Exploring the impact of the ECHO model™ in Ontario on primary healthcare providers sharing of chronic pain knowledge: A qualitative study

by

Naima Salemohamed

A thesis submitted in conformity with the requirements
for the degree of Master of Science
Institute Health Policy, Management, and Evaluation
University of Toronto

© Copyright by Naima Salemohamed 2018
Exploring the Impact of the ECHO Model™ in Ontario on Primary Healthcare Providers Sharing of Chronic Pain Knowledge: A Qualitative Study

Naima Salemohamed
Master of Science
Institute of Health Policy, Management, and Evaluation
University of Toronto
2018

Abstract
ECHO Ontario Chronic Pain/Opioid Stewardship (ECHO Ontario Pain) is a telehealth platform, which supports healthcare providers (HCPs, spokes) to manage patients with chronic pain in their communities, using specialists (hub). ECHO Ontario Pain is using this model to address challenges, such as dealing with a lack of knowledge about chronic pain and inappropriate opioid prescribing practices. Thirteen qualitative semi-structured interviews were conducted with HCPs from the program. Four themes developed: (1) experiences with chronic pain management before joining ECHO, (2) learning and sharing in the program, (3) the use of technology, and (4) recommendations for improvements. ECHO Ontario Pain was a novel way to provide education by demonstrating the effectiveness of participating in an online learning model. The study highlights the value of different learning approaches and how they affect HCPs interactions with their patients, their practices, and their wider community. Overall, these findings complement and add to existing ECHO research.
ACKNOWLEDGEMENTS

I dedicate this thesis to my parents, Shamin and Karim Salemohamed, who were there for me during the entire process and supported me through all my stressful moments; helping me through all obstacles, whether it was my health or the flights back to Vancouver. I appreciate you both so much for encouraging me to pursue this journey and reminding me to never give up. I also thank my sister Alina and other family members for all their support.

I thank my supervisor Dr. Jennifer Stinson for her continuous support during this journey. She has been a great mentor with her quick responses and helpful feedback; I am so thankful that our paths crossed. I have never met someone who is so dedicated to research and helping me succeed. Next, I thank Dr. Emily Seto for always encouraging me, helping me find this project and our long theory discussions. I also acknowledge Dr. Fiona Webster and Dr. Leslie Carlin for all of their qualitative expertise and life wisdom. Thank you to Dr. Andrea Furlan for taking me into the ECHO family and being a second mother to me in Toronto. Finally, a thank you to my examiners Dr. Joanna Sale and Dr. Sanjeev Sockalingam for taking the time to participate in my defense and reading my thesis.

Thank you to the members of the ECHO Ontario Pain team, with whom I have enjoyed lots of fun moments and laughs over the year, especially to Jane, for keeping me grounded, for writing sessions, and for helping during my panicked phone calls. She was my biggest supporter and encouraged me throughout this journey. Thank you to Ralph for all the post-its, pens, and ECHO gear. To my fellow graduate students, Santana and Samah, thank you for all your advice and help during this process.
Thanks to my English teacher Sue Herd. She is the reason I am here today, as she constantly believed in me and pushed me to work harder. To Vicki Pennick and Laura Magrath, both of whom spent time helping me with my thesis. Thank you to all my colleagues at IHPME, and my friends on the IHPME GSU, who were all extremely helpful in sharing their wisdom and providing advice. A thank you to Allie Peckham and Gregory Marchildon for their course on how to write, present and defend a thesis, especially Allie who was always available for advice and brainstorming sessions.

A special thanks to all my friends who supported me during this journey, especially Amil Hirji, Ashkan Azimi, Dylan Collins, Fras Wasim, Monika Dhaliwal, Parmjot Gill, Sowndarya Sundar, Tariq Karim, and Zahid Dossa, who probably know ECHO Ontario Pain almost as well as I do. Thank you for the late night phone calls, life wisdom, and pep talks during this journey.

A final thank you to CIHR and MOHLTC for funding the ECHO Ontario Pain project and a thank you to the ECHO Ontario Pain spokes who participated in this study.
# Table of Contents

Acknowledgements........................................................................................................ iii

Table of Contents .............................................................................................................. v

Abbreviations ................................................................................................................... vii

Glossary ............................................................................................................................. viii

List of Tables ..................................................................................................................... xii

List of Appendices ........................................................................................................... xiii

Chapter 1: Introduction ...................................................................................................... 1
  1.1 Chronic pain in Canada .............................................................................................. 1
  1.2. The ECHO Model™ ............................................................................................... 3
      1.2.1. The ECHO model™ in Ontario .................................................................... 4
  1.3. Study aims & research questions .......................................................................... 6

Chapter 2: Background and literature review .................................................................. 7
  2.1. Prevalence and impact of chronic pain ................................................................. 7
  2.2. Access and challenges to chronic pain treatment ................................................ 10
  2.3. Opioid management ............................................................................................. 12
  2.4. Telehealth interventions ..................................................................................... 15
  2.5. Evolution of the ECHO model™? ....................................................................... 18
      2.5.1. ECHO Ontario’s chronic pain model ............................................................. 20
      2.5.2. The ECHO Ontario Pain format .................................................................. 21
  2.6. Preliminary research conducted by the ECHO Ontario Pain team ..................... 23
  2.7. Summary ................................................................................................................ 30

Chapter 3: Methods and study design ............................................................................. 31
  3.1. Study design ........................................................................................................... 31
  3.2. Theoretical framework .......................................................................................... 32
  3.3. Sample size and study setting .............................................................................. 34
  3.4. Procedures ............................................................................................................ 36
  3.5. Data analysis ......................................................................................................... 37
  3.6. Data rigour ............................................................................................................. 39
  3.7. Ethical considerations ........................................................................................... 41

Chapter 4: Results ............................................................................................................. 43
  4.1 Data collection ......................................................................................................... 43
  4.2 Themes .................................................................................................................... 45
  4.3. Summary ............................................................................................................... 68

Chapter 5: Discussion ....................................................................................................... 69
5.1. Findings related to the literature ................................................................. 70
5.2. The Diffusions of Innovation theory ............................................................ 85
  5.2.1. Modifications and Implications on theory ............................................. 87
5.3. Implications for ECHO Ontario Pain .......................................................... 88
5.4. Implications for other ECHOs ................................................................. 90
5.5. Strengths ................................................................................................. 92
5.6. Limitations ............................................................................................... 93
5.7. Future research ....................................................................................... 94
5.8. Summary of discussion chapter ................................................................ 95

Chapter 6: Conclusions ..................................................................................... 96

Appendix A: Semi-structured interview guide ............................................... 99
Appendix B. Email to potential interview participants ................................. 102
Appendix C: Consent form ............................................................................. 103
  Consent: ..................................................................................................... 106
Appendix D: The coding framework ............................................................... 107
References ....................................................................................................... 108
ABBREVIATIONS

CBL: Case-Based Learning

CIHR: Canadian Institutes for Health Research

CME: Continuing Medical Education

ECHO: Extension for Community Healthcare Outcomes

ECHO Ontario Pain: ECHO Chronic Pain and Opioid Stewardship

ECHO Pain NM: ECHO Pain and Headaches New Mexico

HCPs: Healthcare Providers

LHINS: Local Health Integration Networks

MOHLTC: Ministry of Health and Long-Term Care

NP: Nurse Practitioner

OTN: Ontario Telemedicine Network

OT: Occupational Therapist

PCPs: Primary Healthcare Providers

RCT: Randomized Controlled Trial

RN: Registered Nurse
GLOSSARY

**Bootcamp:** Hands-on in person workshop (Furlan et al., 2014).

**Case-Based Learning:** CBL is a learning and teaching approach that aims to prepare students for clinical practice, through the use of authentic clinical cases. These cases link theory to practice, through the application of knowledge to the cases, and encourage the use of inquiry-based learning methods (Thistlethwaite et al., 2012).

**Canadian Institutes for Health Research:** Canada’s federal funding agency for health research.

**Dyad:** Two perspectives (patient and provider interview).

**ECHO Model™:** The use of telehealth technology to leverage scarce healthcare resources to share best practices and reduce variation in care, in order to improve outcomes through practice-based learning that develops specialty expertise among primary care providers and monitors outcomes.

**ECHO NM:** The initial ECHO Model™ used in New Mexico to treat Hepatitis C.

**ECHO Ontario Pain:** The ECHO Model™ that is used in Ontario to teach primary healthcare providers how to manage their chronic pain patients and opioid stewardship.

**ECHO Pain New Mexico:** The ECHO Model™ replicated for pain in New Mexico.

**Electronic Medical Record:** Medical and clinical patient data gathered at a clinic or hospital in an online- or computer-based record.

**HCPs:** This includes all healthcare professionals who manage patients with different health conditions, specifically for this study with chronic pain management such as
doctors, nurses, pharmacists, social workers, occupational therapists, chiropractors, and health promoters.

**Hub:** Expert academic sub-specialist teams.

**Interdisciplinary (Interprofessional):** Coordination of services in a comprehensive program with frequent communication among all healthcare professionals, and the active involvement of the patient for the management of the patient’s condition, offering non-pharmacological and pharmacological options to the patient (Gatchel, McGeary, McGeary, & Lippe, 2014).

**Ministry of Health and Long-Term Healthcare:** The Ministry in Ontario responsible for the administration of the healthcare system and providing funding and services to healthcare projects in Ontario.

**Multidisciplinary:** The involvement of several healthcare providers to help provide patient care (Gatchel et al., 2014).

**Non-Pharmacological:** Options other than drugs to help treat pain (e.g. physiotherapy, massage, psychology).

**Non-Physicians:** This includes other health professionals such as nurses, occupational therapists, pharmacists, social workers, chiropractors, and community health promoters.

**Online Communities:** Networks for healthcare providers and experts to interact using the Internet.

**Ontario Telemedicine Network:** A form of telemedicine used in Ontario to provide connected care (OTN, 2017).
**Opioids:** Opioids are substances that act on opioid receptors on the nerve cells within the brain and body to produce a morphine-like effect to help relieve pain, and some are available legally via a prescription, and recommended for short-term use.

**Opioid Overuse:** Continued use and abuse that may lead to physical dependence and withdrawal symptoms (Hovda & Brutlag, 2016).

**Opioid Stewardship:** Described as coordinated interventions designed to improve, monitor, and evaluate the use of opioids in order to support and protect human health.

**Pain Knowledge:** Knowledge about the management of chronic pain that includes clinical skills, decision-making, and competencies.

**PCPs:** A PCP is a health care practitioner who sees people with common medical problems in the community. The person is most often a doctor or a nurse practitioner and is the first contact within the health care system and coordinates with other specialists care that the patient may need.

**Pharmacological:** Relating to treatments that use drugs.

**Project ECHO: (Extension for Community Healthcare Outcomes):** Uses tele-education to bridge knowledge gaps between specialists at academic health centers and primary care providers from remote areas

**Rurality Index score of Ontario (RIO):** Index used as an aid to define rural areas. Those with a RIO score of 0 to 39 are considered urban and those with a RIO score of 40 and above are considered rural (ICES, 2010).

**Spoke:** Primary healthcare providers in local communities (Project ECHO UNM, 2017).

**Telehealth:** “The delivery of healthcare services … using information and communication technologies for the exchange of valid information for diagnosis,
treatment, and prevention of disease and injuries … and for the continuing education of healthcare providers.” (World Health Organization, 2010)

**Remote:** Communities without year-round road access, or which rely on a third party (e.g. train, airplane, ferry) for transportation to a health center (Ministry of Health and Long Term Care, 2010).

**Rural:** Communities in Ontario with a population of less than 30,000 that are at least 30 minutes away in travel time from a community with a population of more than 30,000 (Ministry of Health and Long Term Care, 2010).

**Underserviced areas:** Areas that have difficulty attracting and retaining healthcare professionals (Ministry of Health and Long Term Care, 2010).

**Watchful Dose:** the daily dose at which patients may need to be reassessed or more closely monitored (Allen, Asbridge, MacDougall, Furlan, & Tugalev, 2013)

**Zoom:** Platform used for web-conferencing and cross-platform group chat.
LIST OF TABLES

Table 1. Adaptation of Moore’s Framework.................................................24

Table 2. Demographic Characteristics of Sample.............................................44
LIST OF APPENDICES

Appendix A: Semi-structured interview guide...........................................99-101
Appendix B: Email to potential interview participants.................................102
Appendix C: Consent form.............................................................................103-106
Appendix D: The coding framework..............................................................107
CHAPTER 1: INTRODUCTION

1.1 CHRONIC PAIN IN CANADA

Chronic pain is defined as pain that “persists or recurs for longer than three months” (Treede et al., 2015). It can be associated with other chronic diseases or conditions, such as diabetes or asthma (Peng, 2016). One in five Canadians suffer from chronic pain, an issue that has an enormous impact on all aspects of health-related quality of life, at a substantial cost to not only patients, but also to healthcare systems and society in general. Chronic pain is recognized as a disease, as it affects the functional, structural, and chemical components of the brain (Tracey & Bushnell, 2009). There are a variety of treatment options for chronic pain, such as pharmacological, psychological, and physical strategies to manage it, and access to interdisciplinary pain clinics and pain specialists to help treat these patients. However, there is a lack of timely access to these interdisciplinary pain clinics in Canada, with most clinics having over a year long wait list (Lynch, 2011; Peng, 2016). Therefore, primary care providers (PCPs) provide the majority of care for patients with chronic pain in their communities, despite often having insufficient knowledge on pain assessment and management. This is largely due to inadequate training in medical school about assessing and managing chronic pain, learning how to use an interdisciplinary approach by working with a collaborative group of professionals, or both (Watt-Watson et al., 2009).

The problem not only lies in the lack of training of PCPs and other HCPs, but in the over reliance on pharmacological treatments, particularly opioids. Opioids are one
type of medication that is commonly used to treat patients with chronic pain (Rosenblum, Marsch, Joseph, & Portenoy, 2008). There are many patients who rely on opioids for their care, and in 2011 it was found that over 60% of patients with non-cancer pain took opioids, while 20% were long-term users (Gatchel et al., 2014). Although opioids have been reported to be beneficial for certain types of pain management, the side effects can be harmful, and addiction is common (Busse et al., 2017). Studies have shown that there are negative effects to taking opioids. These side effects can include constipation, nausea, and overdependence on the medication, leading to misuse and abuse (Furlan, Sandoval, Mailis-Gagnon, & Tunks, 2006; Lynch, 2011). In 2009, it was reported that opioid-related deaths were on the rise, most of them due to patients taking them for pain issues (Dhalla et al., 2009). Even though opioid prescribing guidelines exist in Canada, many of them have not been taught in medical school, or adequately enforced in practice (Alam & Juurlink, 2016a). New opioid guidelines were published in 2017 that aim to further reduce the use of opioids, and to look at other treatment options to help with pain management for patients (Busse et al., 2017).

Due to the lack of timely access to interdisciplinary pain clinics, challenges with opioid prescribing, and a lack of knowledge about chronic pain for PCPs, a new model of educating primary healthcare providers (HCP) to care for patients with chronic pain was required. A model was needed that would provide all HCPs with the knowledge and skills to feel confident and competent when managing patients with chronic pain. One potential model for disseminating knowledge is using a form of telehealth (similar to videoconferencing) to provide education and skills training for HCPs.
1.2. The ECHO Model™

The Project for Extension and Community Healthcare Outcomes (ECHO™) is a telehealth platform that supports the delivery of educational materials and building of a community of practice. Developed in New Mexico by Dr. Sanjeev Arora in 2003, Project ECHO™ has assisted primary care HCPs to treat viral hepatitis C in rural, remote, and underserved communities (Arora et al., 2011b). Dr. Arora developed this model to assist in delivering specialist care to these underserved communities, and to make new knowledge accessible for PCPs. The goals of Project ECHO™ are to use telehealth technology to leverage scarce healthcare resources, share best practices, and reduce variation in care to improve outcomes through practice-based learning, in order to develop specialty expertise among primary HCPs (Arora et al., 2010).

The mandate of the ECHO model™ is to build a knowledge-sharing network and learning environment, for specialists to link with HCPs in communities, using telehealth. This is organized by using a hub (academic subspecialists) and spoke (different primary care HCPs) model (Arora et al., 2011b). The ECHO model™ is comprised of two-hour telehealth sessions that are held regularly (e.g., weekly) to bring together the hub and spokes. During the sessions, there are 20-minute didactics presented about different topics relevant to diagnosis, assessment, and management of a chronic condition (e.g. treatment options, explanation of the disease, self-management strategies). The spokes also present patient cases from their practice settings that are discussed with the entire group (participants from spokes and hub). The collaboration in the ECHO sessions between the hubs and spokes encourages conversation and problem-solving about a particular patient case to facilitate a learning loop.
The ECHO model™ is different than a traditional telehealth model, which typically involves one-to-one communication between a subspecialist and a patient in a remote or rural community (Arora et al., 2010). The ECHO model™ focuses on educating HCPs about a disease area (such as chronic pain, hepatitis C, or diabetes), using telehealth to teach them the knowledge and skills that they need to learn, or to offer support in managing their patients in the community. The goal of the ECHO model™ is to connect HCPs to facilitate collaboration to solve issues in a disease area, support each other, and lead towards building an online community of practice. These online communities eventually will become a network for HCPs and experts to interact, using the Internet as a new medium for mentoring and case-based learning. There is already a large community of individuals across the world (such as in India, Brazil, and Egypt) that use the ECHO model™ to assist in de-monopolizing expert knowledge and share this information with other HCPs to treat a variety of medical issues (such as mental health issues, addiction, diabetes, or rheumatology) (Arora et al., 2011a).

1.2.1. THE ECHO MODEL™ IN ONTARIO

The ECHO model™, used for pain management in New Mexico, was an ideal model for the development of an ECHO chronic pain model in Canada (Furlan et al., 2014). ECHO Ontario Pain is using this model to address specific challenges in Ontario, such as dealing with the lack of knowledge about chronic pain, and inappropriate opioid prescribing. ECHO Ontario Pain has replicated the use of the hub (academic subspecialists) and spoke (primary care HCPs) model, which uses telehealth technology. There is also an in-person training component, which consists of a two-day, hands-on, bootcamp.
The novel ECHO model™ being used in Ontario aims to address problems in chronic pain management by improving capacity for HCPs to be able to care for patients with chronic pain, through the development of HCP knowledge skills and self-efficacy. The use of a hub and spoke model allows the efficient dissemination of best practices to HCPs across Ontario. One of the goals of ECHO Ontario Pain is to break down the geographic barriers of providing education, by using teleconferencing. Another goal is to work towards developing a community of practice, to increase HCPs’ level of confidence and competence for managing patients with chronic pain. Finally, ECHO Ontario Pain provides a unique platform, in which HCPs who manage patients with chronic pain can speak about the challenges of managing these patients.

