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Novel Approaches to Breaking the Cycle of Intimate Partner Violence (IPV): Medical Trainee and Virtually-targeted Education to Increase Healthcare Provider Readiness to Manage IPV

Dillabough, Kaitlyn

UNIVERSITY OF CALGARY

Novel Approaches to Breaking the Cycle of Intimate Partner Violence (IPV): Medical Trainee and Virtually-targeted Education to Increase Healthcare Provider Readiness to Manage IPV

by

Kaitlyn Erin Dillabough

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Abstract

Intimate partner violence (IPV) is any violent or controlling behavior by a person in a dating, cohabitating or marital relationship to their partner in the form of psychological, physical, and/or sexual violence. Alas, global reports reveal one in three women experience IPV in their lifetime. To challenge the cycle of violence and mitigate associated morbidity and mortality, experts encourage an integrated, multi-faceted approach to IPV management in healthcare settings. The purpose of this thesis is to assess the mEDUCATE (Applying EDUCATE to Medical Student Intimate Partner Violence Training) program specifically, in the context of IPV education programs intended to prepare medical trainees for future practices that are conducive to meeting the societal need for healthcare provider IPV management.

This manuscript-based thesis consists of two manuscripts in-progress. Both manuscripts focus on the mEDUCATE program, which was designed to educate medical trainees on IPV and current screening practices. Manuscript one is a qualitative evaluation of the mEDUCATE program using thematic analysis of semi-structured interviews. This study found value in the mEDUCATE program and established that medical trainees consider this training to be important and applicable to their future practice. Based on this research the mEDUCATE program is being modified for widespread, virtual implementation. The second manuscript presents the quantitative results of a pretest-posttest evaluation of the mEDUCATE program. The Physician Readiness to Manage IPV Survey (PREMIS) scores confirmed that medical trainees IPV knowledge and preparedness significantly increased post-training, The combined manuscripts demonstrate the value of implementing IPV training early in healthcare

providers career to support consistent IPV screening practices and confidence in managing IPV; especially in critical circumstances like the COVID-19 pandemic that generate greater IPV frequency and severity.

Keywords: intimate partner violence (IPV), healthcare provider management, medical trainee education

Preface

Kaitlyn Dillabough (KD) designed and conducted the research studies presented in this thesis with her program supervisor, Dr. Prism Schneider (PS). The contents of this manuscript are the primary contributions of KD and PS, as well as her supervisory committee members, and collaborators at the University. Research activities were conducted by KD and the Foothills Medical Centre Orthopaedic Trauma Research team. Data analysis was performed by KD and collaborators at McMaster University. The mEDUCATE program was delivered in collaboration with representatives from the University of Calgary Medical Students Against Interpersonal Violence group. Training was implemented by KD, PS, a team of community social workers, standardized patient actors, and medical resident volunteers. Co-authors of all published and in-progress manuscripts approve the inclusion of these manuscripts in this thesis. Supervisory committee members informed this thesis composition and approved of the final document presented.

Chapter Two (Manuscript One)

Dillabough K, Leslie M, Lienhard K, Sprague S, Temple-Oberle C, Schneider P. "A Qualitative Evaluation of an Intimate Partner Violence Education Program for Medical Students (mEDUCATE)" has been formatted for submission to the Journal of Family Violence. All co-authors have given permission for inclusion of the manuscript in this thesis. KD and PS conceptualized the mEDUCATE program and study and developed the qualitative study design. KD led all research and writing activities for this study including data collection, data analysis, and results reporting. Data analysis (coding

and thematic analysis) was completed with Karin Lienhard and Michael Leslie. All co-authors contributed to manuscript review and revisions.

Chapter Three (Manuscript Two)

Dillabough K, Temple-Oberle C, Bzovsky S, Sprague S, Schneider P. **"**A Novel Educational Program Improves Trainee Readiness to Manage Intimate Partner Violence in the Clinical Setting: A Pretest-Posttest Study" is currently formatted for submission to the Canadian Medical Education Journal. All co-authors have given permission for inclusion of the manuscript in this thesis. KD and PS were responsible for mEDUCATE program inception, quantitative study design, and implementation. KD led all research and writing activities for this study including data collection, data analysis, and results reporting. Sofia Bzovsky (McMaster University) assisted in quantitative data analysis and reporting. All co-authors contributed to manuscript review and revisions.

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Most importantly, I want to sincerely thank my supervisor, Dr. Prism Schneider, for her supervision, mentorship, time, resources, and expertise throughout the research process and development of this thesis work. Her contributions to my personal and professional growth have been invaluable and are deeply appreciated. Her dedication to her graduate students' development is admirable and her passion for this work as an intimate partner violence champion truly inspiring.

Dedication

This body of work is foremost dedicated to the women and men who have ever suffered from intimate partner violence victimization and not received appropriate support. It is also dedicated to the women and men who have perpetrated violence and since sought support to change their behaviours, as well as children in the home who have ever been secondarily affected by intimate partner violence. Finally, this is dedicated to the healthcare providers in Canada, across all specialties, who are active participants in managing intimate partner violence through education, identification, and intervention.

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List of Abbreviations

CMAJ: Canadian Medical Association Journal

COVID-19: Coronavirus disease of 2019

DV: Domestic Violence

EDUCATE: Education on Domestic Violence: Understanding Clinicians' And Traumatologists' Experiences

IPV: Intimate Partner Violence

mEDUCATE: Applying EDUCATE to Medical Student Intimate Partner Violence Training

PREMIS: Physician Readiness to Manage IPV Survey

STEM: Science, Technology, Engineering, and Math

UN: United Nations

WHO: World Health Organization

CHAPTER ONE: INTRODUCTION

1.1 Introduction

1.1.1 Intimate Partner Violence Definitions

Intimate partner violence (IPV) is defined by the World Health Organization (WHO) as "any behavior within an intimate relationship that causes physical, psychological, or sexual harm to those in the relationship".[1] IPV is a form of domestic violence (DV). In less recent academic literature and colloquially, IPV may commonly be interchangeably referred to as DV or family violence. IPV is distinguished from DV in that IPV refers to acts of violence strictly within an intimate relationship, whereas DV has a broader context and may refer to acts of violence by an individual against children or elders in the household. For the purpose of this research, an intimate relationship has been defined as including dating, coinhabiting, or marital couples.[2] Forms of IPV perpetration include physical violence (slapping, kicking, and hitting), sexual violence (sexual coercion and forced sexual intercourse), emotional abuse (insults, humiliation, destruction, threatening harm, and threatening to take children away), and exhibition of controlling behavior (isolating partner, limiting access to finances, social or educational opportunities, medical care, or other basic needs).[1]

1.1.2 IPV Risk Factors

IPV is a global health issue that affects individuals of all ages, geographical, socioeconomic, and cultural backgrounds.[1,3] While it is acknowledged that men can also be the victims of IPV, and IPV also occurs in same-sex relationships, research shows that women are most victimized by their male partners.[1] In Canada, 79% of reported victims

are female.[4,5] There is also evidence that women experience more severe forms (e.g., life threatening physical violence) of IPV.[5,6] Existing IPV research, and therefore the research summarized in this thesis, largely focuses on the study of female victims. Similarly, our IPV education program focuses primarily on screening for female victims of IPV; concurrent with standard practice, although other scenarios including discussion of female perpetration and male victimization were also explored. Emphasizing that women of any background can be victims of IPV, there are some consistent risk factors that can assist with identifying IPV. Individual risk factors include previous indirect or direct exposure to violence and lower levels of education.[7,8] Relationship risk factors include economic stress, disparities in education between partners, and male dominance in the relationship.[7,8] Furthermore, studies have found that IPV is more likely to occur in societies where gender inequity is the accepted social norm, when there is greater poverty, and lack of community condemnation of violent behavior.[7,8] A significant risk factor for experiencing physical IPV is pregnancy.[3,8] In Canada specifically, the female First Nation population is growing faster than the non-First Nation female population.[6] Therefore, First Nation women are generally younger, more likely to be unmarried, and have higher unemployment.[6] These risk factors and other inequalities make First Nation women at high risk of IPV and homicide.[6] The rate of violent victimization is approximately 2.5 times greater and severity of violence is greater against First Nation women than against non-First Nation women in Canada.[6] Sadly, First Nation women report more injury and are more likely to fear for their lives as a result of IPV.[6]

1.1.3 IPV Prevalence

Globally, one in three women report experiencing IPV during their lifetime and IPV is the leading cause of non-fatal injury for women.[8-11] Reflective of this statistic, are the North American reports of one in six women presenting to fracture clinics having experienced IPV, in the past year alone.[12] Tragically in Canada, every six days a woman is murdered by her intimate partner, with an average of 69 women intimate partner homicides occurring every year.[4,5] During the COVID-19 pandemic, it is likely that the number of intimate partner homicides have significantly increased, considering that the frequency and severity of violence has increased.[13,14]

1.1.4 Increased IPV Prevalence During the Current Pandemic

Worldwide, IPV has escalated due to the global COVID-19 pandemic isolation requirements, which contribute to greater risk of violence in the home and challenges with accessing IPV resources and support.[14] The United Nations (UN) proclaimed violence against women during the COVID-19 pandemic to be a "shadow pandemic" plaguing nations worldwide.[15] During the height of the pandemic, China and Italy reported a significant increase in calls to their local IPV crisis support lines.[16] This surge in crisis support line utilization was not solely the result of an increase in IPV victim calls but was also compounded by an increase in calls from victims' family and friends who had concerns about the isolation and suspected violence their loved ones were experiencing.[15] Similar trends have been seen across Canada, as social service agencies have received nearly twice the reports of DV compared to pre-pandemic statistics.[17] Within Alberta, community IPV collaborators have reported an increase in calls to

Alberta IPV support lines.[18,19] Specifically, the Family Violence Information Support Line reported a 23% increase in calls and the Calgary Women's Emergency Shelter reported a 65% increase in crisis calls during the COVID-19 pandemic from April 2020 to September 2020.[18,19]

Several formidable conditions have favored IPV perpetration during the COVID-19 pandemic. Women disproportionately lost access to income and independence, while simultaneously being burdened with additional household, childcare, and elder care responsibilities at a greater proportion than men.[20] Layoffs and work-from-home orders have led to victims being isolated at home with their abuser.[21] At the start of the COVID-19 pandemic, the Canadian minister of women and gender equality cited a 20-30% increase in violence against women across Canada due to these conditions.[20] In Alberta, RCMP reported 12% more domestic violence calls in the first six months of the pandemic.[21] This report is especially alarming, considering that many cases of suspected violence are typically reported by a victim's social circle, or bystanders, and these cases may have gone unreported during this period of isolation, suggesting that IPV incidence is likely higher.[22]

The study, "Health care practitioners' responsibility to address intimate partner violence related to the COVID-19 pandemic", report that not only has IPV frequency increased during the COVID-19 pandemic, but severity has increased as well, and the types of violence being experienced are distinctive.[23] In a Canadian survey (administered from May 2020 to July 2020), respondents cited that isolation was being used as a tactic to increase violence in the home, that fear surrounding COVID-19 was being used as a form of control, and that behaviour monitoring was limiting victims' access to informal

and formal supports.[13] A greater rate of strangulation was reported, as well as perpetration more unique to the COVID-19 pandemic circumstance, such as enforcing obsessive hand-washing behaviour.[13] Concurrent with increased IPV rates, access to support resources was also negatively impacted by limited physical access to shelters and layoffs of staff at violence-related support agencies.[13] Surveyed staff from these agencies called for increased funding and comprehensive initiatives targeted at challenging the cycle of DV in Canada.[13] This call to action is aligned with the body of evidence that supports the need for healthcare provider and trainee targeted IPV education to identify and assist victims of IPV in the healthcare setting. IPV victims face significant barriers to leaving their homes and their violent partners.[15] These existing challenges are magnified by the pandemic conditions. Additional unique concerns due to isolation restrictions include a fear of court closures complicating custody battles, and the inability to view new homes.[15]

The routine activity theory is commonly used in DV research to conceptualize why societal pandemic settings are particularly conducive to IPV perpetration.[23] According to this theory, three factors contribute to IPV perpetration incidence:

1. Perpetrator motivation.
2. Presence of a target.
3. Absence of obstacles to perpetration.[23]

All three factors are influenced by isolation requirements. Consider that stress may impact a partner's emotional well-being and change their behaviors, partners may spend more time at home together, and monitoring of support-seeking behaviours by one partner may become easier.[23] These factors are evolving and will likely change

interactions between partnered couples over the course of the COVID-19 pandemic.[23] Therefore, it is important that reports of IPV perpetration and management be collected at frequent intervals throughout the pandemic. These reports should be considered in aggregate to inform on need of IPV education and virtual initiatives for healthcare providers.

Considering that isolation requirements limit in-person contact, there is a unique need for healthcare providers to learn how to safely aid IPV victims remotely. Even prior to the pandemic, evidence supports that healthcare providers should routinely screen patients for IPV when the setting is appropriate and screening is certainly required when an injury is suspected as a consequence of violence.[24] Private healthcare settings are believed by patients to be an appropriate place to discuss IPV.[25, 26] The use of direct questioning dialogue to screen female patients for IPV has been evidenced as the most acceptable approach to patients.[24] Therefore, to provide patients with an acceptable standard of care and a safe environment for IPV disclosure, it is the responsibility of healthcare providers to initiate conversations with patients about IPV.

1.1.5 Consequences of Intimate Partner Violence

It is important to understand that despite the frequency and severity of IPV that women worldwide experience, there are many valid reasons a women may choose not to leave a violent relationship. Reasons cited by the WHO include a lack of social support or economic means, fear of retaliation, stigma, or losing their children, and belief that their partner will change their behaviour.[1] Regardless of whether a woman chooses to stay in a

violent intimate relationship, this is still a choice, and all women need a safe, comfortable environment to disclose IPV, and that they feel supported in their own decision making.

Considering the widespread consequences of IPV on women's physical, mental, and sexual health, healthcare providers are often a victim's first contact and place of support after experiencing IPV.[12] Healthcare providers in emergency departments, primary care, and orthopaedic settings have been found to be particularly relevant locations to address IPV with patients.[12] This knowledge supports that healthcare providers and trainees in these aforementioned settings should be educated and equipped to identify and assist patients experiencing IPV to reduce the burden of IPV consequences.

IPV victims utilize healthcare at a greater rate which burdens the Canadian medical system and economy with an estimated $7.4 billion annually.[27] IPV victims have a greater risk of adverse long-term health outcomes, of contracting sexually transmitted diseases, and of experiencing substance abuse, anxiety, and depression as unfortunate consequences of the trauma.[28] Additionally, children who are exposed to IPV use psychological health services at a greater rate and are more likely to be a victim and/or perpetrator of violence as an adult in their own intimate relationships.[29]

1.2 Current Practice and Evidence for Mitigating IPV Impact

1.2.1 IPV Screening Practices

For prevention and response to IPV, the WHO adopts the RESPECT women framework which includes seven strategies to target in a range of settings, including the healthcare sector.[1] The strategies are relationship strengthening, women empowerment,

poverty reduced, child abuse prevented, as well as ensured services, and enabling environments which are applicable to the healthcare setting and providers.[1]The seventh strategy is to transform attitudes and norms about IPV, which is contributed to by education and awareness.[1] The WHO advocates that physicians should address IPV by screening as part of routine practice and by assisting identified victims of IPV.[1] Unfortunately, routine screening is not common practice worldwide.[1] Healthcare providers commonly cite a lack of confidence and comfort in addressing IPV in their practice.[31] Considering the complexity and sensitivity of addressing IPV, physicians report being hesitant to screen patients for IPV for fear that if they receive a disclosure, they will be unable to appropriately respond or aid the patient.[32] This care gap can largely be attributed to a lack of IPV education for established healthcare providers, but also a dearth of formalized IPV education for medical trainees during their professional training.[30] In the United States, many medical schools report inclusion of some family violence education in their curriculum.[33] Unfortunately, the quality, comprehensiveness, and adequacy of time devoted to IPV education is likely insufficient, considering that time spent on IPV in the curricula has not increased at most of these schools for many decades.[33]

1.2.2 Need for IPV Education

Considering the complexity of IPV, the societal and personal burden, and repetitive finding that healthcare providers who receive IPV training are more likely to implement screening in future practice, the need for IPV education is clear.[33] These studies call for an integrated and multi-modal approach to IPV medical trainee

education,[34-37] having shown that IPV education is effective in increasing medical trainees' comfort and confidence in addressing IPV in their future practice.[34-37] This approach is evidenced to result in improvement of IPV knowledge and future screening practices, as well as knowledge retention, across healthcare specialties and training stages.[34-37] In a study of primary care physicians, investigators conclude that clinicians should seek IPV training, and have their readiness to manage IPV audited throughout their career.[34] When evaluating classroom IPV training delivered to orthopaedic medical residents, classroom training was insufficient to increase medical trainees IPV knowledge, but multi-modal approach incorporating demonstration and mentorship was conducive to increasing IPV screening and knowledge.[35] In a study of American medical students, IPV education during medical school was effective in increasing trainees confidence and IPV knowledge.[36] This study also called to action that medical schools integrate comprehensive approaches to IPV education into curriculum.[36] Despite this call to action, the select IPV education which has been implemented at North American medical schools may be insufficient. In a nationwide survey, American medical students reported receiving minimal hours of IPV training and described low screening rates in their eventual practice, although 73% of survey respondents believed IPV is an important issue to discuss with patients.[33] The paucity of IPV medical trainee education correlates to a lack of IPV care in contemporary healthcare settings, with practicing healthcare providers reporting a lack awareness of IPV screening practices and are under prepared to respond to disclosures.[28] Starting IPV education early in medical (or healthcare) training could be critical to emphasizing the importance of addressing IPV in future clinical practice. Early IPV education would introduce trainees to tangible local resources and

other patient care team members (social workers) with whom they can connect to as a future resource for support in assisting patients experiencing IPV.

An estimated 19,000 times every month in Canada women are denied access to domestic violence shelters.[38] Healthcare providers are often a victim's first source of support and their education on available resources to help victims navigate their options and make a safety plan for times of crisis, or to alleviate a precarious scenario before it escalates, is vital to mitigating the downstream consequences of IPV. Providers' background IPV knowledge influences how healthcare providers manage IPV with their patients.[39] Specifically, healthcare providers who do not receive any IPV education during their training are less likely to adequately address IPV with patients,[39] contributing to precarious situations for victims that may escalate to a point of needing to seek shelter in an emergency, which may lack of capacity. More timely screening avoids the crisis situation. Improved IPV training will help close this clinical care gap and more consistently implemented by IPV experts in formal medical education curriculum.[40]

1.2.3 IPV Management During the COVID-19 Pandemic

Rather than addressing IPV separately from the healthcare system, the WHO recommends integration of IPV care into routine practice.[41] To accomplish this goal using telehealth services, healthcare systems and individual healthcare providers must implement unique practices that can be utilized during the COVID-19 pandemic period, or at times when access to in-person healthcare services is limited.[42] If there are no appropriate existing strategies for virtual IPV screening by healthcare providers for a particular country or healthcare practice setting, one should be developed with local

community IPV organizations. Developed strategies need to be disseminated to relevant healthcare providers and public bodies to address the IPV global health crisis amidst other global pandemics.

1.2.4 Challenges Managing IPV Virtually

Telehealth is defined by WHO as "the delivery of healthcare services, where distance is a critical factor, by all healthcare professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and for the continuing education of healthcare providers, all in the interests of advancing the health of individuals and their communities".[41] Telehealth and telemedicine terms are used interchangeably. While there may be societal advantages to optimized telehealth use for the purpose of managing IPV, the limited privacy and increased supervision of services creates unique challenges for healthcare providers. Not only does the delivery method of care during a pandemic make IPV management challenging, but practitioners in an Australian study reported a concomitant increase in complexity of women's healthcare needs and that victims of IPV during the pandemic have had fewer opportunities to seek help.[43] This is reportedly primarily due to increased technological surveillance by perpetrators, so victims have had difficulties accessing resources online or through phone support lines.[43] Obstacles for healthcare providers extend from the disclosure phase to aiding with support access. These telehealth specific challenges include:

1. Difficulty maintaining virtual contact or connection with patients.
2. Patient refusal to attend follow-up appointments.

3. Navigation of patient-provider language and/or cultural barriers, particularly with the inability to examine body language or have a translator physically present; especially considering the intricacy of IPV dialogues.
4. Determination of potential perpetrator surveillance of telehealth visits.
5. Difficulties conducting accurate virtual risk assessments with the patient.
6. Limitations to healthcare providers knowledge of supports and the patient's ability to access supports.
7. The existence of appropriate supports that are culturally sensitive and easily accessible.[43,44]

There is also the difficulty of aiding patients with the execution of developed safety plans due to COVID-19 restrictions and closures, which limit physical access to relevant resources (e.g., family and friends' homes, shelters, or legislative courts).[43] Additionally, healthcare providers often struggle with burnout and stress which has generally increased for all during the COVID-19 pandemic. Therefore, healthcare providers may lack motivation to screen for IPV unless they are educated on the real need for screening and not aware of resources available to support screening practices.[43,44]

One organization reports a potential benefit of healthcare providers addressing IPV in a virtual setting suggesting that, when screened, more disclosures will occur, as women may feel greater comfort in their own home environments.[45] This hypothesis should be investigated in future studies. Despite the challenges associated with managing IPV virtually and the additional burden this practice setting creates for healthcare providers, these practice changes are important. There are existing reports that rates of

women seeking IPV support, on their own initiative in the absence of healthcare provider screening, decreased early in the global pandemic restrictive phases.[42] This finding emphasizes the need for strategies to be developed to educate and aid healthcare providers in virtual IPV screening practices, to support disclosures, and support the agency of IPV victims.

1.2.5 Best Practices for Virtual Screening

North American organizations like Futures Without Violence have provided guidelines for IPV screening during virtual appointments that present additional IPV management challenges, (e.g., patient might be overheard by the perpetrator, if in the home at the time of the appointment).[46] These guidelines provide healthcare providers with pre-visit preparatory tasks, a guiding script for addressing IPV with patients, and recommendations for executing safety planning and connecting patients to applicable resources.[46]

Consistent with other organizational recommendations such as Education on Domestic Violence: Understanding Clinicians' And Traumatologists' Experience (EDUCATE), the Futures Without Violence IPV screening guide instructs that screening should start with a confirmation of the privacy of the telehealth visit.[46,47] If the visit is not private, healthcare providers should attempt to develop a unique strategy to discuss confidential health matters in a private setting with their patients.[46] Once privacy is established, healthcare providers should share information on what IPV is and how it may affect their patients.[46] Healthcare providers should convey the normalcy of IPV screening within their practice.[46] Direct questioning methods should be used to screen for IPV, and

if a disclosure occurs, appropriate phrases to validate the victim's disclosure are recommended.[46-48] Next, steps should be taken with the patient to connect them to local resources. Healthcare providers should keep detailed documentation of the situation.[46] Finally, healthcare providers should ensure they schedule a follow-up visit with patients of concern, or patients who have disclosed IPV.[46]

1.2.6 Additional Resources and Virtually-Targeted Initiatives

In addition to the campaigns and resources disseminated in our manuscript, many other healthcare organizations have developed virtual IPV screening initiatives specialized to their local healthcare providers and citizens.[23] The details of these publicly available campaigns are limited to prevent perpetrator awareness. Signalling campaigns generally consist of a physical signalling system or the use of code words through video chat, telephone, email, or text communications with a healthcare provider.[43] Examples of companies that can be used as referral resources and to strategize IPV screening are Gruveo and Shebah. Gruveo (https://www.gruveo.com/) is an innovative web-based link to a video call (globally accessible) that does not require patients to have downloaded an app; an action that may be surveilled by a perpetrator. Shebah Australia (https://www.shebah.com.au/) is a useful resource for healthcare providers to provide to patients that may help facilitate safety planning after IPV victimization is disclosed. This female-managed company arranges transportation of victims from their homes to safe accommodations, when requested.

Numerous additional strategies and initiatives for virtually managing IPV have been developed or are proposed through partnerships between local IPV organization,

Healthcare providers, and patients. One strategy to screen women for IPV is to encourage healthcare providers to screen mothers during their child's healthcare appointment.[43] The child's appointment may not be surveyed by a perpetrator in the home or may be required to be in-person, even during a pandemic, due to the complexity of care and the need for physical examination.[43] To make established initiatives known to healthcare providers and patients, social media should be exploited to educate and inform. Healthcare providers' administrative staff should also be educated on signalling campaigns, so that when arranging virtual follow-up visits for patients over the phone or by email, patients could successfully signal to them the need for help, which can then be relayed to the healthcare provider for management.[43] To maximize the privacy and security of virtual healthcare visits, safeguards such as encrypted links and safe exits should be utilized to protect IPV victims. If a healthcare provider receives a signal for help from a patient, they can utilize strategies like a virtual home tour for risk assessment to inform subsequent safety planning and referrals.[43] An Australian organization, *1800 Respect* (https://www.1800respect.org.au/), has developed a country-wide digital referral application (app), "Daisy", for public download. This app connects patients to social supports specific to their location. Apps like this are beneficial and their development should be encouraged in every country as a streamlined means to circulate resources to patients using virtual technologies. In Canada, there is a government directed national family violence service website (https://www.canada.ca/en/public-health/services/health-promotion/stop-family-violence/services.html), a downloadable IPV resource app *myPlan Canada App* (https://myplanapp.ca/en/), and a national shelter-finder website ShelterSafe (https://sheltersafe.ca/). Each province also has forms of province-specific resource

websites, in addition to numerous local IPV community organization sites that provide service information, like Sagesse (https://www.sagesse.org/). Informing practicing healthcare providers on existing applications that connect patients to IPV resources is a priority.[43]

1.3 IPV Education

1.3.1 Barriers to Education

There are several significant barriers to providing medical trainees with quality IPV education during their training. Barriers include: an absence of trained healthcare providers available to educate, a lack of allotted time in the medical curriculum, a lack of physical resources (e.g., appropriate space and availability of relevant other healthcare providers to contribute to educational. outcomes), and deficient government and institutional funding allocated for IPV education.[28] Funding may be needed to incorporate IPV education and training into medical school curricula, or to offer IPV training in addition to traditional curricula, for the purpose of securing learning spaces, hiring standardized patient actors, and compensating healthcare provider educators. To ensure sufficient funding for IPV education, governments and medical schools must recognize and prioritize IPV education programs. The perceived lack of qualified healthcare provider instructors to provide IPV training emphasizes the importance of healthcare provider targeted IPV education programs, like the McMaster University EDUCATE program (https://www.ipveducate.com/the-educate-training-program) for training current healthcare providers to become IPV champions and then deliver this education to medical trainees. Training programs like EDUCATE, and the subsequently developed “Applying

EDUCATE to Medical Student Intimate Partner Violence Training" (mEDUCATE) program (see section 2.3.1 Program Development and Appendix B: EDUCATE and mEDUCATE Content Comparison), are important steps to overcoming barriers to higher educational change. Henderson et al. (2011) developed a taxonomy of change for undergraduate education in STEM, to establish lasting change after the introduction of new initiatives. It includes four categories of change that must be achieved including 1) dissemination of curriculum, 2) development of reflective teachers, 3) enactment of policy, and 4) development of a shared vision.[51] The EDUCATE content is widely available for healthcare providers, enabling the development of reflective teacher to act as IPV champions and educators of the mEDUCATE program. The mEDUCATE program curriculum is being disseminated to interested post-secondary medical schools, with the hope it will lead to policy change enacting mandatory IPV education and with the hope that a shared vision will emerge with ongoing exposure to the mEDUCATE program and IPV champions.

