All interviews were recorded using the Zoom platform and audio-based files only were safely stored on a secured server. To enhance the study’s

internal consistency, the primary author used a personal journal for compiling insights, decisions, hunches, and important ideas, as research progressed.

## Data analysis

The full verbatim transcripts of each interview and the primary author's field notes were both collated to perform a qualitative analysis. A thematic analysis (45) was performed in coherence with the ID methodology to allow the examination of participants' multiples perspectives, to highlight patterns and discrepancies, and to generate unanticipated insights. Data collection and analysis took place concurrently, with each of them informing the other in an iterative process that allowed reflection and inductive knowledge generation (37). The analytical process began after a first interview was conducted and extended up to a nine-month period, which enabled a prolonged and close contact with the data.

Each interview was first transcribed by a researcher assistant and then reviewed by the primary author to verify the transcripts' accuracy with the audio recordings and become familiar with the content. All interview transcripts were subsequently imported into the MAXQDA qualitative analysis software, version 2020.1 (©1995–2020, MAXQDA – Distribution by VERBI GmbH). Progressive data coding—starting with broad-based categories and then to narrowing the information down into potentially thematic groups—was used to avoid any premature interpretations and precipitate the formation of data patterns. As relationships between thematic groups became more apparent, a hierarchy of themes and sub-themes was created to pinpoints these relationships.

Regular discussion sessions were held along the way between the research team members (GC, JC, JP and DJA) to stimulate further insights into the emerging themes. In addition to investigator triangulation, a member-checking technique was performed (46), which allowed the research team to discuss and questioned the accuracy and resonance of the preliminary findings with the participant's experiences and perceptions. Following a deep review of participant feedback ( $n = 6/10$ ), themes and sub-themes were refined and renamed until a consensus was reached between the research team members.

## Ethics

This study was approved by the Ethics Committee of the Université de Montréal Hospital Center (#19.295) and the Université de Montréal Research Ethics Committee in Sciences and Health (CERSES-20–017 R). All the participants provided written informed consent. Interviews were conducted outside working hours, and participants were offered a \$CA50 voucher for their contribution.

## Results

Ten nurses (nine women) who participated in ECHO-CD between 2018 and 2020 with a mean age of 39.4 years (3.3 *SD*) were included in the study. All the nurses had more than five years of clinical experience and most of them endorsed a case manager role ( $n = 7$ ). Table 2 provides an overview of the study sample demographics and the practice profile.

Table 2  
Demographics and practice profile of the study sample ( $n = 10$ )

Characteristics	Total (n) or mean (SD); (min, max)
<b>Gender</b>	
Female	9
Male	1
<b>Mean age</b>	39.4 (3.3); (35.0, 46.0)
<b>Degree earned</b>	
Baccalaureate degree	4
Master's degree	6
<b>Professional role</b>	
Case manager	7
Assistant Head Nurse	1
Clinical Nurse Specialist	2
<b>Years of clinical experience</b>	
6–10 years	2
11–15 years	7
16 years and over	1
<b>Work setting</b>	
Psychiatric/Mental health Hospital-Based Services	3
Addiction Treatment Centres	2
Primary Care Mental Health Services	4
Community-based health care services for high-risk populations	1
<b>Area of practice</b>	
Urban/Sub-urban	5
Rural/Distant	4
Mixed*	1

*Note.* Max: Maximum; Min: Minimum; n: number; SD: Standard Deviation.

\*One nurse worked in a large area of the province that included both urban and rural settings; \*\*Of those six nurses, two participated in the curriculum for 2019–2020 as a second registration; \*\*\*For the first year of participation.

Characteristics	Total (n) or mean (SD); (min, max)
<b>Registration year in the program</b>	
2018–2019 curriculum	6**
2019–2020 curriculum	4
<b>Mean number of session attendance***</b>	9,1 (4,5)
<b>Session attendance</b>	
0–5 sessions	3
6–10 sessions	4
11–15 sessions	2
16–20 sessions	1
<i>Note.</i> Max: Maximum; Min: Minimum; n: number; SD: Standard Deviation.	
*One nurse worked in a large area of the province that included both urban and rural settings; **Of those six nurses, two participated in the curriculum for 2019–2020 as a second registration; ***For the first year of participation.	

In total, four distinct yet interrelated themes emerged from the thematic analysis. The four themes with their corresponding sub-themes are embedded in Fig. 1, highlighting how each of them are intertwined to answer the research question.

[INSERT FIGURE 1 HERE]

The first identified theme and its eight contributing sub-themes reflect the progresses nurses made on some clinical nursing competencies and how these competencies were mobilized into their clinical practice. The second theme, comprising three sub-themes, depicts the learning process by which the nurses' experience in ECHO was conducive to the development and mobilization of their competencies. Together, the third and fourth themes describe the factors that influenced nurses' competency development and clinical practice. Table 3 outlines eloquent excerpts from the interview transcripts for each theme and sub-theme.

Table 3

Emerging themes and sub-themes with supporting excerpts from the interview transcripts

Themes	Sub-themes	Excerpts from the interview transcripts
Theme 1: Developing competencies to use in clinical practice when encountering people with CDs	1.1 Pursuing its own professional development and further enhancing practices for CDs by using one's learning experience	<p>- <i>Things we've seen or had access to in the ECHO Programme, well, I share them. There's also a moment in the week where my colleagues and I take the time for a little wrap-up... you add an item to the agenda to tell others about an article or whatever, something that caught our attention. That's something we're trying to do also now more and more So it's not ECHO, but we do it on a small scale. (P4)</i></p> <p>- <i>What I appreciated was when we had to fill out the knowledge questionnaires after the session and it showed our weaknesses, the things that we had to work on and improve, like, for me it was alcohol withdrawal and suicide risk. It's an opportunity for self-reflection. (P5)</i></p>
	1.2 Integrating new interventions while dealing with the complex healthcare needs of people with CDs	<p>- <i>What I realized is that my patients aren't much different from other patients. So, in many cases I told myself: "Well, don't lose hope." There was a patient that it's been years he's like the same person doing the same thing the same way, but it was still worth a shot to invest in him. And I think that what I learned over the course of many ECHO sessions is that yes, it's true, it's difficult to take care of people with concurrent disorders, but despite everything there are still solutions and things that you can do. (P4)</i></p> <p>- <i>I can say that I'm more comfortable working with concurrent disorders than I used to be. I have greater confidence in my aptitudes to treat a patient rather than to refer him immediately to other services or at a specialized service. (P2)</i></p>
	1.3 Providing care to people with CDs using an integrated approach	<p>- <i>However, I find in fact that during ECHO ... it was nonetheless at the heart of the matter to work as much on physical health, as on mental health, as on substance use disorders. I think that it was something that kept coming back at just about all the ECHO sessions, the importance to address all of the different issues at the same time. There was also a didactic presentation that talked a little about the effects of substance use on, among other things, on cognition. Being able to assess the impact of withdrawal and to adapt ultimately our interventions to the clinical situation. (P10)</i></p>

Note. ECHO: Extension for Community Healthcare Outcomes; P: Participant.

Themes, sub-themes and excerpts from interview transcripts were translated from French to English by a certified translator.

