Exploring the experiences of physiotherapists who engaged as knowledge users in integrated knowledge translation research partnerships related to balance measurement practices in Canadian hospitals: a qualitative descriptive study

by

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LAND ACKNOWLEDGEMENT

I, Cheryl Ann Moser, personally designed, conducted, and reported this research in Winnipeg, Manitoba which is located on Treaty 1 Territory. Treaty 1 Territory is the traditional land of the Anishinabe, Cree, Oji-Cree, Dene, and Dakota Nations. Manitoba is National Homeland of the Red River Métis; and Northern Manitoba includes the present and ancestral lands of the Inuit. I believe that acknowledging this truth is a small but critical step in building stronger relationships with Indigenous communities. I respect the spirit and intent of Treaties and the process of creating them, and I am committed to working in partnership with First Nations, Inuit, and Métis people.

ABSTRACT

Background: Integrated knowledge translation (IKT) is an approach to doing health research that engages academic researchers and knowledge users (KU) as equal partners. IKT intends to increase the chances that resulting research evidence will be useful to those engaged, striving toward improved health system functioning and public health outcomes. With this study, I set out to learn what physiotherapists (PTs) had to say about their experience engaging as KUs in an IKT research partnership related to balance measurement practices in Canadian hospitals.

Methods: I used basic qualitative descriptive research methodology, in vivo coding, and conventional content analysis to answer the research questions. Five PTs (n=5) who had engaged as KUs on three balance measurement studies in two provinces were purposefully selected. All five (n=5) participated in online semi-structured interviews. PTs were asked to describe their IKT engagement experience, identify environmental factors that affected their engagement, and discuss how their engagement influenced the research process and evidence use. PTs also characterized themselves using an independently completed pre-interview questionnaire.

Results: Participants described their experiences as positive, meaningful, and associated with benefits such as more clinical treatment options, greater sense of personal pride and professional recognition among PTs, increased research capacity for host organizations, and specific contributions to a body of knowledge. PTs said factors conducive to IKT engagement were supportive organizational culture, as well as devoted time, money, material resources, and human resources. PTs described their contributions to research as brokering trusting relationships; providing an insider point-of-view, project management, and resource coordination; and contributing to increased organizational capacity for research. Participants described how evidence-use was impacted by PT career-stage, individual risk perception, usefulness to the profession, organizational culture, treatment environment (especially since COVID-19 introduced pressures to deliver health care online), and third-party endorsement for change.

Conclusions: KU engagement in IKT health research partnerships provides researchers with increased clinical access, an insider point-of-view, and stronger research evidence. KU engagement increases the accessibility of resulting research evidence, but sustaining desired outcomes is another issue. The KU engagement experience is greatly affected by organizational culture. KU engagement concepts in IKT research partnerships must include feasibility and resource planning, as well as strategies for organizational change and risk management. PTs described external factors such as professional endorsement as being stronger influences on evidence use outcomes than research engagement. The IKT approach may be strengthened if issues related to change, risk, and resources are addressed early and often throughout the partnership.

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Several people and agencies helped to fund this work, especially during the COVID-19 pandemic, which extended the duration and associated costs of this study. Thank you to the University of Manitoba for awarding me the following: FKRM Graduate Assistance Scholarship; COVID-19 Bursary; FKRM Research Expense Fund; and the FGS Research Completion Scholarship. Thank you to the Integrated Knowledge Translation Research Network (IKTRN) for providing me with additional funding through the IKTRN Trainee Fund, which helped me to present this work, and the IKTRN Trainee Open Access Fund, which will help me to publish this work. Finally, I would also like to thank Dr. Sibley for sharing your own research budget with me and providing additional learning opportunities along the way. These generous acts meant I could take important moments to enjoy the process.

DEDICATION

My tireless pursuit of this degree is dedicated to my late mother, Cathy Lee Moser (1952 – 2022), who never survived the journey to see me graduate. Mama… you were my first and only true love. We often struggled to understand one another, but we never stopped trying. I wanted you here for this, to know that I could, and that I would be okay. With God, I did it! I hope you are proud of me.

“Love bears all things, believes all things, hopes all things, endures all things.”