1.3.2 Evidence for the mEDUCATE Model of Education

The mEDUCATE program, completed at the University of Calgary Cumming School of Medicine, explored in this thesis, utilized EDUCATE champion instructors and other relevant service providers, to deliver IPV training to medical trainees. EDUCATE champions are healthcare providers who have completed the EDUCATE IPV education program targeted to orthopaedic healthcare providers via a "train-the-trainer" model. This model prepares program participants to become IPV champions and program instructors in order to deliver the program to others in the future.[52] The mEDUCATE instructors

prompted medical trainees to adopt routine screening practices for female patients in their future practice, in alignment with research indicating that the investigation of patient context and underlying causes of morbidity is beneficial to patient outcomes.[30,53] Instructors also encouraged medical trainees to remember that, when screening patients for IPV, they should not expect a disclosure. They were instructed that if they do receive a disclosure of IPV, there is no single correct response, but rather a range of appropriate responses. Lastly, medical trainees were educated on which healthcare provider colleagues they should engage with to safely address IPV with the patient if the patient agrees to further counselling and information.[30,53] This is meant to increase healthcare provider comfort in addressing IPV, as medical trainees should know they are not expected to be able to find an immediate solution for patients, but rather are meant to act as a support to patients as they decide how to address IPV in their life. [30,53]

Bandura's theory of self-efficacy is referenced in IPV studies as a critical component of IPV education design for programs with the aim of achieving knowledge utilization and promoting future screening practices.[32] The theory is that a greater belief in one's ability to control their life, the greater one's self-efficacy, which leads to valuable behaviors and better performance. [32] According to the theory, self-efficacy can be developed in an educational program by facilitating psychological arousal, vicarious experience, and enactive mastery. Psychological arousal is achieved by appealing to the emotions of participants. Vicarious experience is facilitated when model behavioral is observed. Enactive mastery occurs through the act of practicing skills learned and verbal persuasion.[32] Our educational mEDUCATE model incorporates the theory's principles in each multi-modal training component. First, participants are emotionally appealed to by

the call to action by medical experts and by learning about patients' IPV victimization experiences. The IPV champion who delivers the program then models the skills for participants during a formal demonstration with a standardized patient and again throughout the session. Next, participants enact the skills in a practical training component with the intent of becoming comfortable with their IPV communication skills. Finally, participants are verbally persuaded by IPV champions to engage in IPV screening and communication in their future practice by using a combination of a didactic presentation, verbal feedback for participants during practical training, and encouragement of the participants throughout the session.

Multi-modal IPV training formats are proven to be most beneficial in improving medical trainee confidence and comfort in addressing IPV.[39,54] Aligned with current recommendations, programs where IPV training was delivered via a combination of didactic and experiential learning, that incorporated the presentation of community-based examples and resources, were found to be beneficial and valuable to trainees.[32] Based on recommendations from other IPV education studies, the mEDUCATE IPV training program included didactic learning, a demonstration, and simulation-based practical training that incorporates small-group feedback from peers, IPV expert healthcare providers, and community-based social workers.[32,39,54] Practical training using case-based simulations is integral to developing medical trainees' skillset for addressing IPV in practice because this issue is so sensitive, with variable clinical presentations.[32] The novel mEDUCATE practical training incorporates a variety of unique IPV case-based scenarios to replicate real-life practice, which is anticipated to increase medical trainee comfort in future practice.[32] By including small-group discussions after each simulation,

mEDUCATE trainees had the opportunity to reflect on their communication skills and to refine their approach; this opportunity is critical to achieving learning outcomes, as evidenced by other IPV education studies.[32]

Knowledge retention is a concern with delivering IPV training to medical trainees early in their career for fear that the knowledge will not be retained and utilized in their future practice. Previous studies recommend that IPV training be reviewed at multiple training levels throughout a trainee's education.[54] For example, a study of medical residents reported poor IPV knowledge retention two years after receiving training.[33] Alternatively, revisiting IPV learning outcomes and providing educational opportunities at multiple times throughout training was effective at achieving longer-term knowledge retention in medical residents.[32] When medical trainees can revisit training, they report intentions to incorporate the training into their future practice.[32] Other studies recommend that not only should training be revisited, but also in an array of settings and contexts throughout a medical trainee's education.[54] In addition to knowledge retention theories, the mEDUCATE program was designed following principles of program creation and evidenced models of curricula implementation for medical education. mEDUCATE is designed as an immersion program, as it incorporates multi-modal learning opportunities and is delivered by multidisciplinary facilitators.[55] It is intended to follow a longitudinal model, as learners should revisit IPV education throughout both their training and career. Principles of identifying existing opportunity, championship by faculty and students, development of faculty expertise, and persistence, will be essential to implementation of mEDUCATE program content into formal undergraduate medical school curricula.[55]

1.4 Perspectives on Intimate Partner Violence Education

1.4.1 Medical Trainee Perspective

Most medical trainees report believing that IPV training would prepare them for screening patients in their future clinical practice.[40] They identified the use of standardized patients and physical access to screening questionnaires as being useful to facilitating future screening.[40] Trainees recognized practical training, through practice screening standardized patients, as likely to increase their comfort and confidence in managing IPV.[56] It is clearly established that medical trainees value IPV training.[33,40] However, the most effective methods of training and the development of a uniform IPV education program for consistent implementation at formal institutions, requires further evaluation and progression.[40]

Prior to receiving formal IPV education, over half (55%) of medical students in a study from the United States believed IPV to be relevant to their future practice, while 73% believed the topic of IPV is a critical discussion between patient and provider.[33] Research shows that women compared to men, as well as Black and Hispanic minorities, are more commonly victims of IPV.[33] According to related research field evidence, personal and/or familial exposure to adverse conditions, like domestic violence, impact an individual's perception of the issue and increases awareness.[33] Therefore unsurprisingly, female students in this U.S. based study, minority students, and students with a personal or familial history of IPV, reported considering a higher relevance of IPV to healthcare provider practice.[33] In a survey-based study, medical students in the United States reported that universal IPV screening of female patients is a reasonable

recommendation.[54] Not only have studies evidenced that students perceived value in IPV training, but students who have received training in different settings expressed that the training they received was useful. In a study conducted in Mozambique, participants who received clinical simulation-based training reported that it was valuable.[32] Evidence establishes that most medical trainees support IPV screening and believe screening leads to identification of IPV victims.[56] Therefore, more IPV education for trainees is required as they recognize the importance of screening, however, they generally report being uncomfortable providing this service.[39]

1.4.2 IPV Victim Perspective

The willingness of patients to discuss IPV experiences with healthcare providers, either when screened or of their own initiative, may be questioned.[32] Victims' comfort in disclosing IPV to healthcare providers, or family and friends, is likely variable based on individual factors, such as the establishment of a fiduciary relationship between provider and patient. However, a United States-based survey administered to general practitioner clinics found that over 85% of patient respondents would disclose their IPV experiences if asked by a healthcare provider.[54] Beyond general practitioners, evidence supports training other healthcare provider specialties, particularly orthopaedic surgeons, as patients report feeling orthopaedic clinics are an appropriate setting for disclosures.[12] Furthermore, evidence shows that screening in orthopaedic clinics is effective and necessary as musculoskeletal manifestations are the most common manifestation of IPV, along with head and neck injuries.[12] As societal IPV awareness increases and stigma

decreases, it can be reasonably expected that the number of patients willing to disclose may be even greater than previously reported statistics.

In another study conducted at healthcare clinics in Nigeria, women were asked their opinions on IPV screening.[40] The majority of study participants (73%) supported routine screening of female patients for IPV. When this view was explored, participants said they believed that routine screening would promote victims' disclosures and challenge the cycle of IPV.[40] When victims were asked about IPV education for medical trainees, the majority reported a need for medical trainee IPV education and the inclusion within formal medical curriculums.[43] Victims expressed that this training should be delivered by a multi-disciplinary healthcare provider team, in a multi-modal format.[40]

1.5 Societal Significance

Educating healthcare providers on IPV and virtually accessible IPV resources is critical to addressing the global IPV health crisis during the COVID-19 pandemic and in future restrictive states. In addition to education, virtually-targeted IPV initiatives need to be developed, disseminated, and then researched, in order to determine effectiveness and acceptance. It is important that the public and healthcare providers become aware of these initiatives. To be used effectively and for greater impact, awareness of these initiatives and social media strategies need to be leveraged to communicate IPV knowledge to the community.[49] More community and healthcare provider engagement in IPV education and management through virtual initiatives normalizes societal conversations on IPV and the integration of IPV supports in healthcare.[45] It may also re-invest public and healthcare provider interest in IPV management, thus promoting government and private social organization funding. Funding is critical to ensuring longevity of IPV organizations and

operation of community supports like shelters.[45] The societal significance of virtually-targeted IPV initiatives and education for healthcare providers may ultimately result in society as a whole becoming more aware of IPV and of how to access supports for themselves or support their family and friends in need. Societal awareness may effectively contribute to destigmatizing IPV by challenging IPV attitudes, beliefs, and norms.[1] Education and victim support are both also fundamental to challenging the cycle of IPV and reducing associated mortality and morbidity, such as unintended pregnancy and abortion, both of which are risk factors for IPV.[45] Therefore, societal impacts of virtually-targeted IPV initiatives should be investigated through rigorous evaluation and research.

1.6 Research Implications

Further investigation is required to develop, validate, and distribute virtually-targeted IPV education and initiatives. As the global COVID-19 pandemic subsides, reports on IPV rates, the number of IPV victim disclosures, the rates that supports were accessed, and that healthcare providers screened for IPV and provided interventions throughout the pandemic phases is needed. This vital information will help inform our understanding of what interventions were effective and where gaps in IPV care persist. This data may also reveal novel at-risk groups during a pandemic for IPV victimization.[50] Women's IPV experiences may be affected by their personal background and identities (e.g., age, ethnicity, or immigration status).[49] These intersections should be examined in relation to pandemic related IPV challenges and barriers that are heightened for at-risk women.[49]

Future research should investigate potential benefits of managing IPV virtually by healthcare providers and compare screening outcomes in clinical versus telehealth settings. Additionally, healthcare provider stress and burnout, expectedly experienced by practicing healthcare providers during the COVID-19 pandemic, should be discussed relative to the impact on the delivery of patient care and services.[49] This will identify the unique challenges to virtual IPV care delivery and rates of IPV service provision during the pandemic by healthcare providers who experienced emotional trauma.[49] To maximize benefits and mitigate challenges of telehealth IPV management, IPV researchers and experts should collaborate to create region-specific virtual IPV management protocols.[49] An Alberta-specific protocol should include detailed descriptions of best IPV screening practices, a guide to virtual risk assessments and safety planning, and education on provincial resources and social support organizations for healthcare providers and patients to access in physically restricted settings.

In a researcher-practitioner dialogue, a healthcare provider expressed that "there is still much to learn about and from this pandemic and the impact it will have on our society. I see research as the proverbial bridge that connects the medical and mental health fields".[50] To connect the medical and mental health fields in challenging the cycle of IPV, it is important that interdisciplinary teams of healthcare providers are involved in patient care.[50] Healthcare providers must receive IPV education and training to be successful as IPV champions, and in aiding IPV victims. Considering the complexity of this endeavour and sensitivity of the topic, IPV education and training should start early in healthcare providers careers, beginning in their undergraduate medical training.

1.7 Thesis Outline

1.7.1 Study Aim

Considering the existing gap in IPV education targeted to healthcare providers and medical trainees, the need for effective, consistently implemented IPV training is evident.[33] The aim of this thesis is to examine the development, delivery, and outcomes of the IPV educational program mEDUCATE in the context of importance of healthcare provider management of IPV.

1.7.2 Study Design

To investigate the outcomes of the mEDUCATE IPV educational program, a multi-methods approach including qualitative and quantitative study designs was used with asynchronous data collection and a staged approach to analysis and reporting.[57,58] The philosophical assumption for this study, is pragmatism; that the program is being evaluated for its practical functioning.[59] According to this design, quantitative and qualitative methods were used by researchers to collect data within the same phase of study; however, the quantitative and qualitative data was obtained and analyzed separately.[59] The results of each study method are reported in separate chapters in this multi-methods thesis, with reference in the quantitative component to the qualitative component. Qualitative results are interpreted in the context of the quantitative results to support those results, elaborate, and draw detailed conclusions about the mEDUCATE program value. Both data sets were valuable in investigating the outcomes of the mEDUCATE program and experienced quantitative and qualitative researchers supervised the project. The benefits of this study design are that a wealth of information

can be concluded from integrating the results of the two datasets, it was efficient to collect both data sets within the same study phase, and this design is intuitive.[59] Potential challenges with this study design are related to the expertise and effort needed to successfully complete two study methods; however, these challenges were mitigated by designing this study following a published parent program, EDUCATE, and with collaboration from members of the EDUCATE study. Ultimately, this study design was chosen because multi-method studies have the advantage of producing more comprehensive evidence for evaluating medical educational program value.[59]

1.7.3 Study Objectives

This thesis addresses the following three research objectives:

1. To describe healthcare providers and medical trainees current IPV knowledge, existing IPV educational programs, and resources available through scholarly investigation.
2. To score medical trainees' knowledge and comfort in identifying and assisting patients experiencing IPV after participating in the mEDUCATE training program.
3. To determine the value of the mEDUCATE IPV training program for medical trainees.

By investigating these three main objectives, we aim to understand the effectiveness of the mEDUCATE program, in order to improve upon the program and to promote incorporating IPV training into formal medical education curriculums.

1.7.4 Significance

As IPV is a global public health issue, experienced by one in three women worldwide, global health authorities, including the WHO and the UN, have taken the position that all healthcare providers should be enabled to address IPV with patients in the healthcare setting.[1,60] Enabling healthcare providers to successfully manage IPV requires effective, multi-modal, and spiralling IPV education throughout medical training to translate knowledge to future practice. Few medical trainee IPV training programs have been studied, proven effective, and consistently implemented at medical institutions in North America. This thesis examines the need for medical trainee IPV education, reports on the development and implementation of the IPV education program, mEDUCATE, at a Canadian medical education institution, assesses the program value for medical trainees, and explores the increased importance of ongoing IPV education for healthcare providers during the COVID-19 pandemic. This thesis is meant to describe the value of the mEDUCATE program, including modifications that can be made to increase value of widespread program implementation.

1.7.5 Thesis Structure

This manuscript-based thesis includes a multi-methods approach and contains four chapters. The current chapter, Chapter One, provides a detailed introduction to IPV, detailed background on past and current IPV educational programs, and a summary of current research is included to establish the need for the studies presented in this thesis. Common themes from other manuscripts are discussed in relation to the results of the studies in this thesis. This chapter also establishes the significance of this research.

Chapter Two is a manuscript on the qualitative evaluation of the mEDUCATE IPV educational program, developed in response to the need for medical trainee targeted IPV training. The study findings from the qualitative participant interviews are discussed in relation to existing IPV education and suggestions are made for further study. Chapter Three is a manuscript chapter on the quantitative analysis of mEDUCATE using participant knowledge utilization questionnaires. This chapter findings are discussed in relation to the accompanying qualitative study. Finally, Chapter Four integrates the themes and findings of the study chapters to contextualize the research and summarize the results. This concluding chapter includes suggestions for modifications to the mEDUCATE program, the education and research implications, and ascertains the importance of IPV education for medical trainees.

1.7.6 Evaluation of mEDUCATE: Semi-structure Interview Rationale

To address the lack of knowledge and comfort expressed by healthcare providers in identifying and assisting patients experiencing IPV, an undergraduate medical student-targeted IPV educational program was developed and implemented. A multi-methods study using quantitative and qualitative study methods was designed to assess trainees IPV knowledge, opinions, and skills after receiving the training. Semi-structured interviews were completed to determine the perceived value of the program to medical trainee participants at two weeks post-training. Qualitative interview analysis was performed separately, reported using qualitative description, and subsequently interpreted in the context of quantitative study data.

1.7.7 Evaluation of mEDUCATE: Pretest-Posttest Rationale

The mEDUCATE study included a non-controlled pretest-posttest study to investigate medical trainees' knowledge and comfort to manage IPV as future independent practitioners. Participants baseline responses prior to receiving the mEDUCATE program acted as each participant's compactor for their posttest scores. Participant demographic information was collected for exploratory analyses and to report descriptive statistics of the population studied.

1.7.8 Ethical Considerations

The University of Calgary's Conjoint Health Research Ethics Board (CHREB) approved the human participant research study in this thesis. The study titled Applying EDUCATE to Medical Student Intimate Partner Violence Training (mEDUCATE), (REB19-1954), was approved in December 2019, prior to the IPV training workshop and of any associated research activities with participants. The research study was approved for participant enrollment from the University of Calgary, Cumming School of Medicine undergraduate medical student cohort. All study activities were conducted according to Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans – TCPS 2 standards. All study research personnel maintained TCPS2 and Good Clinical Practice training, in addition to privacy training mandated by the University of Calgary. Students attending the IPV workshop were presented with the option to participate in the anonymous, voluntary study. During the informed consent process, students were made aware that they may withdraw from the study at any time. Collection of quantitative data

using demographic forms and knowledge utilization questionnaires, and qualitative data using interviews were approved study methods. Only de-identified, aggregate data is presented in this thesis. All data was stored according to the University of Calgary's data security standards. Workshop attendees and study participants were provided information on IPV support and mental health resources, considering the sensitive nature of this topic.

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CHAPTER TWO: A Qualitative Evaluation of an Intimate Partner Violence Education Program for Medical Students (mEDUCATE)

2.1 Abstract

Purpose: Healthcare providers report a lack of comfort in identifying and assisting patients experiencing intimate partner violence (IPV). Despite this, there are no practical educational opportunities for medical trainees to learn how to identify IPV or how to effectively communicate with these patients. We developed and implemented a novel multi-modal IPV educational program for medical trainees (mEDUCATE), at the Cumming School of Medicine, to address this knowledge gap. The purpose of this program was to increase trainee knowledge and comfort with identifying and assisting patients experiencing IPV. The primary objective of this study was to explore the acceptability and value of the program to participants and evaluate IPV knowledge utilization. The secondary objective was to evaluate facilitators experiences delivering the program and need for modifications.

Methods: An interpretive description design was used to describe and understand participants' experiences in the clinical context. Interviews were conducted with trainee participants to assess the value of the mEDUCATE program and success of delivering the program. Value was defined as if participants expressed that the training increased their knowledge or comfort identifying or assisting IPV, and/or if they expressed that the training enhanced their medical education. These semi-structured interviews were completed at two-weeks post mEDUCATE training. Additional program facilitator and

collaborator interviews were also completed post-training. Thematic analysis was performed using parallel deductive coding to seek consensus and consolidate themes.

Results: Six mEDUCATE participant and two program facilitator interviews were conducted and analyzed. Major themes included that the novel practical training component and social worker involvement was integral to achieving learning outcomes. Additionally, trainees identified increased comfort in having difficult conversations, a desire to learn from patients and healthcare providers of diverse backgrounds, and that IPV training enhanced their education. Program facilitators described value in delivering this program to medical trainees, identified some barriers to program delivery, and proposed modifications to overcome these barriers.

Conclusions: IPV is a public health issue which all healthcare providers and trainees should be equipped to address, especially in the setting of the COVID-19 pandemic. mEDUCATE has been well-received and this study supports the value of IPV training in medical education. Study results have been utilized to iteratively modify the program content for future delivery, including adaptations for a virtual format.

2.2 Background

Intimate partner violence (IPV) is defined as any behaviour within an intimate relationship that is used to exert power and control that causes physical, psychological, or sexual harm to the other partner in the relationship.[1] Globally, one in three women report experiencing IPV during their lifetime.[2] In North America, one in six women presenting to fracture clinics experienced IPV in the past year alone.[2] In Canada, every six days, a woman is murdered by her intimate partner[3] and IPV is the leading cause of non-fatal injury.[2] Both IPV severity and frequency have increased due to the global COVID-19

pandemic.[4] Mandatory isolation requirements are contributing to greater risk of violence and controlling behavior in the home, additional challenges for healthcare providers in identifying IPV, and barriers for patients looking to access IPV resources.[5] IPV is a critical public health issue which all healthcare providers and medical trainees should be equipped to address, as increased rates of IPV in Canada are, and will remain, a burden to our healthcare system.[5] Healthcare providers should be encouraged to seek IPV education, professional development opportunities, and stay current with local resources. These actions aid in ability to provide patients with necessary supports, especially as healthcare delivery continues to change and new challenges in identifying and assisting individuals experiencing violence arise.[5]

While healthcare providers are a key player in detecting IPV, they often report challenges in asking women about IPV and assisting women they suspect may be experiencing IPV. [2,6-8] Recent research suggests that these challenges can be overcome with educational programs within a clinical setting. [9] Other North American medical schools have identified the need for the development of IPV educational programs and training that will support trainees in their future practice.[10,11] Furthermore, female victims of IPV strongly support the implementation of medical trainee education from a multidisciplinary healthcare team aimed at teaching IPV screening methods for a healthcare setting.[12] However, currently there are limited practical educational opportunities for medical trainees to learn how to identify IPV, communicate with victims and perpetrators, or access resources for patients. To address this knowledge gap, we developed a novel multi-modal IPV educational platform for medical trainees. This was labelled with the acronym mEDUCATE (Applying EDUCATE to Medical Student

Intimate Partner Violence Training) based on the previously developed EDUCATE (Education on Domestic Violence: Understanding Clinicians' And Traumatologists' Experiences) program for orthopaedic trauma healthcare providers (Appendix A).[9] The EDUCATE program has been used for education of fracture clinic staff across Canada.[9.] The purpose of the EDUCATE program is to empower healthcare providers with the knowledge and skills required to successfully identify and assist women attending fracture clinics who have experienced IPV.[9] EDUCATE accomplishes this through a variety of training mechanisms including, videos, online modules, in-person lectures, role play, and interactive discussions.[9] Using the PREMIS (Physician Readiness to Manage IPV Survey) questionnaire, the EDUCATE study found that this training format resulted in significant improvement in physician IPV knowledge on eight knowledge subscales including: *actual knowledge, perceived preparation, perceived knowledge, practice issues, preparation, legal requirements, workplace issues,* and *self- efficacy*, three months after training.[9] Such educational programs may be useful to medical trainees in order to develop competence and confidence in identifying and aiding IPV victims early in their training. mEDUCATE allows medical trainees to practice interactions with standardized patients, receive immediate feedback, perform small-group work, and learn from practicing healthcare providers and social worker experiences. Our educational paradigm shift from "on-the-job training" to focused experiential learning is aimed to ensure trainee confidence and comfort with asking about and addressing IPV in the healthcare setting.

The purpose of this study was to evaluate the knowledge utilization, acceptability, and perceived value of an IPV educational program (mEDUCATE) in a Canadian undergraduate medical student population by exploring the experiences of medical

trainees who participated in the program and program facilitators through semi-structured interviews. Quantitative and qualitative methodology were used to assess the mEDUCATE program and inform on future implementation of the program. The qualitative study discussed in this chapter was conducted post-training, with the resulting interview themes described here.

2.3 Methods

2.3.1 Program Development

We have developed and implemented a novel multi-modal educational training program designed for medical trainee IPV education (mEDUCATE). The mEDUCATE program was adapted from the existing EDUCATE training program, developed by investigators at McMaster University, to deliver IPV education to practicing orthopaedic trauma healthcare provider.[9] This program was initially implemented across fracture clinics in Canada in 2016 in response to the observed opportunity for orthopaedic healthcare providers to screen for IPV based on the prevalence of IPV-related injuries presenting to fracture clinics and the acceptance of routine screening practices in this setting by fracture patients. [9,13] The efficacy of the EDUCATE program in improving orthopaedic healthcare providers readiness to manage IPV has been reported.[9,13] The original EDUCATE program was designed as an educational program for orthopaedic surgeons, surgical residents, surgical fellows, and allied healthcare providers working in fracture clinics, but suggested the potential for this program to be adapted for other healthcare provider specialties and medical trainees.[9] The principles from this program have since been adapted for application to an undergraduate medical student population

in order to create the mEDUCATE program, in response to identified research knowledge gaps and requests from local medical students for an undergraduate medical trainee-targeted IPV learning opportunity. A comparison of the EDUCATE and mEDUCATE programs can be seen in Appendix B.

Given the absence of a standardized medical trainee IPV education program, local IPV EDUCATE trained champions conceptualized mEDUCATE. The program evolved from being orthopaedic focused, to emphasizing the importance of IPV screening in all medical disciplines. As such, content specific to fracture clinics was removed, and more time was added in the program design for trainee questions and performance feedback. We arranged a novel practical training component using case-based scenarios and standardized patients so that trainees could practice their communication skills. Following mEDUCATE, post-workshop knowledge assessment was completed using qualitative methods, and quantitative methods which are discussed in chapter three. The mEDUCATE program was introduced by advertising the workshop to year one and two medical students at the University of Calgary, Cumming School of Medicine. The program was initially offered on a voluntary workshop registration basis in the evening during December 2019, with the intention that after the programs inaugural offering, it would eventually be formally integrated into medical trainee curriculum.

2.3.2 Program Content

The mEDUCATE educational program consisted of an initial two-hour multi-modal training session and provision of follow-up self-directed learning resources (Table 2.1). Trainees watched a brief video discussing the importance of healthcare providers

becoming involved in IPV identification and assistance. The video and following didactic presentation from a local IPV champion, provided medical trainees with an introduction to IPV and the educational program. After the introductory video and didactic presentation, trainees watched videos showing healthcare providers identifying and assisting women with IPV and received an in-person demonstration of routine IPV screening between the educator and a standardized patient actor. Trainees then participated in practical training. They received case-based scenarios and were given the opportunity to simulate screening for and assisting patients experiencing IPV in small groups. This was followed by an interactive group discussion about the experience between trainees, social workers, and educators. The training session concluded with a review of each resource that is available in the local context. Additional online training through the DVeducation.ca can be completed by trainees after the training event at their own discretion.

The mEDUCATE program content was informed by current practices on assessing patient safety, safety planning and provision of appropriate referrals. For example, the World Health Organization suggests routine screening of female patients by healthcare providers when an appropriate opportunity arises at the healthcare providers discretion (e.g., requirements include rapport built with patient, patient is unaccompanied at visit, support workers available to consult if needed) and states the need for healthcare providers to be trained in responding to identified cases of IPV.[1] Relevant to the COVID-19 pandemic and shifts to virtual healthcare delivery formats, campaigns such as “Safe Word” and “Signal for Help”, which were launched specifically in response to the

pandemic, were shared as part of the training program to facilitate access to discreet resources.[5]

The educational program premise encourages healthcare providers to screen all female patients for potential experiences with violence in the home, as IPV can affect the life of any individual. However, it is recognized that certain populations are more vulnerable and may be disproportionally affected by IPV, such as the LGBTQ+, minority, and immigrant communities; partly due to the culmination of other social determinants of health and barriers to accessing IPV resources.[14] Therefore, the mEDUCATE learning objectives include understanding IPV risk factors and applying this knowledge to practical simulation stations with individuals from diverse populations. mEDUCATE will continuously be modified based on feedback from medical trainee participants and program facilitators, as well as with any new evidence-based guidelines for IPV identification and assistance practices, as the program aims to disseminate current resource information through partnerships with provincial family violence organizations, and to provide effective training, by engaging in evidence-based program implementation.