Themes	Sub-themes	Excerpts from the interview transcripts
	1.4 Using new knowledge and skills to deliver evidence-based interventions to people with CDs	<p>- I have the impression that since ECHO, I am more developing motivational interviewing in my practice. Of course I was already doing it, I already had some basic knowledge, but I have the impression that it's something that's now a little more developed. I think that I communicate it better through my practice, especially if the patient really wants to hear it, you know. (P1)</p> <p>- During ECHO we talked about safe injecting, best practices for harm reduction, and how in fact do we empower patients to inject themselves safely. I learned about what signs and symptoms to look at for when these patients are not doing so well, and what strategies I can use. (P10)</p>
	1.5 Maximizing opportunities for collaboration	<p>- The more contact I had with addiction services' team, the easier the communication with them, the more I know their services, the better I can then explain them to our patients and inform them adequately, in the end, on what's available and how to access those services. (P1)</p> <p>- My colleagues and I we help each other quite a bit and we form a pretty tight-knit team, so when we're faced with challenges, well, we look for other ideas, other resources in our team. We try not to go it alone when there are complex situations. So this way we feel less overwhelmed. (P5)</p>
	1.6 Making more effective use of apposite resources by knowing what's available	<p>- Like it or not, it helps to do some mentoring like ECHO with various types of professionals and organizations. So that incites my team and I even more to use existing services for further information and clinical support. It opens things up. (P9)</p>
	1.7 Providing flexible follow-up tailored to the unique needs of people with CDs	<p>- I think I am less trying to rush things up. I'm asking if the time is right for the person to quit alcohol and really take the time to patch things up properly afterwards. Sometimes it's a matter of paving the way better, maybe take a little more time at first to prepare the person to quit for it to be more effective in the long run. (P2)</p> <p>- Having the treatment plan up to date... But sometimes you don't always have the time, so you don't always do it. Often, it's the first thing that falls by the wayside. But realizing that in fact, well, it's important to question things regularly, to update them all the time. So that was highlighted during ECHO. (P4)</p>

Note. ECHO: Extension for Community Healthcare Outcomes; P: Participant.

Themes, sub-themes and excerpts from interview transcripts were translated from French to English by a certified translator.

Themes	Sub-themes	Excerpts from the interview transcripts
	1.8 Adopting non-judgmental attitudes towards people with CDs to maintain therapeutic alliance	<p>- I know that it (ECHO) helped me work out all of my misconceptions ... understanding a little better what can bring people to use and how it's not easy at all to quit, that it's not just someone with no willpower. And... you know, it's not easy, deep down, to overcome a substance use disorder. (P1)</p> <p>- I have the impression that I'm more understanding ... much less judgmental. I imagine that it must transpire in my body language that I am not the least bit judgmental and all I really want to do is properly assess the situation and direct the person towards the proper resources, guide them properly. (P9)</p>
<b>Theme 2:</b> <b>Learning through a shifting lens and transforming clinical practice</b>	2.1 Developing one's competencies through peer experience	<p>- For me, it's really a matter of learning from the expertise of others. Having this opportunity to hear the questions that other participants raised, and what others would then propose. We often ask ourselves the same questions and then you realize: "Oh, well, it's true. I could maybe do such and such with my patient too". That, I find, is extremely enriching as a professional. (P3)</p>
	2.2 Developing one's competencies by collaborating with CD experts	<p>- There were a lot of cases of schizophrenia, complex situations, who were isolated and what to do to mobilize them again. That, I found that interesting. I remember one time when I told myself: "Hey, I myself wouldn't know what to do with that". And I admired the team's dedication and how they approached that. I really would have needed support if I had been in their situation. Having a vision of loads of mentors from across the region, in the end ...I found that to be a rich source of information. (P6)</p>
	2.3 Developing one's competencies by strengthening one's self-confidence	<p>- Sometimes, you feel like ... you're not good at what you do or you question your abilities a lot precisely when things fail to come to a successful conclusion or you keep going through the same problems with some patients over and over, and to share this with others from regions other than our own ... for those of us who do not work in the major urban centers with specialists... So that, too, is reassuring. It's to see that, in the end, what we manage to do with the means at our disposal, well it's not bad at all. (P4)</p> <p>- Because sometimes we have alternative ideas and we tell ourselves: "This time, are we completely off track what we should be doing?" And when we see that others do the same thing, we say: "Well, okay. If it works out fine for them, it should work out fine for us as well. (P5)</p>
<b>Theme 3:</b> <b>Factors facilitating competency development</b>	3.1 Being provided with relevant educational material	<p>- Personally, what I liked a lot was the didactic presentations. And what's good is that they're all backed up with references and they're listed on the website. That's super interesting because I went and retrieved a few of them. So, what it allows us to do is to base our interventions then on the literature. (P3)</p>
<p>Note. ECHO: Extension for Community Healthcare Outcomes; P: Participant.</p>		
<p>Themes, sub-themes and excerpts from interview transcripts were translated from French to English by a certified translator.</p>		

Themes	Sub-themes	Excerpts from the interview transcripts
and practice change	3.2 Feeling a sense of belonging to a community	<p>- <i>You know, you feel a little like you're not all alone. At times you have questions, and you don't know who to turn to. So, this (ECHO) was the perfect place to do so. (P3)</i></p> <p>- <i>Everyone expressing their point of view, everyone sharing, bringing a different perspective ... Personally, I found that there was a nice sense of camaraderie so that everyone could feel very comfortable about asking questions and getting answers. Everyone was very respectful when others spoke and waited their turn to speak. They (team of experts) made sure there was time enough for people to answer the questions. Because of this, I found there was a lot of conviviality, and it was fun. (P9)</i></p>
	3.3 Learning in an interprofessional environment	<p>- <i>In the ECHO sessions on concurrent disorders, well, the panel (team of experts) is interdisciplinary. That, in my opinion, is a winning ingredient there, precisely because our clientele is so varied, so complex and multidimensional. (P3)</i></p> <p>- <i>I really like it a lot because the panel is diversified. We don't just get the physician's point of view, or the pharmacist's point of view ... it was a really diversified panel, so that made it interesting, getting to hear everyone's expertise. It was varied in terms of proposals. It was rich because in my team we don't have any occupational therapists, so it opened to new approaches as regards my practice. (P8)</i></p>
	3.4 Having access to continuing education through technologies	<p>- <i>What I like about ECHO is the easy access. First, the fact that it's free makes it accessible to everyone. And then, the fact that the sessions are delivered on Zoom, well, personally I found it helpful to be able to see the people, to be able to discuss things easily. (P3)</i></p>
<b>Theme 4:</b> <b>Factors limiting competency development and practice change</b>	4.1 Working with limited resources outside of major urban centers	<p>- <i>I would have liked for our own physicians to be involved more in ECHO, like for them to be more present to be able to gain a greater awareness of what's going on elsewhere and like stimulate their imagination. It would have been more interesting for us afterwards to put what we learned into practice. Because, as it turns out, sure, there were nice proposals made during ECHO, but... then, I did not have anyone to back me up about trying new treatment options. Because there are a lot of medical decisions to be made as well behind it all. (P5)</i></p> <p>- <i>Not being in a major urban center, I don't have access to all resources. At times I listened to the case discussions in the ECHO Programme, and they (team of experts) would propose such and such a resource that could help the patient. But I don't have the same array of services as are available in the major urban centers. So, in my opinion, you must be creative and try nonetheless to provide services tailored to your patients' needs. (P6)</i></p>
<i>Note.</i> ECHO: Extension for Community Healthcare Outcomes; P: Participant.		
Themes, sub-themes and excerpts from interview transcripts were translated from French to English by a certified translator.		