To understand if this model was effective as a platform for learning, it was important to evaluate the implementation and performance outcomes. To date, the ECHO Ontario Pain program has undergone preliminary quantitative and qualitative evaluations. However, some of the key gaps in the prior research included a lack of in-depth understanding of the experiences of HCPs and how technology was being used as a platform, and a lack of specific feedback about the impact of the ECHO Ontario Pain program on patients, other providers and the community. The current study sought to address these gaps in our understanding of the impact of the ECHO model™ in Ontario on primary HCPs and their sharing of chronic pain knowledge.
1.3. Study aims & research questions

The primary aim of this qualitative research was to explore the impact of the ECHO model™ in Ontario on primary care HCPs perceptions of managing chronic pain patients. The three main research objectives were:

1) Do HCPs who have attended ECHO Ontario Pain have increased knowledge in chronic pain management and opioid stewardship?

2) How do HCPs perceive ECHO Ontario Pain’s impact on knowledge sharing and enhancement of an HCP’s capabilities to disseminate that knowledge?
   a) How do HCPs perceive that technology facilitated and supported this education?
   b) How is knowledge being diffused through video conferencing, and how beneficial is the use of online communities?

3) How have HCPs gained insights into their own motivations, confidence levels, and treatments for managing their patients with chronic pain?
   a) How does knowledge dissemination directly change the behaviours and interactions of HCPs who participate in this program?
CHAPTER 2: BACKGROUND AND LITERATURE REVIEW

In this chapter, the prevalence and impact of chronic pain, access to chronic pain treatment, and opioid prescribing habits are discussed. This information will provide context to the challenges surrounding chronic pain management in Ontario. These gaps and barriers will build the case for the need to evaluate the impact of the ECHO Ontario Pain program.

2.1. PREVALENCE AND IMPACT OF CHRONIC PAIN

Chronic pain is undertreated and poorly managed in Canada (Lynch, 2011). In 2014, it was reported that approximately 29% of Canadians suffered from chronic pain and 80% of these patients would experience moderate to severe pain throughout their life (Mifflin & Kerr, 2014). Chronic pain can be “associated with the worst quality of life compared to other chronic health conditions” (Lynch, 2011), partially due to the ambiguity of how the condition can be treated or managed. Living with chronic pain has been found to “double the risk of suicide, due to uncontrolled or untreated pain” (Tang & Crane, 2006).

Chronic pain affects all aspects of functioning, such as emotional, physical, social, and everyday functions. In terms of the physical impact of chronic pain, Singh and colleagues (2014) explored the barriers of physical rehabilitation for patients with chronic pain from the perspectives of people living with pain, and their pain specialist. They used a combination of methods including: role-play, interviews, focus groups, and observations to collect data from the two groups (Singh et al., 2014). The researchers found that some patients with chronic pain did not exercise, as they were concerned or feared that it would increase their pain levels, cause further damage, or lead to them
falling and hurting themselves (Singh et al., 2014). This fear of movement resulted in worse physical impairment and led to bad days for patients. The pain specialists expressed that they wanted to help their patients. They tried to help their patients by promoting self-esteem, helping transfer control to the patients, and helping to take attention away from the pain, but some patients either did not want the help, or may have been too anxious (Singh et al., 2014).

The emotional and social impacts of chronic pain can contribute to the daily challenges of living with chronic pain. Wallace and colleagues (2014) conducted a study with 31 patients on their experience living with chronic pain, using interviews and photos where they captured their experience with chronic pain (Wallace, Wexler, McDougle, Miser, & Haddox, 2014). The authors found that chronic pain was associated with a multitude of emotional issues, such as the negative emotions around medications that were prescribed, experiences of hopelessness, and patients losing their independence. Chronic pain can also negatively impact social interactions, as those living with chronic pain are worried about how they place additional burden their spouses and other family members (Breivik, Collett, Ventafridda, Cohen, & Gallacher, 2006; Wallace et al., 2014). Within their daily lives, individuals who suffer from chronic pain begin to withdraw from work, and lose their ability to travel; job performance and other daily activities are affected, since the pain can become so unbearable (Bair, Wu, Damush, Sutherland, & Kroenke, 2008; Wallace et al., 2014).

An additional challenge for these patients is that they often have psychological comorbidities, such as depression or anxiety, due to their pain. Bair and colleagues (2008) conducted a study to understand the association between depression, anxiety, and
chronic pain. They sampled 500 patients; 46% of the patients were found to suffer from pain with a combination of anxiety and depression. The patients with mental health comorbidities had more issues with their daily activities (2.8 points more on a 0 to 10 scale), and pain severity (1.25 points more on a 0 to 10 scale), compared to those who suffered from chronic pain alone. When comparing disability days, patients with pain alone reported 18.1 disability days in the past three months compared to the patients with anxiety and depression, who reported 32.2 to 38.0 disability days (Bair et al., 2008). In addition, the patients who suffered from depression and anxiety had poorer quality of life compared to those with pain alone (Bair et al., 2008). Patients also can have pre-existing anxiety and depression not related to their chronic pain or can develop these problems as a result of living with chronic pain. Either way, the combination of all these factors makes managing these patients more challenging for PCPs.

Patients with chronic pain have more frequent healthcare visits due to these factors (McLaughlin, Khandker, Kruzikas, & Tummala, 2006). Chronic pain has a huge impact on the healthcare system, where costs are estimated to be more than six billion Canadian dollars a year (Lynch, 2011). This is due to the utilization of the healthcare system, but also to indirect costs, because of the debilitating nature of chronic pain (Turk & Theodore, 2011). Chronic pain affects the labour market, as 60% of Canadians who suffer from chronic pain may lose their job or may have to reduce their workload (Phillips & Schopflocher, 2008). These indirect costs can be associated with lose of wages due to unemployment, and the affect of disability days that not only cost the patients, but the organizations too.
In summary, chronic pain can have a tremendous impact on the patient living with chronic pain, their family, society, and the healthcare system. The physical factors, emotional, and comorbidities surrounding chronic pain can be difficult to manage, as they have an effect on many aspects of the patient’s life. The cost is an additional burden that impacts the patient with chronic pain. It can be hard for these patients to be treated, as they may require multiple disciplines and various treatments, which may not be covered provincially or by medical insurance to help manage their chronic pain.

2.2. ACCESS AND CHALLENGES TO CHRONIC PAIN TREATMENT

Prior research identified that chronic pain requires an interdisciplinary team and a multi-modal treatment approach, using a combination of pharmacological, psychological, and physical strategies (DeBar et al., 2012; Roth, Geisser, & Williams, 2012). This type of care involves the combination of different disciplines working together to help provide a variety of treatment options, but also actively involving the patient in the decision-making process and promoting self-management. In 2009, a randomized controlled trial was conducted to look at the collaborative care model for chronic pain treatment interventions versus treatment as usual, which involved chronic pain patients who only visit their primary clinician (Dobscha et al., 2009). This study was carried out at three urban and two rural care centers, and included 401 patients and 42 HCPs. The participants who received the collaborative care were given a comprehensive interdisciplinary patient assessment and clinical education. The results showed a significant improvement for the patients who were in the collaborative care model \( (p < 0.001) \) (Dobscha et al., 2009) compared to those in the usual care group. Even though the evidence has shown that interdisciplinary care is effective for patients with
chronic pain, it is not readily available or accessible in most cities and towns in Canada, and especially not in rural and remote areas (DeBar et al., 2012).

In an interdisciplinary care environment, the HCPs understand all the factors surrounding both the pain, and the related comorbidities, such as mental health challenges and the lack of physical activity (DeBar et al., 2012). Everyone participating in this level of care is aware of the patient’s care plan, resulting in less duplication of services when working in this connected environment. More importantly, the patient becomes included in the conversation and decision-making around their plan of care. This type of care is beneficial because it is individualized and therefore, tailored to managing each patient’s pain, which has been found to be ideal for chronic pain management (Gatchel et al., 2014).

It is estimated that one interdisciplinary pain program can serve, on average, 258,000 Canadians, and the median wait times are typically six months (Peng et al., 2007). This means that 50% of patients with chronic pain must wait “six months to 12 months, or even up to five years to gain access to appropriate treatment for their pain” (Peng et al., 2007). This presents a particular challenge for rural patients, as pain facilities are predominately located in urban areas. Therefore, these rural patients rely on care from family doctors or the limited number of pain specialists in rural communities. However, these family doctors do not have the knowledge and skills to care for these complex patients, which make it challenging for them to provide the best care for their patients.

Watt-Watson and colleagues (2009) conducted a study of ten major universities that had health science facilities (e.g., medicine, nursing, pharmacy) to understand how
much pain education was being taught in the curriculum for each program. They found that 67.5% of health science programs did not have specifically dedicated hours or content for pain management. Moreover, pain knowledge for students was variable, depending on their placements or residency experiences. There was also a lack of interprofessional pain education, which is critical for the effective management of chronic pain (Watt-Watson et al., 2009).

An additional barrier for HCPs when managing patients with chronic pain is the strained relationship that can develop between patients with chronic pain and HCPs. These relationships can be frustrating and time-consuming for both patients and providers, as there is not a single treatment that will cure chronic pain. For instance, there may be issues related to trust, language barriers, and communication challenges for both parties (Peng, 2016). Patients with chronic pain may have a complexity of needs and other comorbidities, such as mental health issues (Peng, 2016). Many patients feel that their doctor may not understand the true burden of chronic pain (Wallace et al., 2014). Finally, many patients also take medications, such as opioids, which can be addictive, and can eventually lead to further trust issues between the HCPs and patients. Currently there are challenges around opioid prescribing, due to the lack of knowledge around opioid prescribing and the lack of adherence to opioid guidelines (Teh et al., 2009).

2.3. **OPIOID MANAGEMENT**

To combat the opioid prescribing issue, another one of ECHO Ontario Pain’s goal is opioid stewardship. Opioids are typically used to manage chronic pain and have become a common method for treating patients with certain pain conditions. In Ontario, opioid-
related deaths have increased by “250% over the past two decades, totalling about 550 deaths annually” (Gomes & Juurlink, 2016). There has also been a surge in prescribing opioids, due to heavy marketing from pharmaceutical companies about their immediate effects of reducing pain (Alam & Juurlink, 2016a). For example, pharmaceutical companies were funding content to be published in textbooks for pain curricula in universities to encourage further opioid prescribing, while diminishing the number and types of adverse events associated with opioids. The trials that have been conducted have not looked at the long-term impact and safety of opioids (Alam & Juurlink, 2016b). Trials that show the benefits of opioids are usually short-term, and usually measure the effectiveness of opioids on a pain scale without looking at other chronic pain factors; patients with comorbidities are usually excluded from these studies (Alam & Juurlink, 2016b).

Recently, there have been studies that show the harms of opioid therapies, and new guidelines have been developed to educate clinicians on how to properly prescribe and wean opioids. There are concerns with the safety, inappropriate prescribing, and the long-term use of these drugs for patients (Rosenblum et al., 2008). Some patients may have a history of substance abuse, and the use of opioids can lead to addiction and abuse, or even worse pain (Lynch, 2011). For example, if a patient has a problem with addiction and abuse, they may try to obtain multiple prescriptions from different HCPs (Jena, Goldman, Weaver, & Karaca-Mandic, 2014), or have trouble adhering to their treatment plan (misuse of opioids), without a proper follow-up plan in place (Kalso, Edwards, Moore, & McQuay, 2004). Some patients who take opioids are also not aware of the risks
or side effects of taking these medications, which may be due to the lack of education and knowledge about opioid prescriptions.

On a policy level, new Canadian guidelines for opioid management for chronic non-cancer pain were released in May 2017 (Busse et al., 2017). These guidelines were based on the *2010 Canadian Guidelines for Safe and Effective Use of Opioids for Chronic Non-Cancer Pain* (National Opioid Use Guideline Group, 2010). In the 2017 updated guidelines, recommendations include advising patients of non-opioid and non-pharmacological options before an opioid trial, not prescribing opioids to a patient with a history of substance abuse, and offering a multidisciplinary approach to managing chronic pain patients when possible (Busse et al., 2017).

There are other strategies in Ontario that have been used to ensure proper opioid prescribing, but some of these strategies have had challenges, which have made them less successful. For example, Ontario currently has a prescription monitoring system, which has helped pharmacists, but it excludes other prescribers, specifically doctors who manage these patients (Finestone, Juurlink, Power, Gomes, & Pimlott, 2016). The College of Physicians and Surgeons of Ontario have offered a course since 1995 to help improve opioid prescribing practices, but there has been little to no change in prescription practices, and since it was not mandatory, not all HCPs participated (Gomes & Juurlink, 2016). All these issues have contributed to poor opioid-prescribing practices for patients with chronic pain. Thus, there is a need to develop and evaluate a program to address this education on opioid stewardship.
2.4. Telehealth Interventions

Continuing medical education (CME) can be used to help fill these knowledge gaps and address the opioid prescribing challenges for chronic pain. Usually, CME is taught in person and been primarily lecture focused, which has great value, but the majority of in-person training is limited to urban and academic centres (McMahon, 2015). Some of the literature on CME has indicated that multiple educational techniques and interactivity is vital when facilitating CME programs as they have been shown to have a greater impact on changing provider knowledge and performance (Davis & Galbraith, 2009; Davis et al., 1999). With the growing popularity of online learning platforms, this is enabling educators to specifically target rural and remote communities. This is important for participants, because it allows HCPs to seek ongoing education, regardless of geographical barriers.

Online learning can be an effective way of teaching HCPs about a topic. However, there are limited online interventions on pain management targeting HCPs and physicians. In 2004, a study was conducted to review the effect of Internet based CME learning and data was collected from different journals which included looking at the nature of the intervention, the sample size and the educational content. The conclusions from the sixteen studies that met the eligibility criteria is that Internet programs do work, but further research was needed to see how knowledge was effectively being translated into practice (Wutoh, Boren, & Balas, 2004).
Donovan et al., recruited HCPs to participate in an online learning module about the management of opioid use for patients with chronic pain (Donovan, Wood, Rubio, Day, & Spagnoletti, 2016). This study chose to design an online learning model because it could be used across multiple sites and helped individuals learn at their own pace. Prior to completing the module, participants completed a pre-test on their knowledge, attitudes, and comfort caring for patients with chronic pain. After the completion of the pre-test, the program used an existing web module known as The Collaborative Opioid Prescribing Education Risk Evaluation and Mitigation Strategy (COPE-REMS®) to help assess provider communication around opioid prescribing (Donovan et al., 2016). After the web module, the participants took the knowledge test again, as well as a satisfaction survey. They also repeated the attitudes and comfort tests six months later, to see if the curriculum had an impact on their knowledge and skill level.

The authors of this study found that physicians improved on communication, knowledge, and skills for chronic pain management. There was an increase in their knowledge scores by 15% ($p < 0.001$) (Donovan et al., 2016). Compared to baseline values before the course (3.6/5), physicians improved their comfort levels in caring for patients with chronic pain immediately after the course (4.0/5), and again at six months (4.1/5) (Donovan et al., 2016). Prior to starting the learning web module, physicians reported a baseline (2.8/5) for their communication, knowledge, and skills to help manage patients with chronic pain. Their scores significantly increased (3.5/5) immediately after the course, and increased further at six months (3.9/5; $p < 0.001$) (Donovan et al., 2016). The authors suggested that the use of web-based education was effective for improving physicians’ knowledge, skills, and communication, and could
help other HCPs who wanted to learn about chronic pain. This module is one example of how pain management learning can be incorporated into a web-based structure.

A telehealth model is one form of online learning that has been used to provide this type of CME. Traditionally, telehealth models involve patients and subspecialists, interacting over a distance, which can be helpful to enhance pain assessments and provide consultation regarding treatment options (Arora et al., 2011a). This type of learning has been modified for educational platforms. By building telehealth networks, a community of practice can be developed for learning, exchanging, and transferring knowledge (Deng & Poole, 2003). The process of sharing medical knowledge while trying to promote community building, facilitates the development of a telehealth network. The creation of telehealth networks can help support CME programs by providing a more accessible place for HCPs to connect with specialists, to learn about a specific disease, or how to treat a specific condition.

A literature review was conducted to understand the effectiveness of using telehealth to improve access to care for pain management. McGeary, McGeary and Gatchel’s (2012) literature review included 32 studies that focused on telehealth for pain management. There were few studies that focused on telehealth being used as an educational model; most focused on providers using telehealth to teach patients how to self-manage their chronic pain, or to treat patients (McGeary, McGeary, & Gatchel, 2012). In this review, the authors talked about different types of telehealth models that could be used for pain education. They recommended the hub and spoke model as a possible model for pain management. Project ECHO™ is an example of a hub and spoke model that is used for chronic pain management.
2.5. Evolution of the ECHO Model™?

The ECHO model™ is one example of an effective telehealth intervention being used to connect HCPs in rural and underserved areas with specialists (Arora et al., 2011b). Currently, there are more than 120 hubs for 60 diseases in 23 countries around the world (Project ECHO UNM, 2017). The first ECHO model™ started in 2003 in New Mexico, and was led by Dr. Arora and his team. The ECHO model™ has demonstrated an improvement in the access to treatment for minority and underserved patients with hepatitis C who were previously unable to receive treatment. Prior to the establishment of the expert hub team, those communities did not have access to high-quality care, because the physicians lacked access to speciality knowledge about hepatitis C (Arora et al., 2011b; Zhou, Crawford, Serhal, Kurdyak, & Sockalingam, 2016).

Since 2009, 16 other ECHO pain replications have been implemented globally (Project ECHO UNM, 2017). Of the 16 replications, only ECHO Pain and Headaches in New Mexico (ECHO Pain NM) has published evaluation outcomes. ECHO Pain NM was developed to address the gaps in pain management and to serve rural and underserved communities in New Mexico (Katzman et al., 2014). Outcome evaluations were collected between January 2010 and December 2012, which included program evaluations from CME surveys and aggregate clinic data, as well as provider-level data from participants who attended at least one year. Over the study period, CME surveys demonstrated a significant increase in participants’ rating of ‘excellent’ ($p < 0.005$) for all five question items: effectiveness, balanced, met objectives, opportunities to ask questions, and relevant to practice (Katzman et al., 2014).
In addition, Katzman et al (2014) conducted focus groups to gain a better understanding of the participants perspectives about ECHO Pain NM. Questions in the focus groups included: reasons why the individual participated, how the learning modes were useful, how learning was applied in their practice, the impact of their participation in ECHO Pain NM on their team, and how they shared what they learned from ECHO Pain NM with others (Katzman et al., 2014). Nine participants were part of the focus groups. They expressed that their participation in ECHO Pain NM reduced isolation, increased engagement with specialists, built up their knowledge, and helped them apply this new knowledge with their patients. They also identified challenges with the length of case presentations and use of the technology, as there were connection issues. Overall, it was shown that using ECHO Pain to offer CMEs had a strong impact in improving the competence levels of HCPs (Katzman et al., 2014).