Table 2.1 mEDUCATE Program Content

Component	Content	Purpose	Time	Setting
Part 1: Video presentation	A video presentation about the importance of healthcare providers becoming involved in IPV identification and assistance. Video available to students through https://www.youtube.com/watch?v=Z7NLxpslVro	Demonstrate the importance and relevance of IPV education for healthcare providers.	5 min	In-person training session Classroom
Part 2: Didactic presentation	PowerPoint presentation, lecture-style, delivered by local IPV champion, teaching trainees how to ask women about IPV routinely in fracture clinics, how to respond to disclosures, and provide assistance to women experiencing IPV.	Educate trainees on identification and assistance for IPV and ensure trainees are knowledgeable about key resource types. Provide trainees with essential IPV knowledge such as definitions, prevalence, effects of IPV, supportive and nonjudgmental communication.	30 min	In-person training session Classroom
Part 3: Demonstration	Demonstration by local IPV champion, with standardized patient, illustrating how to engage in routine screening for IPV with patients. Demonstration may extend beyond screening to a disclosure, follow-up discussions and referrals.	Demonstrate appropriate ways of asking about IPV, providing support and assistance to women experiencing IPV.	10 min	In person training session Classroom

Part 4: Practical stations	Variety of case-based interactive opportunities for trainees to practice screening and providing support and assistance to patients experiencing IPV on a case-by-case basis. Each station to be followed by an interactive discussion about the experience. Trainees receive feedback on performance and the appropriateness of these statements from peers, IPV champions and social workers.	Practice clinical skills pertaining to IPV identification and assistance. This training was designed to help trainees achieve competency in routine IPV screening and providing assistance to patients who have experienced IPV.	1 hr (4) 15-min scenarios 8 min case→ 5 min debrief → 1 min transition	In-person training session Clinical skill-based training rooms Small group (3-4 trainees)
Part 5: Group feedback, discussion, and questions	Discussion of local IPV policies, protocols and procedures and community resources led by local hospital and community social workers. Trainees provided with an opportunity to ask questions and have a group discussion about the program content.	To consolidate learning and provide opportunities to ask questions.	15 min	In-person training session Classroom
Part 6: Online training and resources	Additional online training through the DVeducation.ca to be completed by students after the training event at their own discretion.	Provide trainees with unrestricted access to more education and resources for future practice.	Variable	Ongoing; open access

2.3.3 Learning Theory Basis

Current evidence indicates that a multi-modal educational approach results in a higher uptake and retention of knowledge.[15,16] The educational program includes various instruction methods including video, online, and in-person training, case studies and interactive discussions. The curriculum also incorporates adult learning principles (e.g., learning content within the context of realistic problems), which are fundamental to problem-based learning.[17] Research on both adult education and effective knowledge transfer suggests that interactive strategies are necessary to be successful.[18-22] The elaboration of information that occurs in small group discussions, the use of cases to match knowledge to clinical context, and the activation of prior knowledge are central to problem-based learning. [23,24] The educational program is primarily based upon Bandura's self-efficacy theory for changing behaviour, due to healthcare providers reported lack of initiative to readily discuss IPV and confidence in their abilities to assist IPV victims.[24-27] According to Bandura's social cognitive theory of self-regulation, beliefs in one's own capabilities to organize and execute the courses of action required to handle situations in the future influence how people think, feel motivated, and act.[24] Programs that incorporate strategies for increasing self-efficacy beliefs are expected to lead to behaviour change. [15,28] This theory proposes four mechanisms by which to increase self-efficacy: *performance accomplishments* (experiences of success performing the behaviour of interest), *vicarious experience* (observing peers performing the behaviour successfully), *verbal persuasion* (receiving positive feedback about ability from a respected individual), and *emotional arousal* (minimal levels of fear and anxiety during performance).[24] The mEDUCATE program incorporates these principles using supportive

small-group, case-based learning discussions, role play, and peer observation and feedback. Other studies have reported the effectiveness of programs designed for medical trainees that incorporate a combination of didactic learning, modelling, and practical application in achieving increased self-efficacy, in accordance with Bandura's self-efficacy theory.[15,28] Furthermore, results from the EDUCATE study support the efficacy of this particular IPV educational format for healthcare providers, as participants reported significant improvements in readiness to manage IPV after training.[9,13]

2.3.4 mEDUCATE Program Inaugural Delivery

mEDUCATE was introduced at an initial single undergraduate medical education institution for the purpose of this study. The program content including training material and case-based practical training scenarios can be viewed in Table 2.2. The inaugural mEDUCATE training program and study was delivered in December 2019 at the University of Calgary, Cumming School of Medicine, presented as a voluntary two-hour evening educational opportunity for medical trainees. Program activities were held within the institution's facilities and delivered by an EDUCATE-trained IPV champion alongside numerous other healthcare providers and social workers to stimulate learning from a diverse population of care providers, with the intention of identifying how best to address IPV for a variety of patient populations.

Table 2.2 Practical Training Scenarios

	Description	Learning Outcomes
Scenario 1	A 28-year-old female patient presents alone to the fracture clinic one week after sustaining a scaphoid fracture while walking to work. While the injury itself was not a result of violence, the patient is experiencing emotional abuse from her boyfriend. There are no signs necessarily of IPV, but when asked routinely about it she discloses that she has experienced emotional violence. She is hesitant to disclose the emotional violence, as she doesn't necessarily see this as violence when the doctor first inquires, until it is explained further to her. She feels safe at home and is not in immediate danger. She does accept the resources that are offered to her and is thankful for the doctor's help.	▪ Routine assessment and screen for IPV experience with a female patient ▪ Importance of validating patient experience and explaining what IPV is so that patient may understand the role in could be playing in their life ▪ Response to a disclosure ▪ Offering and patient acceptance of resources ▪ Follow-up and safety planning
Scenario 2	50-year-old female patient presents with and ulnar fracture and exhibits other signs typical of IPV. Her husband is present for the appointment and overbearing. Medical records indicate that injury was sustained from patient tripping and falling into a door. Patients' injuries were actually secondary to physical violence from her husband. If separated from her partner and	▪ Strategy to separate patient from overbearing partner ▪ Response to patient denial when IPV is suspected ▪ Navigating the offering of support to patient regardless of disclosure

	asked about IPV, no. disclosure will occur.	
Scenario 3	A 19-year-old female patient presents alone for fracture appointment. She is here to have x-rays reviewed for a fibula fracture sustained one week ago. The injury was sustained while playing soccer. No signs of IPV are existent. Routine IPV screening should occur but there will be no disclosure. She is in a healthy relationship and feels safe at all times with her partner.	▪ How to incorporate routine screening into standard assessment ▪ Emphasise importance of asking all female patients about IPV at every visit
Scenario 4	Distraught female patient presents alone to fracture clinic appointment for her one-week humerus fracture follow-up. Her physical injury patterns are consistent with common IPV-related injury. Initially says injury was caused from a fall, but when asked about IPV she discloses that her injury was sustained from her partner when he twisted her arm during an argument, and she does not feel safe in the home.	▪ Recognizing more obscure manneristic and emotional presentations of someone who may be experiencing IPV ▪ Immediate response and safety planning appropriate. For an individual who does not feel safe going home following the medical visit
Scenario 5	28-year-old male patient presents alone to clinic with ankle fracture sustained from a fall. The patient did not seek treatment for injury until two weeks after it was sustained. While his injury was not sustained from IPV, he has	▪ Addressing a male patient experiencing IPV victimization ▪ Navigating IPV disclosures or suspicions when children in the home is a factor

	been experiencing physical and emotional violence at home from his wife. In addition to the ankle fracture, the patient has noticeable contusions and cuts visible on his face that were sustained from IPV. The patient has been isolated from family and friends, belittled, and threatened that if he says anything or tries to leave the relationship, his wife will take his two young kids away.	▪ Responding to non-acceptance of offers for support and resources
Scenario 6	35-year-old female with three kids at home presents alone to clinic. Boyfriend recently moved in with the family. Patient presents alone to her follow-up appointment to have a wrist fracture assessed 2 weeks after surgery. This is the first medical visit between patient and healthcare provider. Initially she states that her injuries are a result falling down the stairs at home. In actuality, her injury was caused after her boyfriend and her got into an argument, and he pushed her down the stairs. When/ if asked about IPV, the patient discloses that her boyfriend he gets angry sometimes but insists it's not his fault. Patient confides in healthcare provider that she would like help and accepts resources offered. Patient will accept this, and resources offered.	▪ Treating an injury caused as a direct result of IPV ▪ Importance of follow-up and special attention to injury management to promote healing and prevent re-injury ▪ Patient acceptance of resources available and example of next steps in safety planning and reporting when children are in the home ▪ Healthcare provider required to inform patient of the duty to report instance to authorities since there are children in the home under 18 ▪ Emphasize importance of accurate and descriptive documentation
*Scenario descriptions are to be used as a guide for the standardized patient actors. Detailed scripts are provided to training coordinators and standardized patient actors. Scenarios may be presented in the form of a IPV champion demonstration in		

addressing IPV with the standardized patient actor and/or presented in a random order to small groups of trainees for practical training. Each training session should aim to incorporate all of the above scenarios for appropriate variety and realistic simulation of the various presentations of IPV.

2.3.5 Study Procedures

This study was approved by our local research ethics board (REB19-1954). Consistent with multi-method studies, both quantitative and qualitative methods were used to collect data within a similar timeframe, followed by staged analysis and reporting of results with an integrated discussion of the study results in Chapter Four. This chapter outlines the qualitative interpretive description design study component. Interpretive description qualitative study designs are common in medical education research, as they allow for flexibility to describe the experiences of educational program participants in their own words, while adhering to qualitative methodologies without reducing study quality.[29]

Within the cohort of medical trainees who attended the voluntary training workshop, all trainees were invited to participate in the study as a means of non-probability voluntary convenience sampling. This sampling method was chosen to enhance feasibility and to maximize enrollment from a small population of unique students who participated in this mEDUCATE program. While voluntary convenience sampling may result in of a group of subjects more invested in the topic of IPV compared with other medical trainees, this method was necessary based on the study aim of learning about program participants experiences and also ensured that medical trainees with strong opinions about the program and IPV training had the opportunity to participate and provide in depth, detailed feedback based on their experience. Informed

consent was obtained from individuals who sought to participate in the study component before commencement of the training program. Trainees who did not wish to participate in the mEDUCATE study were still welcome to participate in the training program. For qualitative study purposes, basic demographic information was collected, including age, self-reported ethnicity, years of medical training, intended speciality, and previous IPV education. Study participants were also asked to complete a "consent to contact" information form, if they agreed to being contacted for qualitative follow-up interviews at two-weeks post-training. All trainees providing consent were contacted via email by the research team to participate in follow-up interviews. Reminder emails were sent to students who did not reply after one-week, and considerable effort was made to recruit the maximum number of participants for the interview by accommodating individual availabilities.

Interview participation was explained as an intention to solicit feedback from trainees about each component of the program and explore their level of knowledge and comfort with identifying and assisting IPV victims following completion of the IPV education program. Interviews were scheduled for 60 minutes to allow sufficient time for an in-depth discussion and to more thoroughly explore areas that veered from the interview guide.

2.3.6 Participants

The IPV training program was offered to all first and second year undergraduate medical students at the Cumming School of Medicine. Twenty-two students attended the mEDUCATE training symposium. A subset of medical trainee training program attendees agreed to participate in qualitative study activities. Six trainees who provided consent to contact for mEDUCATE follow-up study activities and were available to complete participation of qualitative interviews at two-weeks post-training were interviewed. Two medical student collaborators who helped facilitate the program were also interviewed following the same methods.

2.3.7 Interview Structure

Two female research study team members with a Bachelor of Science (KD) and Doctorate of Philosophy (KL) background and qualitative research experience, conducted the interviews. These individual interviews lasted approximately 60 minutes and were held privately, in-person, at the University of Calgary.

The lead interviewer (KL) was a member of the larger research team; however, they were not involved in the development or delivery of the mEDUCATE program. Additionally, the lead interviewer was not involved in analysis of the interview data. This positioning of the lead interviewer was used as a means of reducing researcher bias and is reported here as part of the reflexive process. Interviews were reviewed for the presence of leading questions by a second researcher. An interview guide was used (Appendix C). consisting of semi-structured, open-ended questions to inform the discussion on the value of each program feature, potential redundancies or gaps in the education provided, perceived knowledge and practice transformations, and general feedback. The guide, and

the time allotted for the interviews, allowed for the exploration of new topics. Respondents answered in their own words. The interviewer used reflection, paraphrasing, clarifying, and summarizing techniques throughout the interview to review the material discussed and to provide trainees with the opportunity to clarify and add new ideas to the discussion. The interviews were digitally recorded and transcribed verbatim by a professional transcriptionist.

2.3.8 Data Analysis

The primary study objective was to explore the acceptability and value of the mEDUCATE program. This data was critically appraised to inform future modification of the program content and delivery as needed. Qualitative analysis was achieved using semi-structured interviews. Interview transcripts were analyzed using parallel deductive coding, seeking consensus between analysts to consolidate interview themes and present key findings. Interviews were coded and analyzed into themes by two individuals. These two individuals, one male and one female, were supervised by an experienced qualitative researcher. One of the analysts was involved in the mEDUCATE program development and delivery and the other one was not involved. The analysis of the interview data from each individual interview was accumulated and organized into a comprehensive summary. Data was considered in context and reviewed and recoded until theme saturation was achieved. Consensus between analysts was sought, however contrasting perspectives were thoroughly explored and recorded.

Following Braun and Clarke's approach (2006), interview analysis began with familiarization, as analysts did high-level read throughs of all interviews to establish

broad impressions and note emerging ideas.[30] Parallel coding was completed as two independent assessors coded each interview and met episodically to discuss thematic developments. New codes were added as they emerged from the data. NVivo computer software (QSR International, Chadstone, Victoria, Australia) was used for the process of coding data. Each interview was analyzed for codes in an iterative process until theme saturation was achieved. Participants consenting to contact were contacted to arrange a meeting time and met in order of availability until theme saturation was suspected. After six interviews, this was achieved and no additional attempts to schedule more interviews were made. Theme saturation was defined as the point at which no new emerging codes and subsequent themes were being deduced from the data, by either analyst, when comparing each analysts review and consolidating developed codes. Codes and both descriptive and interpretive memos (ideas and provisional theories) were reflected on by analysts. Varying interpretations were collectively reviewed, and consensus was sought between analysts to develop themes. Consistent with interpretive description, the key findings intersecting with existing knowledge were considered and major themes reported by participants were reported in relation to scope and context.

In good practice, the COREQ reporting guideline checklist for interviews has been completed and attached as Appendix G.

2.4 Results

2.4.1 Participant Demographics

Eight attendees were in their first year of medical school and 12 were in their second year. The average age of participants was 23.5 years old (SDEV = 1.5), ranging from 22-25 years old. A greater percentage of female students participated in mEDUCATE study activities [17/20 (85%)]. All qualitative interview participants were female. For context in framing results of the interview data, 80% (16/20) of trainees reported no IPV training prior to medical school. Of the four individuals who had received training, three reported one-five hours and one individual reported more than 15 hours of prior training. These four individuals reported program delivery via workshops, lectures, clinical instruction, and/or online training formats.

Regarding training received in medical schools, 95% (19/20) of trainees reported receiving less than five hours of IPV training and one individual reported receiving six-15 hours The most frequently reported format of IPV training during medical school was in the form of a lecture.

2.4.2 Perceived Program Value

All of the interview participants perceived the mEDUCATE IPV training program to be valuable. The open-ended interview questions and codes were designed to be binary and adaptive, so as not to bias positive interpretations of the data by analysts. Therefore, participant responses describing the value of the program did represent fidelity to the codes, but only positive descriptions of the overall program value were expressed by participants.

Five primary themes regarding program value were identified: 1) benefit of practical training- the practical training portion was integral to program value, 2)

confidence inspiring-training increased student comfort in difficult patient conversation engagement, 3) interprofessional collaboration- social worker presence and feedback was highly valuable to training, 4) enhanced professionalism- students identified the IPV training as enhancing their medical education, and 5) diversified education- students desire to learn about IPV from healthcare providers and patients of diverse personal and professional backgrounds (Figure 2.1).

Theme 1: Benefit of practical training

All interview participants stated that the novel practical training was the most valuable aspect of the training program. Through practical training, trainees said they learned strategies for addressing IPV with patients who are accompanied by partners or family members to their healthcare appointment. Feedback after each practical station scenario, from peers, IPV champions, and social workers was identified as being critical to learning outcomes. When asked, all participants indicated that they received sufficient practice, however additional opportunities to practice skills could be beneficial. One participant suggested, "*more practice with those types of scenarios for sure would increase like the comfort of how to ask and when to ask*." (P5) Another suggested that practicing three times would be the most beneficial.

> …if there was time for three maybe that would be good, like the first time you have no idea what's going to happen and then the second time you're taking the feedback and improving on it, then the third time would be the time when…you kind of just flow through it. (P1)

This highlights the value of the program's practical training component, compared to classical lectures. A participant emphasized this point with saying,

> …it's completely different to have a didactic lecture versus actually going in to do the questioning yourself with the scenario and standardized patients, so I think you gain a lot from it, and then you can actually put yourself in the situation and make mistakes, and then learn how to not make mistakes going forward. (P5)

Another mEDUCATE participant stated, "interacting with the patient and applying our clinical skills is very different, so these kinds of [practical training] workshops are super helpful". (P4)

Theme 2: Confidence inspiring

While the training program was aimed at increasing trainee comfort in identifying and assisting patients experiencing IPV and engaging appropriately in conversations on this sensitive topic, participants stated that their comfort level in having difficult conversations with patients on addressing a variety of topics and concerns increased. One mEDUCATE participant said the workshop,

> gave me a chance to have very difficult conversations in some of the stations… all of those different opportunities help make all of us a little bit more well-rounded and more able to pick out victims of domestic violence, but also to have difficult conversations about something else. (P1)

Participants also indicated that they were encouraged by the training and knowledge gained from the program to screen patients for IPV in their future practice. One interviewee stated, "*some parts of history are just naturally harder for us to broach, for example IPV or sexual histories but, [the workshop] showed us how natural it could be to incorporate this as part of our practice*". (P4) Another participant said, "*it's going*

to be quite useful in my future practice, even just making it a routine addition to all history taking. If it helps uncover even one new victim a year it would be useful." (P1)

Theme 3: Interprofessional collaboration

Interview participants all acknowledged the impact made by social workers in the training through dissemination of IPV knowledge and resources, sharing of their experiences, and provision of feedback to trainees on their practical performances in screening for IPV. The social worker contributions were invaluable, and participants desired more social worker involvement in future training programs. A common sentiment among participants was well summarized by

> it was really good to have [the social workers] there, not only for the practical side of things, they gave some really good feedback, but also having them there to chat about what the community teams do and… how to discreetly provide patients with information… (P5)

Primarily, the social worker contributions enhanced trainee education by providing trainees with tangible resources and assisting trainees in managing an IPV disclosure.

Theme 4: Enhanced professionalism

All interview participants affirmed that the training program enhanced the medical training they were currently receiving in their undergraduate medical education. They stated that the training challenged implicit IPV biases they previously held. One mEDUCATE participant noted the workshop was

> helpful in terms of how to actually interact with patients, especially since like sometimes we're not cognizant of the biases that we might show in our tone of voice, or the ways in which we're phrasing our [questions], or things that we believe are natural behaviors that might be off putting to someone who's experiencing abuse. (P4)

Participants specifically disclosed that their knowledge of IPV identification increased, their comfort in IPV identification increased and their knowledge in IPV assistance increased. Participants were unsure as to whether they perceived themselves as having an increased comfort in IPV assistance.

Theme 5: Diversified education value

The exposure to a variety of perspectives and IPV experts permitted trainees to engage in diverse interactions that they signified as being important to achieving program learning outcomes. Ultimately, trainees desire more education from healthcare providers of various professional backgrounds and personal demographics. Furthermore, they appreciated and desire more education aimed at addressing IPV with patients of various diverse demographic backgrounds. Participants stated that they would like to see "*male surgeons asking a patient [about IPV] … and how it would be different with [diverse] genders or religions," and "same sex couples… [including] trans or a LGBQ+ community member[s]."* (P1, P5, P6)

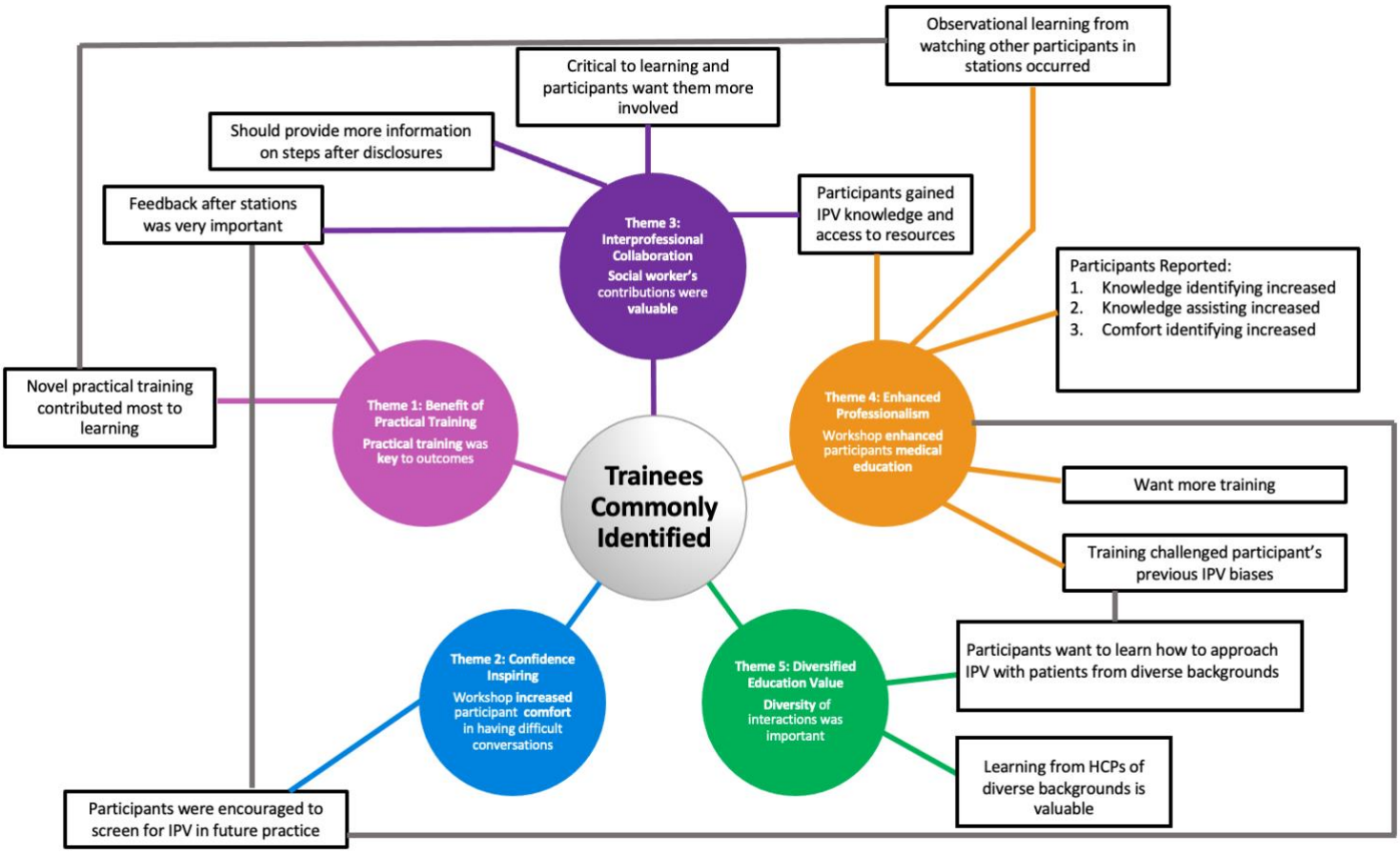

Figure 2.1 Summary of Thematic Analysis.

2.4.3 Program Feasibility

In addition to medical trainee participant interviews, two interviews were conducted with program facilitators to inform the secondary objective of exploring program feasibility in the context of barriers versus perceived value of the program. Interviews were conducted between research study team personnel and representative medical student collaborators who helped to organize the workshop. The student collaborators, who also partook in the training program, reported an overall positive experience in organizing the program within their institution and felt that the program training delivered was highly valuable. One student collaborator said, "I thought the

program was a very novel way to approach intimate partner violence, because previously we only had really the classroom setting to learn about it… I think that this approach may get way more memorable and way more valuable for the participants." The training program was identified to be most useful if implemented early in trainee's education (e.g., pre-clerkship) so that they could practice the skills learned in their subsequent clinical training. For this reason, the inaugural training event was planned to be held while the first-year students were in their orthopaedic course and the second-year students were in their psychiatry course; both areas of practice where patients touched by IPV may present. This timing of delivery may serve as a model for training integration in subsequent iterations.

The local IPV champion facilitator and student collaborators (interviewed), also identified some barriers to implementation. The program was resources intensive, program including the procurement of trained facilitators, institutional approvals, funding, training facilities, and medical trainee engagement. It was suggested that the cost of standardized patient actors could be borne by the medical school if training was incorporated into the formal medical educational curriculum, instead of being offered by interest groups as a voluntary training opportunity. The collaborator interviewees suggested that having the workshop as a voluntary evening event could create barriers to attendance and engagement from trainees. Feasible solutions to maximize attendance included incorporating the mEDUCATE training program into the curriculum within communications or clinical skills-based courses, making training mandatory, or if being held as a voluntary opportunity, having local IPV champions or medical trainee IPV advocates visit classrooms to rally attendance.

2.5 Discussion

The purpose of our study was to explore the experiences of mEDUCATE program participants through individual interviews. The program aimed to improve medical trainees' knowledge and comfort in identifying and assisting patients experiencing IPV in their future clinical practice. Overall, program completion was a positive and valued learning experience for participants. To control for potential researcher bias, interview questions were delivered as open-ended questions, interviews were reviewed for leading questions, and the lead interviewer was an independent researcher who was not directly involved with the delivery of the mEDUCATE program content to trainees or in data analysis and interpretation. Our study results support the value of mEDUCATE IPV training implementation at medical schools at an early stage of training and in a longitudinal fashion. These study results have been used to iteratively modify the mEDUCATE program, as we prepare to adapt a virtual delivery platform and to aid implementation nationally. Henceforth, additional institutions will be invited to participate in the program. Each institution will identify one or two- local IPV champions who have received, or will receive, the EDUCATE training and will be subsequently familiarized with the mEDUCATE program. They will be responsible for implementing mEDUCATE to medical trainees at their site alongside collaborators, including local community and hospital-based social workers. IPV champions may be surgeons, other allied healthcare providers, or relevant research coordinators. As part of the program, participating sites will have access to all training material and case-based practical training scenarios (Table 2.2). In addition to the aforementioned strategies of providing training to facilitators and providing detailed program content materials to increase

intervention fidelity in implementing the mEDUCATE program, we will monitor future program deliveries for comparable implementation.[31]

2.5.1 Delivery Improvements

Logistical delivery and program content modifications have been suggested by facilitators and collaborators to improve implementation of the mEDUCATE program. For successful delivery, it is strongly recommended that facilitators invite both local hospital-based and community social workers to aid in training. The hosts should also consider inviting wellness office representatives from their respective institutions as a resource and contact for any training program participants who may be disconcerted by the program contents and request social supports following the program. To encourage trainees to participate in further IPV educational opportunities, trainees should be directed during training to bookmark the DVeducation.ca website, so that they have the site and online modules saved as a future resource. Participants who are willing to provide their contact information could also be provided with an IPV resource package after the training program. To encourage program attendance by medical trainees, it is recommended that healthcare provider facilitators and engaged trainee peers promote the program through advertising during lectures, access to online training session information, and by sending video messages to the targeted trainee cohort, in order to explain learning outcomes and potential benefits of attendance. Finally, it is recommended that the program be implemented early in training, particularly pre-clerkship, and that follow-up or refresher programs are offered to trainees after the initial

program session for maximal knowledge uptake and utilization. These improvement suggestions are supported by other intimate partner violence education studies.[32]

For delivery at future sites, local facilitators will be provided with all mEDUCATE materials including a customizable IPV resource kit for incorporation of local resources. Furthermore, a didactic presentation PowerPoint (may need to add company and location after this brand name), practical training station scenarios, national resources, links to program videos, and online training will also be provided.

2.5.2 Program Content Modifications

For IPV education more representative of future practice, mEDUCATE content is being modified to include presentations by diverse healthcare provider specialists, to present a broadened view of how patients IPV present and how assistance may differ in various healthcare settings. Targeted expansion will include a focus on IPV not only in orthopaedics and trauma, but also family medicine, plastic surgery, and obstetrics and gynecology. Social workers should have greater program involvement in future deliveries, as their IPV-related expertise and resource knowledge was highly valuable to trainees' learning. Specifically, social workers will contribute to delivery of the program's didactic component, through sharing their experiences with assisting patients with IPV and disseminating information on resources available after an IPV disclosure occurs.

Considering the importance of the practical training component to students, the program has been modified to include greater time allotted to practical training. If resources allow, each program participant should have two attempts at practice with a

standardized patient in different clinical scenarios. Additionally, the suggested time allotted has been modified to include ample time after each practical training station for group debriefing and feedback.

Program participants, student collaborators and program facilitators collectively expressed a strong interest for mEDUCATE training to be integrated into formal medical education. Specific recommendations were that IPV education be introduced into second year communication courses. Random integration of a select few IPV cases into this course would be feasible and logical. It is during trainees' second year communications courses at the Cumming School of Medicine, that they are presented with more complex patient cases. To accommodate trainees request for more IPV education and practical-based training, it was recommended that mEDUCATE training spiral to include first- and second-year sequential exposure. Therefore, the program is being modified to include an introductory module, reported on in this study, followed by a secondary module, to be completed as a refresher by trainees approximately six-months to one-year after the introductory module. The secondary module will include review of IPV knowledge, but primarily focus on more practical training opportunities with expanded complexity of IPV cases. More complex cases include practice stations where safety planning, making referrals to resources, and connecting patients with social workers will be role-played.