Themes	Sub-themes	Excerpts from the interview transcripts
	4.2 Experiencing lack of support from employer	<p>- <i>Well, what worked against me is that I've become a head nurse assistant along the way. That's why I couldn't put things into practice or integrate them as much and to try new things out with my patients because ... I was really pulled out of that role. (P1)</i></p> <p>- <i>What I retained was, I was very passive, in the sense that, I didn't contribute any case-based discussion. Plus, it took place at a time where I was pretty much alone in my team with a novice nurse, so I didn't have the time to prepare any cases to present for ECHO. I could have been more assiduous. (P2)</i></p> <p>- <i>Connectivity was a problem ... the connection at our hospital. We couldn't get connected, so I had to connect either on my cellphone or when I worked from home. Well, when I was home, sure, I was able to connect. Otherwise ... they wouldn't let me at work. So that's a major issue. (P3)</i></p> <p>- <i>It (ECHO) lasted an hour, an hour and a half, and so sometimes I couldn't always attend to the last didactic part because I had other things to do, appointments. (P5)</i></p> <p>- <i>The computer I was using at work didn't have a webcam, so I was only able to chat and listen. (P7)</i></p>
	4.3 Learning in group by way of real-time videoconferences	<p>- <i>There were lots of people during ECHO, a heck of a lot. Personally, I was really impressed, it was super interesting. It was a little intimidated, though. For sure, at first, the idea of presenting a case of patient, it was intimidating ... after all, if you get down to it, it was in front of a lot of people online, a lot of people. You don't know who they are ... it's not like in a classroom, whereby after 2-3 meetings you feel a little more at ease. (P1)</i></p> <p>- <i>For sure, I was very much questioning myself in the first sessions. So, when the time came to make recommendations to other participants, well, I had some reservations ... I would tell myself: "Well, maybe my vision isn't necessarily the right one." (P4)</i></p> <p>- <i>We were, my team and I, on one computer, so there was one person in front of the computer, and others in front of a large screen. Consequently, participation wasn't like optimal, to be able interact, I mean. So, generally, it was more through chat that we'd say: "Write this." But, at times, the time it took to write that, well, we'd moved on to something else. (P5)</i></p>
<p>Note. ECHO: Extension for Community Healthcare Outcomes; P: Participant.</p>		
<p>Themes, sub-themes and excerpts from interview transcripts were translated from French to English by a certified translator.</p>		

Table 3. Emerging themes and sub-themes with supporting excerpts from the interview transcripts

[INSERT Table 3 HERE]

# **Theme 1: Developing competencies to use in clinical practice when encountering people with CDs**

The findings showed that nurses who participated in ECHO-CD have progressed in eight clinical nursing elements of competencies. Above all eight progressions, nurses often indicated that ECHO-CD reinforced their willingness to pursue their own professional development and their involvement in advancing work practices in the field of CDs (sub-theme 1.1). Nurses were able to reflect on their own practice and identify their strengths and learning needs in CDs. They viewed ECHO-CD as a first step toward obtaining further clinical guidance and/or refining their expertise in CDs. Nurses felt more aware of how to update their current knowledge in CDs and to incorporate that into their own practice, as some of them accessed a variety of other formal and informal learning opportunities after ECHO-CD. Also, nurses provided their colleagues with assistance regarding CDs by sharing their new learning acquisitions.

A second perceived progress was to better manage the complex healthcare needs of people with CDs (sub-theme 1.2). Nurses recognized that positive change in people with CDs can be difficult but is not impossible. ECHO-CD helped them to develop and maintain a sense of hope towards people with CDs and to channel this sense into their care provision. Nurses were better managing healthcare needs by being able to adapt their professional ideals to their patients' needs, while seeking for help when they experienced feelings of helplessness. It was also noted that nurses felt more comfortable to deal with unexpected situations and further inclined to embrace ambiguity towards decision making.

Nurses considered that integrating mental health and addiction care was an important aspect of their role, and that ECHO-CD allowed them to further incorporate this fundamental CD-value into their clinical practice (sub-theme 1.3). Nurses indicated they felt more equipped to intervene on both conditions simultaneously by performing a comprehensive assessment of health and social needs and establishing priorities into their care plan. Nurses also acquired new CD-related knowledge (sub-theme 1.4), and information about where people with CDs can access more in-depth advice/services (sub-theme 1.6). These new learning acquisitions were somehow different for each nurse, according to their background or work setting. For instance, nurses who worked in mental health settings gained knowledge about addiction treatments, and skills in withdrawal management and motivational interviewing, while nurses in addiction treatment centres learned about distinguishing primary versus induced disorders, dealing with personality and anxiety disorders, and psychiatric medication.

# **Theme 2: Learning through a shifting lens and transforming clinical practice**

Theme 2 enhances our understanding of how ECHO-CD—in terms of learning methods and strategies—produced meaningful learning experiences from the nurse perspective. According to nurses' perceptions, social interaction was a key component of ECHO-CD as it allowed them to learn from their peers' experience, and to sometimes share their own suggestions or ideas (sub-theme 2.1). Nurses specifically valued the case-based discussion period, in which clinical story telling helped them to feel less alone by

normalizing the difficulties they faced when caring for individuals with CDs. Even for those nurses who did not present a clinical situation, listening to authentic and rich clinical experiences from peers led them to reflect on their own learning and practice, which positioned them well for self-transforming.

Nurses appreciated benefiting from the recommendations and feedback of an interprofessional team of experts in CDs (sub-theme 2.2). Nurses viewed this opportunity as immensely important as they received support from experts with whom they would otherwise not be able to connect with on a regular basis. A key finding was that nurses viewed these healthcare professionals as mentors. Nurses felt more inclined to adapt their clinical practice based on the experts' recommendations since they valued and recognized their expertise within the field of CDs.

Nurses' learning experience helped them to strengthen their confidence in caring for people with CDs (sub-theme 2.3). This sense of confidence was progressively internalized as nurses went through the programme curriculum. For some nurses, receiving recommendations and feedback from experts reassured them that their clinical practice aligned with evidence-based practice in CDs. For other nurses, listening to their peer's experiences allowed them to notice the benefits of changing some of their current behaviours.

The thematic analysis also provided insights into the relationships between theme 1 and 2—meaning which educational components of the programme most contributed to the respective progression of each clinical nursing competency. For example, when “integrating new interventions while dealing with the complex healthcare needs of people with CDs” (sub-theme 1.2), nurses developed their clinical judgment competency further by being exposed to the realities of their peers and by observing others approaches to challenging clinical situations (sub-theme 2.1). When a clinical situation was presented and then discussed, nurses felt reassured that others in the same position might experience the same struggles. Similarly, most nurses gained scientific and up-to-date knowledge in CDs (sub-theme 1.4) from receiving guidance from experts (sub-theme 2.2).

## **Theme 3: Factors facilitating competency development and practice change**

Nurses greatly appreciated the material provided during the programme (sub-theme 3.1). There was a consensus among the nurses that the didactic presentations' content was relevant and could be easily translated into their practice. Reflecting on their overall learning experience, nurses felt a genuine sense of belonging to a community (sub-theme 3.2), which allowed them to establish trust towards the group participants and maintain their engagement into the programme. Nurses reported that ECHO-CD fostered an open dialogue providing opportunities to communicate emotions of distress without feeling judged by others. This convivial atmosphere empowered by the experts and the facilitator's active hosting were perceived as positive contributors to learning.

Based on the nurses' perceptions, one important strength about ECHO-CD was the interprofessional approach that generated enriching discussions (sub-theme 3.3). This group wisdom allowed for

meaningful sharing of information and strengthened the acquisition of cross-disciplinary knowledge and skills in CDs, rather than focusing on silos of discipline-encapsulated knowledge. As such, being exposed to a diversity of allied and medical professions allowed nurses to further use an integrated approach to mental health and substance use issues when providing care to people with CDs (sub-theme 1.2), and foster collaboration between teams and agencies (sub-theme 1.5).

## **Theme 4: Factors limiting competency development and practice change**

Three sub-themes emerged as factors that negatively influenced the development and mobilization of the nurses' competencies, in relation to both the educational and the clinical settings. Firstly, an uneven distribution of appropriate resources for CDs was commonly reported by nurses as an important factor that precluded their capacity to provide adequate and flexible care (sub-them 4.1). This situation was particularly exacerbated for nurses working outside of large urban centres, where limited specialized resources are available. This finding came from witnessing that many nurses struggled to work in a health care system that seeks to avoid people with CDs, and that they often experienced a lack of appropriate referral pathways. As such, navigating through the multiple layers of the health care system to ensure care coordination was described by nurses as complex and demanding. During ECHO-CD, some nurses also claimed that expert recommendations about resources in CDs did not fit well with their local context of practice.