This study was the one of the first research initiatives for ECHO Model™. It only used focus groups, and because of group dynamics, it can sometimes be hard to capture specific individual experiences. Some additional limitations of Katzman and colleagues’ study was that they did not evaluate the use of technology as a platform, or ask for specific examples of how knowledge was being translated, or feedback on the ECHO platform. Our current study aimed to address some of the limitations of the research done by Katzman and colleagues (2014).
2.5.1. ECHO Ontario’s Chronic Pain Model

The ECHO Ontario Pain and Opioid Stewardship model for chronic pain began as a demonstration project in 2014. The Ontario Ministry of Health and Long-Term Care (MOHLTC) funded the project, and ECHO Ontario Pain was also funded by the Canadian Institutes for Health Services Research (CIHR) to evaluate the effectiveness of the program. The co-chairs are Dr. Andrea Furlan, from the Toronto Rehabilitation Institute (a member of the University Health Network) and Dr. Ruth Dubin, from Queens University. The other members of the expert hub leadership team are Dr. Paul Taenzer (Psychologist), Dr. John Flannery (Physiatrist), and Dr. Andrew Smith (Neurologist and Addictions Specialist). The team is also supported by a variety of different healthcare experts: four pharmacists, a registered nurse, a clinical librarian, a physiotherapist, an occupational therapist, a social worker, and a chiropractor (ECHO Ontario, 2017).

The key goals of the demonstration project for ECHO Ontario Pain included:

1) Determine whether the Project ECHO™ model is feasible for expansion to all PCPs who care for patients with chronic pain in Ontario,

2) Determine the impact on increasing provider knowledge (e.g., familiarity with the Canadian Opioid Guideline and appropriate use of urine drug screens),

3) Demonstrate provider satisfaction with the Project ECHO™ model, and

4) Increase provider self-efficacy and comfort level in managing chronic pain (with or without opioids). (Furlan et al., 2014)
2.5.2. The ECHO Ontario Pain Format

ECHO Ontario Pain’s focus is to build knowledge, skills, empathy, and confidence for those dealing with patients with chronic pain in primary care communities. ECHO Ontario Pain’s vision is that not only doctors, but also all HCPs who focus on chronic pain in Ontario will have the knowledge and confidence to manage chronic pain safely and effectively (Dubin et al., 2015). Spokes who were recruited to participate in ECHO Ontario Pain were from rural, remote, or underserved locations, as well as urban areas in Ontario (Dubin et al., 2015). The ECHO Ontario Pain model is run on a web-based platform, on which HCPs connect weekly for two hours via video conferencing. For participants who cannot connect via video conferencing, there is a possibility to connect via telephone.

During the weekly two-hour sessions, there are didactic lectures presented by the hub and case presentations presented by the spokes (Dubin et al., 2015). Each HCP attending the telehealth session receives CME credits, and are welcome to attend as many sessions as they feel necessary (Dubin et al., 2015). The general recommendation is that participants attend one full cycle of didactics (approximately 22) sessions and try to present at least one case during their ECHO Ontario Pain participation. Every ECHO session begins with a didactic component, during which hub experts highlight an aspect of pain management. These sessions are made up of five different modules:

- Module 1: Chronic pain fundamentals
- Module 2: Opioids
- Module 3: Non-opioid management
- Module 4: Common pain conditions
- Module 5: Special topics in chronic pain


After the didactics, the session is followed up with a patient case presented by a spoke member. The different spoke members ask questions and make recommendations, with support from the expert hub members. The experts also share best practice evidence for certain points related to the presented case. During the discussions, the spokes gain knowledge from listening to these cases and conversations, and in turn, build a large network of HCPs skilled in managing patients with complex chronic pain (Furlan, Zhao, & Carlin, 2017a). Another component of the ECHO Ontario Pain sessions are the bootcamps. The bootcamp is similar to a workshop, during which HCPs have the opportunity to interact in person and learn hands-on skills, such as musculoskeletal pain assessment.

Another feature of ECHO Ontario Pain is a chat box, so that the hubs and spokes can interact during the session, and have synchronous communication. After the ECHO Ontario Pain sessions, there is an option for asynchronous communication through the discussion board, which can be used to post questions, comments, or articles for the spoke and hub members.
2.6. Preliminary research conducted by the ECHO Ontario Pain team

One of the components of ECHO Ontario Pain’s mandate is to monitor and evaluate outcomes through research. ECHO Ontario Pain has identified two main areas of research:

1) Implementation: Is the ECHO model™ feasible and acceptable among participants (patients and interprofessional healthcare providers) in the spokes, who manage patients with chronic pain?

2) Performance: Is the ECHO model™ an effective strategy to improve capacity in primary care to manage chronic pain? (Furlan et al., 2014).

ECHO Ontario Pain used an existing framework that had been used for other CME programs to assist with organizing their research objectives and outcomes. Moore’s Framework was used to measure the impact of ECHO Ontario Pain in terms of feasibility, acceptability, and performance impact. The Moore’s Framework was chosen because it is used for other ECHO models, but provides the opportunity to modify it for each ECHO model™ and can be continuously modified throughout the research study.

Table 1 shows ECHO Ontario Pain’s adaptation of Moore’s Framework. In the previous research Levels 1 to 4 had been explored, and for this study Level 5 will be focused on. m

ECHO Ontario Pain used a mixed methods approach to conduct their research. Quantitative evaluations included a pre-post questionnaire that was developed to evaluate the implementation and performance of ECHO Ontario Pain. The qualitative methods included a focus group of participants who participated in the bootcamps. Focus group
discussions explored the experience of HCPs who attended ECHO Ontario Pain, personal takeaways from ECHO Ontario Pain sessions, the effect of ECHO Ontario Pain on the team and colleagues, and asked for general comments and feedback.

**Table 1: Adaptation of Moore’s Framework**

<table>
<thead>
<tr>
<th>Level 1: Participation</th>
<th>Provider accrual and participation in ECHO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 2: Satisfaction</td>
<td>Degree to which provider expectations were met by participating in ECHO</td>
</tr>
</tbody>
</table>
| Level 3: Learning      | Declarative knowledge: knows what ECHO teaches  
                          | Procedural knowledge: knows how to do what ECHO teaches |
| Level 4: Competence    | Degree to which provider shows how to implement what ECHO teaches  
                          | Degree to which pain care beliefs change |
| Level 5: Performance   | Provider practice changes, clinic-wide changes  
                          | Adherence to standards of care for pain management and safe opioid prescribing |
| Level 6: Patient health| Degree to which patient health improves due to what ECHO teaches, or participation in ECHO |
| Level 7: Community health| Degree to which chronic pain patients’ health changes due to ECHO |

(Furlan et al., 2017a)

The ECHO Ontario Pain team used resources and adapted evaluation tools from ECHO Pain New Mexico to help develop their research study in Ontario. Some of the components adapted included pre-post questionnaire items specifically relating to confidence levels in treating chronic pain, knowledge about chronic pain management, and satisfaction with the ECHO Ontario Pain program. However, ECHO Ontario Pain developed their own focus group and semi-structured interview guides.
The pre-post questionnaire assessed four different areas: 1) self-efficacy, 2) attitudes and behaviours, 3) knowledge, and 4) satisfaction. Demographic information was also collected from participants (Furlan et al., 2017a). Between June 2014 and March 2017, 296 individuals registered for ECHO Ontario Pain. Of these, 32 were excluded from participation in the pre-post questionnaires, as they were either non-clinicians or clinicians who registered but never attended a session. Two hundred and sixty-four participants were invited to complete the pre-post questionnaires. One hundred and seventy participants (64% response rate) completed the pre-ECHO Ontario Pain questionnaire and 119 participants (70% response rate) completed both the pre- and post-ECHO Ontario Pain questionnaire.

The pre- and post-questionnaire participants included: 41 (34%) physicians, 25 (21%) nurse practitioners, 15 (13%) pharmacists, 12 (10%) social workers, 7 (6%) registered nurses, 7 (6%) allied health workers (chiropractor, kinesiologist, psychologist, dietician, etc.), 6 (5%) occupational therapists, and 4 (3%) physician assistants. On average, 24 spokes attended each session (Furlan et al., 2017b).

In terms of self-efficacy, participants were asked to rate their self-efficacy using a 7-point Likert scale where 1 = none or no skill at all, and 7 = an expert ability to teach others. All items began with “I am confident in my ability to….”. Some examples are below:

- work with patients who suffer from chronic pain.
- talk with a patient about chronic pain.
- identify patients who need pharmacological management of chronic pain.
• educate my clinical staff about chronic pain patients (Furlan et al., 2017b).

Paired t-tests were calculated for each item of the pre-post questionnaire. There was a statistically significant increase in all items ($p < 0.0001$), as well as for the average self-efficacy score. Pre-ECHO Ontario Pain, the average self-efficacy score for all items was 3.6 ($\sigma = 1.05$), where 3 = slight knowledge and 4 = average among my peers. Post-ECHO, the average self-efficacy score was 4.5 ($\sigma = 1.34$), where 4 = average among my peers and 5 = competent. This increase in self-efficacy showed that HCPs felt more confident in managing their patients with chronic pain after participating in ECHO Ontario Pain (Furlan et al., 2017b).

Attitudes and behaviours were assessed pre- and post-ECHO Ontario Pain using seven items selected from the validated KnowPain-12 questionnaire (Gordon et al., 2014). Items were scored using a 5-point Likert scale, where 1 = strongly disagree and 5 = strongly agree. Paired t-tests were used to assess the differences between pre- and post-ECHO Ontario Pain experiences. No significant increases were observed for items regarding attitudes and behaviours pre- and post-ECHO Ontario Pain (Furlan et al., 2017b).

Knowledge was also assessed using eight items adapted from the KnowPain-12 questionnaire (Gordon et al., 2014). For each knowledge item, responses were scored 0 = incorrect answer and 1 = correct answer. Paired t-tests were used to assess pre-post differences. HCPs’ knowledge scores improved significantly after attending ECHO Ontario Pain ($p < 0.0001$), with the average knowledge score pre-ECHO = 10.1 and post-ECHO = 12.7 (Furlan et al., 2017b).
Satisfaction was measured using the ‘Satisfaction and Acceptability with ECHO questionnaire’ adapted from the University of New Mexico (Furlan et al., 2014). This was administered post-ECHO Ontario Pain only. An example of some of the items included: looking at the participants’ involvement in ECHO Ontario Pain, how ECHO Ontario Pain has enabled rapid learning, best practice dissemination, and how ECHO Ontario Pain has reduced variations in care. Satisfaction was scored using a 5-point Likert scale where 1 = strongly disagree and 5 = strongly agree. Responses were summarized to reflect those who agreed with the items, adding responses for 4 = agree and 5 = strongly agree. HCPs who attended ECHO Ontario Pain were highly satisfied with the ECHO Ontario Pain program, with ‘in agreement’ scores ranging from 67% to 96% (Furlan et al., 2017b).

In summary, ECHO Ontario Pain was found to be feasible and acceptable, and impacted the performance metrics of HCPs’ knowledge and self-efficacy around caring for patients with chronic pain. To complement the quantitative findings, a qualitative study using focus groups was conducted to explore the HCPs’ perceptions of their experience participating in ECHO Ontario Pain and their takeaways from the ECHO Ontario Pain sessions. While the quantitative research showed that there were changes in knowledge and self-efficacy in spoke members, the qualitative research was conducted to examine why and how these changes might have happened.

Focus groups were conducted with HCPs who attended the bootcamp in 2014 and 2015. HCPs could have attended the bootcamps at any point during their participation in ECHO Ontario Pain, some participated after attending a few sessions, while some had already stopped attending ECHO Ontario Pain sessions. Six focus groups were conducted
with a total of 42 participants (Carlin et al., 2015). Five themes developed from the focus groups.

1. **The impact on patient care.** HCPs discussed how beneficial they found the tools that they had learned from ECHO Ontario Pain to help them better manage patients in their practices with chronic pain. They understood the usefulness of the various roles of HCPs (physical therapist, pharmacist, etc.) in managing patients with complex pain and valued the support of the hub experts. They enjoyed having the back-up expertise for managing their challenging patients.

2. **The sense of community.** The participants appreciated learning about similar patient cases presented across Ontario. The HCPs felt reassured that they had a supportive community and network, since sometimes some of the doctors felt like they were working in isolation.

3. **Differences in resources between urban and rural HCPs.** For HCPs, it was interesting to look at the context of their practice, challenges encountered by rural clinicians, and their lack of resources. It was challenging for HCPs in rural communities, who may have a multitude of other responsibilities. They may not have time to learn about new resources or have the extra support from urban centres. These providers appreciated learning from not only the hub members, but also from other spoke members. HCPs found it was helpful to connect with similar providers who also had resource limitations and had trouble suggesting modalities in the area.

4. **Identification of a knowledge gap.** HCPs discussed how much knowledge was available about chronic pain. HCPs felt that their confidence levels were reduced,
as they felt they did not know enough, and had limitations in managing their patients. Some providers felt they hadn’t yet reached a point where they had expert knowledge.

5. **ECHO ripples.** Participants who were part of the ECHO Ontario Pain shared their involvement with other HCPs. They shared their knowledge and diffused what they had learned, encouraging more participation in the program.

(Carlin et al., 2015).

To date, ECHO Ontario Pain research has demonstrated an improvement in providers’ self-efficacy, knowledge, and attitudes. Through the use of focus groups, participants’ experiences of the ECHO Ontario Pain program and managing patients with chronic pain were explored. However, there was a need for further understanding of the HCPs’ experiences with ECHO Ontario Pain, specifically related to their confidence levels, the role of technology, and the effects of ECHO Ontario Pain in clinical practice. During the focus group discussions, participants may not have had an opportunity to share their feedback in a safe space, as they may have felt uncomfortable in a focus group setting, or were limited due to time constraints. Focus group participants were also limited to those who attended the bootcamp. In addition, feedback was received from some non-physicians that they did not feel comfortable speaking openly in the focus groups when doctors were present (Carlin, 2017).
2.7. SUMMARY

As discussed in this chapter, the barriers to chronic pain management, the limited access to treatment, and the burden on HCPs led to the need of a new mechanism to educate and support HCPs in managing their patients’ chronic pain. Using ECHO Ontario Pain as a case study, the following study will be able to address some of the gaps in the research about telehealth interventions being used as an educational method. In addition, by expanding on the previous research conducted on ECHO Ontario Pain, this study aimed to understand the experiences of HCPs, how knowledge sharing was applied in practice, the role of technology in educating HCPs, and to gain insights into HCPs’ confidence, and motivations for joining ECHO Ontario Pain.
CHAPTER 3: METHODS AND STUDY DESIGN

As discussed previously, there is a need for further evaluation to understand the HCPs’ experiences with using ECHO Ontario Pain as a model for both learning and sharing knowledge. This chapter will discuss the study design and theory used to support this research. The Diffusions of Innovation Theory was used (DOIT) to help guide the development of the research objectives and support the analysis for this study. ECHO Ontario Pain represents the innovation used for the delivery of education and its adoption will be studied. In addition, this chapter will outline how the method of qualitative description is being used to support the research questions. Sampling procedures, the analysis process, and data rigour will also be discussed in this chapter.

3.1. STUDY DESIGN

A qualitative description design as articulated by Sandelowski (Sandelowski, 2010) with semi-structured, individual interviews was conducted with HCPs who were either current participants or graduates of the ECHO Ontario Pain program. These interviews were conducted to explore their perceptions of the program, how knowledge sharing had impacted on their communities, how technology had been a facilitator for sharing, and how HCPs had gained insights into their motivations, confidence levels, and treatments for managing their patients.

Semi-structured interviews were chosen to explore the participants’ perceptions and opinions, while also providing the opportunity to probe for more information and clarification (Barriball & While, 1994). Moreover, the Moore’s Framework helped to provide context to designing the questions around performance of the program, and
exploring the changes HCPs had made in their practice. The prior guides from the focus groups were also used to help ensure the research gaps were addressed. For this study the touches of the ECHO model™ defined as the outreach of the model (primary, secondary and tertiary) were explored (Kirsh, Su, Sales, & Jain, 2015). These touches were incorporated into designing the semi-structured interview questions. This study received ethics approval from the University Health Network (REB #14-7415) and the University of Toronto Research Ethics Boards (Reference #33562).

3.2. Theoretical Framework

Level 5 from Moore’s Framework was the focus of this to be used to specifically explore provider and clinic wide changes. While the DOIT was used to help formulate the research questions and develop the interview guide, and was adopted as an overarching theory to be used during the analysis. This theory was developed by Everett Rogers in the 1960s, and is commonly used to explain the uptake of an innovation in a community over time. It has been used in previous research to understand how information technology innovations are spread across different communities (Zhang, Yu, Yan, & Spil, 2015). In our study, the community was defined as those participating in ECHO Ontario Pain and those who had been impacted by the ECHO Ontario Pain model. When using this theory, it is vital to look at ECHO Ontario Pain’s impact on sharing knowledge about chronic pain by looking at the four dimensions of the model: the attributes of the innovation, the social systems, the communication channel, and the element of time.

The first dimension of the model focuses on the attributes of the innovation. The attributes are important when measuring an innovation, because if these features are
perceived to be beneficial, the innovation will be more likely to be adopted. The two attributes that were relevant to the current study were the complexity – understanding how difficult the innovation was perceived to be – and the relative advantage – the degree to which an innovation was perceived as better (Rogers, 2003; Sanson-Fisher, 2004). The primary researcher thought about how the attributes would apply to ECHO Ontario Pain when preparing the interview guide. For example, to understand complexity and relative advantage questions were asked, such as what the HCPs liked or did not like about the model, and the use of different technology platforms (OTN versus Zoom) for ECHO Ontario Pain.