Considering ongoing challenges to healthcare and medical education delivery during the pandemic, we anticipate the need to deliver mEDUCATE through a virtual platform. Transitioning to a virtual platform will allow the delivery of training to multiple institutions and groups at once, and the opportunity to bring together educators and collaborators nationwide. To accommodate this format, content is being modified to

include more pre-recorded video demonstrations showing healthcare providers discuss IPV with patients and respond to disclosures. For the practical training component, virtual break-out rooms would be created for small groups to participate in practical simulations. To reconcile progression towards telemedicine, the program content will include more information on resources that can be offered virtually, instead of physically distributed handouts, and information on new initiatives that have been developed since the beginning of the COVID-19 pandemic. These initiatives enable healthcare providers to address IPV discreetly with patients during virtual visits; a practice likely to become more commonplace for future physicians.[5] Initiatives include the "Signal for Help" and "Safe Word" campaigns, and digital resources for virtual-friendly IPV management like the use of safeguarded video call services and IPV referral finding web applications.[5]

2.5.3 Limitations

This study has recognized limitations. Since participation in the mEDUCATE training program was voluntary and pursued on trainees' own initiatives, mEDUCATE study participants may include trainees who were previously interested in the topic of IPV and IPV education, with previously formed opinions. However, by using voluntary convenience sampling to recruit interview participants for this study, we were able to gather a rich source of data from participants experiences partaking in the training program.[34] This form of non-probability sampling was chosen over probability sampling methods to maximize the number of program participants who could be contacted for interview participation and enroll participants more apt to provide detailed views on the program. It is also possible that participants who had strong opinions on the program (positive or negative) were more likely to agree to participate in an interview than

participants who felt neutral about the value the program; therefore, the interview data obtained may favour more polarized views of participants versus views shared by the middle ground. A small number of participants is not uncommon in qualitative studies, and in the case of this study, interviews were conducted and analyzed with all available participants and with this data we did achieve theme saturation.[35]

Trainees' previous IPV education and medical institutions' curricula likely vary nationwide and internationally.[33] While our study results evidence an increase in IPV knowledge and comfort in identifying and knowledge in assisting patients experiencing IPV, and support the IPV educational program value, the study findings cannot be extrapolated to our understanding of increased knowledge utilization and more frequent IPV identification and assistance practices performed by trainees in their future practice. A longitudinal study design would be needed to assess such practice outcomes. Future research should extend our IPV educational program to medical residents and examine study outcomes in a population of early career physicians who did or did not receive IPV education in their training.[33]

Finally, we did not explore how study participants' own personal experiences with IPV may have affected knowledge uptake and perceived program value. While this exploratory analysis could have been germane, it was ultimately decided that such personal questions may have been a deterrent for some trainees, dissuading participation in qualitative interviews.

2.6 Conclusion

Violence within intimate relationships is a global public health issue that all healthcare providers and medical trainees should be equipped to address, especially in the setting of the current COVID-19 pandemic, as IPV has increased nationwide.[5] While educational programs exist that are targeted at various specialized healthcare provider groups, there is a lack of IPV education available for medical trainees.[36] In this study, the majority of year one and two medical students had received less than five hours of IPV training in medical school. The mEDUCATE program, designed to address this gap in training, was well-received by participants, program facilitators, and collaborators. Qualitative evaluation of the mEDUCATE program evidenced its value in improving medical trainees IPV knowledge and comfort. All qualitative interview participants cited the program as valuable to their medical education. In particular, the main themes were 1) the benefit of the practical training; as students found the practical component highly conducive to improved knowledge and comfort, 2) confidence inspiring; as the training inspired the students to become involved in IPV screening in the future and increased student comfort in difficult patient conversations, 3) interprofessional collaboration; as the social workers were very valuable in delivering training and feedback, 4) enhanced professionalism; as students identified their medical education as enhanced post-training, and 5) diversified education; because students desired to learn from diverse healthcare providers about diverse patients. To implement the program, each hosting institution would ideally have trained IPV champions to deliver the program at the site and access to local community and hospital social workers to support the training program. The cost of delivering the training program, is dependent on the trainee group size and therefore the

number of standardized patient actors that need to be hired for the practical training component. This IPV educational program format will continue to be modified for virtual delivery and can be successfully implemented at multiple institutions.

2.6.1 Study Implications

The program success should be used as evidence, in aggregation with other reports, to support future development and delivery of IPV education into formal medical education.[32,37] Introduction of the mEDUCATE program has the potential to contribute to efforts to address IPV by improving the comfort and confidence of medical trainee participants. The program training may contribute to developing trainees interview skills, specifically focused on addressing IPV with patients, increase IPV knowledge and awareness, and increase trainees knowledge of local resources. The mEDUCATE program encourages increased IPV screening practices, increased promotion of healthy relationships, and normalized language around IPV, which together may contribute to medical trainees' ability to detect IPV and aid victims in practice. With more education and training on IPV across professions and stages of training, there is inherently greater IPV awareness which leads to reducing stigma.

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CHAPTER THREE: A Novel Educational Program Improves Trainee Readiness to Manage Intimate Partner Violence in the Clinical Setting: A Pretest-Posttest Study

3.1 Abstract

Background: Healthcare providers, across many specialties, consistently report a lack of knowledge and comfort in identifying and assisting patients experiencing intimate partner violence (IPV). This care gap may be due to the absence of practical educational opportunities for medical trainees to learn how to identify IPV as future physicians. The purpose of this study was to evaluate medical trainees IPV knowledge and comfort identifying and assisting IPV victims using quantitative methods following the implementation of a novel, multi-modal, IPV educational program targeted to medical trainees (mEDUCATE).

Methods: This one-group, pretest-posttest study design using quantitative methods was conducted at a single Canadian medical education institution. The validated Physician Readiness to Manage IPV Survey (PREMIS) was administered immediately pre- and post-training, then at six-weeks post-training. The *a priori* primary outcome was the mean difference (perhaps set up abbrev here like MD) in the *actual knowledge* subscale score on the PREMIS from pre-training to immediately post-training.

Results: A total of 19 participants with a mean age of 23.5 years, of which 85% were female, completed the nine PREMIS subscales relevant to medical trainees pre- and post-training. Significant improvements on the *actual knowledge* subscale immediately post-training (MD 1.68 pts, 95% CI 0.54 to 2.83; $P = 0.006$) were found. Improvements on seven additional subscales immediately post-training were also reported, including

perceived knowledge and *perceived preparation* (indicative of comfort). At six-weeks, scores had returned to pretest levels, but small participant numbers limit retention conclusions.

Conclusions: The mEDUCATE program is effective in increasing trainee knowledge and comfort addressing IPV with patients in the clinical setting. A spiral design may be needed to promote retention. These findings have been used to refine the program for widespread implementation to additional medical training programs.

3.2 Background

Intimate partner violence (IPV) is defined as harm inflicted by one's past or current partner and may consist of physical, sexual, economic, or psychological abuse.[1] In Canada, a woman is killed by her intimate partner every six days. [2] Unfortunately, in the setting of the current COVID-19 pandemic, rates of IPV perpetration and severity have increased globally.[3] Escalation of physical violence (resulting in severe injuries) remains a key risk factor for intimate partner homicide.[44] Despite this alarming finding and relevancy, healthcare providers often report challenges in asking women about IPV and assisting women they suspect may be experiencing IPV.[5-7] Recent research suggests that these challenges can be overcome with educational programs within a clinical setting.[8,9]

One in six women who present to fracture clinics have experienced IPV in the past year alone.[10] With this taken into consideration, it was identified that fracture clinics are an opportune setting to address IPV.[10] The EDUCATE program has been used for providing structured IPV education for fracture clinic staff across Canada.[8] The purpose of the EDUCATE study was to empower healthcare providers with the knowledge and

skills required to successfully identify and assist women attending a fracture clinic who have experienced IPV.[8] The EDUCATE study reported that this formalized training resulted in significant improvement of physician IPV knowledge on eight knowledge subscales of the Physician Readiness to Manage IPV Survey (PREMIS).[8] Similar educational programs may be useful to medical trainees, in order to develop competence and confidence in identifying and aiding IPV victims early in their training. The purpose of this study was to evaluate the utilization and uptake of an EDUCATE-inspired IPV educational program in a medical trainee population, mEDUCATE. We hypothesized that participants would report improvements from baseline (pre-training) to immediately post-training on the *actual knowledge* subscale of the Physician Readiness to Manage IPV Survey (PREMIS).

3.3 Methods

3.3.1 Program Content

The original EDUCATE program is a multi-modal training platform for surgeons, surgical trainees, and allied healthcare providers working in fracture clinics.[8] The mEDUCATE program, EDUCATE adapted for medical trainees, consisted of a two-hour training session. Trainees watched a short video discussing the importance of healthcare providers becoming involved in managing IPV. Program participants were then given a didactic presentation from a local IPV champion on appropriate definitions, risk factors, common presentations, screening practices, and available resources for patient referral. The IPV champion then demonstrated a case scenario, with a standardized patient actor, on a routine IPV screening in the fracture clinic setting. Following the champion

demonstration, program participants took part in practical training. They received case-based scenarios and were provided with the opportunity to practice asking about IPV and assisting patients experiencing IPV in a small group format with standardized patient actors. Each practical station included a different vignette, and the patient encounter was followed by feedback and an interactive discussion between peers, IPV champions, and social workers. The training program concluded with a large group discussion of the practical training program component, review of each resource available to the trainee for victims, and questions for the IPV champions and social workers. Additional online training through DVeducation.ca was encouraged after training at the discretion of each participant. All training materials, presentations, and case scenarios for practical training were made available to the participants. For a greater uptake and retention of knowledge, evidence supports a multi-modal approach to training .[11] Therefore, the mEDUCATE program included video, didactic lectures, demonstrations, practical training, and online resources.

3.3.2 Program Delivery

mEDUCATE is currently designed for implementation at undergraduate medical education institutions. Each institution should identify one-two local champions at their site who have received, or will take, the EDUCATE training. These individuals will be responsible for implementing the program. Champions may be surgeons, any allied healthcare providers, or research coordinators. The inaugural mEDUCATE training program and study were delivered to undergraduate medical trainees at the Cumming School of Medicine, at the University of Calgary, in December 2019. Training

participation was voluntary, and the two-hour training session was held during the early evening. Training occurred within the university's medical training facilities and was presented by a local IPV champion, with collaboration from local community and hospital-based social workers, the champion's research team, and standardized patient actors.

3.3.3 Pretest-Posttest Study Design

This study was a one-group pretest-posttest, quasi-experimental designed quantitative methods study as part of a multi-methods study design using asynchronous data collection and a staged approach to integration and reporting.[12] Adult medical trainee participants provided informed consent to participate in this study prior to the start of the training program. The participants were recruited through voluntary convenience sampling of those who attended the first mEDUCATE training program. All participants received the same training and study assessments to complete. Basic demographic information including age, ethnicity, years of medical training, intended speciality, and previous IPV education was collected for all participants (Table 3.1). The PREMIS tool, summarized in Appendix E, was administered to assess changes in medical trainees' level of readiness to assist IPV victims at three timepoints determined a priori. At the workshop, participants completed the PREMIS using pen and paper. At the six-week follow-up timepoint, participants completed an identical, but online version of the PREMIS that was distributed individually via email to all participants providing contact information. The PREMIS is a validated quantitative tool that can be used to measure the IPV knowledge of healthcare providers.[13] In a study examining the psychometric

properties of the PREMIS in a population of healthcare students, a Cronbach's Alpha demonstrating acceptable reliability was found and the tools' subscales had good correlation with other measures.[14] In the current study, the survey was completed by participants immediately pre-training, immediately post-training, and again at six-weeks post-training. The PREMIS consists of ten valid scales, nine of which are relevant to trainees including: 1) perceived preparation to manage IPV, 2) perceived knowledge of important IPV issues, 3) actual knowledge, 4) preparation, 5) legal requirements, 6) workplace issues, 7) self-efficacy, 8) alcohol/drugs, and 9) victim understanding (Appendix D).[13] The primary outcome measure for this study was the actual knowledge PREMIS subscale score change from pre-training to immediately post-training. We hypothesized that if medical trainees participated in the mEDUCATE program, they would report improvements on the actual knowledge PREMIS subscale from baseline to immediately post-training. This outcome is indictive of medical trainee confidence in perceived ability to manage IPV in the healthcare setting post-training.

3.3.4 Participants

All first year and second year undergraduate medical education students were invited to attend the mEDUCATE program. A descriptive email containing the training program details and a Google form sign-up link was sent by our medical student collaborators and the University of Calgary Undergraduate Medical Education administration. This email was sent on behalf of our team at two weeks prior and again at one day prior to the training. Training program attendance was voluntary. Each attendee received a description of the mEDUCATE study and was asked to provide their interest to

participate in the study by completing the study forms. Trainees were aware they could still attend the workshop regardless of their choice to participate in the study.

In the parent EDUCATE study, the sample size (assumed to be 110 participants needed) was based on the minimal clinically important difference (MCID) for the actual knowledge subscale of the PREMIS.[8] One-half of the subscale's standard deviation (SD) was a proxy for determining the MCID.[8] The MCID for most health-related quality of life outcome measures can be approximated by half the SD.[15] In planning the mEDUCATE study, a formal sample size calculation was not completed, which is a noted limitation, as with convenience sampling we were limited in our sample size in terms of who volunteered. However, we provide sample size estimates based on an α of 0.05 and a β of 0.10 in Table 4.1 to demonstrate our understanding of the components of effect size, alpha, beta, and power on sample size.

3.3.5 Ethics Approval

The mEDUCATE study was approved by the University of Calgary Conjoint Health Research Ethics Board prior to study implementation (REB19-1954).

3.3.6 Study Outcomes

The objective of this quantitative study was to evaluate medical trainees IPV knowledge and comfort identifying and assisting IPV victims presenting to healthcare settings after receiving the mEDUCATE IPV educational program. Specifically, we evaluated 1) medical trainees' level of comfort and knowledge about IPV, 2) medical trainees' level of readiness to assist IPV victims, and 3) medical trainees' knowledge

utilization. The primary outcome measure for this study was improvement in *actual knowledge* PREMIS subscale scores from pre-training and immediately post-training. Additional subscales, including perceived preparation and perceived knowledge are reported as secondary outcomes (i.e., comfort) and descriptive analysis of the study participants was used to define the target population who attended. Comparisons between pre-training and six-weeks post-training PREMIS scores were recorded to examine early knowledge retention.

The PREMIS is a self-administered questionnaire with 10 validated subscales including: 1) *perceived preparation* to manage IPV, 2) *perceived knowledge* of important IPV issues, 3) *actual knowledge*, 4) *preparation,* 5) *legal requirements*, 6) *workplace issues*, 7) *self-efficacy*, 8) *alcohol/drugs*, 9) *victim understanding*, and 10) *practice issues*, with each subscale being scored independently.[13] The first nine of these subscales are relevant to medical trainees; the *practice issues* subscale was not relevant to trainees and was deleted from the modified outcome instrument used in this thesis. As the scales are scored independently, the creators support the administration of the scales independently and the validity of the tool when not used in entirety.[13] Furthermore, other studies have validated use of the PREMIS in various healthcare trainee populations with the *practice issue* scale eliminated.[14] The nine subscales used were assessed for changes in score pre-training to immediate post-training and pre-training to six-weeks post-training.[14,16] PREMIS questionnaires were scored following the questionnaire developer algorithm.[13] The primary outcome, change in actual knowledge, between pre-training baseline to immediately post-training, was considered most indictive of program value. This was determined from modeling the EDUCATE study, which concluded that the *actual*

knowledge subscale was the most clinically important outcome. The PREMIS subscale score was entered as continuous variable. Mean scores and the standard deviation of the mean (SD) for each subscale for the pre-training baseline, immediately post-training, and six-weeks post-training PREMIS scores are reported (Table 3.2). Mean scores were calculated for each subscale for the PREMIS survey completed at baseline and immediately after training. A paired t-test analysis was conducted and the mean difference (MD) from baseline to immediately post-training was reported with the 95% confidence interval (CI) and p-value for each subscale.) All statistical tests were two-tailed allowing for improvement of worsening of scores and used an alpha level of 0.05. All statistical analyses were performed using R software Version 4.1.0 (usually need company, country here).

In good practice, the STROBE reporting guideline checklist for quantitative studies has been completed and attached as Appendix H.

3.4 Results

3.4.1 Participant Demographics

The medical students in the first and second year of their training at the Cumming Medical school (approximately 200 medical trainees) were invited to participate in training. Ultimately 22 trainees attended the two-hour training program of which 20 consented to participate in the mEDUCATE study. Immediate pre-training study forms were completed by 20 participants and immediate post-training study forms were completed by 19 participants; one participant left the workshop before completing the

post-test forms. Study participants were contacted at six-weeks post-training for the final PREMIS completion, in order to evaluate program material retention. The six-week PREMIS questionnaire was provided by only seven participants. Non-responders were considered as participants lost to follow-up. The mean age of study participants was 23.5 yo (SD 1.6 yo), with ages ranging from 22-25 years old. Most participants were female (n=17; 85%). Participants included eight first year and 12 second year undergraduate medical trainees. The majority had a basic sciences background (n= 14; 70%). Participants identified a range of intended specialty interests from family medicine to pediatrics and neurology. The majority of participants reported receiving none or minimal IPV training prior to medical school (no previous IPV training n=16; 80% and one-five hours IPV training n=3; 15%). While in medical school, most participants (n=19, 95%) identified receiving only one to five hours of IPV training, with the most common educational delivery having been identified as in the form of a classroom lecture (Table 3.1).

Table 3.1 Participant Characteristics

Characteristic	No. (%)
Age (years), mean ± SD	23.7 ± 1.6
Sex	
Male	3/20 (15)
Female	17/20 (85)
Race/Ethnicity	
White	8/20 (40)
Black (African/Caribbean)	1/20 (5)
Hispanic/Latino	1/20 (5)
South East Asian	1/20 (5)
Native Aboriginal	0/20 (0)
Middle Eastern	1/20 (5)
East Asian	4/20 (20)
Other	4/20 (20)
Current year of medical training	
Year 1	8/20 (40)
Year 2	12/20 (60)
Previous educational emphasis	
Basic Sciences	14/20 (70)
Social Sciences	0/20 (0)
Health Sciences	1/20 (5)
Basic Sciences + Social Sciences	2/20 (10)
Basic Sciences + Global Health	2/20 (10)

Engineering	1/20 (5)
Intended specialty	
Internal Medicine	1/20 (5)
Emergency Medicine	0/20 (0)
Family Practice	1/20 (5)
Pediatrics	2/20 (10)
Psychiatry	2/20 (10)
Surgery	3/20 (15)
Neurology	1/20 (5)
Obstetrics/gynecology	2/20 (10)
Undecided	8/20 (40)
Amount of previous IPV training, hours	
None	16/20 (80)
1-5	3/20 (15)
6-15	0/20 (0)
More than 15	1/20 (5)
Type of previous IPV training	
None	16/20 (80)
Watched a video	0/20 (0)
Attended a lecture or talk	1/20 (5)
Attended skills-based training workshop	1/20 (5)
School/classroom	0/20 (0)
School/clinical	0/20 (0)
Online training	0/20 (0)
Other (combination)	1/20 (5)
Amount of IPV training in medical school, hours	
None	0/20 (0)
1-5	19/20 (95)
6-15	1/20 (5)
More than 15	0/20 (0)
Type of IPV training in medical school	
None	0/20 (0)
Watched a video	0/20 (0)
Attended a lecture or talk	11/20 (55)
Attended skills-based training workshop	0/20 (0)
School/classroom	1/20 (5)
School/clinical	0/20 (0)
Online Training	0/20 (0)
Other (combination)	8/20 (40)

Note: IPV = intimate partner violence, SD = standard deviation.
*n = 20

3.4.2 PREMIS Scores

Table 3.2 shows the immediate and six-week post-test PREMIS change scores from baseline. Improvements on eight of nine PREMIS subscales immediately post-training were reported, including on the *actual knowledge* subscale which was the primary outcome (*actual knowledge* [MD 1.68, 95% CI 0.54 to 2.83, $P = 0.006$], *perceived preparation* [MD 1.66, 95% CI 1.25 to 2.06, $P < 0.001$], *perceived knowledge* [MD 1.63, 95% CI 1.18 to 2.06, $P < 0.001$], *preparation* [MD 1.08, 95% CI 0.36 to 1.80, $P = 0.006$], *legal*

requirements [MD 0.96, 95% CI 0.50 to 1.42, *P* < 0.001], *workplace issues* [MD 0.79, 95% CI 0.39 to 1.19, *P* < 0.001], *self-efficacy* [MD 0.55, 95% CI 0.23 to 0.88, *P* = 0.003], and *victim understanding* [MD 0.34, 95% CI 0.16 to 0.53, *P* = 0.001]). There was an increase in change scores for *alcohol/drugs* [MD 0.14, 95% CI -0.31 to 0.59, *P* = 0.53] which did not achieve statistical significance. The largest improvement in scores was on the *actual knowledge* (1.68) and *perceived preparation* (1.66) subscales immediately post-training, with the smallest change on the *alcohol/drugs subscale* (0.14)

19 participants had immediate post-training data, but only seven had six-week data, which limits the power. Regarding retention of improvements at six-weeks, the results of seven participants showed that improvement persisted in mean difference *actual knowledge* subscale (mean difference [MD] 1.00, 95% CI -0.69 to 2.69, *P* = 0.20) and on six additional subscales at six-weeks post-training (*perceived preparation* [MD 1.93, 95% CI 1.28 to 2.58, *P*<.001], *perceived knowledge* [MD 1.86, 95% CI 1.22 to 2.49, *P*<.001], *preparation* [MD 0.90, 95% CI -0.30 to 2.10, *P* = 0.11], *legal requirements* [MD 0.17, 95% CI -0.96 to 1.29, *P* = 0.72], *workplace issues* [MD 0.29, 95% CI -0.57 to 1.14, *P* = 0.41], and *alcohol/drugs* [MD 0.53, 95% CI -0.51 to 1.57, *P* = 1.00). The two subscales that reverted to pre-intervention levels or lower were *victim understanding* [MD 0.00, 95% CI -0.48 to 0.48, *P* = 1.00] and *self-efficacy* [MD -0.07 95% CI -0.79 to 0.66, *P* = 0.81].

Table 3.2 Change in scores on Physician Readiness to Manage IPV Survey subscales between pre-training baseline and immediately post-training and between pre-training baseline and six-weeks post-training. Positive mean differences indicate an improvement in scores from pre-training baseline.

Subscale *	Score, mean ± SD		Mean difference (95% CI)	p-value	Score, mean ± SD		Mean difference (95% CI)	p-value
	Baseline *n=19*	Immediately post-training *n=19*	*n=19*		Baseline *n=7*	6-weeks post-training *n=7*	*n=7*	
Actual knowledge	30.74 ± 2.42	32.42 ± 1.92	1.68 (0.54 to 2.83)	0.006	31.29 ± 2.63	32.29 ± 1.50	1.00 (-0.69 to 2.69)	0.20
Perceived preparation	3.19 ± 1.04	4.85 ± 0.83	1.66 (1.25 to 2.06)	<0.001	2.89 ± 1.10	4.82 ± 1.34	1.93 (1.28 to 2.58)	<0.001
Perceived knowledge	3.39 ± 0.98	5.02 ± 0.67	1.63 (1.18 to 2.06)	<0.001	3.16 ± 0.93	5.02 ± 1.14	1.86 (1.22 to 2.49)	<0.001
Opinion subscales								
Preparation	n=17 3.87 ± 0.71	n=17 4.95 ± 1.13	n=17 1.08 (0.36 to 1.80)	0.006	n=6 3.60 ± 0.79	n=6 4.50 ± 0.71	n=6 0.90 (-0.30 to 2.10)	0.11
Legal requirements	n=17 3.98 ± 1.32	n=17 4.94 ± 1.07	n=17 0.96 (0.50 to 1.42)	<0.001	n=6 4.22 ± 1.67	n=6 4.39 ± 2.09	n=6 0.17 (-0.96 to 1.29)	0.72
Workplace issues	n=16 3.74 ± 0.62	n=16 4.53 ± 0.83	n=16 0.79 (0.39 to 1.19)	<0.001	n=5 3.91 ± 0.84	n=5 4.20 ± 0.80	n=5 0.29 (-0.57 to 1.14)	0.41
Self-efficacy	n=16 4.19 ± 0.38	n=16 4.74 ± 0.66	n=16 0.55 (0.23 to 0.88)	0.003	n=5 4.30 ± 0.32	n=5 4.23 ± 0.32	n=5 -0.07 (-0.79 to 0.66)	0.81
Alcohol/drugs	n=17 4.18 ± 0.49	n=17 4.31 ± 0.68	n=17 0.14 (-0.31 to 0.59)	0.53	n=5 4.00 ± 0.53	n=5 4.53 ± 0.38	n=5 0.53 (-0.51 to 01.57)	0.23
Victim understanding	n=17 5.66 ± 0.50	n=17 6.00 ± 0.67	n=17 0.34 (0.16 to 0.53)	0.001	n=6 5.60 ± 0.19	n=6 5.60 ± 0.42	n=6 0.00 (-0.48 to 0.48)	1.00

Note: CI = confidence interval, SD = standard deviation of the mean.
*Ranges for subscales (range): actual knowledge (0 to 38); perceived preparation to manage IPV (1 to 7); perceived knowledge of important IPV issues (1 to 7); practice issues (0 to 58); preparation (1 to 7); legal requirements (1 to 7); workplace issues (1 to 7); self-efficacy (1 to 7); alcohol/drugs (1 to 7); and victim understanding (1 to 7).

3.5 Discussion

This study demonstrated significant immediate improvements in IPV knowledge for mEDUCATE training participants. Trainees' IPV knowledge, attitudes, and beliefs, as measured by PREMIS scores, improved from baseline to immediately post-training on all scales and at six-weeks post-training on seven of nine scales, albeit the latter analysis lacked power to refute the null hypothesis. Of the nine PREMIS subscales scores that showed improvements immediately post-training, *actual knowledge* and *perceived preparation* may have improved the most as students had gained an IPV knowledge foundation, greater comfort, and self-efficacy, consistent with (who's) theory of program design, to successfully address IPV. These improvements signify that trainees gained confidence in their ability to successfully identify and assist victims of IPV following mEDUCATE training and anticipate that in future practice they will be prepared with the tools and confidence to manage IPV. These results indicate that medical trainees feel more confident in their perceived ability to manage IPV as future healthcare providers after participating in mEDUCATE training. Considering that the medical trainees who participated in the mEDUCATE study reported minimal previous IPV training in either their pre-medical education or during medical school, this finding confirms our hypothesis.

It is presumed that the reason the participants' *alcohol/drug* scores changed the least from baseline to immediately post-training because medical trainees generally would have received prior education on the impact of drugs and alcohol on patient health. At this point in their training, it is likely they had previous practice screening for patient substance use history through mock clinical practice. If IPV screening were normalized and consistently performed in actual medical practice, as alcohol and drug screening is, medical

trainees would receive greater exposure and education in this practice. Subsequently, medical trainees would be more likely to have an increased knowledge and comfort addressing IPV with patients. IPV is arguably as important to a victim's health as alcohol and drug use and should receive as much attention in medical trainee education. Six-weeks post-training, participants' mean difference *self-efficacy* scores worsened compared to baseline while participants' mean difference victim understanding score was unchanged, cautioning over-interpretation due to small number of participants completing the six-week measure. The report of decreased self-efficacy could evidence an absence of long-term knowledge retention and therefore trainees' apparent lack of self-efficacy at managing IPV six-weeks following training. This finding underscores the need for more education, implemented at routine intervals throughout trainee's education, so that they can practice and maintain skills. Despite an increase in victim understanding knowledge immediately after the training, by six-weeks participants victim understanding scores were, on average, back to baseline scores. Compared to the results of the EDUCATE study, healthcare providers similarly reported unchanged victim understanding scores at three-months post-training.[8] Healthcare providers also reported attenuation of the *alcohol/drugs* subscale at the long-term follow-up point.[8]

The quantitative evidence of mEDUCATE program value is consistent with the qualitative mEDUCATE results and EDUCATE study findings that show IPV training for medical trainees and practicing healthcare providers increased participant knowledge and comfort with IPV.[8] mEDUCATE participants stated that the program improved their knowledge and comfort in identifying IPV and knowledge assisting with IPV. This is consistent with the quantitative results on the *actual knowledge*, *perceived preparation*,

and *self-efficacy* PREMIS subscales specifically. However, interviewed participants were divided, unsure, or unaware if the program increased their comfort in actually assisting patients to manage IPV. This was not unexpected considering that they were not yet practicing providers, therefore they had not had practical opportunities to assess their comfort beyond the practical component of the mEDUCATE program. Similarly on the quantitative outcome measure, the *practice issues* subscale of PREMIS that would associate to measuring comfort in assisting IPV patients, was not completed by participants due to irrelevance. Interview participants said that they would benefit from increased practical training, which may improve their comfort managing IPV. They also recognized the value of having the social workers and diverse healthcare provider specialties involved in the mEDUCATE program. This perceived benefit identified by participants is aligned with, and may be a reflection of, their improved scores on victim understanding, legal requirements, workplace issues, and preparation subscales immediately post-training, as all the facilitators involved had a breadth of knowledge to share.