Within the context of limited human resources, nurses also expressed they were often in the position of arguing against their own colleagues about the best approaches to care in CDs. Most of the time, these situations took place when nurses sought to incorporate new ideas into their patients' care plan, based on what they had learned in ECHO-CD. Unfortunately, nurses had to demonstrate to their colleagues that their suggestions were scientifically proven, and how these new ideas would constitute an added value to the current care plan. Many nurses also felt that advancing practices in the field of CDs would require "philosophical change", noting that most healthcare professionals continue to work with a punitive approach with patients with CDs.

While nurses had a positive regard about learning from their peers' experience, they also identified the group modality as a major downside (sub-theme 4.3). Nurses expressed apprehensions and a sense of fear when beginning the programme, which were triggered by feeling intimidated from others' expertise in CDs. Nurses were particularly reluctant to use the video feature of the videoconference technology for presenting a clinical situation or when they believed their knowledge or experiences would have benefit the group. To overcome this, nurses felt more comfortable using the chat forum to ask questions and share their ideas. Nurses noted, however, that their apprehensions were allayed by the presence of a facilitator, and once they received constructive feedback and encouragements by the experts (sub-theme 3.2).

## **Discussion**

# Main findings

Our findings support that an interprofessional videoconference-based educational programme on CDs seem to reinforce the development of nurses' competencies and clinical practice (theme 1), through interactive learning with peers and experts, and through self-reflection (theme 2), and within an environment that can be either facilitating (theme 3) or limiting (theme 4). These findings are congruent with the results of Garrod's et al. (6) scoping review, in which the authors concluded that continuing education was an effective means of improving attitude, increasing knowledge and confidence, and supporting practice change in nurses who provide care to people with CDs. In complementarity with prior studies of ECHO programmes in the field of CDs that reported broad statistical results on participants' knowledge and confidence gain (22, 28–32), this study provided rich data on the manifestations of the development of clinical nursing competencies, and an in-depth understanding of how this process took place, and what factors influenced it.

This study highlighted that ECHO-CD created an educational space allowing nurses to further develop and mobilize their competencies into their clinical practice with individuals with CDs (theme 1). These findings closely correlate with essential competencies established in shared-competency frameworks in CDs (47), interprofessional guidelines of CD evidence-based interventions (5, 11), and Canadian standards of practice within the field of mental health nursing (48). Compared to those competency-based frameworks, our results indicated that most nurses progressed from a "core" to a "generalist" level of competency in CDs. Taking one particular example of this progression (with reference to sub-theme 1.3, "Providing care to people with CDs using an integrated approach"), the nurses perceived that prior to ECHO-CD, they were able to perform a basic screening assessment (i.e., core level) of their patients with CDs. Then, reflecting on their overall participation and the changes they made into their clinical practice, most nurses indicated they were now able to undertake a more in-depth assessment of their patients' past history and current needs, based on a comprehensive integration of mental and physical health, substance use and social functioning (i.e., generalist level). As opposed to this trend in their progression, our results indicated that some nurses evolved up to a "specialist" level in terms of pursuing their own professional development and further enhancing practices for CDs (sub-theme 1.1), as they were able to critically analyze their own practice and assist their colleagues in reviewing their knowledge, skills, and practice.

As indicated in previous studies (8, 49), the nurse participants viewed their clinical practice with people with CDs as a constant struggle between their professional ideals and their patients' expectations and choices (sub-theme 1.2). Even though most nurses felt emotionally exhausted when caring for more complex situations of CDs, participating in ECHO-CD allowed them to cultivate hope and maintain therapeutic optimism (sub-theme 1.8). Hence, ECHO was not only conducive to acquiring new knowledge or learning, but it has also fostered a supportive environment that was essential to nurses' well-being. Similarly, Petrakis et al. (50) conducted a systematic review regarding educational approaches to leveraging CD competencies and found that supervision supported healthcare professionals in difficult situations by helping them to reflect on the learning process that occurred.

We found that during ECHO-CD, nurses made some progress into their clinical competencies by interacting with peers (sub-theme 2.1), by being mentored by experts (sub-theme 2.2), and by building their own confidence (sub-theme 2.3). Our results indicate that ECHO-CD reflected well the three key theoretical foundations of the ECHO Model, namely Wenger's Theory of Communities of Practice (44), Lave and Wenger's Situated Learning Theory (43), and Bandura's Social Cognitive Theory of Behavioral Change (42)—which are linked to sub-themes 2.1, 2.2 and 2.3, respectively. This finding reiterates the results of a previous qualitative study on primary care providers' experiences of participating in an ECHO programme on resistant hypertension (51), whereby the participants highlighted the benefits of each theory's educational principles. In this study, we have extended those findings by emphasizing on how each of the learning theories used in ECHO-CD were intimately related to the distinctive progression of certain competency elements.

In terms of facilitating factors, most nurses felt that the didactic presentations were crucial to acquiring specific and up-to-date knowledge on CDs, and they would appreciate that more time would have been allocated to this (sub-theme 3.1). This finding was not anticipated, given the fact that traditional lectures have been documented as less effective than active methods of learning. While published work within the field of nursing education has called for alternatives to traditional continuing education (52), our study findings showed that nurses rewarded ECHO-CD for its capacity to join both active and passive methods of learning. One possible explanation is that nurses may need more guidance or direct supervision in order to further develop their competencies in CDs (6). Indeed, entering an interdisciplinary, videoconference-based environment with unknown colleagues and experts triggered uncertainties and questioning in nurses about how they provided—or should provide— care to people with CDs.

Considering that the ECHO Model was originally designed for medical providers only, an interesting finding from this study is that nurses viewed the interprofessional environment as a key factor that enabled their competency development (sub-theme 3.3). The positive impacts of interprofessional education on knowledge and skills in collaboration are well documented within nursing education research (53, 54), as well as in the field of mental health nursing practice (55). Similarly, studies within the ECHO literature have outlined several benefits of interprofessional education from the experiences and views of participants such as an increased awareness of one's and colleagues' professional role and open-minded attitudes towards interprofessional collaboration (56–61).

While technical issues such as Internet connectivity and bandwidth have been reported as important barriers to participation in other ECHO programmes worldwide (61–63), this study on the contrary revealed that nurses had a positive experience with the videoconference technology (sub-theme 3.4). The Zoom software was viewed as a convenient and flexible means of learning that does not require advanced technological skills. This finding is consistent with other authors, such as Gagnon et al. (64) who concluded in a systematic review that ease of use and perceived usefulness were the most common factors influencing the adoption of information and communication technologies by healthcare professionals.

Regarding limiting factors, this study's findings show that diligent participation was a challenge for nurses—and this was mostly due to the lack of support from their employer and/or organization (sub-theme 4.2). As a result, it was common for nurses to not participate in each session of the programme or only to attend a part of a session. Barriers to participation included time/practice-related issues, lack of appropriate technological material to fully take part in the programme, increases in nursing workload and rolling staff placement. Such contextual factors may negatively influence participation—as we found that nurses' engagement in ECHO-CD varied from actively participating (e.g., presenting a clinical situation, intervening with others throughout a session by sharing knowledge, personal experiences or feedback), to minimally interacting with others using the chat forum or being passive (e.g., no verbal or written interactions). These findings are congruent with existing literature on virtual communities of practice in other contexts than ECHO. For instance, an integrative review by McLoughlin et al. (65) revealed that a large proportion of participants function in the role of “lurkers” (i.e., participants who do not actively participate), especially when participation is neither required nor requested by the community. Nevertheless, it has been suggested that “lurking” can be a first step for participants who are apprehensive about using technology, or who lack confidence or experience.