The second dimension of the DOIT is the communication channel, which focuses on how new content is being exchanged between individuals (Rogers, 2003). The use of communication is critical for ECHO Ontario Pain, as the research team wants to see more participants communicate and share information about the program. People’s perceptions of a program provide a subjective view, which can help to understand how information is conveyed about the innovation. To understand this dimension, questions were asked about how participants learned about the program, and how they shared what they learned.

The third dimension of the DOIT is the social system, which is defined as groups of people working towards a common goal (Rogers, 2003). Social systems are important to ECHO Ontario Pain, as one of their goals is to build a virtual community of practice (Wenger, 1998) for HCPs to be supported in the management of patients with chronic pain. It is critical to understand how relationships are formed to create a new social network or community of practice. Some of the questions asked that focused on social
systems were questions around interactions with other HCPs in their practice and the wider community, and how the HCPs felt being part of an online community.

The final element of the DOIT is the component of time, understanding how long it takes to accept or reject an innovation (Rogers, 2003). There are five different groups of adopters that are referenced by Rogers. There are innovators (first group to adopt an innovation), early adopters (well informed about the innovation), early majority (followers), late majority (followers), and laggards (delayed followers) (Rogers, 2003). In this study, the participants were all part of the early adopters or the early majority, who had opted to be part of the ECHO Ontario Pain program. Therefore, for this study, it was not possible to explore this component, as all of our participants were at the same time point.

3.3. Sample size and study setting

Over the demonstration project, more than 200 HCPs participated in ECHO Ontario Pain. The individual members of the spokes were located in different areas of Ontario, which meant the interviews were conducted by telephone (Holt, 2010). The goal was to conduct interviews with as many participants as necessary who had previously, or were currently attending ECHO Ontario Pain, until data saturation was reached (Tong, Sainsbury, & Craig, 2007). Saturation was reached during the interviews, when the primary researcher and the members of the research team felt there was no new information being collected on the research questions or themes.

There are several types of purposive sampling, and this study chose to use maximum variation sampling (Patton, 2005). Maximum variation was used to identify
HCPs to approach about participating in the semi-structured interviews. It was important to have a mix of participants, based on their type of profession, geographical location, gender, use of telehealth technology platform, and whether they had presented a patient case during any ECHO Ontario Pain session (Patton, 2005). A sample size of 12 to 15 participants was anticipated. Sample sizes are generally smaller for qualitative studies, as the goal is to achieve a deeper understanding of complex issues, not generalizability (Marshall, 1996).

**Inclusion criteria for participants.**

- HCPs of any profession (physicians, physician assistants, nurse practitioners, registered nurses, pharmacists, social workers, chiropractors, community health promoters, and occupational therapists);
- HCPs from different locations across Ontario (a variety from the Local Health Integration Networks (LHINS)) representing rural, remote, and urban underserved areas;
- HCPs that were male or female participants;
- HCPs who used both categories of telehealth technology platform (Ontario Telemedicine Network (OTN) and Zoom) over the course of ECHO Ontario Pain implementation;
- HCPs who presented patient cases during ECHO Ontario Pain, and those who did not.

**Exclusion criteria for participants.**

- Participants who attended less than one ECHO Ontario Pain session;
3.4. **Procedures**

Potential interview candidates were invited to participate by email, sent by the research coordinator of ECHO Ontario Pain (see Appendix B). Respondents were asked to contact the primary researcher by email if they were interested in participating, at which time they were asked to sign the consent form (see Appendix C). The method of recruitment that was undertaken was aimed to have a variety of HCPs, a multitude of LHINs, and participants who engaged in both presenting and learning. Twenty-two HCPs were selected according to the inclusion/exclusion criteria outlined above. The primary researcher emailed all of them, and 13 agreed to participate in the study, for a response rate of 59%. The participants received a $50 Visa gift card as an honorarium for participating in the interview. The primary researcher conducted the telephone interviews from an office at Toronto Rehabilitation Institute (TRI) and took memo notes during the interview process to add them at the end of the transcripts. Memo notes highlighted the tone of voice of participants and the primary researcher’s reflections and afterthoughts about the interview, and noted interpretations during data analysis. These memo notes were important for taking the overall context into consideration during analysis. The audio recordings of the interviews were transcribed by a professional transcription service and reviewed for accuracy by the primary researcher.

The primary researcher developed the interview guide with the assistance of the research team and built on the themes from the previous focus groups, Moore’s
Framework, and the dimensions of the DOIT. The interview guide (see Appendix A) focused on three broad topics: HCPs experiences with ECHO Ontario Pain, impact of ECHO Ontario Pain on the provider’s practice, and features of ECHO Ontario Pain. The guide was piloted with a doctor from an urban LHIN. She found the flow easy to follow and suggested speaking slower when conducting the interview. After three interviews were completed, the transcripts were circulated to the thesis committee for their feedback on the quality of the interviews, tips for improving the interview, and how to probe further. Initial thoughts from the committee members were added as probes to the interview guide to help facilitate a more in-depth discussion on certain components of the interviews; some additional probes were based on content from the interviews. Some examples of the questions for the probes, were asking about specific examples of practice change, their experience with online community building, and confidence levels. During subsequent interviews, the primary researcher took additional notes to begin to familiarize herself with the data, and to start to look for patterns within the data.

3.5. **Data Analysis**

Thematic analysis was used which is a dynamic process that summarizes the informational content of data by finding repeated patterns within a set of data (Braun & Clarke, 2006). The data were collected and analyzed data concurrently, but will be described by the phases outlined by Braun and Clarke (2006). In the first phase, the primary researcher familiarized herself with the data by reviewing all the transcripts and creating a summary of each one. This is referred to as immersion. The second phase included coding key messages, characteristics, and themes, in order to generate initial codes (Braun & Clarke, 2006). Memo notes were also written during this process as a
method for reflecting on the coding (Saldaña, 2015). The data analysis process was completed inductively and deductively. For inductive coding, the primary researcher identified segments of the data she found interesting in relation to the study research questions, also known as open coding (Saldaña, 2015). She also used deductive coding, using the DOIT, to identify text that aligned within the dimensions of theory. Two members of the research team (F.W. and L.C.) independently coded four transcripts and then met with the primary researcher to compare codes and to refine the coding framework. The primary researcher then applied the coding framework (see Appendix D) to all the transcripts.

The third phase involved organizing codes into themes relevant to the phenomenon under study, by exploring the relationships within and between codes (Braun & Clarke, 2006). This process involved using white boarding and index cards. In this stage, the primary researcher started to look for patterns within the codes, in an attempt to create an overarching theme. During this phase, the primary researcher also began to analyze the literature, to understand how the identified themes might fit within existing evidence. This led to the fourth phase of refining the themes, and seeing how relevant the themes were to the initial research aims (Braun & Clarke, 2006). This also involved looking at the dataset as a whole, and understanding how themes were interrelated.

During the fifth phase, the naming of the primary and subthemes were finalized. Each theme was examined to ensure that it was robust enough to justify being a stand-alone theme. The sixth and final phase of thematic analysis was telling the overall story of the data, and relating it back to the research questions (Braun & Clarke, 2006).
3.6. Data rigour

Elements of Tong’s checklist were used to assess rigour during this qualitative study. His checklist consists of three domains: (i) research team and reflexivity, (ii) study design, and (iii) analysis and findings (Tong et al., 2007).

The first domain, reflexivity is defined as a “researcher’s recognition of their own influence on their research, such as gender [or] social status” (Kuper, Reeves, & Levinson, 2008). For reflexivity, it is important to look at the personal characteristics of the researcher, which includes their credentials, occupation, experience, and gender to understand how this impacts the research process. For example, it was important to look at the relationship between the primary researcher and the participants prior to conducting this study. For this study, the primary researcher was a female Masters candidate at the Institute of Health Policy, Management, and Evaluation who is a non-clinician. She had no prior relationship with any of the participants who were chosen to participate in the study. The participants were aware that she was a graduate student working with ECHO Ontario Pain. The primary researcher had taken qualitative research methods classes to build her knowledge of qualitative research. Using memo notes, she identified some of her assumptions that related to her particular standpoint. For example, she has a background in Health Informatics, which makes her pro eHealth and the use of technology; therefore, she had to be careful that she did not convey this during interviews, or allow this to influence data interpretation, when others might not share her worldview or values. Team composition, another aspect of this domain, was interdisciplinary. This allowed for multiple perspectives to be shared, thus decreasing the chance that any one perspective would dominate the analysis.
The second domain identified by Tong focuses on the study design. Here Tong suggests that the researchers need to identify the theoretical framework being used, so readers are aware of the method being used to explore the questions (Tong et al., 2007). Our study design was qualitative descriptive analysis, supported by the use of the DOIT framework. Tong also advises that specific sampling details and the setting of the interview is important to note. Our study used appropriate purposive sampling. Specifically, we used maximum variation sampling to recruit 22 participants; 15 responded, and only 13 participated in the phone interviews. The two people out of 15 who did not participate, responded that they were too busy to participate in the interviews at this time. The pilot interview was conducted in person, for approximately 40 minutes, at the doctor’s office; subsequent interviews were conducted on the telephone. During these interviews, the interviewees were advised to be in a private room, to ensure all thoughts could be shared confidentially. Tong’s checklist recommends that the interview guide (see Appendix C) is shared with those reading the research, and they are aware of the prompts being used (Tong et al., 2007). The interviewer completed memo notes after the interviews and during the different stages of coding, to help understand when data saturation was reached. The memos were helpful in creating the story of the data, and to provide additional context to the data when needed.

The third domain focused on the analysis and the coding process. Tong advises that all details of the analysis be documented, as it can help to indicate a better understanding of the data (Tong et al., 2007). The primary researcher was the main coder; some of the thesis team assisted with this process. Multiple coders are needed to cross-check the data when conducting coding, as this can provide a different perspective on the
data and help to refine interpretations (Sandelowski, 1986). Two qualitative experts (L.C. and F.W.) assisted the primary researcher with the coding process, by reviewing a portion of the transcripts and the themes were discussed in relation to the data helping to develop the final coding framework. Tong recommends that if quotations are used, a variety of quotations should be used. Our research aimed to have different quotations to support and validate the participant’s findings in each theme. Finally, the generated data should be clearly presented. The use of Tong’s checklist helped ensure that the primary researcher was helping to improve the quality of the data and their reporting.

3.7. Ethical Considerations

The University of Toronto Research Ethics Board and the University Health Network Research Ethics Board approved this study. Every participant read, understood, and signed the consent form. All data collected during this research study were kept confidential by replacing names with ID codes, and ensuring there was no participant demographic information on the notes or transcripts. No data were stored on personal computers; the data are and will continue to be stored on a computer at Toronto Rehabilitation Institute (TRI) for 10 years, in a locked office. All the interviews were password protected, and all the transcripts were anonymized. The consent forms and contact information are also stored at TRI. A list linking the study number with the name is being kept by the principle investigator (A.F.) of ECHO Ontario Pain in a secure place, separate from the study file. The principal investigator will keep any personal information about the participants in a secure and confidential location for 10 years. The participants will not be named in any reports, publications, or presentations that will come about for this study. All paper records were properly shredded. Finally, access to
these data will be limited to the thesis supervisors, the committee members, and the ECHO Ontario Pain research team.
CHAPTER 4: RESULTS

4.1 DATA COLLECTION

We contacted 22 HCPs to invite them to participate in the interviews. Fifteen responded, but two could not participate because they said they had a prohibitive workload; therefore, 13 interviews were conducted from September 2016 to January 2017. The primary researcher conducted interviews with four primary care doctors, and nine non-physicians, which included three nurses (two registered nurses and one nurse practitioner), two pharmacists, and one chiropractor, community health promoter, occupational therapist, and social worker. The participants represented eight urban and five rural areas. Seven of 14 Ontario LHINs were represented in the sample. The majority of participants (10/13) had presented a case during the ECHO Ontario Pain sessions, while three did not present. Table 2 provides the descriptive characteristics of the participants.

This chapter will provide the results from this study, highlighting the four inter-related themes that were created. These themes were organized temporally, based on the participant’s involvement in ECHO Ontario Pain during their journey proceeding from their experiences prior to their involvement in ECHO Ontario Pain, their experiences of participation, and the knowledge mobilization phase following the end of ECHO Ontario Pain. Finally, we include their recommendations and suggestions for improvements after their participation in the program.
<table>
<thead>
<tr>
<th>ID Number</th>
<th>Profession</th>
<th>LHIN</th>
<th>Urban or rural</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>doctor</td>
<td>Toronto Central</td>
<td>urban</td>
</tr>
<tr>
<td>2</td>
<td>nurse practitioner</td>
<td>North East</td>
<td>rural</td>
</tr>
<tr>
<td>3</td>
<td>social worker</td>
<td>Toronto Central</td>
<td>urban</td>
</tr>
<tr>
<td>4</td>
<td>registered nurse</td>
<td>Toronto Central</td>
<td>urban</td>
</tr>
<tr>
<td>5</td>
<td>community health promoter</td>
<td>North West</td>
<td>rural</td>
</tr>
<tr>
<td>6</td>
<td>chiropractor</td>
<td>Champlain</td>
<td>urban</td>
</tr>
<tr>
<td>7</td>
<td>occupational therapist</td>
<td>South East</td>
<td>rural</td>
</tr>
<tr>
<td>8</td>
<td>doctor</td>
<td>Champlain</td>
<td>rural</td>
</tr>
<tr>
<td>9</td>
<td>doctor</td>
<td>Waterloo Wellington</td>
<td>urban</td>
</tr>
<tr>
<td>10</td>
<td>registered nurse</td>
<td>Champlain</td>
<td>urban</td>
</tr>
<tr>
<td>11</td>
<td>pharmacist</td>
<td>Hamilton Niagara</td>
<td>urban</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Haldimand Brant</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>pharmacist</td>
<td>North West</td>
<td>rural</td>
</tr>
<tr>
<td>13</td>
<td>doctor</td>
<td>Hamilton Niagara</td>
<td>urban</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Haldimand Brant</td>
<td></td>
</tr>
</tbody>
</table>
4.2 Themes

Theme 1: Experiences with chronic pain management before joining ECHO Ontario Pain.

The majority of the HCPs expressed their frustration with not being able to adequately help their patients prior to joining ECHO Ontario Pain, not liking the way patients were managed, and some of them felt isolated when managing their patients with chronic pain. These frustrations took several forms. For example, a couple of HCPs commented on their lack in understanding the impact of chronic pain on their patient, as their patients are also very frustrated.

“They’ve been dealing with [pain] for years, and they just don’t really know what’s causing the pain. They’re just maybe frustrated and annoyed because in my first few encounters with patients I felt they didn’t really want to come and see me just because they had this attitude that nothing works, and they’re always in pain.” (interviewee 005, rural, community health promoter)

HCPs also explained that they were unsure of how to learn more about chronic pain independently and sought out information from other colleagues, who then referred them to ECHO Ontario Pain. Some of the HCPs responded that they were also aware of ECHO Ontario Pain because of the hub members.

“I actually had an extremely complicated patient and I ended up just making some phone calls to pharmacists who I thought might be able to help me out with some of the clinical questions. It was a chain of people, but I ended up talking to
one pharmacist in particular and she brought up this ECHO thing.” (interviewee 012, urban, pharmacist)

The doctors reported that they were aware they had complex patients and recognized the gap in their knowledge for assessing and managing these patients; they did not know how to access chronic pain information. They indicated that they were keen to learn new methods (i.e., non-pharmacological methods and proper opioid tapering) that differed from the education that was taught to them during their previous training. Specifically, some HCPs shared that they wanted to gain some advanced knowledge about chronic pain management:

“I felt that I was competent to do basics of looking after people with chronic pain, but I guess I was interested … it seems to me that it’s a really under-serviced area. I was interested in doing maybe more specialised work in chronic pain, and I just thought it would be really useful to hear about state of the art from experts.” (interviewee 013, urban, doctor)

Some HCPs described that they had specific experiences and reasons for joining ECHO Ontario Pain. Some expressed that they were looking forward to using ECHO Ontario Pain as a general learning tool, but some wanted to learn more about opioids, as opioid prescribing was not part of their everyday practice. HCPs also described having patients with chronic pain referred to them by other HCPs who did not know to how to further help the patient. Finally, a few of the non-physicians explained that they joined the ECHO Ontario Pain program because their managers suggested it, as their clinic was planning to start a pain program, or they shared they were seeking more knowledge to
help support their existing pain programs. There were others that did not have specific reasons for joining ECHO Ontario Pain.

In summary, all of the interviewed HCPs expressed that they felt overwhelmed when managing their patients with chronic pain prior to joining the ECHO Ontario Pain program, due to the challenges experienced by the patients and the complexities of chronic pain. Moreover, HCPs shared that due to the lack of formal training about chronic pain, there was a gap in their knowledge that they felt needed to be filled.

**Theme 2: Learning and sharing through ECHO Ontario Pain**

Learning and sharing are benefits that were raised by participants as being important throughout and after the ECHO Ontario Pain program. This aligns well with one of the foundational philosophies of ECHO Ontario Pain, which is to provide an open and collaborative learning environment. This theme is very broad and includes two subthemes. The first is learning within ECHO Ontario Pain and includes didactic, case-based learning, and informal learning from others. The second is sharing, which is defined as how knowledge is being applied and diffused, known as the touches of the ECHO model™ (Kirsh et al., 2015). There are three types of touches that were adapted for use in our ECHO Ontario Pain research.

1) **Primary touch:** The care received by the patient whose case was presented at an ECHO Ontario Pain.

2) **Secondary touch:** The care for all patients being managed by the HCP who attended ECHO Ontario Pain.
3) **Tertiary touch:** The care that all patients received in the clinic, the interactions with other HCPs in that clinic, and the interactions with the wider community (Kirsh et al., 2015).

**Learning within ECHO Ontario Pain**

ECHO Ontario Pain provides different modes of learning opportunities, so that HCPs can learn a substantial amount of educational content, and to ensure learner needs are met. All of the HCPs expressed value in the information from the didactics, the case presentations, learning from others, or a combination.

**Didactic learning**

Half of the HCPs viewed the didactics as a helpful resource for learning. The HCPs found that the didactic sessions contained useful knowledge from a range of experts. Some HCPs printed out the lectures as reference material and explained that the tools that were taught were useful for applying to their clinical practice. Many HCPs shared that they learned how to use tools, such as the Brief Pain Inventory¹ and the My Opioid Manager Tool² appropriately in their clinic, and perceived these tools as valuable educational resources. They noted that ECHO Ontario Pain was able to provide additional information and context to different guidelines used in chronic pain, by outlining specific steps and approaches for managing chronic pain

---

¹ Brief Pain Inventory: A widely used measurement tool for assessing clinical pain (Cleeland & Ryan, 1994).