In comparison with the EDUCATE study, the quantitative results showed that the *practice issues* subscale had the greatest score improvement from baseline to three-months post training.[8] The greatest increase in practice issue scores by healthcare providers was followed by an increase in actual knowledge PREMIS subscale scores. Improvements on these particular scales is unsurprising considering practicing healthcare providers would have had the opportunity to employ the skills they learned in training immediately after, leading to long term knowledge retention and practice utilization. Similarly, in a study of primary care healthcare providers in clinics across the United States following an IPV education intervention, at both one- and six-months post-intervention participant PREMIS

scores evidenced significant mean improvements on the preparedness subscale.[17] They also evidenced mean improvements on perceived knowledge at one-month post-intervention.[17] These findings in relation to mEDUCATE corroborate the conclusion that IPV education improves participant knowledge and preparedness to manage IPV with patients. It also underscores the importance that IPV training for medical trainees should be implemented at intervals throughout their education to refresh and reinforce IPV management skills; since they do not have the same opportunities to practice on a routine basis like practicing healthcare providers.[17] It is anticipated that to produce long-term IPV knowledge retention, like that evidenced in EDUCATE and the primary care healthcare provider study, re-visiting IPV training throughout training and career is supported.[8,17]

Our study findings support the need for medical trainee IPV educational opportunities and demonstrate the value of further integrating IPV training (mEDUCATE) into undergraduate medical trainee education. As mEDUCATE participants knowledge increased immediately post-training, revisiting the content may be beneficial for knowledge retention. This is supported by an IPV education study evidencing that orthopaedic residents who participated in an IPV education model combining classroom training, mentorship, and revisiting content was more effective in producing future IPV screening practices than in orthopaedic residents who received only classroom training.[18] Furthermore, in a study of IPV education for internal medicine residents in the United States, multi-modal education methods, like those in mEDUCATE, including a video, case-based scenarios and didactic teaching were also shown to improve participants IPV knowledge, confidence, and self-reported IPV screening behaviors.[19]

After determining the value of incorporating the mEDUCATE program into formal medical education, Kern's six-step approach to curriculum guide for medical educators to develop and change medical education curriculums to meet societal healthcare needs was reviewed.[20] The mEDUCATE program has been assessed relative to participant and facilitator feedback, and PREMIS results. Kern's approach is being used as a guide for formal medical education integration of the program according to the six-steps: 1) problem identification and general needs assessment, 2) targeted needs assessment 3) goals and objectives, 4) educational strategies 5) implementation, and 6) evaluation and feedback.[20] The final mEDUCATE curriculum developed will be presented, along with mEDUCATE study results, to undergraduate medical schools in Canada for long-term implementation into their medical education programs. Additionally, the mEDUCATE program continues to be offered as a workshop for medical trainees and is being adapted for virtual delivery and application to medical resident cohorts.

3.5.1 Limitations

Pretest-posttest study designs are often cited as an appropriate study design for educational research.[9,21] However, with this design, threats to internal validity must be evaluated. Considering that the identical PREMIS tool was administered pre-training and immediately post-training, it is possible that results are vulnerable to testing bias, wherein outcomes are subject to bias based on the fact that participants had also completed the same test prior.[21] However, for some sections there are no correct responses to the PREMIS, participants were not given an indication of desired responses, and the PREMIS is a validated outcome measure. Other concerns with a pretest-posttest study

design are history, maturation, and loss to follow-up. However, the immediate post-training posttest timepoint was chosen to mitigate these biases as no significant outside events could have taken place affecting trainees study outcomes and no significant amount of time passed that maturation or loss to follow-up of participants would be a concern. Since study participants were not vulnerable to these effects, randomization to a control and study group was not required for internal validity.[21] The study is limited by the pretest-posttest study design, which could be considered to produce inferior evidence compared to a randomized controlled study. However, the study design was based on the EDUCATE study[8] and for the assessment of educational programs, a pretest-posttest design is common and appropriate for our research aim.[21] A pretest-posttest design is conducive to all program participates receiving training and is most appropriate for measuring the primary outcome of actual IPV post-training knowledge.

Since there was no follow-up after six weeks with participants for this study, it is not possible to determine if trainees perceived increased in IPV knowledge will translate to increased future screening practices as healthcare providers, nor can we evidence long-term knowledge utilization. Though improved scores on the PREMIS tool have been evidenced to predict future IPV-related clinical behaviors of healthcare providers.[13,22] Furthermore, the mEDUCATE program design was formatted according to knowledge on the most effective educational practices leading to knowledge retention (e.g., multi-modal, and self-efficacy theory based), but it is difficult to determine if the improvements in PREMIS scores are clinically significant. A longitudinal study would be needed to specifically answer this.

Other limitations were the relatively small sample size that arose from convenience sampling, and the lack of six-week data from many participants. The information from this study can be used to inform a sample size calculation for future prospective research. Since the training was voluntarily offered and was scheduled in the evening, many eligible medical trainees at the site did not attend the training program workshop. While this limits the power of our study to report statistically significant outcomes at six-weeks post-training (n= 7), a smaller program participant group size (n=22) did enable the program facilitators to offer more practical training opportunities for each individual trainee and more in-depth feedback during the group discussions. Furthermore, the use of a pretest is useful in studies with small sample sizes, in order to allow comparisons to baseline measures and to increase statistical power.[21] Despite the small sample size, statistically significant improvements in actual and perceived medical trainee IPV knowledge, from pretest to posttest immediately following mEDUCATE training, were found. In a larger sample size, similar trends and results demonstrating the trainees improved IPV knowledge post-training would be expected. IPV knowledge six-weeks post-training should be investigated in longitudinal studies with larger sample sizes following the formal implementation of the mEDUCATE program at medical institutions. However, our existing findings are consistent with similar studies in orthopaedic surgeons (EDUCATE) and primary care physicians.[8,17] In a study of primary care healthcare providers IPV knowledge using the PREMIS after an IPV educational intervention, they also evidenced significant mean improvements in participants IPV preparation and knowledge post-intervention.[17]

This study was conducted at a single site using a multi-modal intervention. Considering this, generalizability of study results is limited to the context of implementation of the full mEDUCATE program within a medical trainee population, rather than implementation of only certain components of the program. While participants IPV *actual knowledge* increased post-training, the components of the program (i.e., the didactic presentation, or instructor demonstration, or practical training) that contributed more or less to this outcome cannot be teased from the result that the program as a whole increased IPV knowledge.[21] Additionally, trainees' previous IPV training experiences and comfort managing IPV is expected to vary across institutions,[23] limiting generalizations. However, other studies of IPV educational programs in primary care physician, and orthopaedic surgeon and resident populations reveal similar findings to the mEDUCATE program results that IPV knowledge is increased through a multi-modal education intervention approach compared to didactic teaching alone.[8,17-19]

Future research should study the outcomes of mEDUCATE program implementation at additional sites across Canada. The training could also expand to medical and surgical residents and further study could examine clinical outcomes in a population of trainees early in their career as practicing physicians who received mEDUCATE training.

3.6 Conclusion

This study demonstrates the value of the mEDUCATE IPV training program for medical trainees and the success of the program in increasing immediate trainee IPV knowledge. The mEDUCATE IPV training program incorporated a variety of learning mechanisms, importantly including practical training, which increased trainees'

knowledge and comfort in identifying and assisting patients experiencing IPV. This study provides support for the implementation of robust IPV training into medical trainee curriculums, in order to address the lack of confidence healthcare providers report in addressing this important global public health issue. By increasing knowledge through IPV training programs, medical trainees can be prepared for situations with patients experiencing IPV in future clinical practice.

There is still a paucity of research and emphasis on the importance and success of IPV education programs targeted to undergraduate medical trainees. Based on the study results and feedback from program facilitators and participants, the mEDUCATE program has been well-received and modified for implementation at more undergraduate medical education institutions across Canada. Future research should examine the success of the mEDUCATE program in a larger cohort of undergraduate medical trainees, be examined in medical and surgical resident populations, and with long-term participant follow-up, in order to assess future IPV knowledge utilization once in clinical practice.

3.7 References

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CHAPTER FOUR: CONCLUSION

4.1 Overview of Findings

The findings from Chapter Two (manuscript one) and Chapter Three (manuscript two) are presented in this section to consolidate conclusions ascertained from the research presented in this thesis. Together both manuscripts will be reviewed in the context of each other to provide interpretation and discussion of how the results of each support our overall conclusions. See section 4.2.

4.1.1 Overview of Findings From mEDUCATE Qualitative Study

Participants in the mEDUCATE IPV training workshop valued the education they received. Qualitative interview analysis showed that medical trainee participants deemed value in the program and would support medical trainees receiving the mEDUCATE training and the formal implementation of IPV education into medical school curriculum. The five major findings from consolidated qualitative analysis themes constitute:

1. The novel practical training component of the mEDUCATE program was valuable to trainee's IPV education.
2. After receiving mEDUCATE training, trainees perceived more comfort in having difficult conversations with patients.
3. Social worker program facilitators provided expertise and feedback throughout the mEDUCATE program that was highly valued by trainees.
4. mEDUCATE training program enhanced their overall medical education in unique aspects.
5. Exposure to IPV education by healthcare providers from different specialties and personal backgrounds, as well as non-healthcare provider IPV experts, incited

trainees' interest to learn more about IPV from healthcare providers and patients of varied unique personal and professional backgrounds in the future.

Areas of program improvement were proposed by participants and facilitators. Most notably, there was an outstanding interest in the inclusion of the mEDUCATE program into formal medical trainee curriculums.

Additionally, primary recommendations to improve program delivery include:

1. Inviting wellness officers from the host institution to attend the program training, as a personal resource for trainees.
2. Advise the trainees to save electronic resources shared on their digital devices and offer the option for trainees to sign up to receive information on future resources and training opportunities or provide trainees with a physical IPV resource toolkit.
3. Healthcare provider facilitators should personally promote and advertise the program to medical trainees at their institutions if the program is not made mandatory.
4. The program should be started early in their training (pre-clerkship). And offered at intervals throughout medical trainees' education.

The primary recommendations to improve program content include:

1. Ensure protected time during the practical training component for each trainee to participate in multiple (two or more) attempts at mock simulation practice.
2. Include didactic presentations by diverse healthcare provider specialists of different demographics and professional specialties (e.g., family medicine, plastic surgery, obstetrics, and gynecology).

3. Include patient perspectives by inviting patient allies who have experienced IPV to discuss their experiences.
4. Increase social worker program involvement by incorporating their IPV expertise into didactic presentations and ask them to provide digital and physical IPV referral resources directly to the trainees.

These proposals are being used to guide modifications to the mEDUCATE program with the intent of offering the program via in-person and virtual delivery formations Canada-wide.

4.1.2 Overview of Findings From mEDUCATE Quantitative Study

Participants in the mEDUCATE program reported improved IPV knowledge post-training. Quantitative PREMIS scores were used to evaluate trainees IPV knowledge, attitudes, beliefs, comfort, and practices. PREMIS scores showed mean improvements from pre-training to immediately post-training, and pre-training to six weeks post-training, on most subscales. Specifically, significant improvements on all nine relevant trainee PREMIS subscales (actual knowledge, perceived preparation, perceived knowledge, preparation, legal requirements, workplace issues, self-efficacy, alcohol/drugs, victim understanding) were reported immediately post-training. At six-weeks post-training, potentially demonstrating a degree of knowledge retention, results show that participant improvement on *actual knowledge* and on six additional subscales, save for victim *understanding* and *self-efficacy*. These six-weeks post-training change scores did not reach statistical significance but could be attributed to the small sample size at six weeks. These findings support that medical trainees are more confident in their knowledge and comfort to identify and assist patients experiencing IPV after

participating in mEDUCATE training. This supports the value of the mEDUCATE program and broad medical trainee IPV education integration.

Demographically, participants were majority female (85%). This finding may imply a sex-based bias toward IPV education and training engagement. All participants were in their first (eight participants) or second year (12 participants) of undergraduate medical school at the time of receiving training, Notably, most participants reported receiving no IPV education prior to medical school. A total of 95% reported receiving between one and five hours of IPV training during medical school. Previous IPV training was primarily delivered through didactic lectures to these participants. Didactic IPV education has been proven a relatively ineffective delivery method of education for the purpose of increasing medical trainee ability to manage IPV when delivered independently. This finding particularly supports the broad implementation of the mEDUCATE program for medical trainees as the format includes multi-modal approaches to training delivery (e.g., didactic presentations, demonstrations, practical simulations, and small-group discussions).

4.2 Assimilation of Research Findings

To fully understand and appreciate the educational needs, healthcare needs, and care gaps for improving IPV awareness and management, the results of the mEDUCATE qualitative and quantitative methods studies can be interpreted together in aggregate to strengthen our understanding of this complex subject. The mean score improvements in participants actual knowledge (reported from the pretest-posttest study) combined with the value participants contributed to the novel practical training component of the

mEDUCATE program (reported from semi-structured interviews) supports that a multi-modal IPV educational program is effective and supported by medical trainees. Essentially, we can infer that the multi-modal education delivery, that included a practical component deemed to be important to participants, was evidenced to improve participants IPV knowledge**.** Participants subjectively reported that the workshop improved their knowledge and comfort for identifying IPV. The *actual knowledge* subscale represents importance to clinical practice and participants improved scores on this subscale are indicative of improved knowledge. *Perceived preparation* and *perceived knowledge* subscale improvements, substantiate participants subjective improved comfort reports. The participant improvements on the other PREMIS subscales immediately post-training are also valuable and can be examined in combination with the other participant qualitative themes. Conversations around IPV can be challenging; therefore, the improvement in *perceived preparedness* and *self-efficacy*, shown by improved subscale PREMIS scores post-training, combined with reported improved comfort in having difficult conversations with patients from the thematic analysis further support that the practical component of the mEDUCATE program can improve confidence with these difficult conversations. In the interview analysis, the theme of the IPV workshop enhancing participants medical education was identified as all interview participants who reported that the workshop increased their knowledge in identifying IPV, knowledge assisting with IPV patient management and comfort identifying IPV; these findings are supported by the pretest-posttest PREMIS survey results where participant scores showed mean improvements on IPV knowledge and preparation immediately post-training. Additionally, interviewees commonly identified that their knowledge of IPV experience

and resources was increased post-training, which is aligned with the pretest-posttest study finding on the PREMIS survey, immediately post-training, that participants showed mean improvements on the victim understanding and self-efficacy subscales.

4.3 Strengths and Limitations

Each of the research papers presented in this thesis have strengths and limitations, summarized in this section. Strengths of the research are the in-depth analyses with individual research participants and data collection directly from local sources for virtually targeted IPV initiatives and current IPV statistics. Primary limitations are to the scope of data collection due to anonymity concerns and the sensitivity of this thesis topic, and limited generalizability due to the small study size and single institution population. Despite the individual study limitations, the strengths of interpreting the qualitative and quantitative method study results in relation to each other are that the findings of each validated the other. Therefore, a common understanding and interpretation of a phenomenon was developed.

4.3.1 Strengths and Limitations of mEDUCATE Qualitative Analysis

Participation in qualitative interviews at two weeks post-training was voluntarily pursued by mEDUCATE study participants, as opposed to random selection. It is therefore possible that the participant sample is more representative of medical trainees who had previous interest in IPV education. However, demographic data did not identify any study participants who had received a significant number of hours of IPV training. If the participant population was not representative of the general medical trainee cohort, in how they valued IPV education or mEDUCATE specifically, this would limit the study.

Conversely, a study strength is that having participants keen to discuss the program resulted in in-depth qualitative interviews between researchers and participants, that were rich in feedback.

The study had a small sample size and single-site implementation. This limits the generalizability of results to medical training institutions globally if the program were not replicated exactly and implemented in full; however, programs may need to be adapted to local context and social norms. Considering the lack of long-term follow-up in this study, conclusions about long-term knowledge retention and translation to future clinical practice are limited. Smaller sample sizes are not uncommon in qualitative studies and interviews were pursued with all consenting participants with whose data theme saturation was reached. Two analysts independently coded qualitative interview data, engaging throughout in reflexive processes, and periodically conversed to consolidate themes and findings. This data analysis method strengthens study results as the method allows for discussion of various interpretations and reduced researcher bias. Interviews were anonymous with names redacted to promote honesty and depth of responses, further strengthening the study. Each in-depth interview was conducted together by an experienced qualitative investigator and a graduate student to maintain consistency and prevent the use of leading questions. To maintain fidelity, a detailed, in-depth set of interview questions was developed in line with qualitative methodology to model the EDUCATE study while pertaining to the specific elements of the mEDUCATE program. Although overall, the interview model was semi-structured as there was the opportunity for participants to ask questions and add information. This was desired as a means of discovering unpredicted themes and new qualitative findings. Questions exploring

participants' own personal experiences with IPV, which could be of interest and could affect knowledge uptake and perceived program value outcomes, was not exploited due to consciousness of the sensitivity of such questions.

4.3.2 Strengths and Limitations of mEDUCATE Quantitative Analysis

The mEDUCATE quantitative study was a quasi-experimental single group pretest-posttest study, which by design is considered to produce less dominant evidence compared to a randomized controlled study. Participant follow-up concluded at six weeks post-training; therefore, it is not possible to determine if trainees' perceived increases in IPV knowledge will translate to increased screening practices. We are also unable to determine specifics of long-term knowledge utilization and clinical significance. A small sample size and no *a priori* power calculation for this study suggests the results do need to be interpreted with caution. A detailed description of how the study size was arrived at is given in Chapter Three based on the EDUCATE study and other health education research.[1,2]. Table 4.1 outlines the summary of possible sample sizes needed to be adequately powered to detect changes from baseline to post-training, based on a paired t-test analysis for the mEDUCATE quantitative study.

Table 4.1 Sample Size Assumptions

		Minimal clinically important difference (MCID) points			
		1	**2**	**3**	**4**
Standard deviation for change from baseline to post-training	**3**	97	26	13	9
	4	171	44	21	13
	5	265	68	32	19
	6	381	97	44	26

**Note:* $\alpha = 0.05, \beta = 0.10$

Additionally, the small sample size and single site study implementation limits the extrapolation of results beyond the initial study setting of medical trainees at the Cumming School of Medicine, especially if the program were to be implemented in a different population and/or not in full. The opportunity to analyze correlations between previous IPV training and PREMIS scores was not exploited. This analysis was limited by the small sample size and a limited range of responses to the demographic question on previous IPV training. However, all participants had received little to no previous IPV training, which strengthens the conclusion that IPV education for medical trainees is currently limited and supports the recommendation for more medical trainee targeted IPV education.

The quantitative study was strengthened by use of a validated outcome measure tool, PREMIS. Testing bias was prevented as there are no correct responses to most PREMIS subscales, and respondents were not given any indication of desired responses. The primary study strength is that the mEDUCATE program and research study were developed from the validated and nationally implemented IPV education program, EDUCATE. Results of the EDUCATE study evidenced increased healthcare provider IPV knowledge and comfort post-training; consistent with mEDUCATE quantitative results.[1] This strengthens validity of the mEDUCATE program and supports further study of the implementation of IPV programs for medical trainees in medical curriculums.

4.4 Implications

The combined findings from this research have implications for future research, clinical practice, and society. The results primarily inform the necessity of continued IPV education program development, evaluation, and implementation for healthcare providers

at every stage of training and once employed in independent practice. The findings should be utilized to guide continued modifications to the mEDUCATE program and both the design and assessment of other IPV educational programs. They also establish the need for more medical trainee IPV educational research to better understand the implications that education and training have for clinical practice and the societal implications of healthcare providers and trainees being educated on IPV.

4.4.1 Research Implications

Healthcare providers have a responsibility to engage in IPV screening and assistance, even in virtual appointments that have become more common in the context of the COVID-19 pandemic. [3] To support and promote IPV management by healthcare providers, they need to receive information on available resources. We recommend that all healthcare providers engage in mandated or self-sought IPV training. At minimum, leaders at institutions should be ensuring their healthcare providers are aware of available IPV resources and are empowered to utilize these tools. To progress research in this area, more investigation is needed on optimal knowledge delivery methods to engage healthcare providers in awareness of important IPV information and initiatives. As healthcare practices progress to include more general telemedicine care, we need to continue the dissemination of this knowledge and initiatives.[3] This basis of research evidence on healthcare providers responsibility to address IPV should also extend beyond telemedicine and pandemic practices to mobilize IPV management knowledge and training in any healthcare setting for all healthcare provider specialties. Considering the importance of this issue and screening to challenge the cycle of IPV, future research

should evaluate whether IPV screening practices increased among healthcare providers during the COVID-19 pandemic, in correlation with the increased IPV frequency and severity. Such research should examine the correlation and potential causation of increased IPV rates and screening practices among healthcare providers of varying specialties. It should investigate differences in practice between groups of healthcare providers who have received some IPV training versus healthcare providers with no previous IPV training, and importantly, between healthcare providers who were informed of virtually-targeted IPV management resources and healthcare providers who had no knowledge of these campaigns. To enhance the significance of these recommended studies, large cohorts should be enrolled, and comparative groups should be used. As this all applies to practicing healthcare providers, it also affects medical trainees, and they should be educated to become equipped with the same knowledge and resources. The mEDUCATE program was developed to accomplish the delivery of IPV education and practical training to medical trainees and was successful in this aim.

During the development of the mEDUCATE program, there was a paucity discovered in IPV educational programs targeted at North American medical trainees, and a lack of research on efficacy of existing programs for improving medical trainees' knowledge and comfort in identifying and assisting patients with IPV. The limited existing literature and studies focused on appropriateness and acceptability of IPV educational programs, rather than actual knowledge and practice outcomes. mEDUCATE reports these outcomes and validates the value of IPV education to medical trainees at the University of Calgary. The successful presentation of the mEDUCATE program to medical trainees, and mEDUCATE participants' increased knowledge and comfort

managing IPV, should be used as aggregate evidence with other studies to support permanent implementation of IPV education programs into medical student training.[4,5] The mEDUCATE program research has built the evidence-base for teaching medical trainees to address IPV early in their training by equipping trainees with IPV-related patient interview skills, increasing general IPV knowledge and awareness, and providing knowledge of local resources.

Other medical schools may incorporate IPV education in some form, however the mEDUCATE study accomplishes aims that other research in the field has not investigated. The finding that the novel multi-modal program, specifically the practical training component, was imperative to medical trainees IPV training should be further investigated in future studies if the program is implemented to a greater extent (offered more frequently or incorporates follow-up training) or is implemented in the traditional medical student curriculum and clinical training. mEDUCATE findings also have unique research implications as social workers were present during training to delivery IPV education and feedback to the medical trainees. Further research could investigate the relationship between expertise of healthcare providers and social workers in managing IPV. Our research showed the value of social workers contributing to medical trainee IPV training by educating trainees on the steps in management after a disclosure occurs and how/when to appropriately access resources provided by social workers. mEDUCATE shows the importance of having multidisciplinary IPV training, that includes realistic simulations of future practice through practical training.

In summary, our study findings have research implications in the field of medical education research and IPV management in healthcare research. Now that an educational

program targeted specifically to medical trainees has been developed and evaluated, it can be subsequently validated in other medical trainee populations including larger North American medical trainee cohorts, medical trainees training globally, and medical residents. Our research establishes a background knowledge on the importance of IPV education to medical trainees, emphasises the collective interest of medical educators, IPV victims and medical students on this issue and illuminates the need for more research and development in this field.

PREMIS was used in the mEDUCATE study and was considered an acceptable outcome measure for measuring undergraduate medical student IPV knowledge outcomes, with the deletion of the *practice issues* subscale. This measure has been validated in various healthcare provider trainee populations including amongst paramedic, nursing, dentistry, and medical students, as well as orthopaedic and family medicine residents.[6-11] For medical trainees, the *practice issues* subscale of the PREMIS consists of not-yet relevant questions pertaining to a provider's individual professional practice, to which trainees would not yet experience at this stage of their training. Since each subscale of the PREMIS is scored independently, and there is no cumulative scoring methods or evidence provided from combining subscale scores, the *practice issues* subscale can be disregarded when conducting research in medical trainee populations. Considering the PREMIS is lengthy (67-item survey), having trainees skip the *practice issues* sections speeds up data collection and reduces respondent burden. There may be value in development research to produce a modified version of the PREMIS, or in validating a tool with similar scales, to assess medical trainee knowledge outcomes after IPV training, that only includes questions relevant to trainees. While the *practice issues*

subscale is not relevant to undergraduate medical trainees and therefore our mEDUCATE study, this subscale would be appropriate for medical residents, as they have more clinical exposures. The subscale would be valuable to assess long-term knowledge retention and clinical practice implications.

4.4.2 Clinical Practice Implications

Implementing the mEDUCATE program in medical schools across North America could builds the knowledge base of our future healthcare providers to effectively address IPV. Considering that program participation successfully improved trainees' confidence in managing IPV, IPV knowledge, and awareness, if knowledge is retained, these trainees will be more likely to screen for IPV as independent practicing healthcare providers. They will also be better equipped to assist patients who disclose IPV. Even if a participant's long-term knowledge retention is minimal, participants were provided links to other supplementary educational resources, which they can conveniently access on demand, as well as links to community IPV organizations that provide referral resources for virtual access.

Through dissemination of information on virtually-targeted IPV resources for healthcare providers, education, and campaigns for managing IPV with patients in the clinical setting, we support continued IPV screening and management during the critical COVID-19 pandemic period and improvements in IPV management practices in healthcare settings henceforth.

4.4.3 Societal Implications

Our IPV education covers risk factors for IPV victimization that healthcare providers should be aware of, but also dispels the misconception that women of certain backgrounds are unlikely to experience IPV. Normalizing conversations about IPV with every woman decreases associated stigma and facilitates safe spaces for IPV disclosures. The private setting of a healthcare appointment, where healthcare providers have an ethical duty and confidentiality obligation, is particularly conducive to the creation of these spaces. By increasing healthcare provider comfort in managing IPV, patient-provider IPV conversations will become increasingly normalized, and this will reinforce routine screening. Healthcare provider self-sought and mandated IPV education and routine clinical screening practice may serve to encourage their peers to also engage in IPV training and will better prepare these individuals to address IPV with family and/or friends. More discussion on this issue serves to decrease stigma and may increase the number of IPV disclosures, both of which challenge the cycle of IPV. Furthermore, more IPV-related discussions normalize IPV language and standardizes terminology. The results of our research demonstrated that not only were medical trainees more comfortable having IPV-related discussions after receiving training, but they also expressed that they felt the training was conducive to increasing their comfort having generally difficult conversations with patients on a variety of issues. Considering the importance of communication between patients and providers, this may have beneficial implications for patient care and promote trust in providers and the healthcare system. Furthermore, these discussions between patients and providers shift the focus from a

disease-centered model of care to patient-centered care that accounts for social determinants of health.

By using education as a tool to challenge the cycle of IPV in Canada, the economic burden associated with IPV will decrease. Reducing the morbidity and mortality of IPV injury would specifically decrease the monetary, resource, time, and emotional burden on the healthcare system and healthcare providers. Incorporating IPV education in medical schools' curricula will increase the quality of education provided and the progressive standing of our Canadian institutions. An implication of this research, in conjunction with destigmatizing IPV victimization, is the promotion of healthy relationships in society between partners and in healthcare between patients and providers.