Overall, this study builds on growing literature describing factors that can positively (theme 3) and negatively (theme 4) influence learning within continuing professional education (66). It is novel in that it exposes—from nurses' experiences and perceptions—that such factors are multi-faceted, ranging from proximal (i.e., personal and educational factors) to distal influences (i.e., contextual factors such as social, cultural, environmental, organizational and political influences). Hence, strategies for fostering competency development and practice change in nurses will need to address a broad range of factors simultaneously. Interestingly, our findings indicated that personal and educational factors (i.e., educational material, sense of belonging to a community, interprofessional environment, videoconference technology, group learning mode) identified by nurses mirrored most of the barriers and facilitators previously described in a broad spectrum of the ECHO literature (e.g., chronic pain, Hepatitis C, paediatric care) (17, 58, 62, 67), while contextual factors (i.e., limited resources, lack of employee support) specifically accounted for evidence from ECHO programmes in the field of mental health/psychiatric and addiction care (28, 32, 68–70).

## Limitations

Above all, 32 nurses from the whole population ( $N = 65$ ) met the inclusion criteria and of these, only 10 agreed to participate in this study. Hence, it is possible that a selection bias exists, since nurses who did not participate in this study may have different experiences or perceptions that we were not able to capture. However, the data collection strategies used in this study, including ensuring a certain level of heterogeneity between the recruited participants and conducting in-depth interviews, helped strengthen the credibility of the findings. Our results should also be interpreted with caution, as this study included nurses working in healthcare services across one province only. Finally, we acknowledge that our findings may not be indicative of everyone's experience, including other health professions or local contexts that may differ.

# Implication of the findings for education, clinical practice, and research

Drawing from this study's findings and existing research evidence, we have underpinned in Table 4a number of recommendations which are likely to be beneficial for education, clinical nursing practice, and research.

Table 4

Recommendations for education, clinical practice, and future research, based on the study findings

Key findings	Recommendations
<b>Education</b>	
<p>- This study emphasizes the pressing need for all nurses encountering people with CDs to be offered basic education—even the experienced nurses, who may benefit from continuing education opportunities to expand their scope of practice.</p>	<p>- Both mental health/psychiatric and addiction issues must be covered in undergraduate nursing programs (48).</p> <p>- Continuing professional education in CDs should be standardized within the clinical settings.</p>
<p>- ECHO is an online collaborative model of continuing education relying on active participation for content.</p>	<p>- Limited and fragmented participation should be addressed in future ECHO programmes—or in other types of online collaborative learning models—by developing mechanisms for engaging non-contributing participants with active knowledge sharers.</p>
<p>- Despite its many benefits, group learning mode can negatively influence participation.</p> <p>- Nurses may not feel comfortable sharing with the group, or interacting with other participants, especially with those of a senior position or with more expertise.</p>	<p>- Ensuring that educational programmes have a positive and encouraging environment can help to build a trust culture between participants.</p> <p>- Carefully selecting facilitators who are both knowledgeable in the specialist area and team builders in their approach to sharing knowledge.</p> <p>- The key task of the facilitator is to create a safe learning environment in which participants can share their successes as well as their challenges.</p>
<p>- ECHO—and other types of VC-based educational programmes—depends on a reliable Internet connection and the use of visual connectivity to improve communication and relationship building between participants.</p>	<p>- Access to a dedicated technological support service during the sessions is a prerequisite to ensuring the successful conduct of the learning activities.</p>
<b>Clinical nursing practice</b>	
<p>- Caring for individuals with CDs is challenging for nurses, and it has been associated with a higher vulnerability to burnout syndrome and with low job satisfaction and work engagement among nurses (71, 72).</p>	<p>- Mentoring programmes and supervision should be further incorporated into nursing practice and clinical settings.</p> <p>- A team-based approach to continuing professional development should be prioritized to enhance collaboration and communication between colleagues, and to align care practices around shared values and goals.</p> <p>- Emotional support is essential to enrich the continuing education programmes already in place.</p>
<p><i>Note.</i> CDs: Concurrent Disorders; ECHO: Extension for Community Healthcare Outcomes; HD: High Definition; VC: Videoconference.</p>	

Key findings	Recommendations
	<ul style="list-style-type: none"> <li>- Future continuing education programmes should integrate self-confidence enhancing strategies to support nurses in caring for individuals with complex healthcare needs.</li> </ul>
<ul style="list-style-type: none"> <li>- Factors influencing nursing competency development are multi-faceted.</li> </ul>	<ul style="list-style-type: none"> <li>- A tailored approach to continuing professional education, whereby the structure and clinical content of interventions are personalized to the needs of their end users, is essential for optimize changes in clinical practice.</li> <li>- Researchers, educators, and clinical leaders should develop mechanisms to reinforce nurses’ participation in and motivation toward continuing professional education by engaging with them during all design and maintenance procedures—starting from the planification, through to the evaluation and improvement of their initiatives.</li> <li>- Protected time periods during working hours must be established for nurses to engage in continuing professional development opportunities.</li> </ul>
	<ul style="list-style-type: none"> <li>- Working environment should provide nurses with the minimum technical equipment required to fully benefit from online educational programmes (e.g., desktop or laptop computer, Internet connection, webcam or HD cam, and speakers and microphones).</li> </ul>
	<ul style="list-style-type: none"> <li>- Supportive leadership from local stakeholders, including health administrators and organizational leaders, is crucial to foster best care practices and promote a culture of change.</li> </ul>
<b>Future research</b>	
<ul style="list-style-type: none"> <li>- Future research and evaluation work are needed to extend our current understanding of barriers to and enablers of participants’ engagement in ECHO. For example, studies should aim to examine what level or type of engagement is ideal for learning to occur and be sustained in longer term outcomes.</li> </ul>	
<ul style="list-style-type: none"> <li>- Given that the ECHO Model allows developers to adapt its content and structure it to local needs, further research is needed to better understand how these variations in the educational intervention may affect participants’ learning and clinical practice.</li> </ul>	
<ul style="list-style-type: none"> <li>- More research needs to be conducted into the effectiveness of ECHO for increasing learning and professional performance. For example, studies should focus on addressing the following question: What are the best education practices for using ECHO, and what areas should be improved to enhance its effectiveness in supporting competency development and changes in clinical practice?</li> </ul>	
<ul style="list-style-type: none"> <li>- Further research should aim to examine interaction processes in educational interventions using many learning methods simultaneously and to investigate their impact on nursing learning and practice-level outcomes.</li> </ul>	
<p><i>Note.</i> CDs: Concurrent Disorders; ECHO: Extension for Community Healthcare Outcomes; HD: High Definition; VC: Videoconference.</p>	

Table 4. Recommendations for education, clinical practice, and future research, based on the study findings

[INSERT Table 4 HERE]

## Conclusions

To our knowledge, this is the first study of an ECHO programme on CDs aiming to explore how nurses further developed and mobilized their competencies into their clinical practice. Building on a socio-constructivist perspective of learning, this study stands out for its' philosophical and conceptual originality, and sheds new light on the ECHO Model contributions to the competency development and clinical practice of nurses. It was unique in that it sought insight into the progression of nurses' learning while gathering rich data about the factors that facilitated or limited this process. This study therefore contributes to the current body of knowledge on the ECHO Model and adds value in terms of increased understanding of what are the optimal educational methods and learning environment that can support nurses in developing high-level of competencies in CDs. It also adds some support to previous research emphasizing the current need for nurses to participate in formal opportunities for continuing professional development over the span of their careers.

Our results suggest that ECHO-CD offered an efficient and convenient alternative to traditional continuing education, since it situates learning within authentic professional practice using videoconference technology. Furthermore, ECHO-CD was an opportunity for experiential learning that helps nurses apply their new knowledge to improving their problem solving and to meeting the dynamic and complex needs of patients with CDs. These findings are critical to both the field of nursing education research and continuing education research in the health professions. They will provide guidance to researchers, educators, nurses, and decision makers who are developing, implementing, evaluating, and escalating future educational interventions in the field of CDs.

## Declarations

### **Ethics approval and consent to participate:**

All methods were carried out in accordance with the Canadian Tri-Council Policy Statement on Ethical Conduct for Research Involving Humans (73), and the COREQ (36) guidelines for qualitative research. The study was approved by the Ethics Committee of the Université de Montréal Hospital Center (#19.295) and the Université de Montréal Research Ethics Committee in Sciences and Health (CERSES-20-017 R). All the participants provided written informed consent.