² My Opioid Manager: Used as a point of care tool for providers prescribing opioids for chronic non-cancer pain. (Furlan & Robidas, 2012).
“Some of the didactic lectures that they gave ... give you an approach for dealing syndromes, or an approach to dealing with people who...[have] issues with opioids. So, it helped with people with neuropathic pain or dealing with people with different pain give you an approach in a variety of different common scenarios.” (interviewee 008, rural, doctor)

However, a few of the non-physicians perceived that some of the content presented in the didactics was too physician-focused, or not relevant to their particular role. Some of the HCPs shared that they felt they did not need to know some of this information for their specific practice and other HCPs mentioned that it might be challenging if you did not have the specific medical background.

“It was a little bit intimidating, because there were a lot of questions around drugs and medications, and [was] sort of physician-focused.” (interviewee 007, rural, occupational therapist)

HCPs communicated that they appreciated that ECHO Ontario Pain was an environment in which experts, as well as peers, could learn to understand the nature and complexities of dealing with chronic pain. One participant shared that:

“I think a lot of us don’t know how to deal with chronic pain the way we should, and because we don’t always see it, we don’t understand it. There are so many different definitions of chronic pain and it’s very individualised.” (interviewee 004, urban, registered nurse)

The majority of HCPs perceived that ECHO Ontario Pain was also beneficial for looking at the various roles of other HCPs, and understanding how each role can help
with chronic pain management, as specific pain management techniques are not taught in the curricula of the individual disciplines. By learning about the roles, the HCPs indicated that they began to learn how they could integrate other HCPs, other tools, and resources in the community to help improve patient outcomes in their practices. For example, one nurse described that her learning was beneficial to help pharmacists in the community, to ensure they were aware of patients who were on high doses of opioids or narcotic contracts. However, a few of the non-physicians indicated they still found it challenging to persuade the doctors to explore new ways of managing their patients with chronic pain, despite the knowledge the non-physicians had gained. A pharmacist indicated it could be challenging for doctors to change their behaviours, as each practised pain management differently.

“I am trying to suggest to [the pain program] that we should be doing the universal precautions... but to try and convince the physicians that we need to [present cases] ... [is difficult] because they’re busy doing other things and pain isn’t necessarily their focus.” (interviewee 011, urban, pharmacist)

The majority of HCPs identified that specifically learning about opioids was important. The HCPs reported that it was beneficial to learn standards and procedures that were outside the formal training of their professional education. Some HCPs appreciated learning about proper prescribing habits for managing opioids. In particular, non-physicians who did not prescribe opioids or have prior training appreciated the new education. For the non-physicians, they shared that this information was important, as it would help them be more aware of their patient’s medications and certain side effects due to opioids. Many of the HCPs expressed that they learned that opioids should not always
be the first choice, and there are a variety of non-pharmacological approaches that can be used.

“I’ve taken [information] from lectures, like I’m more aware of how I prescribe opioids. I don’t have anyone above the watchful dose, but I certainly keep that watchful dose in mind, which I probably wasn’t paying as much attention to before.” (interviewee 009, urban, doctor)

Case Presentations

In addition to learning from lectures, participants of ECHO Ontario Pain are encouraged to present a case during their time in the ECHO Ontario Pain program. While all of the doctors and some non-physicians did present a case, there were three non-physicians who did not present a case. Some of the case presenters commented that they felt apprehensive and nervous before presenting a case, but afterward felt it went well and valued the feedback they received. Many shared that they appreciated the multitude of perspectives that were given on how to handle patients who had complex conditions. Some of the HCPs explained that presenting a case and learning from ECHO Ontario Pain taught them how to better interact with their patients. They also perceived that by presenting a case it gave the HCPs a more complete understanding of not only the patient’s pain, but also their comorbidities. HCPs shared that the advice given to them by other ECHO Ontario Pain participants on the case they were presenting could also be applied to a variety of other patients in their care.

“[The advice] gave you a different lens of what other people were thinking about. [There were] really helpful suggestions from the expert table as well, in
terms of some approaches to dealing with it, and most of them were not pain-related; most of them were mental health and self-esteem related.” (interviewee 008, rural, doctor)

Some HCPs described experiencing some negative emotions from presenting a case at ECHO Ontario Pain. For example, some HCPs reported that they were at a loss as to how to best care for their patients, which it made it more challenging to present their cases at ECHO Ontario Pain. Some of the case presenters found controversial cases, such as patients with high opioid use, or patients with multiple conditions, more difficult. This was because, although the treatment was working for the patient, they worried that it might not be the safest or best practice option. Some HCPs shared that even though the moderators worked hard to create a learning environment that was non-judgemental and that provided constructive feedback, some learners still felt judged.

“I felt that I was being judged for my care of this patient. I don’t know if that’s really what was going on, or if that was just me, but ... I felt terrible after, it was a pretty awful experience ... I felt that the sense was, how could you have prescribed [opioids for this patient] like you were doing.” (interviewee 013, urban, doctor)

Learning from others

The final pedagogical strategy offered through ECHO Ontario Pain involved learning from others through informal conversations or offline conversations. The HCPs indicated that they valued hearing about similar experiences of other HCPs, and the conversations that were generated from discussions. They commented that they appreciated that they
could collaborate and share in this open environment, which made it easier for HCPs to feel connected to ECHO Ontario Pain’s community of practice. They also found it beneficial to be part of an environment in which they could hear real stories and cases about what does or does not work for others, when managing patients with chronic pain

“The way the doctors spoke about it, there was a reality to it. It wasn’t this sugar-coated, rose-coloured glasses, the-world-is-great [perspective]. There was some ‘Yeah, patients aren’t going to be on board with this, sometimes it isn’t going to go the way you want it.’” (interviewee 012, rural, pharmacist)

**Different levels of sharing**

The sharing of knowledge happens simultaneously within the healthcare community and there are different touches (outreach) of the ECHO model™. This theme focuses on the primary, secondary, and tertiary touches. These touches show how knowledge moves from ECHO Ontario Pain to the patient, within the practice, and the wider community.

**Primary touch**

The primary touch is defined as the impact of the HCPs case presentation on the patient who was being presented. The majority of HCPs reported that the applicability of their learning was immediate, and felt that presenting the patient’s case at ECHO Ontario Pain had an immediate effect on the care of the patient whose case they were presenting. This was evident by helping their patient progress in the management of their pain, such as figuring out a diagnosis immediately, or trying a new treatment. For others, suggestions were shared about making small incremental changes, fixing one issue at a time, or building a plan with the patient to evaluate during follow-up appointments. HCPs also
conveyed that they felt patients were beginning to feel more involved in solving their chronic pain.

Presenting the case at ECHO Ontario Pain: “I think it made [the patient] feel better that somebody was paying attention to her and listening to her about her pain. I think it was really helpful for her. She talks about it a lot, like it made her feel special.” (interviewee 002, rural, nurse practitioner)

Some HCPs shared that participating in ECHO Ontario Pain gave them suggestions for enhanced treatment options to try with their patients. They also communicated that they began to learn how to appropriately talk with their patients about challenging topics in chronic pain. By participating in ECHO Ontario Pain, HCPs commented that they were able to strengthen and rebuild a better relationship with their patients over time. They also described how they saw an increased importance in engaging their patients, and encouraging them to be part of the care plan. For example, one registered nurse reflected that she was able to help a patient with a treatment change:

“‘There was one patient who wanted to try marijuana. We presented at ECHO ... ECHO said it wasn’t a good idea [and] they did not recommend it. So, when we came back and told the patient that it was not recommended, she accepted that. It was so much easier saying that it was presented to a group of professionals and experts in pain who actually did not think that this should be recommended. It was much more accepted from the patient’s side [when] it didn’t just come from her physician.” (interviewee 011, urban, registered nurse)
However, there were some HCPs who chose to present more challenging and complex cases at ECHO Ontario Pain, and had trouble convincing their patients to change their habit or try new treatment options. Some HCPs stated that they were having challenging conversations with their patients, and found it hard to persuade them to look at alternate treatment options, as many of the patients were resistant to change. For instance, one HCP shared with us his challenge of tapering one of his patients off narcotics:

“This one patient I was presenting used to go on message boards and I would tell her there’s no evidence that narcotics help treat pain with fibromyalgia, and she said, well, that’s just one view. She said, ‘On the message board I’m on ... people all talk about how narcotics help their pain.’” (interviewee 013, urban, doctor)

**Secondary touch**

The majority of HCPs also expressed that that by participating in ECHO Ontario Pain, they were able to apply their new skills with patients who were not presented at ECHO Ontario Pain, known as the secondary touch. For instance, HCPs shared that they struggled to have open conversations with their patients about various treatment options before ECHO Ontario Pain. The HCPs described that ECHO Ontario Pain program helped to teach them how to communicate information appropriately with their patients.

“So, I think we tried some of the things that we got feedback on, but maybe more loosely and we maybe didn’t communicate back to the patient clearly. I think having the feedback from the group helped us to really formulate what our next
couple of appointments with our patients would look like.” (interviewee 009, urban, doctor)

Some HCPs voiced that by partaking in ECHO Ontario Pain, they were able to empower and engage their patients to work on their care plan collaboratively; in turn, this helped their patients make informed decisions. For example, HCPs described using the expert advice provided by the hub to help motivate their patients to try new treatment methods or stop old treatment methods.

“When we’re together [as the HCP and the patient], we talk about everything that affects pain. We talk about stress management, we talk about nutrition, we talk about caffeine intake, which can be coffee, tea, [or] chocolate. We talk about physical exercise. We talk about everything that are the pain risk factors.”
(interviewee 010, urban, registered nurse)

HCPs were also able to share suggestions on self-management to their patients with chronic pain, as they learned about specific principles in ECHO Ontario Pain. Many of the HCPs indicated that ECHO Ontario Pain provided concrete examples of how to teach their patients self-management techniques, and how to build on small changes, to help guide the patient to make long-term changes. Some examples of self-management tools included exercise programs and mindfulness. Some HCPs recommended programs for patients to actively participate in their own self-management. One non-physician provided an example of how she has worked to empower her patients to be champions in their care plan.
“I show them a diagram and all the different things that can have an impact on [their] chronic pain ... and just ask them, ‘where do you think you can make a change’, or ‘what type of change would you be willing to make?’ Then, we’ll set up SMART\textsuperscript{3} goals around that and then I’ll follow-up with them after.”

(interviewee 005, rural, community health promoter)

\textit{Tertiary touch}

The tertiary touch is defined as the dissemination of knowledge within the HCPs’ own family healthcare teams or practices, or outside of the ECHO Ontario Pain community. In particular, the doctors learned how to be more efficient and share knowledge when working in an interprofessional team. The doctors also reported that they were exploring new methods for collaborating with other HCPs in their practice and their patients. By participating in ECHO Ontario Pain, HCPs stated that they became aware of the benefits of the interdisciplinary approach of co-ordinating with other professionals (i.e., physiotherapy or psychology) to treat their patients. Non-physicians commented that they felt they were able to help doctors consider the patient’s pain more holistically, by taking into account factors such as the patient’s mental health and interpersonal relationships. Both groups understood that working as an interprofessional team to compile the recommendations from the discussions and conversations was vital in providing better care for the patient. For example, one doctor explained why working together was perceived to be effective:

\textit{“Your chances of being successful in changing a patient’s life for the better are much higher. I was able to take one of my patients, who had been on a very high...\textsuperscript{3} SMART Goals: Specific, Measurable, Achievable, Realistic/Relevant, and Timed goals.}
Some HCPs also explained how they applied the information they learned in ECHO Ontario Pain and used technology such as computers, phones, and electronic medical records to incorporate this knowledge into their practices. Half of the HCPs described that they set up shared folders on their computers and phones for all the HCPs in their practice, so they could have access to the ECHO Ontario Pain program resources, such as lectures, notes from discussions, or other tools to share with their patients. HCPs also discussed the different tools they created to help manage their patients, such as contract agreements and standardized procedures, to help create a more seamless experience for both the HCPs and the patients.

“We have a standardized way now of booking [our patients], so they’re all booked under chronic pain and they all have an ICD (International Classification of Diseases: used to classify and code diagnoses) code ... [Moreover, we have incorporated] tools such as a narcotic contract ... the brief pain inventory ... [and] urine drug screens [into our system]...Within our practice as well, if we get a prescription or a renewal request, [the NP will] review it first before it goes to the family doctor, just to make sure it’s appropriate.” (interviewee 002, rural, nurse practitioner)
Some non-physicians mentioned that they implemented new processes in their practice to evaluate prescriptions and to be part of the patient’s care plan, along with the doctor.

“The education about the opioids has absolutely increased my knowledge about medication and the prescribing of medication; [I learned] enough that in two weeks I’m actually presenting to our physicians about the opioid management and the new guidelines from the [Centre for Disease Control] that came out this year.” (interviewee 010, urban, registered nurse)

ECHO Ontario Pain has not only spread within individual practices, but into the wider healthcare community at large, as well. Many defined this wider healthcare community as being comprised of members who had not participated in ECHO Ontario Pain, but who worked with HCPs who had participated in the program, such as community pharmacists or social workers. Participants told us that by participating in ECHO Ontario Pain, they were able to connect and share their knowledge with those in the wider community. Half of the interviewed HCPs had shared their knowledge with other health professionals in their field. Moreover, some HCPs shared knowledge in the community through formal presentations and seminars.

“I do presentations on terms of Methadone and Buprenorphine for the Ontario Pharmacists Association. I talk about some of the things that I’ve learned from ECHO ... so giving community pharmacists some ideas on other ways that patients could be managing their pain, instead of just relying on opioids, for
instance the presentation that I’m going to be doing in the doctors-on-tour⁴, I talk about the whole issue that opioids aren’t necessarily a first choice, in my experience.” (interviewee 011, urban, pharmacist)

Another HCP expressed that they integrated information from ECHO Ontario Pain into other pain management and physical medicine programs in the community, to better serve their patients. There were a couple of HCPs who discussed how they applied and shared the information they learned with their local hospitals. For instance, the chiropractor commented that due to his participation in ECHO Ontario Pain, he was able to share his knowledge in the hospital and become a resource for pain management.

“I’m the only non-physician who’s invited to go to physical medicine rounds at the [Hospital] ... I am also active in the LHIN [and I] do a clinic ... to triage patients. It has had some positive effects, being involved with ECHO, in being able to interact with other regulated health professionals, because they start to get to know you’re an option for them in respect to dealing with patients.”

(interviewee 006, urban, chiropractor)

In summary, these three touches of ECHO Ontario Pain encompass how knowledge is shared with patients, other HCPs, and the community outside of ECHO Ontario Pain. They show the reach of the ECHO Ontario Pain model, and the direct changes that are happening as a result of sharing the information learned by participating in ECHO Ontario Pain.

⁴ Doctors on Tour: An educational credit trip for health professionals to learn from each other.
Theme 3: The use of technology as a platform of learning

One of the philosophies of ECHO is to move knowledge and not people. This theme focuses on how technology is used to move knowledge in the ECHO Ontario Pain program. Many HCPs valued the fact that videoconferencing was used to communicate and share this information. They appreciated being able to connect with a variety of HCPs by talking and using the chat box during, and after the sessions. They also appreciated that the use of technology enabled participants from communities across Ontario to participate, who may not have had the opportunity otherwise.

“It was surprising to see the amount of people who were participating. I thought that was pretty impressive, and I liked seeing other health professionals from other smaller communities.” (Interviewee 005, rural, community health promoter)

HCPs stated that they valued engaging with the same people virtually every week, and felt supported that they could build these long-term connections. They commented that this was different from other online courses that they had taken, as the learning model of ECHO Ontario Pain was unique compared to the other online courses. Specifically, in ECHO Ontario Pain, HCPs were encouraged to speak up and share their ideas. One HCP indicated that due to this encouragement, she learned more.

“I guess I would say the difference is, when you take an online course, it’s like, here’s your module, read this, post in the chat box. This is different. There was an expectation that you participate, there’s an expectation that you answer some questions, there’s an expectation that you present and follow-up. That just made it
more interactive. It forced you to learn more and try harder ... the accountability was better.” (interviewee 002, rural, nurse practitioner)

However, a couple of HCPs stated that while technology was a good medium, it was sometimes hard to speak up, especially if they were shy or were worried about saying the wrong thing. Moreover, they stated it was hard to keep focused for the entire length of the ECHO sessions (two hours), and that not all of the HCPs were equally engaged in the conversation. Some HCPs indicated that sometimes with technology, it can be hard to speak up during the sessions, and some chatted more. There were also technology glitches and barriers that sometimes prevented participants from fully seeing everyone’s faces, which would make the conversation more difficult to follow.

The majority of HCPs stated that they appreciated that the ECHO Ontario Pain platform had moved from OTN to Zoom. The OTN platform was limiting for HCPs, as they had to log on at the accurate time or they would not be allowed in the session; moreover, it sometimes required extra technical assistance to set up OTN. Only one HCP described that OTN worked better, as when she used Zoom, she found the connection ‘choppy’. The majority of HCPs preferred using Zoom, because it provided HCPs the opportunity to be able to connect from anywhere.

“'I thought [Zoom was] a tremendous way of connecting. It’s so easy. It worked so well. You can do it in your own exam room. You have your computer in front of you. You can pull up the record of your patient. I’m very impressed.”’ (interviewee 001, urban, doctor)
Another tool that HCPs had access to within ECHO Ontario Pain was the discussion board feature. However, half of the HCPs stated that they were not aware of the discussion board, or had not used it. The other providers commented that they used the discussion board a couple of times, and found it useful for helping them answer specific questions.

“The conversations seemed to be its own, I guess, education platform too. Just in reading other people’s messages, I learned a little bit that way too” (interviewee 012, urban, pharmacist)

There were some HCPs who commented that there was a time lag of when items were supposed to be posted on the discussion board, which may have made the content irrelevant. They also were not notified when some information was posted on the discussion board.