4.5 Knowledge Translation

Our team's goal is to improve IPV education and training policies, programs, and practice for medical trainees and healthcare providers. To facilitate knowledge translation and reach these goals, we employed integrated and end of study dissemination to engage all relevant stakeholders. For the duration of this thesis projects, there were ongoing discussions between mEDUCATE researchers, EDUCATE program investigators (https://www.ipveducate.com/), Cumming School of Medicine Undergraduate Medical Education directors, healthcare providers of various specialties, community and hospital-based social workers, medical student IPV awareness advocates (https://www.msaiv.org/), and community IPV organizations including Sagesse (https://www.sagesse.org/) and the Calgary Women's Emergency Shelter

(https://www.calgarywomensshelter.com/). EDUCATE researchers provided access to the training materials and guidance on the delivery and modification of the original EDUCATE program. They also helped inform the study design. Cumming School of Medicine staff helped facilitate delivery of the program, and the medical student IPV awareness advocates influenced the timing of delivery. Our IPV community partners were a part of educating some of the mEDUCATE researchers informally, and formally reviewed the program training materials. Additionally, we engaged key stakeholders from high- risk communities such as Indigenous communities, diverse groups of healthcare providers (including social work, psychiatry, primary care, and emergency care), Calgary Police Services, and local community IPV organizations programs to facilitate the optimal methods for data dissemination in this area of study. These stakeholders were initially supportive collaborators or neutral to the concept of IPV education. After discussing the value of IPV education, these stakeholders were all interested in learning more about IPV education, were supportive of the mEDUCATE project and were keen to participate as collaborators and informants in the future. They may use this knowledge in the future to advocate for healthcare providers and trainees to receive more IPV education.

To provide healthcare providers in Alberta with IPV education and to circulate knowledge on best IPV practices and resources available to manage IPV in healthcare, University of Calgary IPV researcher and champions, led by KD and PS, delivered the EDUCATE program to healthcare providers at a workshop in Edmonton, AB. The workshop was held June 2019 at the University of Alberta Hospital. This session was formatted to include local resource information. Knowledge of our teams current IPV

initiatives were successfully promulgated to the attending healthcare providers and new research collaborations, beyond the University of Calgary, were formed. To disseminate knowledge on the mEDUCATE study, qualitative results were presented as a virtual poster talk at the O'Brien Institute 2021 Health & Medical Education Scholarship symposium. mEDUCATE qualitative results were also presented virtually at the Ontario Student Medical Education Research Conference (OSMERC) in March 2021, and this abstract was published in the McGill Journal of Medicine (https://mjm.mcgill.ca/article/view/874/633//). The combined qualitative and quantitative mEDUCATE study results were presented virtually as a poster at the Canadian Orthopaedic Association 2021 COA/CORS/CORA Annual Meeting. An abstract on the final combined research findings of mEDUCATE was submitted and is pending acceptance for a presentation at the Canadian Public Health Association 2021 meeting. A similar multi-method, combined results mEDUCATE abstract is being prepared for submission to the Orthopaedic Research Society 2022 Annual Meeting. These presentations procured knowledge translation to medical students and healthcare providers across North America of diverse specialties, but primarily to an audience of orthopaedic and trauma healthcare providers, researchers, medical education professionals and the IPV scientific community.

My thesis supervisor (PS) has encouraged our research team and study collaborators to participate in IPV champion training opportunities over the course of the research studies in this thesis. KD arranged for the orthopaedic trauma research team at the University of Calgary to join her in participating in REALTalk (https://realtalk.sagesse.org/) training, the Take a Stand

(https://www.calgarywomensshelter.com/index.php/shelter-programs/take-a-stand) initiative in early 2021, and the Turning Points Gala fundraiser in 2021. These training resources and events are available to the public and healthcare providers. The mEDUCATE team has been active in supporting these initiatives through participation and bringing public and peer awareness to the programs.

The group of IPV champions who initially facilitated the mEDUCATE program and research on virtually targeted initiatives were all familiarized with the EDUCATE program. As champions, they continue to train other researchers and healthcare providers on IPV management. These individuals will train future mEDUCATE program facilitators at each additional program site for successful implementation. All mEDUCATE program materials including program overview, videos, presentations, and case scenarios have been consolidated into a guide for program implementation at future sites. The training and guides for facilitators will enable widespread implementation of the mEDUCATE program in the 2021/2022 academic year and henceforth.

4.6 Future Directions

For broader research, clinical and societal implications, more IPV education research on medical trainee and virtually-targeted programs are essential. Educational programs are available for practicing healthcare providers in North America to participate in, although they are limited, and healthcare providers may not be aware of these programs or the importance of educating themselves on IPV. Bringing awareness of these programs and IPV resources to healthcare providers is necessary, especially during the COVID-19 pandemic, as isolation increased. Academic papers like “Health care

practitioners' responsibility to address intimate partner violence related to the COVID-19 pandemic" bring awareness to the importance of healthcare providers managing IPV with their patients; however, more knowledge translation needs to be prioritized by the healthcare system, individual health organizations, direct employers, and healthcare provider peers to individual healthcare providers, in addition to the awareness campaigns that community IPV organizations impel.[3]

Considering that most healthcare provider IPV educational programs available in North America are limited to specific specialty audiences, we can advance our IPV management practices in healthcare by educating all medical trainees, regardless of intended specialty, in best IPV practices. There is a lack of IPV training programs available to medical trainees. The development of mEDUCATE addresses this healthcare gap. More research needs to be conducted on generalizability of this program to medical trainees across North America. The program should also be continually evaluated and modified to incorporate recent resources and statistics and present the most effective training platform for increased knowledge and comfort identifying and assisting patients with IPV post-training. Future research should also include a long-term study of IPV training program participants' knowledge utilization and retention by collecting outcomes from training through to independent practice

The primary audience for the mEDUCATE program is undergraduate medical trainees, training at North American medical schools. In the future, our findings support the implementation of mEDUCATE at more undergraduate medical training institutions across North America. The mEDUCATE program should be expanded to delivery in French and Spanish. It should also be validated in resident populations, across various

medical specialties, initially targeting family medicine and orthopaedic trauma residency training programs. mEDUCATE was initially implemented at the University of Calgary, Cumming School of Medicine. The next targets for medical trainee implementation are the McMaster University, Michael G. Degroote School of Medicine and the University of Alberta, Faculty of Medicine & Dentistry. Ideally the program will then be scaled to all Canadian medical schools.

Following the mEDUCATE study protocol, the program is being iteratively modified based on evaluations from program participants and facilitators. Program adaptations include allotting a greater program time to the practical component so that feedback after each station can be longer and trainees can be exposed to more practice simulations. With additional time dedicated to practical training, more simulation patient cases can be added. New cases will be diversified to include patients from visible minorities, same-sex relationships, and First Nation populations.

Although evidence shows the majority of IPV victims in Canada are female, the program recognizes that males are also victims of IPV. [12,13] We have therefore included a patient case involving male IPV victimization for medical trainees to explore. Research on male experiences with IPV and screening in the healthcare system for male victimization and perpetration is currently being investigated by the team of researchers involved in the mEDUCATE study. Emerging evidence will be used to modify the program to include best practices on identifying and assisting males experiencing IPV. Additionally, as care delivery continues to evolve, telehealth simulations will be added to educate trainees on virtual IPV campaigns like “SafeWord” which are particularly useful during the COVID-19 pandemic. The mEDUCATE program should be amended

annually to ensure recency of IPV concepts and resources provided, and training on the current best IPV management practices.

In addition to content modifications, the mEDUCATE program delivery is also being modified to include a virtual delivery platform that still permits a multi-modal educational approach and the incorporation of the valuable practical simulations. A virtual platform will allow for expanded implementation and implementation on an annual basis regardless of restrictive circumstances like the COVID-19 pandemic.

It is recommended based on our study findings that IPV training programs be implemented consistently and repeatedly throughout medical trainee education. Medical schools, researchers, and IPV champions should collaborate to incorporate the mEDUCATE program or another validated IPV training program, into their curriculum. In addition, or as an alternative to curriculum incorporation, schools should offer the program as an additional training workshop each year to all medical trainees. To advance this initiative, the mEDUCATE team plans to engage the Canadian Medical Association, the Royal College of Physicians and Surgeons of Canada, and individual Canadian medical schools to broaden the mEDUCATE program to a national IPV training program. The program could then be expanded to medical and surgical residency training programs for trainees to experience repeated exposure.

4.7 References

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APPENDICES

Appendix A: EDUCATE Program Overview

Table 1: EDUCATE program content

Component	Content	Purpose	Time	Setting
1	A video presentation about the importance of orthopedic surgeons and other HCPs becoming involved in IPV identification and assistance. The video also introduced the IPV education program. The video is available through https://www.youtube.com/watch?v=Z7NLxpslVro	• Obtain buy-in from the orthopedic community and convince them of the importance of investing time and resources in the IPV education program • Inform trainees about what they could expect to receive from the IPV education program	3 min	Viewed individually at participants' convenience or as part of the in-person training session, depending on the champion's preference
2	Three interactive online modules that are part of the series entitled "Responding to Domestic Violence in Clinical Settings" available through dveducation.ca.[22] The modules focus on conveying background knowledge (e.g., definitions, prevalence, dynamics of abusive relationships, barriers to leaving an abusive relationship), as well as clinical skills pertaining to IPV identification and assistance. This training was designed to help trainees achieve competency in identifying and providing assistance to women who have experienced IPV.	• Provide trainees with core IPV knowledge such as definitions, prevalence, effects of IPV, supportive and nonjudgmental communication • Demonstrate appropriate ways of asking women about IPV experiences • Provide interactive opportunities for trainees to select from a variety of statements asking women about IPV and to receive feedback on the appropriateness of these statements • Demonstrate appropriate ways of providing support and assistance to women experiencing IPV • Provide interactive opportunities for trainees to select from a variety of statements providing support and assistance to women experiencing IPV and to receive feedback on the appropriateness of these statements	Approx. 1 h	Viewed individually at participant's convenience or as part of the in-person training session, depending on the champion's preference
3	The local IPV champion(s) delivered an in-person PowerPoint presentation that included a lecture explaining how to ask women about IPV in the fracture clinic and provide assistance to women experiencing IPV. This presentation included 2 videos demonstrating IPV identification and assistance within a health care setting, as well as 4 case-based scenarios. Champions were provided with mock cases but were encouraged to discuss real-life cases from their practice, if possible. Trainees were given a chance to role play and discuss how they would respond to these cases in their practice. The presentation concluded with a discussion of local IPV policies, protocols and procedures and community resources. Trainees were then provided with an opportunity to ask questions and have a group discussion about the training content.	• To consolidate learning from the video and online training and provide trainees with an opportunity to ask questions about any previous aspects of training that were not clear • To provide training about how to identify, and provide assistance for, IPV • To provide trainees with an opportunity to practise asking about, and providing assistance with, IPV • To ensure trainees are knowledgeable about key local resources • To consolidate learning through interactive discussion and opportunities to ask questions	Approx. 1 h	In-person group training session led by champion
Ongoing	Local IPV champions received bimonthly training updates from the Methods Centre (McMaster University). Local IPV champions were responsible for distributing these updates to trainees (e.g., through presentations at rounds, training meetings, and email).			

Note: HCP = health care provider, IPV = intimate partner violence.

Appendix B: EDUCATE and mEDUCATE Content Comparison

	EDUCATE*	mEDUCATE
Year First Implemented	2016	2019
Site(s)	Seven North American Fracture Clinics	University of Calgary Cumming School of Medicine
Facilitators	EDUCATE IPV champions (received prior IPV training)	o One local EDUCATE trained IPV champion (orthopaedic surgeon) o Two IPV researchers o Two Cumming School of Medicine student collaborators o Several Foothills Medical Centre healthcare providers (nurses and social workers) o Several local community social workers
Target Population	Orthopaedic healthcare providers - Surgeons - Surgical trainees - Nurses - Cast technicians - Administrative staff	Medical trainees - Undergraduate
Length	2 hours Additional access to training resources online	3 hours Additional access to training resources online
Goal	Provide orthopaedic healthcare providers working in fracture clinics with the comfort, knowledge, and skills to appropriately identify and assist women experiencing IPV	Improve medical trainees' knowledge and comfort in identifying and assisting individuals experiencing IPV when presenting to a healthcare setting

Components	1- Introductory video on the importance of IPV education for healthcare providers 2- Interactive online modules for completion at own pace 3- In-person presentation by a local IPV champion	1- Introductory video on the importance of IPV education for healthcare providers 2- In-person presentation by a local IPV champion + demonstration 3- Practical small group training + feedback 4- Interactive online modules for reference + additional online trainee resources
Assessments	- **Quantitative:** pretest-posttest Physician Readiness to Manage IPV Survey (PREMIS) scores on 10 subscales - **Qualitative:** semi-structured participant and facilitator interviews	- **Quantitative:** pretest-posttest Physician Readiness to Manage IPV Survey (PREMIS) scores on 9 subscales - **Qualitative:** semi-structured participant and facilitator interviews
Follow-up	**Timepoint 1 (Quantitative):** Immediately pre-training **Timepoint 2 (Quantitative):** Immediately post-training **Timepoint 3 (Qualitative):** participant and facilitator interviews at 1-105 days post-training **Timepoint 4 (Quantitative):** 3-months post-training	**Timepoint 1 (Quantitative):** Immediately pre-training PREMIS **Timepoint 2 (Quantitative):** Immediately post-training PREMIS **Timepoint 3 (Qualitative):** 2-week post-training interviews **Timepoint 4 (Quantitative):** 6-week post-training PREMIS
Primary Outcome	Change on actual knowledge subscale of PREMIS from baseline to 3 months post-training	Change on actual knowledge subscale of PREMIS from baseline to immediately post-training
Results	Found: - Significant improvement on the actual knowledge subscale at 3 months	Found: - Statistically significant improvements on the actual knowledge subscale immediately post-training

	post-training (MD 2.44, 95% CI 1.79 to 3.09) - Statistically significant improvements on 7 additional subscales at 3 months post-training (all other scales excluding alcohol/drugs and victim understanding) - Statistically significant improvements on all 10 subscales immediately post-training Facilitators and participants described positive experiences in completion of the program Suggestions for improvement were used to modify the program and resources, now available at www.IPVeducate.com	[MD 1.68, 95% CI 0.54 to 2.83, P = 0.006] - Statistically significant improvements immediately post-training on 7 additional subscales, excluding alcohol/drugs (improvement; not statistical significance) - Significant improvements on 7 of 9 subscales at 6-weeks post-training excluding victim understanding and alcohol/drugs Facilitators and participants described positive experiences in completion of the program - Novel practical training component most valuable - Social worker involvement in delivery was integral to learning outcomes - Increased comfort in trainees having difficult patient conversations - Enhanced medical education - Want to learn from diverse groups of healthcare providers Suggestions for improvement are being used to modify the program for delivery to other medical training institutions

***References for EDUCATE content**

1. The EDUCATE Investigators. Novel educational program improves readiness to manage intimate partner violence within the fracture clinic: a pretest–posttest study. CMAJ Open. 2018;6(4).

2. Sprague S, The EDUCATE Investigators. A Qualitative Evaluation of the Implementation of an Intimate Partner Violence Education Program in Fracture Clinics. Journal of Family Violence. 2019;34(7):621–30.

Appendix C: mEDUCATE Interview Guide

Medical Student Participant Interview Guide

The interviewer will introduce himself/herself and thank the participant for agreeing to participate in the interview.

1. *How did you find the educational program?*
    - What was interesting about it?
    - Did it capture your attention?
    - Was there anything that was boring?
    - What was helpful about it?
    - Was there anything that prevented it from being helpful?
    - Did it take too much or too little time to complete?
    - Did it contain too much or too little detail?
    - What changes could be made to improve the program?
2. *How did you find the video component of the educational program?*
    - What was interesting about it?
    - Did it capture your attention?
    - Was there anything that was boring?
    - What was helpful about it?
    - Was there anything that prevented it from being helpful?
    - Was the length too long or too short?
    - Did it contain too much or too little detail?
    - What changes could be made to improve the video?
3. *How did you find the in-person/presentation component of the educational program?*
    - What was interesting about them?
    - Did they capture your attention?
    - Was there anything that was boring?
    - What was helpful about them?
    - Was there anything that prevented them from being helpful?
    - Did they take too much or too little time to complete?
    - Did they contain too much or too little detail?
    - What changes could be made to improve the online modules?
4. *How did you find the practical training component of the educational program?*
    - What was interesting about it?
    - Did it capture your attention?
    - Was there anything that was boring?
    - What was helpful about it?
    - Was there anything that prevented it from being helpful?
    - Was the length too long or too short?
    - Did it contain too much or too little detail?
    - What changes could be made to improve the in-person training presentation?
5. *How did you find the IPVeducate.com website?*
    - Did you use the website?

- What did you use it for?
- Did you find the website helpful?
- What was most helpful about it?
- What was the least helpful about it?
- Did you find the website easy or difficult to use?
- What could be done to improve the website?
- Do you think this website will be a useful resource for you in the future?

6. *How has the educational program changed your knowledge about identifying women experiencing intimate partner violence?*
    - What aspects of the training were most helpful in increasing your knowledge?
    - What aspects did you find the least helpful?
    - What changes could be to improve the educational program's ability to increase knowledge?
7. *How has the educational program changed your comfort in identifying women experiencing intimate partner violence?*
    - What aspects of the training were most helpful in increasing your comfort?
    - What aspects did you find the least helpful?
    - What changes could be made to improve the educational program's ability to increase comfort?
8. *How has the educational program changed your knowledge about assisting women experiencing intimate partner violence?*
    - What aspects of the training were most helpful in increasing your knowledge?
    - What aspects did you find the least helpful?
    - What changes could be to improve the educational program's ability to increase knowledge?
9. *How has the educational program changed your comfort in assisting women experiencing intimate partner violence?*
    - What aspects of the training were most helpful in increasing your comfort?
    - What aspects did you find the least helpful?
    - What changes could be made to improve the educational program's ability to increase comfort?
10. *How has this training enhanced your medical education?*
    - Will this training be useful for your future practice?
    - Should this training be mandatory for all medical students?
    - How could this training be better implemented into your medical curriculum?
11. *Do you have any additional feedback or anything else you would like to share?*

Appendix D: Physician Readiness to Manage IPV Survey (PREMIS)

Accessed: http://www.futureswithoutviolence.org/userfiles/file/HealthCare/AJPM%20-Short+Toolkit.pdf

Participant number: ☐☐--☐☐☐☐

Appendix 3: Physician Readiness to Manage IPV Survey (PREMIS)

Background

1. Please circle the number which best describes how prepared you feel to perform the following:
(1 = Not prepared; 2 = Minimally; 3 = Slightly; 4 = Moderately; 5= Fairly well; 6 = Well; 7 = Quite well prepared)

	Not Prepared						*Quite Well Prepared*
a. Ask appropriate questions about IPV	1	2	3	4	5	6	7
b. Appropriately respond to disclosures of abuse	1	2	3	4	5	6	7
c. Identify IPV indicators based on patient history and physical examination	1	2	3	4	5	6	7
d. Assess an IPV victims' readiness to change	1	2	3	4	5	6	7
e. Help an IPV victim assess his/her danger of lethality	1	2	3	4	5	6	7
f. Conduct a safety assessment for the victim's children	1	2	3	4	5	6	7
g. Help an IPV victim create a safety plan	1	2	3	4	5	6	7
h. Document IPV history and physical examination findings in a patient's chart	1	2	3	4	5	6	7
i. Make appropriate referrals for IPV	1	2	3	4	5	6	7
j. Fulfill legal reporting requirements for:							
– IPV	1	2	3	4	5	6	7
– Child abuse	1	2	3	4	5	6	7
– Elder abuse	1	2	3	4	5	6	7

2. How much do you feel you know about:
(1 = Nothing; 2 = Very little; 3 = A little; 4 = A moderate amount; 5= A fair amount; 6 = Quite a bit; 7 = Very much)

	Nothing						*Very Much*
a. Your legal reporting requirements for:							
– IPV	1	2	3	4	5	6	7
– Child abuse	1	2	3	4	5	6	7
– Elder abuse	1	2	3	4	5	6	7
b. Signs or symptoms of IPV	1	2	3	4	5	6	7
c. How to document IPV in a patient's chart	1	2	3	4	5	6	7
d. Referral sources for IPV victims	1	2	3	4	5	6	7
e. Perpetrators of IPV	1	2	3	4	5	6	7
f. Relationship between IPV and pregnancy	1	2	3	4	5	6	7
g. Recognizing the childhood effects of witnessing IPV	1	2	3	4	5	6	7
h. What questions to ask to identify IPV	1	2	3	4	5	6	7
i. Why a victim might not disclose IPV	1	2	3	4	5	6	7
j. Your role in detecting IPV	1	2	3	4	5	6	7
k. What to say and not to say in IPV situations with a patient	1	2	3	4	5	6	7
l. Determining danger for a patient experiencing IPV	1	2	3	4	5	6	7
m. Developing a safety plan with an IPV victim	1	2	3	4	5	6	7
n. The stages an IPV victim experiences in understanding and changing his/her situation	1	2	3	4	5	6	7

Participant number: ☐☐--☐☐☐☐

IPV Knowledge. Check one answer per item, unless noted otherwise.

1. What is the strongest single risk factor for becoming a victim of intimate partner violence?
   - [ ] Age (< 30 yrs)
   - [ ] Partner abuses alcohol/drugs
   - [ ] Gender – female
   - [ ] Family history of abuse
   - [ ] Don't know

2. Which one of the following is generally true about batterers?
   - [ ] They have trouble controlling their anger
   - [ ] They use violence as a means of controlling their partners
   - [ ] They are violent because they drink or use drugs
   - [ ] They pick fights with anyone

3. Which of the following are warning signs that a patient may have been abused by his/her partner? (*Check all that apply)*
   - [ ] Chronic unexplained pain
   - [ ] Anxiety
   - [ ] Substance abuse
   - [ ] Frequent injuries
   - [ ] Depression

4. Which of the following are reasons an IPV victim may not be able to leave a violent relationship? (*Check all that apply)*
   - [ ] Fear of retribution
   - [ ] Financial dependence on the perpetrator
   - [ ] Religious beliefs
   - [ ] Children's needs
   - [ ] Love for one's partner
   - [ ] Isolation

5. Which of the following are the most appropriate ways to ask a patient about IPV? (*Check all that apply)*
   - [ ] "Are you a victim of intimate partner violence?"
   - [ ] "Has your partner ever hurt or threatened you?"
   - [ ] "Have you ever been afraid of your partner?"
   - [ ] "Has your partner ever hit or hurt you?"

6. Which of the following is generally true? (*Check all that apply)*
   - [ ] There are common, non-injury presentations of abused patients
   - [ ] There are behavioural patterns in couples that may indicate IPV
   - [ ] Specific areas of the body are most often targeted in IPV cases
   - [ ] There are common injury patterns that are associated with IPV
   - [ ] Injuries in different stages of recovery may indicate abuse

Participant number: ☐☐--☐☐☐☐

OPINIONS

For each of the following statements, please indicate your response on the scale from "Strongly Disagree" (1) to "Strongly Agree" (7).

Statements	*Strongly Disagree*		*Disagree*		*Agree*		*Strongly Agree*
1. If an IPV victim does not acknowledge the abuse, there is very little that I can do to help.	1	2	3	4	5	6	7
2. I ask all new patients about abuse in their relationships.	1	2	3	4	5	6	7
3. My workplace encourages me to respond to IPV.	1	2	3	4	5	6	7
4. I can make appropriate referrals to services within the community for IPV victims.	1	2	3	4	5	6	7
5. I am capable of identifying IPV without asking my patient about it.	1	2	3	4	5	6	7
6. I do not have sufficient training to assist individuals in addressing situations of IPV.	1	2	3	4	5	6	7
7. Patients who abuse alcohol or other drugs are likely to have a history of IPV.	1	2	3	4	5	6	7
8. I feel comfortable discussing IPV with my patients.	1	2	3	4	5	6	7
9. I don't have the necessary skills to discuss abuse with an IPV victim who is:							
a. Female	1	2	3	4	5	6	7
b. Male	1	2	3	4	5	6	7
c. From a different culture/ethnic background	1	2	3	4	5	6	7
10. If victims of abuse remain in the relationship after repeated episodes of violence, they must accept responsibility for that violence.	1	2	3	4	5	6	7
11. I am aware of legal requirements regarding reporting of suspected cases of:							
a. IPV	1	2	3	4	5	6	7
b. Child abuse	1	2	3	4	5	6	7
c. Elder abuse	1	2	3	4	5	6	7
12. I am able to gather the necessary information to identify IPV as the underlying cause of patient illnesses (e.g. depression, migraines).	1	2	3	4	5	6	7
13. If a patient refuses to discuss the abuse, staff can only treat the patient's injuries.	1	2	3	4	5	6	7
14. Victims of abuse could leave the relationship if they wanted to.	1	2	3	4	5	6	7
15. Health care providers have a responsibility to ask all patients about IPV.	1	2	3	4	5	6	7
16. My practice setting allows me adequate time to respond to victims of IPV.	1	2	3	4	5	6	7
17. I have contacted services within the community to establish referrals for IPV victims.	1	2	3	4	5	6	7
18. Alcohol abuse is a leading cause of IPV.	1	2	3	4	5	6	7
19. Screening for IPV is likely to offend those who are screened.	1	2	3	4	5	6	7
20. There is adequate private space for me to provide care for victims of IPV.	1	2	3	4	5	6	7
21. I am able to gather the necessary information to identify IPV as the underlying cause of patient injuries (e.g., bruises, fractures, etc.).	1	2	3	4	5	6	7
22. Women who choose to step out of traditional roles are a major cause of IPV.	1	2	3	4	5	6	7
23. Health care providers do not have the knowledge to assist patients in addressing IPV.	1	2	3	4	5	6	7
24. I can match therapeutic interventions to an IPV patient's readiness to change.	1	2	3	4	5	6	7
25. Use of alcohol or other drugs is related to IPV victimization	1	2	3	4	5	6	7
26. I can recognize victims of IPV by the way they behave.	1	2	3	4	5	6	7

Participant number: ☐☐--☐☐☐☐

Practice Issues

1. How many *new diagnoses* (picked up an acute case, uncovered ongoing abuse, or had a patient disclose a past history) of IPV would you estimate you have made in the last 6 months?
   - [ ] None
   - [ ] 1-5
   - [ ] 6-10
   - [ ] 11-20
   - [ ] 21 or more

2. Check the situations listed below in which you currently screen for IPV: *("screening" means asking about IPV in the absence of specific statements by the patient disclosing IPV; check all that apply)*
   - [ ] I do not currently screen
   - [ ] I screen *all* new patients
   - [ ] I screen *all* new female patients
   - [ ] I screen *all* patients with abuse indicators on history or exam
   - [ ] I screen *all* female patients at the time of their annual exam
   - [ ] I screen *all* pregnant patients at specific times of their pregnancy
   - [ ] I screen *all* patients periodical
   - [ ] I screen *all* female patients periodically
   - [ ] I screen certain patient categories only (check below)
     - [ ] Teenagers
     - [ ] Young adult women (under 30 years old)
     - [ ] Elderly women (over 65 years old)
     - [ ] Single or divorced women
     - [ ] Married women
     - [ ] Women with alcohol or other substance abuse
     - [ ] Single mothers
     - [ ] Black or Hispanic women
     - [ ] Immigrant women
     - [ ] Lesbian women
     - [ ] Homosexual men
     - [ ] Depressed/suicidal women
     - [ ] Pregnant women
     - [ ] Mothers of all my pediatric patients (if applicable)
     - [ ] Mothers of paediatric patients who show signs of witnessing IPV
     - [ ] Mothers of children with confirmed or suspected child abuse, neglect
     - [ ] Other, please specify: _____

3. How often in the past 6 months have you asked about the possibility of IPV when seeing patients with the following:

	Never	*Seldom*	*Sometimes*	*Nearly Always*	*Always*	*N/A*
a. Injuries	1	2	3	4	5	6
b. Chronic pelvic pain	1	2	3	4	5	6
c. Irritable bowel syndrome	1	2	3	4	5	6
d. Headaches	1	2	3	4	5	6
e. Depression/anxiety	1	2	3	4	5	6
f. Hypertension	1	2	3	4	5	6
g. Eating disorders	1	2	3	4	5	6

Participant number: ☐☐--☐☐☐☐

4. In the past 6 months, which of the following actions have you taken when you identified IPV? *(Check all that apply)*
   - [ ] Have not identified IPV in past 6 months
   - [ ] Provided information (phone numbers, pamphlets, other information) to patient
   - [ ] Counseled patient about options she/he may have
   - [ ] Conducted a safety assessment for the victim
   - [ ] Conducted a safety assessment for victim's children
   - [ ] Helped patient develop a personal safety plan
   - [ ] Referred patient to:
     - [ ] Individual therapy
     - [ ] Couples therapy
     - [ ] Child therapy/support group
     - [ ] On-site social worker/advocate
     - [ ] Battered women's program/shelter
     - [ ] Alcohol/substance abuse counselling
     - [ ] Local DV/IPV hotline
     - [ ] Child protective services
     - [ ] Legal advocate/victim witness advocate
     - [ ] Batterers' treatment program
     - [ ] Religious leader/organization
     - [ ] Battered women's support group
     - [ ] National DV/IPV hotline
     - [ ] Lesbian/gay/transgender/bisexual support group
     - [ ] Police, sheriff, or other local law enforcement
     - [ ] Housing, educational, job, or financial assistance
     - [ ] Other referral (describe): _____
     - [ ] Other action (describe): _____

5. Is there a protocol for dealing with adult IPV at your clinic/practice? *(Check one)*
   - [ ] Yes, and widely used
   - [ ] Yes, and used to some extent
   - [ ] Yes, but not used
   - [ ] No
   - [ ] Unsure
   - [ ] Not applicable to my patient population

6. Are you familiar with your institution's policies regarding screening and management of IPV victims?
   [ ] Yes [ ] No [ ] N/A

7. Is a camera available at your work site for photographing IPV victims' injuries?
   - [ ] Yes - - Type: [ ] Polaroid or other instant camera, [ ] Digital, [ ] Other: _____
   - [ ] No
   - [ ] Unsure
   - [ ] Not applicable to my patient population

8. Do you practice in a province where it is legally mandated to report IPV cases involving competent (non-vulnerable) adults
   - [ ] Yes
   - [ ] No
   - [ ] Unsure

9. For every IPV victim you have identified in the past 6 months, how often have you:

	Never	*Seldom*	*Some-times*	*Nearly Always*	*Always*	*N/A*
a. Documented patient's statements re IPV in chart	1	2	3	4	5	6
b. Used a body map to document patient injuries	1	2	3	4	5	6

Participant number: ☐☐--☐☐☐☐

	Never	Seldom	Some-times	Nearly Always	Always	N/A
c. Photographed victim's injuries to include in chart	1	2	3	4	5	6
d. Notified appropriate authorities when mandated	1	2	3	4	5	6
e. Conducted a safety assessment for victim	1	2	3	4	5	6
f. Conducted a safety assessment for victim's children	1	2	3	4	5	6
g. Helped an IPV victim develop a safety plan	1	2	3	4	5	6
h. Contacted an IPV service provider	1	2	3	4	5	6
i. Offered validating or supportive statements	1	2	3	4	5	6
j. Provided basic information about IPV	1	2	3	4	5	6
k. Provided referral and/or resource information	1	2	3	4	5	6

10. Are IPV patient education or resource materials (posters, brochures, etc.) available at your practice site? *(Check one)*
    - [ ] Yes, well-displayed, and accessed by patients
    - [ ] Yes, well-displayed, but not accessed by patients
    - [ ] Yes, but not well-displayed
    - [ ] No
    - [ ] Unsure
    - [ ] Not applicable to my patient population

11. Do you provide abused patients with IPV patient education or resource materials? *(Check one)*
    - [ ] Yes, almost always
    - [ ] Yes, when it is safe for the patient
    - [ ] Yes, but only upon patient request
    - [ ] No, due to inadequate referral resources in the community
    - [ ] No, because I do not feel these materials are useful in general
    - [ ] No, other reason *(specify)*: _____
    - [ ] Not applicable to my patient population

12. Do you feel you have adequate adult IPV referral resources for patients at your work site (including mental health referral)?
    - [ ] Yes
    - [ ] No
    - [ ] Unsure
    - [ ] Not applicable to my patient population

13. Do you feel you have adequate knowledge of referral resources for patients in the community (including shelters or support groups) for adult IPV victims?
    - [ ] Yes
    - [ ] No
    - [ ] Unsure
    - [ ] Not applicable to my patient population

Thank you for completing this survey.