**Consent for publication:** Not applicable.

**Availability of data and materials:**

The datasets generated and/or analyzed during the current study are not publicly available due to their sensitive nature (i.e., the data used in this study were collected through individual interviews and are in the form of personal verbatim) but are available from the corresponding author on reasonable request.

**Competing interests:**

The authors declare that they have no competing interests.

**Funding:**

This study received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

**Author's contributions:**

GC: Conceptualization of the study, recruitment of participants, acquisition of data, analysis and interpretation of data, writing original draft, conceptualization of the figure, editing and reviewing the manuscript.

JC: Conceptualization of the study, analysis, and interpretation of data, editing and reviewing the manuscript.

JP: Conceptualization of the study, analysis, and interpretation of data, editing and reviewing the manuscript.

LB: Conceptualization of the study, editing and reviewing the manuscript.

GR: Editing and reviewing the manuscript.

DJA: Conceptualization of the study, analysis, and interpretation of data, editing and reviewing the manuscript.

**Acknowledgments:**

The authors wish to thank the nurses who participated in this study and Mrs. Clémence Provost Gervais for her assistance with study coordination.

This study was conducted as part of the doctoral studies of the first author (GC) and for which she received scholarships from the following: Foundation of the Université de Montréal Hospital Centre, Fonds de Recherche du Québec–Société et Culture (FRQSC), Quebec's Ministry of Higher Education Scholarship Program, Research Chair in Innovative Nursing Practices and Équipe FUTUR-FRQSC.

DJA holds a clinical scientist career award from the Fonds de Recherche du Québec (FRQS) and acknowledges research support from Health Canada and the Quebec's Ministry of Health and Social Services.

## References

1. Urbanoski K, Inglis D, Veldhuizen S. Service Use and Unmet Needs for Substance Use and Mental Disorders in Canada. *Can J Psychiatry*. 2017;62(8):551–9.
2. Pinderup P, Thylstrup B, Hesse M. Critical Review of Dual Diagnosis Training for Mental Health Professionals. *Int J Ment Health Addiction*. 2016;14(5):856–72.
3. Priester MA, Browne T, Lachini A, Clone S, DeHart D, Seay KD. Treatment Access Barriers and Disparities Among Individuals with Co-Occurring Mental Health and Substance Use Disorders: An Integrative Literature Review. *J Subst Abuse Treat*. 2016;61:47–59.
4. Khan S. Troubles concomitants de santé mentale et de consommation d'alcool ou de drogues au Canada (Rapports sur la santé). Statistique Canada. 2017. <http://www.statcan.gc.ca/pub/82-003-x/2017008/article/54853-fra.pdf>. Accessed Dec 9 2021.
5. O'Neill S, Lapalme M, Camiré M. Modèles de dispensation des soins et services aux personnes présentant des troubles concomitants de santé mentale et de dépendance. Institut Nationale d'Excellence en Santé et en Services Sociaux (INESSS). 2016. <http://www.santecom.qc.ca/Bibliothequevirtuelle/INESSS/9782550753469.pdf>. Accessed Jan 31 2022.
6. Garrod E, Jenkins E, Currie LM, McGuinness L, Bonnie K. Leveraging Nurses to Improve Care for Patients with Concurrent Disorders in Inpatient Mental Health Settings: A Scoping Review. *J Dual Diagn*. 2020;16(3):357–72.
7. Padwa H, Guerrero EG, Braslow JT, Fenwick KM. Barriers to Serving Clients With Co-occurring Disorders in a Transformed mental Health System. *Psychiatr Serv*. 2015;66(5):547–50.
8. van Boekel LC, Brouwers EPM, van Weeghel J, Garretsen HFL. Stigma among health professionals towards patients with substance use disorders and its consequences for healthcare delivery: Systematic review. *Drug Alcohol Depend*. 2013;13(1):23–35.
9. Coombes L, Wratten A. The lived experience of community mental health nurses working with people who have dual diagnosis: a phenomenological study. *J Psychiatr Ment Health Nurs*. 2007;14(4):382–92.
10. McCabe E, Parrish M. A review of the complexities of working effectively with people being prescribed both antipsychotic medications and opioid substitution therapy. *Drugs: Education, prevention and policy*. 2018;25(1):1–12.
11. National Institute for Care and Health Excellence (NICE). Coexisting severe mental illness and substance misuse: Community health and social care services (NG58). 2016. <https://www.nice.org.uk/guidance/ng58>. Accessed Jan 15 2022.
12. Babenko O, Koppula S, Daniels L, Nadon L, Daniels V. Lifelong learning along the education and career continuum: meta-analysis of studies in health professions. *J Adv Med Educ Prof*. 2017;5(4):157–63.

13. Price S, Reichert C. The Importance of Continuing Professional Development to Career Satisfaction and Patient Care: Meeting the Needs of Novice to Mid- to Late-Career Nurses throughout Their Career Span. *Administrative Sciences*. 2017;7(2):17.
14. Skiba DJ. Technology Enabled Learning in Nursing. In: Hussey P, Kennedy MA, editors. *Introduction to Nursing Informatics*. 5 ed. Cham, Switzerland: Springer Nature; 2021. p. 375–94.
15. Arora S, Kalishman S, Dion D, Som D, Thornton K, Bankhurst A, et al. Partnering urban academic medical centers and rural primary care clinicians to provide complex chronic disease care. *Health Aff (Millwood)*. 2011;30(6):1176–84.
16. Faherty LJ, Rose AJ, Chappel A, Taplin C, Martineau M, Fischer SH. Assessing and Expanding the Evidence Base for Project ECHO and ECHO-Like Models: Findings of a Technical Expert Panel. *J Gen Intern Med*. 2020;35(3):899–902.
17. Zhou C, Crawford A, Serhal E, Kurdyak P, Sockalingam S. The Impact of Project ECHO on Participant and Patient Outcomes: A Systematic Review. *Acad Med*. 2016;91(10):1439–61.
18. Holmes CM, Keyser-Marcus L, Dave B, Mishra V. Project ECHO and Opioid Education: A Systematic Review. *Curr Treat Options Psych*. 2020;7(1):9–22.
19. McBain RK, Sousa JL, Rose AJ, Baxi SM, Faherty LJ, Taplin C, et al. Impact of Project ECHO Models of Medical Tele-Education: A Systematic Review. *J Gen Intern Med*. 2019;34(12):2842–57.
20. Catic AG, Mattison ML, Bakaev I, Morgan M, Monti SM, Lipsitz L. ECHO-AGE: an innovative model of geriatric care for long-term care residents with dementia and behavioral issues. *J Am Med Dir Assoc*. 2014;15(12):938–42.
21. Beste LA, Glorioso TJ, Ho PM, Au DH, Kirsh SR, Todd-Stenberg J, et al. Telemedicine Specialty Support Promotes Hepatitis C Treatment by Primary Care Providers in the Department of Veterans Affairs. *Am J Med*. 2017;130(4):432-8.e3.
22. Komaromy M, Bartlett J, Manis K, Arora S. Enhanced Primary Care Treatment of Behavioral Disorders With ECHO Case-Based Learning. *Psychiatr Serv*. 2017;68(9):873–5.
23. Beste LA, Mattox EA, Pichler R, Young BA, Au DH, Kirsh SF, et al. Primary Care Team Members Report Greater Individual Benefits from Long- Versus Short-Term Specialty Telemedicine Mentorship. *Telemed J E Health*. 2016;22(8):699–706.
24. Ni Cheallaigh C, O'Leary A, Keating S, Singleton A, Heffernan S, Keenan E, et al. Telementoring with project ECHO: A pilot study in Europe. *BMJ Innov*. 2017;3(3):144–51.
25. Bauer L, Bodenheimer T. Expanded roles of registered nurses in primary care delivery of the future. *Nurs Outlook*. 2017;65(5):624–32.
26. Blankson ML, Almonte SY, Lainas KA. Implementing Project Echo: Complex Care Management, Using Technology to Support Primary Care Nurses. 2017. <https://www.nursingrepository.org/handle/10755/622467>. Accessed 20 Jan 2022.
27. White C, McIlpatrick S, Dunwoody L. Supporting and improving community health services—a prospective evaluation of ECHO technology in community palliative care nursing teams. *BMJ Support Palliat Care*. 2019;9(2):202–8.