“I would just say that the things weren’t posted [on the discussion board] immediately, they were posted a couple of weeks later, which was kind of like, oh, I don’t remember, I have to go back and look at that...[However.] It was nice, because then if I posted and I got a reply, then I got an email, so I didn’t have to keep going back if I posted. But if I was looking for something, I’d have to keep going back.” (interviewee 002, rural, nurse practitioner)

Half of the HCPs who tried to use discussion board reported that they had some technical challenges and were unable to log onto the system. One nurse shared her experience of trying to connect.
“I registered through Disqus\(^5\) (an engagement tool), so I think every time I want to, I just have to, I don’t know if it’s my fault, I’m doing something wrong, but I have to re-enter Disqus. So, I can’t just go on the weekly session and click message board, then it will say ‘enter under’, ... So, I have to do that. I think it’s a safety feature, which is fine, but I think I usually [can find the] answer [that I need].” (interviewee 010, urban, registered nurse)

In summary, technology was an effective medium, in which HCPs could communicate and interact, in a new form of online learning. While it was an effective tool for engagement, there were sometimes challenges with the technology itself, and knowing when to speak. There should also be some training available, so that HCPs can become aware of all the features and functionality of the platform, such as the discussion board.

**Theme 4: Recommendations for improving ECHO Ontario Pain**

All of the HCPs who participated in ECHO Ontario Pain stated they valued the opportunity to join the program, and felt privileged to take part. Although participants generally reported increased confidence and competence levels, most of the HCPs felt that there was still a lot for them to learn and recommended that the ECHO Ontario Pain program should be continuous, as it is essential to learn about chronic pain, and there is always new research in the field of chronic pain. One provider shared that she was not aware practices had changed compared to what she was taught in medical school.

---

\(^5\) Disqus: An engagement tool used for the HCPs to discuss information outside of the sessions
“I feel much more confident in managing chronic pain patients, in that I will never go up as high in prescribing opioids as I did before. I feel a certain amount of guilt about that, but you also have to understand that when I started my medical career, it was all about prescribing opioids for non-cancer pain.”

(interviewee 001, urban, doctor)

ECHO Ontario Pain does not have a specific timeline on how long HCPs should stay in the program, but they are usually encouraged to participate for one full cycle. However, the majority of HCPs stated they could not participate long-term or consistently, because of time commitments.

“Two hours on a Thursday is really hard for us to commit to because we’re only closed for an hour between 12:30 and 1:30 for lunch, and then we start seeing patients again. For the most part, I listen for the didactic part which I think is great, but ... [it is hard] for me to have another hour to sit there and listen to the cases; it’s taking away from my own patient care.” (interviewee 011, urban, pharmacist)

Some HCPs had suggestions for addressing the time barrier, including that the didactics and case presentations could be offered on different weeks, so HCPs could choose which session to attend. Another suggestion was to offer the option to register for individual sessions, so one could target their particular interests. Sometimes, there was also a time conflict within the sessions, for example, when two or more cases were being presented, making it challenging for HCPs to engage.
“With two cases, I felt like it was so rushed that it was hard for me to catch on; it was hard for me, even to give advice to the other team who was presenting the case.” (interviewee 003, urban, social worker)

Ongoing and continued participation in the ECHO Ontario Pain program was a key issue that was raised during the interviews. Half of the HCPs stated that they did not understand if there was a next step after the ECHO Ontario Pain program, and did not know what happened upon leaving the program. Some participants described connecting and forming bonds during the sessions, but others felt it was hard to maintain those relationships post-ECHO Ontario Pain. Some HCPs reported being hesitant to leave the ECHO Ontario Pain program, for fear of losing the support network and consistent learning environment. One HCP suggested that by knowing who the experts were in the community, ‘mini-hubs’ could be created. Another HCP suggested that having a list of contacts, so you could connect with people after you left ECHO Ontario Pain would be beneficial. Others suggested having separate sessions to discuss complex patient issues, or to learn about new chronic pain evidence or treatments as they become available, once they had left the ECHO Ontario Pain program.

“You’d have the knowledge base that you wanted and then after that you could do sort of like a follow-up where you met with graduates once a month. Sort of an informal session, where you could ask questions about issues that have come up ... see how other people are doing and what they are doing.” (interviewee 007, rural, occupational therapist)
There were some other recommendations for ECHO Ontario Pain, including the creation of a forum for asking more general and open-ended questions related to chronic pain in general, and explaining features of the program. A couple of HCPs felt it would be helpful to have a place where stories could be shared. This could be a place for listening and not coming up with a solution for the pain at that moment. There were also some suggestions of other topics that could be discussed in ECHO Ontario Pain, such as general chronic pain questions or controversial issues (i.e., the use of cannabis). Another example of a controversial topic was prescribing opioids to patients with fibromyalgia, as opioids were helping a patient for instance who had this condition, but opioids were not recommended in the literature. A couple of HCPs advocated for a safe place, either virtually or face-to-face, to talk about patient issues and the challenges that some patients experience.

“Sometimes, you just have to talk to your colleagues about this very difficult part of our job [and] how you want to encourage your patients, but not burn out at the same time. And so, what I would appreciate is a place to put that without people starting to problem solve. It is about listening.” (interviewee 001, urban, doctor)

ECHO Ontario Pain has provided a learning community where HCPs value learning about chronic pain, but there are challenges, due to time and commitment levels, which make it hard for HCPs to fully participate. Many HCPs wanted support after participating in ECHO Ontario Pain. Participants were able to offer some suggestions on ways to address these issues, and the sustainability of ECHO Ontario Pain.
4.3. **Summary**

The themes presented here describe the HCPs experiences with the ECHO Ontario Pain program, how they shared the information they learned during ECHO Ontario Pain, the use of technology as a platform, and recommendations for improving ECHO Ontario Pain. The interviews reflected that HCPs felt isolated and undertrained when managing their patients with chronic pain prior to participating in ECHO Ontario Pain. They valued that ECHO Ontario Pain provided them with the resources to learn more about chronic pain through didactic and case presentations, and valued being able to share their knowledge across their practices, with their patients, and the community. In addition, the use of telehealth, while still novel as an educational model, has been a useful interactive model for teaching HCPs about chronic pain. Finally, while the program was effective in teaching HCPs about chronic pain management, there is continuously new information to learn in chronic pain. Several recommendations to improve the ECHO Ontario Pain program were identified.
CHAPTER 5: DISCUSSION

As discussed in the previous chapters, chronic pain is poorly managed, and there is inadequate training for HCPs who work in primary care settings across Ontario. HCPs in rural and remote communities need more training and knowledge about chronic pain management. ECHO Ontario Pain helps provide information and resources to HCPs who treat patients with chronic pain, through didactic and case presentations and discussions, using a video conferencing platform. Our study sought to understand the experiences of HCPs who participated in ECHO Ontario Pain. We used a qualitative study design and completed individual semi-structured interviews with 13 HCPs. Four major themes were developed: experiences with chronic pain management before joining ECHO Ontario Pain, learning and sharing knowledge through the use of ECHO Ontario Pain, the use of technology as a learning platform, and recommendations for improvements to the ECHO Ontario Pain program. Each of these themes will be discussed in relation to the existing literature. Specifically, the main study findings will be related to those from previous studies, to give an overview of how this research supported or extended previous findings. In addition, the implications of the findings will be discussed in relation to ECHO Ontario Pain, the theoretical basis, and future research. Finally, a review of the strengths and limitations of this study will be discussed.
5.1. FINDINGS RELATED TO THE LITERATURE

As part of this study, we explored the HCPs’ experiences with managing chronic pain patients before they participated in the ECHO Ontario Pain program. The majority of respondents in our study responded that they found managing chronic pain challenging, because they felt frustrated with how to take care of their patients, felt isolated, and did not fully understand the impact of chronic pain on their patients.

Our findings confirmed previous studies that have found similar challenges when managing patients with chronic pain. For example, two previous qualitative studies were conducted in the United States (Esquibel & Borkan, 2014; Matthias et al., 2010), to explore the experiences of PCPs who managed patients with chronic pain, and the effects of chronic pain management on the provider-patient relationship. In these studies, Matthias and colleagues (2010) conducted one-on-one interviews with 20 providers at five Veterans Affairs clinics (nurses, doctors, and pharmacists) in the United States, while Esquibel & Borkan (2014) conducted 21 dyad interviews in a clinic between patients and providers, to get both their narratives on the management of chronic pain.

In these two studies, PCPs reflected that they found it challenging to communicate with, and relate to their patients (Esquibel & Borkan, 2014; Matthias et al., 2010). Matthias and colleagues’ (2010) study participants shared that they felt ineffective in their ability to manage their patients with chronic pain, found it was challenging to have difficult conversations with their patients, and felt overwhelmed when managing their patients. The clinicians who participated in Esquibel and Borkan’s (2014) study had similar perspectives of feeling ineffective in chronic pain management, and the patients
in their study expressed how they were really suffering and needed opioid therapy for relief.

Some of the main recommendations from Matthias and colleagues’ (2010) study included the need to develop programs to support PCPs with better suggestions on managing chronic pain, and on how to improve communication with their patients. Esquibel and Borkan (2014) also indicated the need for better support for chronic pain management through the integration of shared decision-making, and improved communication between patients and physicians. They also recommended that more education for patients and doctors was needed around chronic pain and opioid therapy.

Our study has provided evidence that HCPs are using ECHO Ontario Pain as a learning program, to understand how to manage chronic pain. In our study, participants reinforced the Esquibel and Borkan findings of the need for education and improved communication, and commented that by participating in ECHO Ontario Pain, they had the opportunity to learn about self-management approaches, strategies for co-creating care plans with patients, and opioid education to help with appropriate prescribing.

In addition, in our study, participants voiced their concerns about inadequate knowledge of chronic pain, and they sought to add to or build on their knowledge. Similarly, Johnson and colleagues (2013) conducted a study to assess challenges for PCPs who manage chronic pain in 13 European countries. In total, 1309 PCPs (100 from each country) responded to an online questionnaire about their chronic pain knowledge. Some of the findings, specific to educational needs, reported that 89% of the PCPs wanted further education on chronic pain management. Moreover, 84% providers
believed that chronic pain was challenging to treat, and there was a low priority around the management of chronic pain. The authors recommended that more support was needed for primary care chronic pain management, and more information should be taught about proper opioid prescribing (Johnson, Collett, & Castro-Lopes, 2013). Our research has addressed some of their recommendations. For instance, participants in our study valued that ECHO Ontario Pain provided them with specific chronic pain education and tools that they could apply in practice. The ECHO Ontario Pain team also worked to teach the curriculum through a variety of learning methods, so all HCPs could learn from them. Finally, our research is beneficial as it contributes to the Canadian perspective on the challenges that primary care HCPs experience with managing patients with chronic pain, since the other studies were conducted in the United States and Europe.

Learning is offered through the didactics, case presentations, and learning from others. This variety of methods was appreciated by all the HCPs, as some preferred the didactics, while others preferred the cases. Beginning with didactics, the participants of our study commented that they valued the variety of resources and tools that were suggested to them during the didactic sessions that they could apply to their practices, such as My Opioid Manager (Furlan & Robidas, 2012) and the Brief Pain Inventory (Cleeland & Ryan, 1994). The participants also expressed that they found the didactic topics helpful, as, for example, one topic of primary interest focused on opioids and proper prescribing habits. In particular, opioid prescribing was of great interest, due to challenges with proper opioid prescribing and the current opioid crisis. Other research has demonstrated that even with the use of guidelines, there is still problematic
prescribing and overuse in Ontario and Canada (Canadian Centre on Substance Use and Addiction, 2017).

While there are guidelines in the literature (Busse et al., 2017) to support HCPs in proper opioid prescribing, HCPs who participated in our study reported that they were seeking further knowledge on how to apply these guidelines with their patients, and were uncertain about certain side effects when prescribing. Previous research demonstrated that even with the use of guidelines, opioid prescribing issues may not be totally avoided. Allen and colleagues (2013) conducted a study to evaluate how doctors’ opioid prescribing habits had changed after the release of the 2010 Canadian Guideline for Safe and Effective Use of Opioids for Chronic Non-Cancer Pain (Allen et al., 2013). These guidelines, while published in coordination with the College of Physicians and Surgeons, were communicated to doctors, but they were not required to implement them in their practice. In this study of 710 doctors, results showed that the doctors were taking a precautionary approach to opioid management by aiming to advise their patients of side effects and harms. Despite this, they continued to commonly prescribe opioids and sometimes overprescribe (Allen et al., 2013). The study indicated it was rare for doctors to discontinue opioids, they had knowledge gaps around opioid prescribing, and some of them were unaware of their patients who were at high risk for addiction (Allen et al., 2013). This was because the doctors believed there was evidence of long-term benefits of opioids, or they believed it was difficult to change prescriptions when another doctor had already prescribed the opioids to the patient.

Allen and colleagues’ (2013) findings were similar to HCPs in our study as they commented that they were struggling to understand how to effectively prescribe opioids.
In our study, HCPs reported that ECHO Ontario Pain provided support and training to help them learn about proper opioid prescribing habits. Our study contributes to the limited literature about non-physicians learning about opioid prescribing, as our opioid education was tailored to be applicable for all HCPs involved in the patient’s care plan. Some of our HCPs stated that they were not directly involved in opioid prescribing, but they shared that it was useful to be aware of the patient’s medications, and valued learning about non-pharmacological options for treatment. Our study also demonstrated how we could improve opioid prescribing habits, especially during this current opioid crisis, which may encourage others to join the ECHO Ontario Pain program, or seek resources to help improve their opioid management. This example demonstrates the benefit of CME and shows how providers are working to change their practice behaviours.

While learning from the didactics was helpful for developing approaches and learning evidence-based material, the cases were also useful in providing real life examples. Case based learning (CBL) is the second type of educational approach that ECHO Ontario Pain offers and HCPs reported it was important. CBL builds on local knowledge, taken from case presentations, and applies that knowledge into actual patients. Case discussions were facilitated by the HCPs at ECHO Ontario Pain, where participants had the opportunity to present challenging or controversial patient cases. Previous studies have demonstrated the effectiveness of learning from multiple methods of case based learning and patient stories. For example, a narrative review was conducted about CBL at Warwick University in the United Kingdom. The authors reviewed 173 abstracts that described a wide variety of methods used to incorporate CBL into their
health professional programs, to see if the desired learning outcomes were met for each educational program (Thistlethwaite et al., 2012). These abstracts were then graded. Thistlethwaite and colleagues (2012) recommended that further exploration was needed to determine their quality; they decided to conduct a full review, using the standard best evidence medical education coding sheet to help the graders evaluate (Thistlethwaite et al., 2012).

The authors included a total of 104 papers in the final review. They assessed that only 22% were of high quality (Thistlethwaite et al., 2012). They found that the use of CBL improved communication, enhanced learning, and provided the opportunity to introduce interprofessional collaboration. Thistlethwaite and colleagues’ (2012) findings were similar to feelings expressed by participants from ECHO Ontario Pain, during and after presenting their cases at ECHO Ontario Pain. HCPs expressed that the cases provided an in-depth approach on how to manage the patient, as well as strategies that they may have not thought of before. Further, they noted that it helped them think about an interprofessional system of learning and how they could apply it with their patients. For example, participants gave examples of how they began to further interact with colleagues in their practice, and examples of community resources that would help their patient with pain and other comorbidities.

Thistlethwaite and colleagues (2012) recommended that further exploration was needed to understand the effectiveness of CBL, and to understand how students learn from cases. In ECHO Ontario Pain, our study participants indicated how much they valued learning from the cases, as it provided them the opportunity to think about their patients’ problems with a new lens, and use other approaches recommended by other
HCPs. HCPs shared with us, and demonstrated how they used their case experiences and applied them to change patient’s treatment options, such as involving other HCPs, lowering dosages, setting goals, or by communicating with their patients.

One of the key differences between Thistlethwaite and colleague’s (2012) study and ECHO Ontario Pain is that the latter approach uses real life cases. This contributes to the literature on the use of real life cases for learning. The 104 cases from the former study were authentic, but were summaries that were created based on true experiences, and the stories were not told by the HCP who personally dealt with the case. The real life cases are unique in ECHO Ontario Pain, as the cases were not manipulated or modified to fit a specific didactic; they were presented by the HCP who was struggling to care for the patient in question. ECHO Ontario Pain participants commented that by presenting a real case, they had to spend time reviewing prior treatments for their patient, noting what did or did not work. They indicated that it was valuable to present cases, because it helped them think out loud, but it also supported the patient, because they could tell their patients that they had expert opinion to backup their advice.

Learning from others was another form of teaching that participants found valuable, whether it was an informal conversation or an offline conversation. Our HCPs voiced that they found value in building relationships with participants who had the same role as them, or working with HCPs who could complement their work. These findings supported literature on the role of online communities and virtual communities of practice. For instance, 2008 HCPs were surveyed and were asked if they used online communities, and if so, what their motivations were for using these communities (Betts, O'donoghue, Aikin, Kelly, & Boudewyns, 2016). They authors found that over 75% of
HCPs wanted to use these communities to seek the opinions of colleagues, and these communities were useful to help improve patient care (Betts et al., 2016). These findings were comparable to our study, where HCPs indicated that they found these discussions helped improve patient care, and provided solutions to similar problems that other HCPs had with encouraging behavioural changes. The authors concluded that the more HCPs shared knowledge, the more engaged and involved they were in their practices (Radaelli, Lettieri, Mura, & Spiller, 2014).

This finding was also expressed by HCPs in our study; they felt that when they shared knowledge, they were able to apply new knowledge to their practices, and some became a chronic pain resource. Our study went further, and provided examples of how our HCPs not only applied their new knowledge to their patients’ care and practices, but also shared it with the wider community outside ECHO Ontario Pain.

Knowledge sharing can be split into the three different touches: primary, secondary, and tertiary. In our study, the touches were further explored and examples were provided to understand the impact and reach of the touches. Limited research has been conducted on the touches of the ECHO Ontario Pain model, and our research provided evidence to support the beneficial effects of touches for learning about chronic pain.

The primary touch focused on how HCPs were able to make an impact on the patient whose case was presented in ECHO Ontario Pain. HCPs in our study described small changes that had immediate effects on their patients, such as communicating with them better, and encouraging them not to start a particular treatment, such as marijuana.
Lovell and colleagues (2014) demonstrated the effectiveness of engaging patients in developing a care plan for managing their cancer pain. Their review looked at evidence on the elements of patient education, to see which was the most effective in promoting engagement. The findings demonstrated that respectful communication between providers and their patients led to increased trust between patients and HCPs, which was important to empower patients (Lovell et al., 2014). We heard from the HCPs that patients had become more positive and more engaged in their care, because they felt they were being listened to. Lovell and colleagues (2014) suggested that more work be done to look at complex interventions that involve patient education and engagement. The experiences that our participants shared added examples of how providers were working harder to contribute to patient engagement, as better engagement will lead to a strengthened relationship between patient and provider, and improved communication between both parties. By presenting a case at ECHO Ontario Pain, HCPs also had the opportunity to better educate their patients, and involve them in their own care plans.