Appendix E: Physician Readiness to Manage IPV Survey (PREMIS) Synopsis

Instrument name: Physician Readiness to Manage IPV Survey (PREMIS)

Authors: Short LM, Alpert E, Harris JM, and Surprenant ZJ

Development: Existing IPV survey tools were reviewed, and initial questions were adapted from these existing tools (scales from the Centers for Disease Control and Prevention and the Massachusetts Medical Society). IPV experts at institutions across North America reviewed these survey tools and concurrently developed new questions (scale items) from IPV literature to come to a consensus on a draft tool. This draft tool was evaluated for psychometric properties in a population of 166 physicians, revised, and retested three times in a physician population before validation and publication of the tool.

Source: Short LM
https://www.academia.edu/23676648/PREMIS_Toolkit_Article_Instrument_codebook_SPSS_code_Instructions_A_Tool_for_Measuring_Physician_Readiness_to_Manage_Intimate_Partner_Violence

Year validated: 2005

Purpose: A comprehensive and reliable tool for measuring the effectiveness of IPV educational programs

Studied populations:
- Practicing physicians
- Medicine, nursing, social work, and dental students

Time to complete: 15 minutes

Scales: 10 Subscales (67 items)
- Background
    1) Perceived preparation
        - Range: 1 (not prepared) to 7 (well-prepared)
    2) Perceived knowledge
        - Range: 1 (nothing) to 5 (very much)
- Actual Knowledge
    1) Actual knowledge
        - Total score of correct answers
- Opinions
    1) Preparation (5 items)
        - Range: 1 (Strongly disagree) to 7 Strongly agree)
    2) Legal Requirements (4 items)
        - Range: 1 (Strongly disagree) to 7 Strongly agree)
    3) Workplace issues (6 items)

        - Range: 1 (Strongly disagree) to 7 Strongly agree)
    4) Self-efficacy (6 items)
        - Range: 1 (Strongly disagree) to 7 Strongly agree)
    5) Alcohol/drugs (3 items)
        - Range: 1 (Strongly disagree) to 7 Strongly agree)
    6) Victim Understanding (7 items)
        - Range: 1 (Strongly disagree) to 7 Strongly agree)
- Practice Issues
    1) Practice Issues *EXCLUDED from this study

Scoring: Data analyst used PREMIS instrument, codebook, SPSS syntax, and scoring information document provided in the purchased PREMIS toolkit. Each scale scored separately, allowing for the elimination of the "*Practice Issues*" subscale from assessment in this study.

Psychometric properties of PREMIS tool:

- Good internal consistency; Cronbach's Alpha for 10 scales= 0.65
- Good reliability in a medical student population; a ≥ .70
- High construct validity; Rand coefficient= 0.89
- Psychometric properties of tool consistent (reliable) when tested between two groups of practicing physicians.
- Survey scores were consistent over a 12-month period.
- PREMIS with *practice issues* deleted evidenced to be an appropriate tool for use in medical trainee population.[1]

Adapted from:

Short LM, Alpert E, Harris JM Jr, et al. A tool for measuring physician readiness to manage intimate partner violence. Am J Prev Med. 2006;30:173-80.

References

1. Connor PD, Nouer SS, Mackey ST, Tipton NG, Lloyd AK. Psychometric Properties of an intimate partner violence tool for Health Care Students. Journal of Interpersonal Violence. 2010;26(5):1012–35.

Appendix F: Methods and Methodologies Overview

Qualitative Research: Supplementary Questions

1**. What was your rationale for using qualitative research for your thesis project? Discuss other qualitative approaches to inquiry and the strengths and weaknesses of each**.

In the medical education field, the use of qualitative research methodology is not uncommon.[1] In searching the literature for studies on medical school curricula, intimate partner violence (IPV) education, and IPV education for medical trainees, several valuable qualitative studies or mixed methods studies using qualitative methodologies were cited. In fact, this manuscript topic and study was modelled as an extension of the EDUCATE program and study.[2] Aligned with the EDUCATE qualitative study purpose, we wanted to evaluate the feasibility and value of the mEDUCATE program through the experiences of the program participants and faciliators.[2] This inquiry warranted qualitative investigation to evaluate a holistic understanding of this question.[3] However, the use of both qualitative and quantitative methods requires extensive resources and expertise to be conducted with quality, therefore careful consideration was taken before deciding to use both methods.[3] The use was deemed appropriate as we have members on the research team experienced in both quantitative and qualitative methods, and continue to collaborate closely with the EDUCATE investigators who could help inform the study.[2]

By using both qualitative and quantitative methods in this manuscript by means of a concurrent parallel design, the gaps in understanding the study question from quantitative methods can be supplemented with qualitative study results. For example, a

weakness of the quantitative analysis is that the results demonstrated that in a population of medical trainees, the mEDUCATE IPV educational program did improve their IPV knowledge compared to baseline, however we cannot conclude which components of the program contributed more/less to this outcome.[3] With qualitative methodologies, the exact words of participants can be used to describe how, and why the intervention was or was not successful.[3] Therefore, more information can be obtained about the relationship between the program and participants knowledge.[3] Qualitative methods utilize inductive analysis, in that the use of open questions allows for new understandings from participants to emerge, and design flexibility, in that the lines of inquiry can be adapted from these new understandings.[3] The results of qualitative studies can deliver a holistic perspective on relationships between participants and programs as a whole and investigate relationships between a participants and the parts of program. Also, by including a qualitative study, we can discuss transferability, defined as how research findings transfer, by describing the researcher, context, and participants in greater detail.[3]

The qualitative study methodology used in this manuscript was interpretive description. This method was chosen so that straight descriptions of the event could be recounted by participants and facilitators that could be compared to the quantitative study results for interpretive validity. With this approach, information is collected from participants about the meaning they attribute to an event, typically in the form of open-ended one-to-one interviews or focus groups.[4] With an interpretive description design, we could use a semi-structured interview format, but remain open to emerging insights during the interviews and modify codes as fit to the data.[4] From this data, researchers can gather robust detail on the event and the opportunity for unanticipated information to

observe exists, unlike in quantitative surveys.[4] Results are presented in the form of both participants own words and meaning interpreted from participant identified themes.[4]

While the interpretive description qualitative method was chosen for the study in this manuscript, other common qualitative methods exist such as narrative research, grounded theory research, case studies, ethnography, and phenomenology. Compared to interpretive description which is used to provide more direct answers to research questions applicable to institutions and practitioners, the other qualitative study approaches are more theorized.[4] This does not mean that interpretive description studies are lower quality, but rather it can produce results of greater relevance to the target audience; in this case medical trainees and educators, and IPV experts. Further advantages of interpretive description are that it is highly adaptable and can be used to describe findings in relatively simpler terms.[5] Interpretive description in qualitative medical education research if often the most effective method of meeting the demand in this field by generating evidence that can be more immediately translated into practice.[5] Concerns with this methodology are that it relies greatly on study rigour and researcher expertise to justify relationships from the study findings to the study context.[5]

Another qualitative inquiry methodology is narrative research. Narrative research is the description of a single individual's life, or typically a remarkable life event, reported by the researcher in context as the researcher's interpretation of the event.[3] The source of data is the directly from the participant or documents pertaining to their life.[1] A strength of this methodology is that it gives the person of interest a direct voice and captures many levels of experience.[3] Weaknesses of this methodology are that it only

studies one or a few individual's experiences and is highly subjective.[1] It requires extensive data collection and a clear understanding of the setting and participant context.[3]

Grounded theory research is the study of a group of participants and aims to generate a theory directly from the data collected.[1] With this study design, pre-existing theories are not used to inform the study but rather theories are induced from the data to form conclusions.[3] Generalizations are made from the data after testing theories and data until an appropriate relationship is established.[3] This is a process and often involves many revisions.[3] Based on the aim of this design, data is typically in the form of one-to-one interviews, focus groups, or participant observations.[1] A weakness of this design is that the quality of the study is dependent on the researcher's interpretation and insight.[3]

In case study research, the study object is referred to as a "case" and a study can investigate one case, or several cases simultaneously.[3] The case can be an event, activity, process, or population (for e.g., in medical education research this may be a program, classroom, or school).[3] The case is described in detail for the consumer.[3] The in-depth description is a strength of this methodology.[3] Another is that it permits the study of individuals or phenomenon's that were previously inaccessible to researchers.[3] Weaknesses are that case studies may require extensive resources to complete, especially multiple-case studies, the results have limited generalizability, and likely require replication.[3]

Ethnography is the study of a culture and can utilize multiple approaches to data collection on a society, group, or situation.[3] The aim is to portray the everyday experiences of individuals by making observations and conducting in-depth interviews.[1] From this data, hypotheses are made, rather than initiating the study with a preformulated

hypothesis.[3] The post-study hypotheses can be revised as more data is collected before final conclusions are made.[3] The strengths of ethnographic research are the potential for revelation of nuances and unanticipated observations owed to in-depth data collection methods.[3] An additional strength is that ethnographic researchers should report thick descriptions of their findings.[3] Thick description involves a high level of detail in reports, typically in the form of long participant quotes.[3] However, weaknesses of this study design are that it is difficult to assess validity of conclusions and there is limited generalizability.[3]

The final common qualitative study method of inquiry to discuss is phenomenology. The purpose of phenomenological is to study the perceptions of a phenomenon in a particular group of individuals.[3] This can include perceptions, experiences, and reactions.[3] The aim is to gain insight on these perceptions, experiences, and reactions of individuals through in-depth interviewing, typically, and then describe the phenomenon.[1] Phenomenology assumes that there will be a commonality in how different individuals experience a phenomenon.[3] Therefore, researchers are studying to see what is common in individuals experience. The researcher determines what is relevant from participants recounts of an experience, identifies commonalities which translate to themes, and then describe these themes in reports.[3] Strengths of phenomenology are that it can provide great insight and produce findings that can contribute to new theory development and/or changes in practice.[6] Weaknesses are that this method is also subjective on the part of participant and potentially researcher, also has limited generalizability, relies on participants effectively articulating their experiences, and may be resource intensive to conduct.[6]

In comparing the advantages and disadvantages of each qualitative methodology discussed above, a strong argument can be composed for the use of qualitative interpretive description in medical education research. For the mEDUCATE study, the use of qualitative interpretive description is aligned with the study aim and outcomes, and therefore rationalized. This methodology was effective at producing evidence-based knowledge from mEDUCATE participant experiences that developed into themes, while permitting the description of dissenting participant perspectives if they were to have arisen.[5]

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2. Define and discuss what mixed methods study design is and describe three different types of mixed methodology.

A mixed methods study design is defined as a means of using both quantitative and qualitative methodologies to inquire about a research question and then interpreting the results of both approaches together.[1] It involves philosophical assumptions, the use of qualitative and quantitative approaches, and the mixing of both approaches in a study".[1] Mixed methods studies are complex but also, when conducted appropriately, stronger than an independent quantitative or independent qualitative study for some research questions.[1] This is because not only are both qualitative and quantitative methods and data analyses used to investigate the research question, but the studies are conducted in conjunction, and the results are interpreted together or compared at some point in the study process.[1] Mixed method studies can be designed and classified according to the sequences of events.[2] Three common mixed method methodologies are the exploratory design, explanatory design, and convergent (convergent parallel) design.[2]

The exploratory design is structured that a qualitative study is conducted and analyzed first, from which variables of interest are developed and then are used to inform a second study using quantitative methods.[2] The methods of each study are analyzed separately, but the results of each are interpreted together to mix the findings of each study, explain relationships among variables, and draw final conclusions.[2] Exploratory mixed methods studies are commonly used to develop instruments, such as

questionnaires and scales.[2] The advantage of this mixed methods design is that the outcome measures are developed from the participant data after learning about their experiences through qualitative study.[1] The disadvantage, as with all mixed methods studies, are the extensive resources needed for data collection and analysis.[3] Additionally, subjectivity may be introduced as the researchers must decide the most important outcomes to follow-up with quantitative investigation are from the participants qualitative data.[1] However, this should and can be avoided in a well-done high quality study.[1]

Conversely, the explanatory design is structured that researchers first complete a quantitative study, analyze the results, and then conduct and qualitative study to gain additional insight for interpreting the findings.[2] As with the exploratory design, the data from each study are analyzed separately but interpreted together to expand on the findings of each study.[2] An advantage is that the quantitative and qualitative study methods and results are distinct for the consumer, but importantly, the quantitative study findings can be elaborated on and more thoroughly explored in the qualitative study.[1]

Finally, the convergent parallel design, or sometimes called a triangulation design, involves the conduction of a qualitative and quantitative study simultaneously or within a overlapping timeframe, with each study being held valued similarly.[3] With this design, both studies aim to investigate the same research questions with the goal of the findings validating each other to develop a common understanding and interpretation of a phenomenon.[2] If the results of the two studies are contradictory, this is a problem that should be investigated by the researchers to understand why the two methods yielded different results.[2] Data can be analyzed together, or separate, similar to the exploratory and explanatory design.[2] If analyzed together, quantitative data should be transformed to

quantitative data by assigning meaning or qualitative data should be transformed to quantitative data by assigning numbers to codes.[1] With either analysis approach (separate or together), the findings should be discussed in reports in relation to each other.[1] The advantage of this mixed methods study design is that the weaknesses of qualitative and quantitative study designs are compensated by including them both.[3] Also, in the case of the studies presented in this manuscript, with the concurrent parallel design, different but related questions can be investigated using the different study's outcome measures as the researcher can embed the data collections.[1] This is exemplified in this manuscript as the quantitative study investigated the outcomes of the mEDUCATE program, and the qualitative study focused more in investigating the processes if the mEDUCATE program which contributed to these outcomes.

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3. Describe and discuss ways to evaluate the quality of a qualitative study.

There is no universal criteria accepted for evaluating qualitative research, as with any research methodology.[1] However, there are numerous strategies and reporting standards checklists developed for enhancing study quality.[1] Qualitative studies should be assessed for the integrity of study methods and accuracy of findings developed from data, the consistency of data collection and analysis procedures, and the transferability and applicability of findings to other contexts or settings.[1] A high-level evaluation of qualitative studies can be completed using an appropriate study content checklist, such as the Standards for reporting qualitative research (SRQR) or the Consolidation Criteria for Reporting Qualitative Research (COREQ) checklists. Theses checklists were developed through literature searches to identify reporting guidelines and critical appraisal criteria relevant to qualitative research.[2] The checklists are meant to guide authors of qualitative studies to transparent reporting, thus, aiding readers in evaluation of study quality.[2] Domains authors should report on, for example on the COREQ, are "research team and reflexivity", "study design", and "analysis and findings", each with numerous sub-topics.[2] The qualitative study should be evaluated on appropriateness of study title, inclusion of a problem statement, literature review, purpose, research questions, data collection methods, details of data analyses and findings, and on overall writing quality.[3] When investigating the quality of a study more thoroughly, there should be an assessment of researchers use of procedures for checking and enhancing validity and reliability.[3] These procedures or techniques include triangulation, reflexivity, member checking, external auditing, and thick description.[3] Triangulation can be enacted by researchers at the qualitative data collection phase and involves using a variety of instruments to collect participant data.[3] This may enhance the quality of the study because it can show that

findings and conclusions are evidenced across measures.[3] Throughout the research process, but particularly during the data analysis and reporting phases, the qualitative researcher should practice reflexivity.[3] This is the concept of reflecting on personal thoughts as the researcher while conducting assessments and then reporting these details to enhance study quality, because in qualitative research, the position and experiences of the investigator are relevant to study conclusions.[3] Essentially, the researcher should describe the relationship between themselves and the study participants.[4] In study reporting, the researcher may also have a few participants review the report for accuracy.[3] This is called member checking, which is a way of establishing trustworthiness of the data.[3] In corroborating the report, the participant has validated that the researcher's interpretation and reporting of results is an accurate, quality representation.[3] If the researcher engages an individual not involved in the study as an investigator or participant to review the study, that is also a quality enhancing technique called an external audit, and can be valuable to identifying inaccuracies or biases in the report.[3] A final procedure for enhancing the validity of a qualitative study that can be evaluated by the reader, is the use of thick description.[3] Thick description is when in reporting the findings of a study, the researcher describes the context of the study, observations, and research questions. By using thick description, reliability and reproducibility of a study is enhanced.[3] Qualitative studies can also be evaluated for quality based on the instruments used for data collection.[1] Instruments should be validated in the study population described and researchers should have expertise and experience in conducting qualitative data collection and analysis.[1] Finally, it is critical for a high-quality qualitative study to

engage in transparency of reporting personal biases, study methods, study analysis procedures, and findings.[1]

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4. Describe qualitative reporting guidelines, why they are important, and provide examples. Why are reporting guidelines important for qualitative research?

Reporting guidelines are important in qualitative research as they encourage a high standard of reporting, transparency of methodology, and provision of sufficient study information by the researcher for repeatability.[1] As stated above, there is no universally used standard reporting guideline for qualitative research, however there are numerous acceptable options commonly used. These include the Standards for Reporting Qualitative Research (SRQR) and the Consolidated Criteria for reporting qualitative

research (COREQ). The COREQ is specific for qualitative research using interviews and focus groups.[2] The SRQR is broader checklist that can be used for reporting of qualitative studies with a variety of methods.[3] The SRQR was developed through literature review and the resulting item list synthesized was externally reviewed.[3] The intention of the SRQR is to guide researchers in reporting results for publication and aid readers in assessing study quality.[3] There are 21 items.[3] These items address title, abstract, introduction, research design and methods, results, and discussion details.[3] An example of a key point on the SRQR is that in methods, authors are asked to expand on processes, such as how saturation may have been defined in the study.[3]

While the SRQR is a valuable tool for researchers doing a broad spectrum of qualitative studies, the COREQ is specifically designed for comprehensive reporting of qualitative studies using interviews and focus groups.[2] As the qualitative study in this manuscript used interviews for data collection, a completed COREQ checklist is attached as Appendix G. To develop the COREQ, investigators searched the literature for existing qualitative study checklists and then compiled the items into three domains: research team and reflexivity, study design, and data analysis/reporting.[2] From this exhaustive list, any duplicate, undefined or unfeasible items were removed.[2] The resulting list is 32 items.[2] For users of the COREQ checklist, an interview is defined as an in-depth and semi-structured individual question asking to participants about a particular experience.[2] Focus groups are defined as semi-structured question asking to a group of 4-12 participants and a moderator.[1] With the intention of improving study conduct, the use of COREQ by qualitative researchers may indirectly improve study quality.[2]

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Quantitative Research: Supplementary Questions

1. **Describe the strengths and weaknesses of a pre-test/post-test study design. What other study designs could have been used and why were they not chosen?**

There are numerous variations of the pretest-posttest study design, with or without a control group, each with inherent strengths and weaknesses.[1] The simplest design, which was used in this thesis, is the one group pretest-posttest design.[1] In this design, data is collected, an intervention occurs, and then data is collected again in the same group, on the same outcome measures, using the same methods and instrument.[1] The strengths are that the use of a pretest establishes a baseline to which the post-intervention results can be compared to measure change in a population after an intervention.[1] Essentially, in single group studies that do not use random sampling the pretest baseline acts as a control to compare the "experimental group".[1] Not only does that pretest act as a control for comparison, but it also presents the opportunity for the researcher to examine

the study outcomes in the population prior to intervening.[1] For example, in medical education research, the pretest results could be reported to inform on the participants pre-existing knowledge on a topic before receiving education. This data produced from this study design can be statistically analyzed using a paired t-test for continuous data or chi-squared test for categorical data.[1] A weakness of this study design is that it can be subject to instrumentation or testing bias, also called measurement bias.[1] Testing bias is mitigated in our study as the PREMIS instrument is scored using an algorithm and statistical software and therefore requires minimal researcher "marking". In regard to participant testing bias, the PREMIS tool is short, only 15 minutes, to mitigate participant fatigue.

The variations of pretest-posttest studies include a one-group pretest-posttest design with a double pretest, and two-group pretest-posttest designs, for example. A single group pretest-posttest design was chosen over a double pretest design as this such design was not feasible based on our sampling method and timing of intervention. The mEDUCATE participants were recruited from a group of medical students who voluntarily attended the IPV training workshop which was the intervention. Therefore, there was only one opportunity to administer a single pretest to this population before the intervention occurred and a posttest was administered. Despite the use of only a single pretest, since the pre- and post-test occurred immediately before and after the intervention (mEDUCATE program workshop) we can more confidently conclude that the outcomes measured can be explained by the intervention rather than resultant of maturation or history as the entire length of data collection between the pretest and our primary outcome of the quantitative study which was PREMIS results immediately posttest was only three hours; although it is to be noted that we also collected a second

set of posttest data at six-weeks post-training and the results were comparable to those immediately post-training. Other pretest posttest study designs that are more intricate than the one-group pretest- double posttest design that we used, require more resources and a larger population to sample if two groups are used.

The one-group pretest-posttest study design we used for the quantitative component of the study in this manuscript may be considered a quasi-experimental design. Examples of other study designs that could have been chosen are variations of experimental designs or non-experimental designs such as a descriptive survey study; all of which are appropriate for medical education studies. [2] A randomized control trial is study design consisting of two groups of tested participants to be compared. This study design is used to control for differences between individuals in a study population. While randomized control trials may be considered the gold standard of research in many contexts as randomization is used to control cofounders, randomization cannot control for all biases including history, maturation, testing, and instrumentation bias any more than other study designs like a single group pretest-posttest design.[2] In fact, for medical education research, it has been concluded that well designed and implemented non-randomized study designs can be more relevant depending on the context, have small risk of bias, and greater reproducibility.[2] Furthermore, for randomized control trials it is often suggested there are at least 40 participants in each group, but this is dependent on the outcome of interest; for our study population this number was not feasible.[2] It is widely understood that randomized true experimental studies are not always feasible or ethical and therefore a quasi-experimental study, like our single group pretest-posttest design that uses the pretest as the control and posttest as the experimental measure are more

appropriate. [3] When testing the effect of a new workshop or curriculum on student knowledge, extraneous factors like conflicting student class schedules prevent true randomization and make such processes less relevant.[3] Without randomization, quasi-experimental researchers should collect data on group variables.[3] In our study we collected the medical trainee participants demographics to compare the participants at baseline. The use of a pretest as a control makes our study a quasi-experimental descriptive survey study. In this design, the researcher collects data using a survey on a variable to describe the characteristics of a population.[4] This design is particularly vulnerable to instrumentation bias and involves no comparison group to determine if participants changed or improved after an intervention, relative to peers who did not receive training, as there is no manipulation of the intervention variable.[4] Rather there is only a measure of an existing characteristics within the single group.[4]

An experimental, non-experimental, or other variations of quasi-experimental designs were not chosen because a one-group pretest-posttest study is most appropriate and common for research with small sample sizes, a nonrandomized design, aiming to generalize to extended populations, all applicable to the study in this manuscript. Ultimately, our study design was chosen based on relevance to our research question, available resources, and the quality of design. When conducted appropriately with design modification to mitigate any threats to internal validity, quasi-experimental single group pretest-posttest studies have a relatively high level of internal validity, however they may have limited external validity, or generalizability, compared to other study designs.

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2. Describe how missing data can be identified and strategies to manage missing data.