28. Chand P, Murthy P, Gupta V, Kandasamy A, Jayarajan D, Sethu L, et al. Technology Enhanced Learning in Addiction Mental Health: Developing a Virtual Knowledge Network: NIMHANS ECHO. 2014 IEEE Sixth International Conference on Technology for Education. 2014:229 – 32.
29. Komaromy M, Duhigg D, Metcalf A, Carlson C, Kalishman S, Hayes L, et al. Project ECHO (Extension for Community Healthcare Outcomes): A new model for educating primary care providers about treatment of substance use disorders. *Subst Abus.* 2016;37(1):20–4.
30. Komaromy M, Madden EF, Hager B. Improvement in Behavioral Health Symptoms and Functioning Among Rural Patients Cared for by Primary Care Teams Using the Extension for Community Health Care Outcomes Model. *Journal of Rural Mental Health.* 2019;43(2 & 3):73–80.
31. Mehrotra K, Chand P, Bandawar M, Rao Sagi M, Kaur S, G A, et al. Effectiveness of NIMHANS ECHO blended tele-mentoring model on Integrated Mental Health and Addiction for counsellors in rural and underserved districts of Chhattisgarh, India. *Asian J Psychiatr.* 2018;36:123–7.
32. Sockalingam S, Arena A, Serhal E, Mohri L, Alloo J, Crawford A. Building Provincial Mental Health Capacity in Primary Care: An Evaluation of a Project ECHO Mental Health Program. *Acad Psychiatry.* 2017;42:451–7.
33. Pepin J, Goudreau J, Lavoie P, Belisle M, Blanchet Garneau A, Boyer L, et al. A nursing education research framework for transformative learning and interdependence of academia and practice. *Nurse Educ Today.* 2017;52:50–2.
34. Tardif J. L'évaluation des compétences: Documenter le parcours de développement. Fortier G, Préfontaine C, editors. Montreal, Canada: Chenelière Éducation; 2006.
35. Chicoine G, Côté J, Pepin J, Pluye P, Boyer L, Fontaine G, et al. Impact of a videoconferencing educational programme for the management of concurrent disorders on nurses' competency development and clinical practice: protocol for a convergent mixed methods study. *BMJ Open.* 2021;11(3):e042875.
36. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): A 32-item checklist for interviews and focus groups. *Int J Qual Health Care.* 2007;19(6):349–57.
37. Thorne S. *Interpretive description: Qualitative research for applied practice.* 2 ed. New York, USA: Routledge; 2016.
38. Thompson Burdine J, Thorne S, Sandhu G. Interpretive description: A flexible qualitative methodology for medical education research. *Med Educ.* 2020;55:336–43.
39. Phillips AC, Lewis LK, McEvoy MP, Galipeau J, Glasziou P, Moher D, et al. Development and validation of the guideline for reporting evidence-based practice educational interventions and teaching (GREET). *BMC Med Educ.* 2016;16(1):237.
40. Arora S, Kalishman S, Thornton K, Dion D, Murata G, Deming P, et al. Expanding access to hepatitis C virus treatment—Extension for Community Healthcare Outcomes (ECHO) project: Disruptive innovation in specialty care. *Hepatology.* 2010;52(3):1124–33.
41. Arora S, Thornton K, Jenkusky SM, Parish B, Scaletti JV. Project ECHO: linking university specialists with rural and prison-based clinicians to improve care for people with chronic hepatitis C in New

- Mexico. Public Health Rep. 2007;122 Suppl 2:74–7.
42. Bandura A. Self-efficacy: Toward a unifying theory of behavioral change. *Psychol Rev.* 1977;84:191–25.
  43. Lave J, Wenger E. *Situated Learning: Legitimate Peripheral Participation.* Cambridge, UK: Cambridge University Press; 1991.
  44. Wenger E. *Communities of practice: Learning, meaning, and identity.* 1 ed. Cambridge, UK: Cambridge University Press; 1998.
  45. Paillé P, Mucchielli A. *L'analyse qualitative en sciences humaines et sociales.* 4 ed. Malakoff, France: Armand Colin; 2016.
  46. Birt L, Scott S, Cavers D, Campbell C, Walter F. Member Checking: A Tool to Enhance Trustworthiness or Merely a Nod to Validation? *Qual Health Res.* 2016;26(13):1802–11.
  47. Hughes E. *Closing the Gap: A Capability Framework for Working Effectively with People with Combined Mental Health and Substance Use Problems (Dual Diagnosis).* Centre for Clinical and Academic Workforce Innovation, University of Lincoln. 2006.  
<http://eprints.lincoln.ac.uk/id/eprint/729/1/uoa12eh05.pdf>. Accessed Dec 17 2021.
  48. Canadian Association of School of Nursing (CASN). *Entry-to-Practice Mental Health and Addiction Competencies for Undergraduate Nursing Education in Canada.* 2015. [https://www.casn.ca/wp-content/uploads/2015/11/Mental-health-Competencies\\_EN\\_FINAL-3-Oct-26-2015.pdf](https://www.casn.ca/wp-content/uploads/2015/11/Mental-health-Competencies_EN_FINAL-3-Oct-26-2015.pdf). Accessed Jan 15 2022.
  49. Roncero C, Szerman N, Teran A, Pino C, Vazquez JM, Velasco E, et al. Professionals' perception on the management of patients with dual disorders. *Patient Prefer Adherence.* 2016;10:1855–68.
  50. Petrakis M, Robinson R, Myers K, Kroes S, O'Connor S. Dual diagnosis competencies: A systematic review of staff training literature. *Addict Behav Rep.* 2018;7:53–7.
  51. Socolovsky C, Masi C, Hamlis T, Aduana G, Arora S, Bakris G, et al. Evaluating the role of key learning theories in ECHO: A telehealth educational program for primary care providers. *Progress in Community Health Partnerships: Research, Education, and Action.* 2013;7(4):361–8.
  52. Frenk J, Chen L, Bhutta ZA, Cohen J, Crisp N, Evans T, et al. Health professionals for a new century: Transforming education to strengthen health systems in an interdependent world. *The Lancet.* 2010;376(9756):1923–58.
  53. Guraya SY, Barr H. The effectiveness of interprofessional education in healthcare: A systematic review and meta-analysis. *The Kaohsiung Journal of Medical Sciences.* 2018;34(3):160–5.
  54. Rutherford-Hemming T, Lioce L. State of Interprofessional Education in Nursing: A Systematic Review. *Nurse Educ.* 2018;43(1):9–13.
  55. Marcussen M, Nørgaard B, Arnfred S. The Effects of Interprofessional Education in Mental Health Practice: Findings from a Systematic Review. *Acad Psychiatry.* 2019;43(2):200–8.
  56. 56.