The secondary touch focused on how sharing and applying knowledge impacted other patients in the HCPs’ practice. By being involved with ECHO Ontario Pain, HCPs reported that they worked harder to help patients become more involved, and become champions of their own chronic pain care plan. An example of a secondary touch was learning how to share knowledge about self-management techniques with all their patients, because many of the HCPs were struggling to incorporate specific strategies into their interactions with their patients. Prior to their involvement with ECHO Ontario Pain, many of the HCPs were unaware of the value of self-management. The literature is consistent with these findings. Dorflinger and colleagues (2012) completed a literature
review on self-management of chronic pain. They found that while self-management was encouraged in pain guidelines and recommendations, implementation techniques and strategies were not taught to HCPs. Some of the recommendations in the literature for improving self-management included: building a strong provider-patient relationship, increasing patient-centered communication, providing information to patients about self-management (goal setting and pros and cons of treatment options) (Dorflinger, Kerns, & Auerbach, 2013). Our research built on these recommendations. HCPs who participated in ECHO Ontario Pain described how they were able to learn and share self-management strategies with their patients, and help them set SMART goals, with follow-up sessions. In turn, this helped patients to be more responsive to treatment, and HCPs commented that they noticed an increase in engagement. Our report on the effects of self-management education will contribute to the limited literature on how to empower providers to promote self-management strategies to their patients.

The tertiary touch focused on how knowledge was shared within the practice, with other HCPs, and within the wider community. The majority of HCPs indicated that they learned the importance of working in interprofessional teams to manage chronic pain through their participation in ECHO Ontario Pain. Many studies have supported the use of interprofessional care to help manage chronic pain, and indicated how it can significantly improve outcomes for patients with chronic pain (Dobscha et al., 2009). For instance, Angeles and colleagues (2013) conducted a mixed methods study (randomized controlled trial and semi-structured interviews) to assess the feasibility of interprofessional care for patients with chronic pain who were part of a specific family health team in Ontario. In this study, the 63 participants were divided into an early
intervention (experimental) group and delayed intervention (control) group (Angeles et al., 2013). A multidisciplinary program was designed to focus on chronic pain management, which was used by the intervention group. The authors found that participants in the intervention showed a significant improvement in their pain levels and care (i.e. helping with their quality of life) compared to the control group, who received no treatment. Our study’s HCPs had similar results and by learning about the significance of interprofessional care in ECHO Ontario Pain, they were able to make an impact on their patients, such as reducing their opioid use, or helping them manage their comorbidities. Our study will contribute to the literature by providing examples of how interprofessional care can work across practices, and how relationships improved between non-physicians and physicians in the management of chronic pain. These examples can provide context to previous quantitative studies on the effectiveness of interprofessional collaboration.

Moreover our study adds to the literature on technology being used for HCPs to share knowledge as there has been limited evidence to understand the impact of technology on learning (Bullock, 2014). Our study has contributed to adding specific evidence to studies on telehealth being used for learning. For example Brandon and colleagues (2015) conducted a study on how telehealth was used to train group leaders who managed a cancer transition program. In this program, nine group leaders attended eight telehealth sessions (Brandon et al., 2015). The study found the group leaders valued the program because of the helpful content that was shared, and that telehealth programs could be used to support learning (Brandon et al., 2015). This study used quantitative methods to measure the training content, confidence, and satisfaction. The qualitative
component included focus groups to determine their reactions to the program, with respect to training and leading a group.

The group leaders expressed satisfaction with using telehealth software. For instance, rural leaders found it valuable to participate in the training sessions. Participants also reported that they enjoyed staying connected with each other, and appreciated the comfort in sharing difficult moments. Our study found that the leaders experienced some technology challenges that made it difficult to keep up with the flow of conversation, and there was a challenge with using telehealth during working hours (Brandon et al., 2015). This study recommended that the training program could be tailored to help providers feel more comfortable, technology challenges could be mitigated, and more interactivity was needed to help with group dynamics. Our study had findings similar to those expressed in Brandon and colleagues (2015) study. Our participants responded that they appreciated being able to connect with a variety of HCPs from small and large communities, and they valued that everyone had an opportunity to speak during the sessions. However, there were challenges with the time of the sessions, and HCPs could not commit to all the sessions.

Our study has added to the literature on telehealth as a vehicle for education and can support literature on video conferencing. Cameron, Ray & Sabesan conducted a systematic review to understand video conferencing as an educational support for learning. From 1288 studies, 13 satisfied the eligibility criteria and while positive effects were reported, there were negative effects reported with technology challenges, poor interactions and lack of rapport building, (Cameron, Ray, & Sabesan, 2014). This study recommended that further evaluation and research needed to be completed to understand
if video-conferencing was an effective tool. Our study has demonstrated how ECHO Ontario Pain is has produced environments where participants commented that interactivity was increased due to the expectation to speak, and the case presentations provided the opportunity for discussion. Similar to Brandon and colleagues (2015) and Cameron, Ray & Sabesan’s (2014) review, ECHO Ontario Pain participants expressed that they also experienced technology challenges, but our HCPs commented that these were mitigated well when changing platforms from OTN to Zoom. This change in platform provided the opportunity for HCPs to connect in from any location, at any time. In regards to speaking during the ECHO Ontario Pain sessions, participants felt encouraged to speak and felt the moderators provided the opportunity to engage everyone.

Our participants commented on the use of the discussion board, used primarily for offline communication. The majority of the HCPs stated that they either experienced issues of not knowing how to use the discussion board, or were unaware of the discussion board entirely. Other studies shared similar examples that sometimes content on discussion boards could be disregarded if not viewed immediately, or if content was posted too late. For example, a study was designed to evaluate the use of asynchronous learning methods (such as a discussion board) to teach a redesigned pharmacy teaching program in the United States (Garrison, Baia, Canning, & Strang, 2015). Thirteen participants were surveyed and also wrote self-reflective essays on their experience with the learning program. The authors wanted to understand if asynchronous learning was an appropriate method to use for teaching pharmacy students. The study’s findings were positive about the use of technology as a successful teaching platform, with over 60% of
the participants valuing the option to learn at their own pace (Garrison et al., 2015).

However, some participants reported feeling frustrated with using some of the teaching methods, such as the discussion board, as sometimes, responses were delayed. Garrison and colleagues’ (2015) participants suggested several ideas for enhancing their online learning program, such as having more online faculty present, adding more specific topics on the online curriculum, and having rules on the discussion board to promote more active and timely communication. ECHO Ontario Pain participants experienced similar issues with the discussion board, such as not understanding how to use the software, the delayed posting of content, or forgetting to check the discussion board, therefore missing out on potential learning opportunities.

To help mitigate the low use of the ECHO Ontario Pain discussion board and other features such as the chat box, a suggestion was made to include a tutorial. This tutorial could be provided before ECHO Ontario Pain sessions, to explain tools such as the discussion board, the chat box, and other features (e.g., how to re-join the ECHO Ontario Pain program after being inadvertently disconnected). This tutorial would help HCPs learn how they could interact outside of the scheduled sessions, and understand the benefits of using the discussion board and other features.

Another suggestion to mitigate the problem of low use of the discussion board was for members of the hub team to add resources to the discussion board immediately, and to monitor the board for questions. HCPs posted on the discussion board on a flexible basis, so sometimes answers were missed. This would be helpful because the more that HCPs use discussion board, the more it will become a part of their daily routine, facilitating them to become more active learners (Courtney & Wilhoite-Mathews, 2015).
The continued use of these online tools will encourage further diffusion of knowledge, and keep the conversation going offline, outside of the regular sessions.

The participants felt that it would be important to find methods to help support continuous learning and engagement, once they stopped attending ECHO Ontario Pain. One idea to increase engagement was the development of a database that could list current participants and ECHO Ontario Pain alumni, to maintain communication and connection offline. A database could be useful for HCPs, to become aware of ECHO Ontario Pain graduates in their area if they needed support, advice, or were wondering what tools were available in their area. Having access to this database could encourage HCPs to create mini-hubs of experts in their own communities across Ontario. ECHO Ontario Pain could also build a repository for sharing resources and tools that other HCPs had designed to use in their practices. For example, one HCP built physician and patient pain medication management tool to help discuss issues around opioid prescribing, urine drug screens, and other issues that may arise in chronic pain management. This tool could be shared with HCPs in the ECHO Ontario Pain community who may need advice on how to implement certain chronic pain management tools.

The final barrier that was identified was the time commitment required for the ECHO Ontario Pain sessions. Study participants suggested some workarounds that could be developed to make ECHO Ontario Pain more accommodating for everyone. Other studies have also indicated challenges with participating in a program that takes commitment and time to participate (Brandon et al., 2015; Garrison et al., 2015). Suggestions included re-examining the time of day of the ECHO Ontario Pain sessions, how the sessions were organized, and the level of commitment required. For example,
participants could be provided with options to attend specific sessions, based on their interest. By knowing the cases ahead of time, participants could choose the ones that were relevant to them. Some HCPs also reported commitment issues that prevented them from attending all of the ECHO sessions, or they could not miss patient appointments, due to their funding model. While evening sessions were currently available on opioid tapering, other evening sessions could be scheduled that focused on other topics of high importance to the community.

5.2. The Diffusions of Innovation Theory

The use of the Diffusions of Innovation Theory helped our study to explore three of the dimensions from the theory relevant to our research; there was one dimension that did not fit, due to our study design. Using ECHO Ontario Pain as the innovation, this theory helped us to understand how the innovation was being adopted or rejected by the HCPs.

The first dimension of the DOIT framework describes the importance of the characteristics of the innovation for diffusion. Within that dimension, the relevant concepts of complexity and relative advantage were used in this study. In terms of relative advantage, ECHO Ontario Pain was a unique model because it used technology to not only teach, but also to engage learners in a virtual community. These HCPs were able to take snippets of what they had learned, and then apply them in their own communities. Another example of relative advantage was ECHO Ontario Pain’s use of real life cases that were presented, instead of modified or manipulated cases, which made the cases relatable, and the application valuable in practice. In terms of complexity, ECHO Ontario Pain has worked to make the system simple and functional to use for all
HCPs. For instance, participants indicated that the change of platform from OTN to Zoom, helped to make connecting to the ECHO Ontario Pain platform simpler. In particular, the change helped with connectivity issues, and provided flexibility if participants wanted to connect from home. By using DOIT as a guide, we were able to highlight some of the key attributes of using the ECHO model.

The second dimension is the communication channel, which is the measurement of the rate of how people talk and spread news about the innovation. It was important to consider how the HCPs perceived and evaluated ECHO Ontario Pain, to understand how the innovation was being adopted. The vast majority of participants joined ECHO Ontario Pain because they learned about it through word of mouth. Sharing news about the program was communicated by the hub members or by HCPs, who shared their experiences of participating in ECHO Ontario Pain. These conversations demonstrated that as more individuals communicated about the model, the rate of diffusion increased.

The third dimension is the creation of social systems, which is how groups work in adopting the innovation. As suggested by Sanson Fisher, a relatively flat hierarchy within the social systems of an innovation can lead to a successful diffusion of the innovation (Sanson-Fisher, 2004). In ECHO Ontario Pain, all participants were on equal ground, and the majority of participants felt comfortable engaging in the discussions. For example, one HCP expressed that when any participant talked, they were heard, and everyone was very respectful to people’s input. HCPs began to work closely with their colleagues after participating in ECHO Ontario Pain, and some of the non-physicians reported that they began to feel comfortable with approaching doctors about changing
treatments. By working together, they could continue to learn and build, from each other and their individual experiences.

The fourth dimension is the time, which assesses the adoption process, how adopter participants influence each other, and the rate of adoption of the innovation. The dimension of time was not relevant to our study because our data were collected from the same adopter groups. For instance, it would have been beneficial to engage participants at different points in the adoption curve, as they would be classified in a different adopter group. We also did not observe the innovation at multiple time points, which made it challenging to measure the rate of adoption.

5.2.1. Modifications and Implications on Theory

While the three of the four dimensions of the framework helped guide this research, other factors could be added as new dimensions, as the individual characteristics would help to further explain factors that influenced diffusion such as the touches. One of the constructs that could be added is the adopter’s motivation for joining the program. Some people may have been interested in participating because they wanted to learn more about the innovation. However, people who may have been required to participate in the innovation may be less likely to adopt it than if they had joined on their own, as the former are not intrinsically motivated. A future study could survey participants on their motivation and further analyses could be performed to learn why and how motivation impacted their adoption of ECHO Ontario Pain.

Another construct that may be important to add is the geographical location of the participant. This is an important factor to consider, as someone in a rural or remote
community might be more motivated to participate in an intervention, because of the lack of access to resources that are readily accessible in urban areas. The innovation may diffuse more quickly in these communities, due to a smaller population, and a higher need for a learning program.

The next construct under the individual characteristics dimension that could be added is the learning abilities and skills of the participant prior to joining the program. It may take some people longer to fully participate in the program if they are not comfortable with using the technology, or it takes them longer to understand the innovation. MacVaugh and Schiavone found this in their literature review on the limits of diffusion of an innovation. They proposed that it was important to take into account learning abilities and the users knowledge in the adoption of innovation (MacVaugh & Schiavone, 2010). As technology is constantly changing and updating, it would be important to know the baseline expertise of users, and which areas may need further explanation. It is also important to recognize individuals who may have accessibility issues when using the technology. Future studies could add a survey to assess learning preferences or computer skills.

5.3. Implications for ECHO Ontario Pain

Our study provided recommendations that could directly improve the ECHO Ontario Pain program. The first recommendation is related to the use of technology, which would be incorporating tutorials to teach incoming participants how to use the ECHO Ontario Pain platform and other features, such as the discussion board, so they can be used effectively. Other literature has demonstrated that when tutorials are made available, they
can help improve learning, which may encourage more participants to connect with the using the online tools (Catalano, 2014). Adding this tutorial to the ECHO Ontario Pain program would be simple to implement before HCPs joined the program. Participants told us that they did want to use the discussion board, but the lack of awareness and challenges using the tool prevented them from doing so. The tutorial would help participants feel more comfortable with using technology, and they would be able to communicate offline. It is also important for ECHO Ontario Pain to post items on the board that are discussed as soon as possible, to ensure it is relevant. If participants used the discussion board frequently, it could provide support offline to HCPs who are struggling with a problem, participants would be able to suggest other topics for discussion, and this use would promote more asynchronous knowledge sharing of resources and tools.

The second recommendation focuses on time, which was a barrier for many ECHO Ontario Pain participants. Currently, many of the study’s participants felt they could not fully commit to ECHO Ontario Pain, due to other commitments in their clinic and busy schedules. Minor changes could be made, such as to ensure that participants are aware of which specific didactics and cases are being presented each session, so they could choose to attend. The continued offer of evening sessions would help attendees who could not attend the regular sessions during working hours. However, further discussion would be required to see if the time of the ECHO Ontario Pain sessions could be moved, or the actual format could be changed. ECHO Ontario Pain is modeled on other ECHOs, which may require ECHO Ontario Pain to follow the same format.
The third recommendation is the need to support continuous learning and engagement of participants once they leave ECHO Ontario Pain. The integration of a database is important to ECHO Ontario Pain, because they are creating experts in different communities across Ontario. A database would be simple to implement, but would require the consent of participants who would want to share their information. It would be valuable for current and future spoke members to know who has participated in this program in their community. For instance, HCPs who have participated in the program have a special expertise that they can apply to help those suffering from chronic pain in their communities, but also as supports for other HCPs. These new experts could sustain the ECHO Ontario Pain community that had been built, and provide the opportunity to re-engage with ECHO Ontario Pain. ECHO Ontario Pain could also create a repository of tools that other HCPs have created, to help HCPs who may be struggling to implement knowledge in their communities. This may be challenging to collect all the content, but would be useful once populated.

5.4. IMPLICATIONS FOR OTHER ECHOS

Our research can also contribute to other ECHO models completing evaluations. Recently, Zhou and colleagues (2016) conducted a systematic review of existing ECHO models (39 studies), their effectiveness, and impact (Zhou et al., 2016). In Zhou and colleagues (2016)’s study, they used Moore’s Framework for evaluating CME programs to evaluate the literature, and it was found that the majority of previous ECHO research was only linked to outcomes from Levels 1 to 4. The first four levels explore participation in the program, satisfaction with the program, what the participants have learned, and competence, which demonstrates what they have learned. Zhou and
colleagues’ (2016) recommended that further research was needed to gain results for Levels 5 to 7 (performance, patient health, and community health). Our research contributed evidence for level 5, performance measurement, which is focused on practice and clinic-wide changes, and adherence to standards of care for pain management. This study also evaluated how the HCP’s new knowledge affected other patients, their practice, and the wider community. Further research is needed to evaluate Levels 6 and 7, which focus on patient and community outcomes.

Findings from our study can also be used to support ECHO programs outside of ECHO Ontario Pain. To date, limited qualitative research has been completed to evaluate other ECHO models worldwide, to help understand the diffusion of knowledge. Our research demonstrated how knowledge reached non-ECHO Ontario Pain communities, by HCPs applying and sharing their knowledge after their participation in the program. Resources and tools were built by these HCPs that could be used to help support chronic pain management. ECHO Ontario Pain was also one of the first ECHO groups to conduct individual interviews; other groups have only used focus groups. Other ECHO programs could benefit from the use of individual interviews in their future research, because this format can provide a more in-depth understanding of the participants’ experiences, and provide feedback that can be used for continuous improvement that may not be captured using other research methods, such as focus groups.
5.5. **Strengths**

One of our study’s strengths is its ability to leverage the previous quantitative and qualitative research that was conducted by the ECHO Ontario Pain program. Our qualitative research used semi-structured interviews to build on the findings from previously conducted focus groups. The use of individual interviews is different than focus groups, because more individualized detail is shared with the interviewer during one-on-one conversations (Tong et al., 2007). Focus groups include multiple participants, and prevent opportunities for people to fully share their thoughts. During focus groups, some people may be hesitant to say something, for fear of judgement from other participants. During individual interviews, some HCPs may share more information from their personal perspective and experiences. In addition, in the focus group discussions, one of the themes was ECHO ripples (understanding how ECHO Ontario Pain has spread). Our research was able to contribute to the knowledge of the ripples by providing specific examples of knowledge diffusion. Specifically, the HCPs shared their personal experiences with their patients (positive and negative), knowledge sharing with their practices and the wider community, their use of technology as a platform for learning, and their critical feedback about the ECHO Ontario Pain program.