Missing data is the absence of data points for an individual participant.[1] This can occur in quantitative data collection due to researcher error if data is lost on a participant, by participant neglect or unwillingness to answer certain questions, participant absence during data collection, participant response outside of instrument range, or random error.[1] For accurate data interpretation and transparency in publishing results, researchers must acknowledge missing data and plan how to handle missing data that arises. Missing data points may be identified by researcher observation of the data collected or by a statistical system like SPSS, wherein missing data points are flagged by the software.[1] To retain data on as many participants as possible, it should be the goal of researchers to minimize missing data points for participants whenever possible.[1]

There are numerous strategies to manage missing data. The first strategy is to minimize missing data.[1] This should be done by choosing methods and instruments that participants are able and inclined to complete.[1] The use of shorter, comprehendible, easily administered data collection tools should be used when reasonable.[1] For our study, were used the PREMIS tool for quantitative data collection. This instrument is short, maximum 15 minutes to complete, and is comprised of multiple choice and opinion/comfort skills that can be answered with minimal participant exertion. Furthermore, we designed the IPV workshop to include time both pre and post intervention for participants to complete the immediately pre-training and immediately post-training PREMIS so that the forms did not need to be completed on participants own time to increase return yield. While participants were informed that they may choose not to answer any questions that were sensitive or uncomfortable for them to answer, the instrument can still be scored even if some questions on a scale are not answered and to prevent the skipping of questions, the data collection process was anonymous to increase participant comfort. The number of follow-up visits should also be limited to what is essential in order to prevent missing data.[2] In our study, there were only two follow-up timepoints to reduce the potential of participant loss to follow-up and minimize missing data. All efforts should be made to encourage participation in follow-up and to document reasons for loss to follow-up.[2] In our study, participants completed the pretest and immediate posttest during the workshop and at the six-week follow-up timepoint, participants were contracted via email by the lead investigator with electronic versions of the PREMIS. Only individuals who voluntarily provided their contact information (email) at the workshop were contacted for follow-up as the study was anonymous. For

participants who did not return the forms within a week, two subsequent email contact attempts were made to encourage and remind participants to complete the follow-up. Although efforts should first be made to prevent missing data, when it occurs there are strategies to analyze the available data despite missing points. Prior to the start of a study, the acceptable threshold of missing data must be determined according to researcher expertise, literature review, quality of study methods and psychometric properties of the data collection instrument being used.[2] It is generally agreed upon that up to 15% of data may be missing and substituted for without the statistical findings being affected.[1] Any participants who have missing data points may be excluded from the study in case deletion.[3] With this strategy, in studies of small populations or with many participants missing data points this will result in a small number of participants in the final analysis.[3] Alternatively, numbers may be substituted for missing data points, either a designated negligible value to complete the dataset, or when using statistical software, an average of other participants scores may be substituted for an individual missing data point.[3] There are various variations of this type of imputation method to handle missing data.[3] For example, another strategy for using imputation to manage missing data is to input the participant last entered value.[2] It should be cautioned that mean substitution methods can lead to an underestimation of study error.[3] In a pretest-posttest study, like ours, an imputation or substitution strategy is nonsensical as the variable values are anticipated to change following the intervention.[2]

Data missing at random, not in association with any particular one item or timepoint, while not ideal, is characteristically less biased.[2] If missing data is not random, but rather abundantly missing for one item or participant, this is more likely to bias study

results.[2] Regardless of type, the power of a study may be reduced if the volume of missing data is large enough.[2] While case deletion is the more common method of handling missing data, because our sample size was smaller and data was primarily complete for the primary quantitative outcome of PREMIS score on actual knowledge immediately post-training, participants missing data at six-weeks were not excluded from the study.[2] In our study, most missing data was in the form of the complete absence of six-week PREMIS scores due to participant loss to follow-up. These participants were excluded from the six-week timepoint data analysis but were included in the immediate post-training timepoint data analysis where data was complete.

For participants who remained in the study, data sets were complete at each timepoint for all relevant subscales of the PREMIS. Missing data was not planned for in the qualitative study phase, as the interviews were open-ended, and participants were recruited to accommodate their schedules for one visit only. For the quantitative study phase, we aimed to prevent missing data by sending participants electronic versions of the PREMIS questionnaire for easier completion and reminder emails were sent on two occasions by the principal investigators. Further measures to contact participants, beyond email, were not pursued to protect participant confidentiality and considering the voluntary nature of study participation. To manage the missing six-week timepoint of some participants, case deletion at this timepoint was used. This method of managing missing data impacted our study by decreasing the sample size from 19 participants immediately post-training to seven participants at six-weeks post-training. This smaller sample size decreased the power of the study at that particular timepoint and significance of results evidencing improvements in IPV knowledge. The missing data also impacts our

ability to draw conclusions about longer term IPV knowledge retention resulting from the mEDUCATE program.

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3. Describe three assumptions of a paired t-test.

In quantitative research, to make a decision on whether to reject or accept the null hypothesis, a statistical test is required. In repeated measures studies, like the pretest-double posttest study design used in this manuscript, the null hypothesis is defined as the assumption that the difference between paired outcomes in a sample is zero. In the quantitative study in this thesis, we hypothesized that participants would show mean improvements from the pretest to posttest on the PREMIS outcome measure. To test this assumption, we used a paired t-test as our statistical analysis method.

The parametric t-test is a statistical test to determine if the difference between means in a sample is significant or not. In medical education literature, the common

arbitrary value for statistical significance is 0.05. If the parametric t-test value (p-value) is less than or equal to 0.05, a researcher ordinarily concludes that a significant difference does exist and can confidently reject the null hypothesis. In our quantitative study, if the mean difference in participants scores from pretest to posttest (after the IPV workshop intervention) was calculated to have a p-value of less than or equal to 0.05, we concluded the participants improvements were significant (not due to chance).

Parametric tests, including t-tests and ANOVA tests, have more statistical power than to be nonparametric tests, such as the chi-square test. This means that if a significant difference between means exists, the parametric tests are more likely to detect it. In order to conduct a parametric t-test, certain criteria of the data must be met. These are the three assumptions of paired t-tests. The first assumption is that data are continuous versus discrete. Continuous data (interval or ratio) can be any value on a scale, whereas discrete data has finite, integer values (categorical or nominal). In our quantitative study, participants mean scores on each of the nine PREMIS subscales were continuous values. The second assumption of paired t-tests is that the data is normally distributed and there are no outliers. In our quantitative study, the differences between matched pretest and posttest scores followed a normal distribution around the mean (assessed through SPSS software tests for normality). The third assumption is that every individual in a population had an equal chance of being selected as a study participant. In the case of our nonprobability sample, this assumption is violated. In modelling the EDUCATE and other medical education studies, the paired t-test was applied, and the results reported regardless. However, in interpreting the results of this test, the statistical significance is cautioned because of this limitation.

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4. Describe the difference between purposive sampling and convenience sampling. What are the advantages and disadvantages of each (specifically related to bias)?

Purposive and convenience sampling are types of nonprobability sampling methods used by researchers conducting both quantitative and qualitative studies, as appropriate.[1] The primary distinction between these types of nonprobability sampling and the other category, probability sampling, is that nonprobability sampling methods do not involve random selection.[1] When reporting the results and implications of a study using nonprobability sampling, the conclusion can only be generalized to the population sampled.[1] It is very often not practical to randomly select participants from an entire population, therefore the use of nonprobability samples in research is not uncommon, despite the general limitations to these sampling methods.[1] The main difference between the two primary nonprobability sampling methods, purposive and convenience, is that a convenience sample is obtained from a group situationally accessible to the researcher

and a purposive sample is composed of subjects with a particular characteristic(s).[1] These two sampling methods have some shared and unique advantages and disadvantages.

Purposeful sampling is defined as "a strategy in which particular settings persons or events are selected deliberately in order to provide important information that cannot be obtained from other choices…the researcher includes cases or participants in the sample because they believe that they warrant inclusion". [1] There are multiple subclassifications of purposive sampling based on the case characteristic sought, including maximum variation, homogenous, typical case, extreme case, critical case, total population, and expert that can all be further explored and described.[2] Subjects included as part of a purposive, sometimes called a judgement sample, must ultimately all share a defined set of qualities.[2] Intuitively, the greater number of inclusion and exclusion criteria, the more purposeful a purposive sample is.[1] However the characteristics you are selecting participants for is more specific than a general set of study inclusion/exclusion criteria.[3] While this sampling method may be used in both qualitative and quantitative research, purposive sampling is more common in qualitative studies as researchers are seeking individuals who are willing to participate and can provide targeted, valuable information about their knowledge and experiences relevant to the study questions.[2] In qualitative studies, purposive sampling facilitates the inclusion of rich information with the lowest necessary sample size and resource cost.[2] With purposive sampling, there is rarely a target sample size, but rather the focus is sampling the desired population until saturation is reached (i.e., no new emerging data or themes from data).[2] Advantages of purposive sampling are many:

1) Generally low cost and convenient.[4]

2) Highly conducive to an exploratory research design. [5]
3) Conducive to achieving depth of data gathered.[2]
4) Selection of the study population is based on desired characteristics which allows for control of other variables.[6]
5) The participant selection permits easier matching of group data, if necessary.[6]
6) It introduces sample homegenity.[6]
7) Permits exclusion of subjects at high risk of adverse events. [1]
8) High internal validiy.[1]

Disadvantages of purposive sampling are:

1) A comprehensive understanding of the population to be sampled is needed.[1]
2) Data richness may be dependent on participant knowledge.[6]
3) Selection criteria are subjective.[5]
4) Inferential parametric statistics should be utilized with caution. Non inferential may be more appropriate.[5]
5) Cannot generalize findings to populations beyond sample.[5] Increasingly purposive samples have less external validity.[1]
6) Cannot make estimations of sampling error.[4]
7) Noncoverage bias. Some subjects matching the sample will not have the chance of being included due to extraneous variables.[4]
8) Selection bias. Participants are self-selected.[4]

With convenience sampling, all participants meet a practical criteria such as being in a certain location or part of a program from which they are accessed.[1] This sampling is useful when resources are limited and/or the target population is large or relatively

inaccessible.[1] Like purposive sampling, convenience sampling can be used in both qualitative and quantitative studies.[4] However, it is more commonly the sampling method in quantitative studies.[4] Advantages of convenience sampling include:

1) Subjects are relatively readily available.[2]
2) Typically, the least expensive of the sampling methods.[5]
3) Typically, the least time consuming of the sampling methods.[5]
4) Typically, the most convenient of the sampling methods.[5]
5) As this method is less resource strenuous, studies using convenience sampling may be executed and finished in a shorter timeframe.[4]
6) Typically, as sample size increases, statistical power increases.[2]
7) Loss to follow-up tracking may not be required as it may be irrelevant.[4]
8) Participant burden is lessened as participants are recruited on a voluntary basis and not individually targerted.[4]
9) Conducive to achieving breadth of data gathered.[2]
10) High internal validity.[1]
11) Emphasizes generalizability. Findings are representative of sample population.[7]

Convenience sample disadvantages are:

1) There may be no complete list of the source population to reference.[6]
2) There is no sampling unit.[6]
3) Subject to selection bias.[5]
4) Cannot generalize findings to populations with characteristics not consistent with sample.[5] Limited external validity.[1]
5) Vulnerable to selection bias.[1] High self-selection probability.[1]

6) Outliers (cases not consistent with data collected) may have a greater effect on results.[2]

While there are disadvantages to convenience samples, this method is most common.[7] A substantial proportion of medical education research studies use nonprobability sampling methods.[8] In qualitative study, probability sampling is often not applicable as researchers are investigating individuals who have experienced or been a part of a particular phenomenon.[8] Nonprobability sampling was more appropriate. Specifically, we used non-probability convenience sampling to sample mEDUCATE participants as the intent was to learn about the experiences and knowledge outcomes in medical students who were participating in the IPV education mEDUCATE program. All medical students at the University of Calgary were invited to participate in the training via email communications from their student representatives. Of those students who voluntarily attended the evening training, all had the study explained to them and were invited to participate in the mEDUCATE study, anonymously, and were reminded that they could receive the mEDUCATE program education training that evening regardless of whether they also chose to participate in the study by completing the study forms handed out at the training. From those students choosing to participate in the study, contact information was collected (email addresses, no names) for contact to complete data collection at the follow-up time points. At two-weeks post-training all participants providing contact information were emailed from the principal investigator three times, asking for participants to participate in individual interviews. All students who responded consenting to schedule an interview were interviewed chronologically until qualitative data saturation was reached. At six-weeks post-training, to collect the second quantitative

post-test data, all participants who had provided contact information were emailed with electronic versions of the PREMIS to complete, by the principal investigator. Follow-up emails were sent two subsequent times to remind and encourage participants to complete the follow-up forms and email return them. As the aim of the study was essentially to investigate the delivery and outcomes of the mEDUCATE program, this method of sampling was intuitive. It is aligned with the model EDUCATE program sampling method, aligned with medical education literature, successful in sampling the population meant to inform our study aim and was best suited to our available resources at the time of study conduction.[8,9]

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5. Define bias (i.e., systematic error), how it differs from random error, and the implications of bias generally. Describe three types of bias that may have contributed to systematic error in your study? How can these types of bias have impacted your study outcomes?

In the research context, bias is defined as any non-objective, predisposed consideration of the research question and can occur in investigating and or reporting on the research question.[1] Bias may be introduced at any point in the study process from sampling, data collection, data analysis, determining outcome measures, to reporting results.[1] This is different than random error in that random error results due to naturally occurring variability in sampling.[1] Random error will theoretically be less in larger sample sizes than relatively smaller sample sizes, whereas bias occurs to various degrees in both large and small samples and it results in estimates of study findings being over or underexaggerated.[1]

There are numerous types of bias, and all should try to be avoided by means of prevention through the development of a quality study design, scrupulous implementation, transparency in analysis and awareness in reporting.[1] However, it is understood that no study can practically be completely void of all bias.[1] Researchers and readers should be conscious of this when interpreting results and the implications of a study. Types of bias can be grouped into broad categories based on when they present: pretrial bias, trial implementation bias, and data analysis bias.[1]

A specific risk of bias in our study is sampling bias during trial implementation. We used convenience sampling, a nonprobability method of sampling common in medical education research. It inherently results in individuals with certain characteristics being more likely to be enrolled in a study.[2] This type can impact studies by limiting generalizability of the findings to populations beyond the sample.[2] In our study detailed demographic information was collected from the participants including age, sex, race/ethnicity, year of medical training, intended practice specialty, previous IPV training

and format of previous IPV training. This information was collected to inform the reader as to which population the study findings apply.[3] Despite the risk of sampling bias in our study, convenience sampling was the most practical sampling method to be applied, and because we wanted to investigate the experiences of participants in the mEDUCATE program through qualitative interviews, it was the best selection method for obtaining applicable, information-rich cases. While it is possible our convenience sample consisted of self-selecting participants who held strong opinions about the program, these opinions could have equally been positive or negative and are helpful to inform on the value of the program in either case, for our study aim.[3] To further mitigate or dispel sampling bias, the study should be repeated with a similar sample to assess whether the results can be replicated.[3] Despite the risk of sampling bias in our study, and the consideration that randomization is often considered the strongest sampling method to mitigate risk of sampling bias, valid conclusions can be drawn from nonprobability sampled studies.[4] Literature states that in nonprobability sampled studies within the fields of both education and clinical medicine for studies that are well designed and conducted, with transparent and trustworthy reporting, the risk of sampling bias is generally small.[4]

Another potential source of bias in our study during data collection is the risk of response bias.[5] Response bias is the potential for participants to provide responses to study questions and answers on outcome measures that they consciously or unconsciously perceive as the satisfactory answer.[5] The Hawthorne effect is the phenomenon where participants in a study give positive responses or exhibit positive behaviors since they are aware they are being studied.[4] This is difficult to control for, but researchers should be aware of this potential bias.[5] Response bias can also manifest

unconsciously as a result of participant demographics, such as gender.[1] In the mEDUCATE study there is a risk of gender bias because participants were not matched for gender, therefore this is an uncontrolled variable. With a larger sample size, a technique to mitigate response bias, potentially from confounding or uncontrolled variables, is the use of stratified analysis.[1] To mitigate the risk of gender bias, and understand the potential influence on our findings, demographics were collected on participants so that we can report that 85% of participants in the quantitative methods study were female and 100% of participants in the qualitative methods study were female. This finding may imply a sex-based bias toward IPV education and training engagement, but that cannot be known. Generally, to avoid response biases researchers should carefully format and deliver outcome measures.[5] In interviews, open-ended questions in that participants can expand on should be used.[5] The mEDUCATE study interview questions were all open-ended and participants were given the opportunity to expand on every question after it was asked and to make any open remarks at the end of the interview. In surveys, scales and multi-select questions are typically most appropriate.[5] The PREMIS tool used in the mEDUCATE study is composed entirely of scale-formatted response and multiple-choice questions. During the data collection phase, researchers should make extensive effort to retain participants until the final follow-up timepoint of data collection to prevent nonresponse bias.[1] This is also referred to as mortality or loss to subjects.[1] It is possible that participants who are approached for study inclusion but do not participant, or participants who are lost to follow-up would have responded differently than participants from whom data is obtained.[5] Therefore these non-responders should be described in reporting the study, if possible.[5] This is difficult

with anonymous studies, such as the mEDUCATE study. In recognition of potential loss to follow-up, the primary outcome of the quantitative methods mEDUCATE study was set a priori as actual IPV knowledge immediately post-training, when participants were still easily accessible to the research team, compared to at the six-week follow-up time point. At the six-week follow-up timepoint, participants were contacted on three occasions to ask them to complete the follow-up forms, and an electronic version of the PREMIS tool was dispersed for ease of completion. The follow-up request email communications were delivered by the principal investigator. Additionally, in the qualitative methods mEDUCATE study, it was established in the study design that participants would be recruited until data and thematic saturation was achieved. We were successful in obtaining saturation.

A final potential bias in our study is testing bias. Testing bias is defined as the effect that taking a pretest has one posttest scores with repeated testing.[4] With a pretest-posttest study design, the pretest is often an inherent part of an education program in medical education research, and it provides valuable baseline information to compare post-intervention data to, in order to understand the effect of the intervention (e.g., educational program).[4] The use of a pretest also increases the statistical power of a study.[4] Considering that in the mEDUCATE study the identical PREMIS tool was administered pre-training and immediately post-training, it is possible that results are vulnerable to testing bias.[3] However, for most sections of the PREMIS tool, there are no correct responses. Furthermore, participants were not given an indication to desired responses at any point from pretest to posttest, and the PREMIS is a validated outcome measure. In evaluating the nature of the PREMIS tool and our data collection methods, the risk of

testing bias is small. The advantages of a pretest-posttest study design for achieving the mEDUCATE study aims include provision of baseline "control group" data, mitigation of the potential regression to the mean effect, and information about long-term knowledge retention gained.[2] In comparison to the potential for testing bias, the numerous advantages of the study design make the pretest-posttest design appropriate for our study.[2]

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6**. Describe the statistical power of your study and describe three ways that you could have increased the power of your study.**

Statistical power is defined simply as "the extent to which the results of an analysis accurately reveal a statistically significant difference between groups when a statistical difference truly exists".[1] Essentially, power is the probability of rightfully rejecting the null hypothesis, that is, that the difference between means is zero.[2] Mathematically, power equals one subtract the probability of a type II error, defined as failure to reject the null hypothesis when the alternative hypothesis is true.[2] Power is defined by sample size, effect size, alpha level (probability of type I error), and beta level (probability of type II error).[2] Therefore, it is alterations to these determinants that can increase study power. Evidently, having a higher-powered study is generally favorable, as this means the probability of accepting the researcher's hypothesis, and this to be true, is high.[2] A high-powered study has a greater probability of detecting a true effect, whereas a lower power study has a smaller probability of detecting a true effect.[2] Low power studies are more vulnerable to random error and bias; however, high powered studies should also be cautioned because if the sensitivity of a test is too high, statistically significant results found may not even have clinical or practical implications.[2] High-powered studies can likely detect small-large effects, whereas low-powered studies will detect large effects only and these effects can be confounded by other variables.[2] Low-powered studies however, are the norm in some fields, like neuroscience were populations to sample are generally smaller and human biomedical research.[3] This can result in an over or under estimation of the magnitude of the actual effect and direction of actual effect.[2] Ultimately, the benefits of a higher powered study must be considered compared to the resource cost.[3] It is generally considered by researchers in the field of education, that a study power of greater than or equal to 0.8 (80% chance of rejecting null hypothesis when it is

false) is acceptable with a 0.5 effect size, in standard deviation units.[4] While a high statistical power is good, with a power level of 1.0 theoretically perfect, a power of >0.99 would be concerning as to whether the size of the test was adequate.

A power analysis can be used to evaluate the necessary sample size for a high-powered study.[6] A sample size analysis was conducted for the mEDUCATE study (Table 4.1). Based on this, the small sample size for the primary outcome of IPV knowledge on the PREMIS immediately post-training (19 participants) is a limitation to the study power to report statistical significance of results. However, our study includes a pretest, as part of the pretest-posttest design, which adjusts for individual differences and increases the statistical power of our study.[5] Experts support that a pretest can increase statistical power in certain study designs when a sample size is small and/or a high loss to follow-up rate is predicted, as well as increase generalizability.[5] Further increasing our study power is that a parametric test (paired t-test) was used to calculate significance, and parametric tests are considered higher power than non-parametric tests.[6] We also used a validated outcome measure in our study population, the PREMIS tool, which increases the power of our study.[6] The primary limitation to power in our study is the sample size.

The most direct means of increasing study power is to increase sample size.[6] Oher methods include increasing the effect size by means of manipulating the independent variable, such as increasing the length of an intervention, for example.[6] Decreasing the variance in the study population also increases power.[6] As does controlling for extraneous variables.[6] Therefore, studying a population with a defined characteristic is valuable.[6] Increasing significance level, typically $\alpha = 0.05$, to $\alpha = 0.01$ is another way to increase power as it increases sensitivity of the test to detect a true effect.[6] Decreasing the

standard deviation will also increase sensitivity of tests and therefore power.[6] While parametric statistics are generally more powerful than non-parametric statistic, within the types of parametric tests one-tailed tests have a higher power than two-tailed tests.[6] One-tailed tests are specific to detecting an effect in only one direction.[6] This may or may not be justified depending on the study aim. Finally, decreasing measurement error by choosing the most accurate measures and enforcing precision of use, increases power.[6]

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Appendix G: COREQ Checklist

COREQ (COnsolidated criteria for REporting Qualitative research) Checklist

A checklist of items that should be included in reports of qualitative research. You must report the page number in your manuscript where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript accordingly before submitting or note N/A.

Topic	Item No.	Guide Questions/Description	Reported on Page No.
Domain 1: Research team and reflexivity			
Personal characteristics			
Interviewer/facilitator	1	Which author/s conducted the interview or focus group?	58
Credentials	2	What were the researcher's credentials? E.g. PhD, MD	58
Occupation	3	What was their occupation at the time of the study?	58
Gender	4	Was the researcher male or female?	58-59
Experience and training	5	What experience or training did the researcher have?	58
Relationship with participants			
Relationship established	6	Was a relationship established prior to study commencement?	58
Participant knowledge of the interviewer	7	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	58
Interviewer characteristics	8	What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	67
Domain 2: Study design			
Theoretical framework			
Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	56
Participant selection			
Sampling	10	How were participants selected? e.g. purposive, convenience, consecutive, snowball	56-57
Method of approach	11	How were participants approached? e.g. face-to-face, telephone, mail, email	57
Sample size	12	How many participants were in the study?	58
Non-participation	13	How many people refused to participate or dropped out? Reasons?	N/A
Setting			
Setting of data collection	14	Where was the data collected? e.g. home, clinic, workplace	58
Presence of non-participants	15	Was anyone else present besides the participants and researchers?	58
Description of sample	16	What are the important characteristics of the sample? e.g. demographic data, date	58, 60-61
Data collection			
Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot tested?	58, 133-134
Repeat interviews	18	Were repeat inter views carried out? If yes, how many?	N/A
Audio/visual recording	19	Did the research use audio or visual recording to collect the data?	N/A
Field notes	20	Were field notes made during and/or after the inter view or focus group?	N/A
Duration	21	What was the duration of the inter views or focus group?	58
Data saturation	22	Was data saturation discussed?	60
Transcripts returned	23	Were transcripts returned to participants for comment and/or	N/A

Topic	Item No.	Guide Questions/Description	Reported on Page No.
		correction?	
Domain 3: analysis and findings			
Data analysis			
Number of data coders	24	How many data coders coded the data?	59
Description of the coding tree	25	Did authors provide a description of the coding tree?	N/A
Derivation of themes	26	Were themes identified in advance or derived from the data?	59-60
Software	27	What software, if applicable, was used to manage the data?	60
Participant checking	28	Did participants provide feedback on the findings?	58-59
Reporting			
Quotations presented	29	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	61-64
Data and findings consistent	30	Was there consistency between the data presented and the findings?	60-64
Clarity of major themes	31	Were major themes clearly presented in the findings?	65
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?	65-66

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

Once you have completed this checklist, please save a copy and upload it as part of your submission. DO NOT include this checklist as part of the main manuscript document. It must be uploaded as a separate file.

Appendix H: STROBE Checklist

STROBE Statement

	Item No	Recommendation
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract Pg #79- "A Pretest-Posttest Study"
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found Pg #79-80- Abstract
Introduction		
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported Pg #80-81- Background
Objectives	3	State specific objectives, including any prespecified hypotheses Pg #80-81- Purpose and hypothesis, Pg# 85- Study Outcomes Specific Objective: "The purpose of this study was to evaluate the utilization and uptake of an EDUCATE-inspired IPV educational program in a medical trainee population, mEDUCATE." Hypothesis: "We hypothesized that participants would report improvements from baseline (pre-training) to immediately post-training on the actual knowledge subscale of the Physician Readiness to Manage IPV Survey (PREMIS)."
Methods		
Study design	4	Present key elements of study design early in the paper Pg #81-84 (Program Content, Program Delivery, Pretest-Posttest Study Design)
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection Pg# 82-83 (3.3.2 Program Delivery), Pg# 84 (3.3.4 Participants)
Participants	6	*(a)*Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up Pg#84 (3.3.4 Participants)
		(*b*) For matched studies, give matching criteria and number of exposed and unexposed *N/A*
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable Pg# 85-86 (3.3.6 Study Outcomes) "The primary outcome was the mean difference in actual knowledge subscale score on the PREMIS from pre-training to immediately post-training."
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group Pg# 83-84 (Pretest-Posttest Study Design), Pg#85-86 (3.3.6 Study Outcomes) PREMIS tool described, further elaborated on in Appendix E
Bias	9	Describe any efforts to address potential sources of bias Pg#96-97 (3.5.1 Limitations)
Study size	10	Explain how the study size was arrived at Pg#85 (3.3.4 Participants)

Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why Pg#86- "The PREMIS subscale was entered as continuous variable and all other independent variables were categorical. Mean scores and the standard deviation of the mean (SD) for each subscale for the pre-training baseline, immediately post-training, and six-weeks post-training PREMIS scores are reported"
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding Pg#86- "We calculated the mean scores for each subscale for the PREMIS survey completed at baseline and immediately after training. We also conducted a paired t-test analysis and reported the mean difference (MD) from baseline to immediately post-training with the 95% confidence interval (CI) and p-value for each subscale.) All statistical tests were two tailed and used an alpha level of 0.05. All statistical analyses were performed using R software (Version 4.1.0)."
		(*b*) Describe any methods used to examine subgroups and interactions *N/A*
		(*c*) Explain how missing data were addressed *See supplementary material
		(*d*) If applicable, explain how loss to follow-up was addressed Pg#96-97 (3.5.1 Limitations) *See supplementary material
		(*e*) Describe any sensitivity analyses *N/A*
Results		
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed Pg#87- "Approximately 200 medical trainees were invited to participate in training and ultimately 22 trainees attended the two-hour program and 20 consented to participate in the mEDUCATE study. Immediate pre-training study forms were completed by 20 participants and immediate post-training study forms were completed by 19 participants. Study participants were contacted at six-weeks post-training for the final PREMIS completion, in order to evaluate program material retention. The six-week follow-up data was provided by seven participants."
		(b) Give reasons for non-participation at each stage Pg#87- "Non-responders were participants lost to follow-up."
		(c) Consider use of a flow diagram *N/A*
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders Pg#87-89- (3.4.1 Participant Demographics, Table 3.1 Participant Characteristics)
		(b) Indicate number of participants with missing data for each variable of interest Pg#91- Table 3.2
		(c) Summarise follow-up time (eg, average and total amount) Pg#87- (3.4.1 Participant Demographics)
Outcome data	15*	Report numbers of outcome events or summary measures over time Pg#89-91- (3.4.2 PREMIS Scores)

Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included Pg#89-91 (Table 3.2 Change in scores on Physician Readiness to Manage IPV Survey subscales between pre-training baseline and immediately post-training and between pre-training baseline and six-weeks post-training. Positive mean differences indicate an improvement in scores from pre-training baseline.)
		(*b*) Report category boundaries when continuous variables were categorized *See Appendix E
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period *N/A*
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses *N/A*
Discussion		
Key results	18	Summarise key results with reference to study objectives Pg#92 (3.5 Discussion)- "This study demonstrated significant improvements in IPV knowledge for mEDUCATE training participants post-training. Trainees' IPV knowledge, attitudes, beliefs, and behaviours, as measured by PREMIS scores, improved from baseline to immediately post-training on all scales and at six-weeks post-training on seven of nine scales."
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias Pg#96-99 (3.5.1 Limitations)
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence Pg#92-100 (3.5 Discussion, 3.5.1 Limitations, 3.6 Conclusions)
Generalisability	21	Discuss the generalisability (external validity) of the study results Pg#98-99
Other information		
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based N/A

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