57. Damian AJ, Robinson S, Manzoor F, Lamb M, Rojas A, Porto A, et al. A mixed methods evaluation of the feasibility, acceptability, and impact of a pilot project ECHO for community health workers (CHWs). *Pilot Feasibility Stud.* 2020;6:132.
58. Hassan S, Carlin L, Zhao J, Taenzer P, Furlan AD. Promoting an interprofessional approach to chronic pain management in primary care using Project ECHO. *J Interprof Care.* 2020;35(3):464–7.
59. De Witt Jansen B, Brazil K, Passmore P, Buchanan H, Maxwell D, McIlpatrick SJ, et al. Evaluation of the impact of telementoring using ECHO(c) technology on healthcare professionals' knowledge and self-efficacy in assessing and managing pain for people with advanced dementia nearing the end of life. *BMC Health Serv Res.* 2018;18(1):228.
60. Doherty M, Modanloo S, Evans E, Newhook D. Exploring learners' perspectives of a Project ECHO palliative care education curriculum in resource-limited settings in light of key learning theories. *Research Square.* 2020; doi: 10.21203/rs.2.21713/v1.
61. Shea CM, Gertner AK, Green SL. Barriers and perceived usefulness of an ECHO intervention for office-based buprenorphine treatment for opioid use disorder in North Carolina: A qualitative study. *Subst Abus.* 2019;42(1):54–64.
62. Ball S, Stryczek K, Stevenson L, Hearn R, Au DH, Ho PM, et al. A Qualitative Evaluation of the Pain Management VA-ECHO Program Using the RE-AIM Framework: The Participant's Perspective. *Front Public Health.* 2020;8:169.
63. Salvador JG, Bhatt SR, Jacobsohn VC, Maley LA, Alkhafaji RS, Rishel Brakey H, et al. Feasibility and acceptability of an online ECHO intervention to expand access to medications for treatment of opioid use disorder, psychosocial treatments and supports. *Subst Abus.* 2020;42(4):610–7.
64. Gagnon MP, Desmartis M, Labrecque M, Car J, Pagliari C, Pluye P, et al. Systematic review of factors influencing the adoption of information and communication technologies by healthcare professionals. *J Med Syst.* 2012;36(1):241–77.
65. McLoughlin C, Patel KD, O'Callaghan T, Reeves S. The use of virtual communities of practice to improve interprofessional collaboration and education: Findings from an integrated review. *J Interprof Care.* 2018;32(2):136–42.
66. Cianciolo AT, Regehr G. Learning Theory and Educational Intervention: Producing Meaningful Evidence of Impact Through Layered Analysis. *Acad Med.* 2019;94(6):789–94.
67. Carlin L, Zhao J, Dubin R, Taenzer P, Sidrak H, Furlan A. Project ECHO Telementoring Intervention for Managing Chronic Pain in Primary Care: Insights from a Qualitative Study. *Pain Medicine.* 2018;19(6):1140–6.
68. Englander H, Patten A, Lockard R, Muller M, Gregg J. Spreading Addictions Care Across Oregon's Rural and Community Hospitals: Mixed-Methods Evaluation of an Interprofessional Telementoring ECHO Program. *J Gen Intern Med.* 2020;36:100–7.
69. Mahadevan J, Shukla L, Chand PK, Komaromy M, Murthy P, Arora S. Innovative virtual mentoring using the Extension for Community Healthcare Outcomes model for primary care providers for the management of alcohol use disorders. *Indian Journal of Medical Research.* 2020;151(6):609–12.

70. Hager B, Hasselberg M, Arzubi E, Betlinski J, Duncan M, Richman J, et al. Leveraging Behavioral Health Expertise: Practices and Potential of the Project ECHO Approach to Virtually Integrating Care in Underserved Areas. *Psychiatr Serv.* 2018;69(4):366–9.
71. Behilak S, Abdelraof AS-e. The relationship between burnout and job satisfaction among psychiatric nurses. *J Nurs Educ Pract.* 2020;10(3):8–18.
72. Dawood E, Mitsu R, Monica A. Perceived Psychiatric Nurses Job Stress: A cross sectional study. *IOSR Journal of Nursing and Health Science.* 2017;6(2):37–47.
73. Canadian Institutes of Health Research, Natural Sciences and Engineering Research Council of Canada, and Social Sciences and Humanities Research Council, *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (TCPS2).* 2018. [https://ethics.gc.ca/eng/policy-politique\\_tcps2-eptc2\\_2018.html](https://ethics.gc.ca/eng/policy-politique_tcps2-eptc2_2018.html). Accessed Feb 15 2022.

## Figures

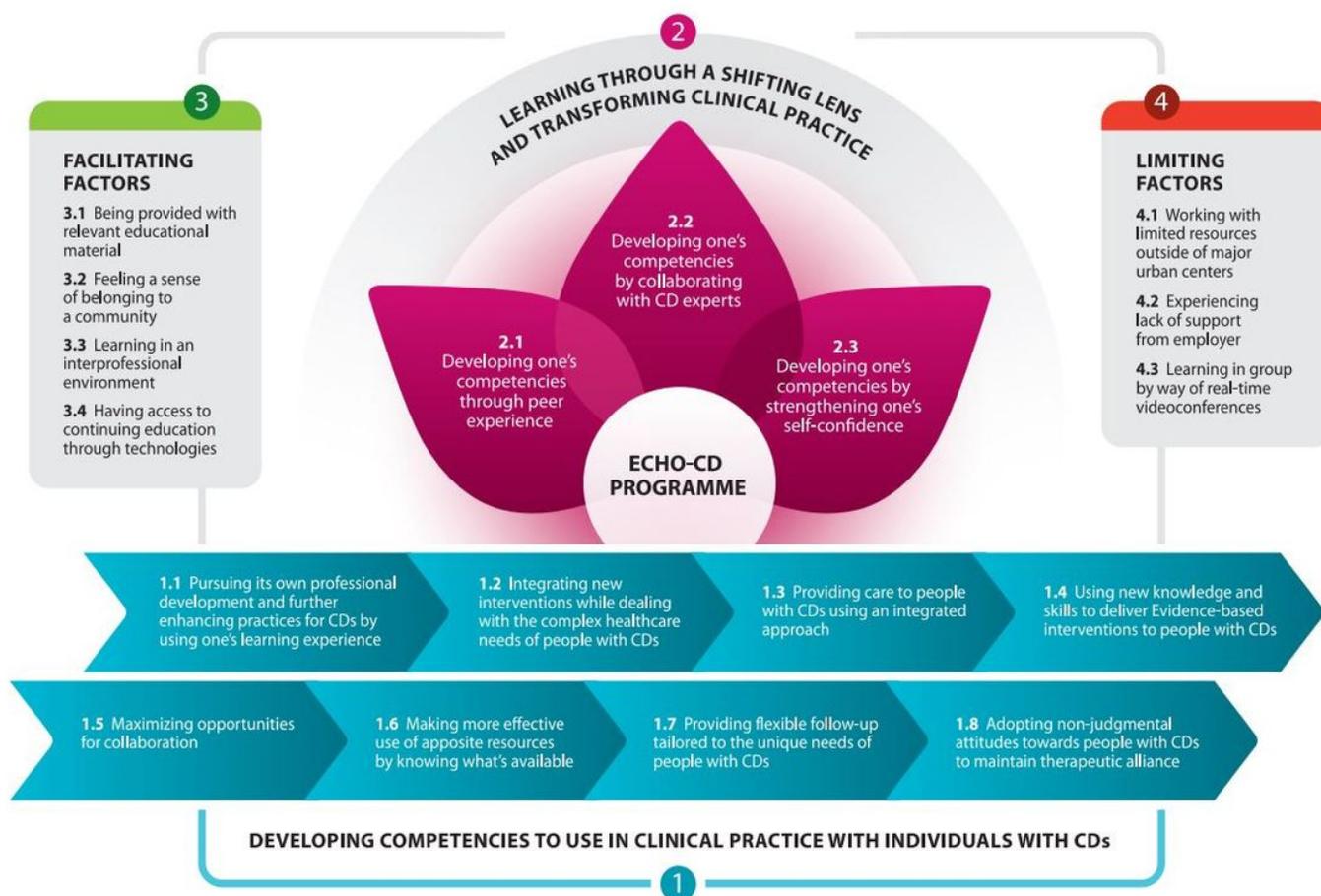


Figure 1

Overview and relationships between themes and sub-themes reflecting the experiences and perceptions of the nurses who participated in ECHO-CD.

## Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [Additionalfile1Researchchecklist.docx](#)
- [Additionalfile2Interviewguide.docx](#)