Other key strengths included the participation of a representative population of ECHO Ontario Pain HCPs in the study. This sample was reflective of the percentage of each discipline participating in ECHO Ontario Pain, their point in the ECHO cycle, and the variety of LHINs. During this research, the primary researcher used reflexivity to reflect on her biases before, and when conducting the data analysis and interpretation. She took notes throughout the coding process to reflect on assumptions, and to help build
the coding framework. It was also helpful to have an interdisciplinary committee to help with coding and to reach consensus on coding issues. Many discussions were held with the committee to help reach consensus on the themes.

**5.6. LIMITATIONS**

While this study had numerous strengths, there were some limitations that should be discussed. This research was conducted with participants from their first four years in the ECHO Ontario Pain program, but we did not specifically capture when each individual joined ECHO Ontario Pain, or how long they had participated in the program. We also did not capture how many ECHO Ontario Pain sessions participants attended. The interviews were only conducted with people who stayed in the ECHO Ontario Pain and participated in more than one ECHO Ontario Pain session. Therefore, our results did not represent the perspective of participants (13%) who dropped out of ECHO Ontario Pain, or signed up and did not participate (Furlan et al., 2017a). It may have been valuable to understand why they decided not to continue. These interviews were only conducted at one time point, and did not examine participants through their participation cycle of ECHO Ontario Pain (i.e. pre-ECHO, during ECHO, and post-ECHO). This research also did not interview patients, so we cannot comment directly on the impact on patients. Finally, because this research was specifically focused on pain management, it may not be generalizable to other chronic disease ECHOs.
5.7. **Future Research**

While ECHO Ontario Pain is conducting other research initiatives, such as chart reviews, to confirm HCPs’ practice changes, there are still some gaps that should be explored. We need to further explore the long-term implications of the touches, as well as how HCPs changed the way they interact with and treat their patients. It would useful to see if the HCPs’ experiences and interactions with their patients shared during the interviews were actually being implemented, and applied in practice. Ethnographic observation could be used as one potential method to explore these gaps. For instance, ethnographic observation was used in a rural hospital in Ontario to look at the complexity of teamwork between providers, patients, and families. During this study, the researchers observed participants in the field, to look at their interactions, and combined these observations with interviews and focus groups, to gain a deeper understanding of their experiences (Casimiro, Hall, Kuziemsky, O'Connor, & Varpio, 2015).

The use of ethnographic observation could be helpful to achieve some of the outcomes that have not been explored from Levels 6 and 7 in Moore’s Framework. Level 6 focuses on patient outcomes, such as their function, quality of life, and how satisfied they were with the care they received, while Level 7 focuses on overall patients with chronic pain, and how the community is improving as a whole. By observing this knowledge exchange, researchers would be able to reflect back to one of the initial goals of ECHO Ontario Pain, which is monitoring the performance of ECHO Ontario Pain in the long-term.
5.8. Summary of Discussion Chapter

Overall, the findings complemented the existing literature about the challenges of chronic pain management for community-based HCP, learning models, and telehealth platforms. Our study findings also contributed to the literature on chronic pain and online learning. The touches were discussed and evidence was provided to explain the impact of the touches. Our research extended the findings of studies on chronic pain management, patient and provider relationships, opioid usage, and technology as an online learning tool, to help address some of their recommendations. We explored the dimensions of the DOIT framework to understand how our innovation was contributing to the rate of the diffusion due to participation in the ECHO Ontario Pain community, but also suggested some modifications to the theory. We also learned about how this research contributed to Moore’s Framework and explored in greater detail the touches. Future research could be conducted to further view the interactions of participants with their patients, to understand how knowledge is being diffused.
CHAPTER 6: CONCLUSIONS

We sought to understand the experiences of 13 HCPs during their participation in the ECHO Ontario Pain program using individual qualitative interviews. Specifically, the research questions were: (1) Did the ECHO Ontario Pain program improve knowledge and skills in pain management and opioid stewardship? (2) How did HCPs share knowledge about pain management gained through this program? (3) How did HCPs gain insights into their motivations and confidence levels in managing patients with chronic pain. Four themes developed: (1) experiences with chronic pain management prior to joining ECHO Ontario Pain, (2) learning and sharing through ECHO Ontario Pain, (3) the use of technology as a platform for learning, and (4) recommendations for improving ECHO Ontario Pain.

With respect to the first research question this study found through the first theme that there was an improvement in their knowledge and skills from participation in ECHO Ontario Pain. Participants stated that prior to participating in the program, they had limited knowledge about chronic pain, and in particular a lack of knowledge about opioid management. This is similar to the literature that has found that HCPs in primary care settings perceive they do not have the knowledge and skills to care for this challenging population especially related to using opioids (Esquibel & Borkan, 2014; Matthias et al., 2010). Further research needs to be conducted to examine how HCPs’ knowledge and opioid prescribing habits are changing over time due to their participation in ECHO Chronic Pain.

Our second research question was about understanding how HCPs are sharing knowledge and if technology has been a facilitator to support knowledge translation.
During this research, we were able to expand the understanding of the ECHO ripples found from the previous focus group discussions (Carlin et al., 2015), and contribute to the limited literature on primary, secondary, and tertiary touches. Our second theme focused on learning and sharing and examples were discovered on how the HCPs applied what they learned and shared that led to changes in patients’ treatments, changes in practices, and interactions with the wider community. Our study also illustrated how HCPs benefited from learning about new treatment methods, gained new perspectives on problems and understanding the value HCPs working collaboratively to more optimally manage these patients. The third theme on the use of technology helped further explore the second part of the research question on how technology has been a facilitator for knowledge translation by exploring the impact of using a virtual platform for learning. Using online learning helped connect smaller and larger communities within Ontario, leading to building new relationships and networks, which eventually formed a virtual community of practice. As we continue to measure the sharing and use of technology over time methods such as participant observation and incorporating the recommendations for improving the ECHO Ontario Pain program, we will be able to realize further knowledge diffusion about chronic pain and opioid stewardship.

The third research question focused on how HCPs gained insights into their motivations, confidence levels and treatments for managing patients with chronic pain. Through this study, the first theme on prior experiences provided specific reasons and motivations for HCPs joining ECHO Ontario Pain. HCPs shared that listening to the presentations, learning from the cases, presenting cases and having informal conversations contributed to their ability to provide more treatment options to their
patients in their practices. In theme two, we also found that many HCPs saw an improvement in their confidence by participating in the program whether as non-presenter or a presenter.

In summary, this study provided examples of HCPs’ individual experiences with participating in the ECHO Ontario Pain program, and demonstrated how they effectively shared chronic pain knowledge in their communities. The recommendations will be useful for improving future iterations of the ECHO Ontario Pain program. Our research also adds to the existing ECHO Ontario Pain research to provide further insights into the impact of the program. Continuing to understand the struggles of HCPs, who manage chronic pain patients, will help ECHO Ontario Pain developers to shape future curriculum and build a stronger community. Further exploration of the touches and technology will help to understand how knowledge diffusion can be more widespread and how the ECHO Ontario Pain program can be used as an effective telehealth educational model. Our research will help guide future ECHO™ research around the world.
APPENDIX A: SEMI-STRUCTURED INTERVIEW GUIDE

Preamble. The questions below are meant to reflect topics that are encapsulated by the interview, but this interview guide will be iteratively refined during the course of the interviews.

Semi-structured interview guide

Good morning/afternoon [insert participant name],

Thank you for setting aside the time for this interview. My name is Naima Salemohamed and I am a Master’s student at the University of Toronto, working with Drs. Furlan, Seto, and Stinson, and I will be conducting your interview today. I wanted to take a moment to discuss the agenda for the interview. I hope to explore three main themes: your experience with ECHO, ECHO’s impact on your clinical practice, and features of ECHO. The interview will take about 30 minutes. You do not have to answer any questions you do not want to, and the interview can stop at any time. You may withdraw your consent at any point up until the point of data analysis. In compensation for your time we will send you a $50 VISA gift card.

For the purposes of research, I would like to record our conversation. Is that okay with you?

[TURN ON RECORDER—placed so that you can see the little red light. Also, see notes from the transcribing service on how best to record a telephone interview.

With the recorder on, state your name, respondent’s name, and today’s date. Confirm that respondent has agreed to participate in the interview and to be recorded. Wait for audible affirmation.]

Do you have any questions before we get started? [Respond to questions].

Topic 1: Your experience with ECHO

Questions:

• Initially what motivated you to participate in project ECHO?
• What were some of your expectations?
• Reflecting on your experience with ECHO, how has it met or not met your expectations?

Prompts. Can you give me an example? What did you like most about ECHO? What did you like least about ECHO? Was there anything that surprised you about participating in ECHO and, if so, what?
• (If presented case) I want to ask about your experience(s) presenting a case at an ECHO session.

I see you have presented a case for ECHO.

• How did you decide what case to present? What was your experience of presenting a case?

Prompts. What were benefits and drawbacks of presenting? How did you feel about feedback from other spokes and the hub?

• In what ways, if any, did presenting a case affect your management of the presented patient?
• (If did not present case) I see you haven’t presented a case at ECHO. I’m curious as to why that might that be.

Prompts. Time constraints, perceived value for effort, type of practice, number of ECHO sessions.

Would you want to present a case at ECHO?

Topic 2: Impact of ECHO on your practice

• How has ECHO affected your interaction with patients?
• How has participating in ECHO affected your interactions with clinicians in your practice?

* Note depending on profession, ask how they feel if they are not a doctor.

• With healthcare providers outside your own team/office/clinic [as appropriate] (other professions)
• What changes, if any, have you implemented in your practice because of ECHO

Prompts. Communication, lab testing, use of electronic or other resources?

• What would you say about the impact of ECHO on your confidence in managing pain patients?

Prompt if needed. Some participants have found that participation in ECHO has actually made them feel less confident, because it exposed them to what they did not know. Can you comment on that at all?
Topic 3: Features of ECHO

ECHO relies on using technology to connect clinicians across Ontario. We are interested in your interactions with technology and the different functionalities and features provided by ECHO.

- How is your experience with using the Zoom method?

**Prompts.** user experience of online community building, or building a network?

- We are interested in your experience using the online discussion board. Did you use this? How have you found this tool to be helpful? How do you think this could be improved?
- Did you find that the information/resources within ECHO supported your learning needs?

**Prompts.** real time support

- Are their additional features you would like to see in ECHO?

**Final question**

- Is there anything else that you thought I would ask that I didn’t ask, or that you would like to add?

Thanks for your time and your valuable input.

**Some themes to think about**

- Online Community Network
- Interactions
- Collaborative Network
- Continuous learning Post-ECHO
- Increase in Confidence levels
- Resource engagement and learning

**Other thoughts**

- Technology & Chronic Pain
- Need Examples, stories
- Holistic Approach

**Additional questions & follow-up thoughts**
Dear XXX,

My name is Naima Salemohamed, and I am a graduate research student working with Dr. Furlan and Dr. Dubin with Project ECHO Chronic Pain. As you may know to evaluate the project we are conducting different research initiatives. My portion of the project involves conducting interviews with different healthcare providers understanding their experience with ECHO, the impact on their practice and some other questions.

I was hoping that you would be interested in participating in our interview. Please let me know if you have time for this; I would appreciate your help. I have attached the consent form for your review.

Thank you in advance, and please let me know if you have any questions.

Thanks
Naima
CONSENT FORM TO PARTICIPATE IN A RESEARCH STUDY

Study title: ECHO Evaluation of Clinicians

Principal investigator:
Dr. Andrea Furlan, staff physiatrist at Toronto Rehabilitation Institute; Associate Professor, Department of Medicine, University of Toronto

Research study personnel:
Dr. Leslie Carlin, Research Associate, University of Toronto
Naima Salemohamed, Masters Student, University of Toronto
Jane Zhao, Research Coordinator, Project ECHO, Toronto Rehabilitation Institute

Sponsor: Toronto Rehabilitation Institute, University Health Network

Introduction:
You are invited to participate in a research study conducted by Dr. Andrea Furlan. You are currently participating, or have completed your participation in ECHO Ontario Chronic Pain and Opioid Stewardship, ECHO Ontario Pain for short. Evaluation and monitoring outcomes of Primary Care Providers attending weekly ECHO sessions are important aspects of ECHO Ontario. We aim to understand more about the implementation and performance of the program in rural, remote, and underserviced communities in Ontario.

We are interested in how primary care providers perceive their involvement and participation in ECHO Ontario. Your participation in the study will be important to us as we try to evaluate and improve weekly ECHO sessions for all participants, and to policy-
makers, because the ECHO model™ shows promise as an effective strategy to increase the capacity and access in underserved areas for patients with chronic pain. We have already conducted qualitative focus groups, and are collecting ongoing questionnaires. In this portion of the study, we hope to explore some themes that emerged from the focus groups and other research, as well as some new topics.

**Research design:**

We want to conduct research on ECHO through semi-structured interviews. These interviews will be conducted over a three-month period. We hope to recruit 12 to 15 participants for this portion of the study, and explore three main topics: 1) Your experience with ECHO, 2) Impact of ECHO on your practice 3) Features of Project ECHO.

**Risk and benefits of participation:**

There are no anticipated risks or harms associated with participating in this semi-structured interview. Benefits that may come from your participation in this research will be to contribute to our understanding of how to best provide chronic pain management education for primary care providers.

**Confidentiality:**

If you agree to participate in the interview, the following personal information will be collected:

- name;
- age group;
- sex;
- profession;
- years in practice; and
- country where you completed your professional training.
This study information will not identify you:

Any personal information about you, as listed above, collected for research purposes, will be linked to a unique participant ID code. All data collected during this research study will be kept confidential and will not be shared with anyone outside the Project ECHO research team. You will not be named in any reports, publications, or presentations that may come from this study.

The following people may come to the hospital to look at the study records and at your personal health information to check that the information collected for the study is correct and to make sure the study is following proper laws and guidelines:

• Representatives of the University Health Network (UHN), including the UHN Research Ethics Board.

The conversations of the semi-structured interview will be recorded and transcribed for qualitative analysis. All audio recordings will be destroyed following transcription. All personal information and transcripts of interviews will be kept locked and stored in a secure area and only made available to researchers directly involved in the study. The study principal investigator will keep any personal health information about you in a secure and confidential location for 10 years. A list linking your study number with your name will be kept by the study doctor in a secure place, separate from your study file.

Voluntary participation:

Your participation is voluntary. You may withdraw from the study at any time and your withdrawal from the study will not affect your relationship with ECHO Ontario Pain or Toronto Rehabilitation Institution, University Health Network.

Compensation:

You will be compensated with a $50 VISA gift card for this semi-structured interview.
Questions about the study:

If you have any questions, concerns, or would like to speak to the study team for any reason, please call Dr. Andrea Furlan at 416-597-3422, ext. 4607.

If you have any questions about your rights as a research participant or have concerns about this study, you may call the Chair of the University Health Network Research Ethics Board (UHN REB) or the Research Ethics office number at 416-581-7849. The REB is a group of people who oversee the ethical conduct of research studies. The UHN REB is not part of the study team. Everything that you discuss will remain confidential.

You will be given a signed copy of this consent form.

Consent:

This study has been explained to me and any questions I had have been answered. I know that I may leave the study at any time. I agree to the use of my information as described in this form. I agree to take part in this study.

__________________________  _____________________  ____________
Participant Name (PRINT)    Signature            Date

__________________________  _____________________  ____________
Person Obtaining Consent (PRINT)    Signature            Date
# APPENDIX D: THE CODING FRAMEWORK

<table>
<thead>
<tr>
<th>Parent Node</th>
<th>Child Node</th>
<th>Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experiences with chronic pain management before joining ECHO Ontario</td>
<td>Reasons for joining ECHO Ontario</td>
<td>Understanding what participants expected from joining ECHO Ontario Pain and why they joined ECHO Ontario Pain.</td>
</tr>
<tr>
<td></td>
<td>Validating existing knowledge and adding new knowledge</td>
<td>Add new knowledge, learning resources, and new methods for treating patients. Validating and confirming existing knowledge.</td>
</tr>
<tr>
<td></td>
<td>Lack of understanding of chronic pain</td>
<td>They were unsure how patients felt and unsure where to go to learn about this information.</td>
</tr>
<tr>
<td>Learning and Sharing through ECHO Ontario</td>
<td>Learning through ECHO Ontario</td>
<td>Different types of learning through didactics, case presentations or other forms of communication (i.e. the discussion board). How learning varies depending to roles.</td>
</tr>
<tr>
<td></td>
<td>Primary Touch</td>
<td>The care received by the patient whose case is presented at ECHO Ontario Pain.</td>
</tr>
<tr>
<td></td>
<td>Secondary Touch</td>
<td>Care for all patients receiving care from the HCP who attends ECHO Ontario Pain.</td>
</tr>
<tr>
<td></td>
<td>Tertiary Touch</td>
<td>All patients that receive that level of care in the clinic, the interactions with other HCPs and the wider community.</td>
</tr>
<tr>
<td>The use of technology</td>
<td>Technology as a facilitator for learning</td>
<td>How technology is facilitating and supporting learning for the ECHO program?</td>
</tr>
<tr>
<td></td>
<td>Technology as a Barrier</td>
<td>Looking at OTN vs Zoom and how technology affected participation in the ECHO program.</td>
</tr>
<tr>
<td>Recommendations for improving ECHO Ontario Pain</td>
<td>Confidence and Competence Levels</td>
<td>The ability to do something successfully, or believing in their course of action (i.e. treatment for the patient) because of ECHO.</td>
</tr>
<tr>
<td></td>
<td>Impact of Chronic Pain and multiple definitions</td>
<td>How chronic pain affects patients (physical, social and emotional), healthcare systems and society and unique.</td>
</tr>
<tr>
<td></td>
<td>Time</td>
<td>Time barrier for being part of the ECHO program (i.e. giving up hours or time during the ECHO sessions).</td>
</tr>
<tr>
<td></td>
<td>Feedback for the ECHO Program</td>
<td>Suggestions of how ECHO can be run in the future.</td>
</tr>
</tbody>
</table>
REFERENCES


Carlin, L. (2017) *Discussion about focus groups /Interviewer: N. Salemohamed.*


Catalano, A. (2014). Improving distance education for students with special needs: A qualitative study of students' experiences with an online library research course. *Journal of Library & Information Services in Distance Learning, 8*(1-2), 17-31.


Project ECHO UNM. (2017). Project ECHO: A Revolution in Medical Education and Care Delivery Retrieved from https://echo.unm.edu


Tracey, I., & Bushnell, M. C. (2009). How neuroimaging studies have challenged us to rethink: is chronic pain a disease? The Journal of Pain, 10(11), 1113-1120.