1 Corinthians 13:7

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CHAPTER I: INTRODUCTION

Knowledge gained through health research offers tremendous potential to improve the health and well-being of Canadians (Graham et al., 2006, 2013, 2022; Bowen & Graham, 2013; Graham, Kothari & McCutcheon, 2018). However, barriers to translating knowledge into relevant, useful health policy and health care practice take time to understand and overcome in Canada's public health care delivery system (Bowen & Graham, 2013; Gagliardi & Dobrow, 2016). The way in which health research is conducted is among the barriers (Bowen et al., 2019; Graham et al., 2006, 2013, 2022). For example, the COVID-19 pandemic showed us that scientific collaboration to address complex health and social problems can result in fast, effective, sustainable solutions (Bernardo et al., 2021; Brouwers et al., 2021; Dix-Cooper et al., 2021; Groot et al., 2021; Khalil et al., 2021). COVID-19 prompted unprecedented information sharing and stimulated a substantial rise in health research partnerships among academics, publishers of scientific research, government and health agency representatives, private enterprise, and members of the public to accelerate research (Bernardo et al., 2021). Globally, these partnerships resulted in advanced medical practices for hospitalizations, disease transmission and vaccine research, globalized and regionalized public health policy, and innovation in the design and delivery of personal protective equipment for various populations (Bernardo et al., 2021). In Canada, distinct COVID-19 research collaboratives among academics, clinicians, and policymakers in each of Ontario, Saskatchewan, and British Columbia provide further examples of how working together can result in fast, effective evidence-informed health policy and practice (Brouwers et al., 2021; Dix-Cooper et al., 2021; Groot et al., 2021). The impetus to realize greater, timely returns on health research investments, especially in the wake of COVID-19, is driving interest in new ways of doing health research (Bowen & Graham, 2013;

Gagliardi & Dobrow, 2016; Gagliardi, Kothari & Graham, 2017; Kothari, McCutcheon & Graham, 2017; Nguyen et al., 2020; Graham et al., 2022). One approach to health research that is helping to achieve these aims, is called “integrated knowledge translation”, or “IKT” (Bowen & Graham, 2013; Gagliardi & Dobrow, 2016; Bowen et al., 2019; Brouwers et al., 2021; Dix-Cooper et al., 2021; Graham et al., 2013, 2022).

Background

IKT is an approach to health research that was founded in Canada as a way of engaging academic researchers and knowledge users (KUs) as equal partners (Nguyen et al., 2020; Graham et al., 2013, 2022). A KU is generally considered a specialized stakeholder with decision-making power in Canada’s health care delivery system who is positioned to affect change (Graham et al., 2022; Nguyen et al., 2020). KU engagement in IKT research refers to a deliberate, respectful, mutually beneficial relationship among partners who share decision-making power in the conduct of research and knowledge translation processes (CIHR, 2023; Graham et al., 2022). IKT shares some features with other research partnership strategies, such as community-based participatory research (CBPR), engaged scholarship, Mode-2 research, planned action research, and research co-production (Nguyen et al., 2020; Graham et al., 2009, 2013). IKT stands out for being the only approach founded within a Canadian health care research and system implementation context (Nguyen et al., 2020). With its underpinnings in planned action theory, IKT explicitly aims to increase knowledge use by helping decision-makers affect the likelihood of change in specific environments (Nguyen et al., 2020; Graham et al., 2022). I see IKT as helping to engineer change in limited social contexts, but with broader impacts on health system functioning and public health outcomes as the approach becomes refined. For example, IKT often takes place among small groups of researchers and KUs investigating one issue in health at a time. However, each partnership offers insights into broader contextual and procedural factors that affect change. In my thesis I wanted to explore some of these ideas further using a specific example of the IKT approach to researching and advancing a particular issue in health care.

With this study I aimed to explore the experiences of physiotherapists (PTs) who had engaged as KUs in IKT health research partnerships that investigated balance measurement practices in public hospitals in Ontario and Manitoba, Canada. A relatively recent series of IKT health research partnerships led by Canadian academic researcher Dr. Kathryn Sibley provided me a convenient sample with which to explore the KU experience from a PT lens and from within a relatively consistent health care context. Since 2014, Dr. Sibley has conducted research studies in partnership with PTs using the Knowledge-to-Action Framework (KTA) to guide her research program (see Figure 1). These studies have focused broadly on knowledge translation science that aims to optimize balance and fall prevention in older adults, and more specifically on clinical behaviors related to balance measurement practices among PTs in Canadian public hospitals. All studies share a focus on reactive balance assessment, which is a critical, functional skill of relevance to physiotherapy practice with the potential to improve public health outcomes related to falls risk among older adults (Sibley et al., 2018). Her IKT health research partnerships with practicing PTs addressed ways of identifying an issue in health care; assessing barriers to knowledge use; adapting research to the local context; selecting, tailoring, and implementing interventions; monitoring use; evaluating outcomes; and sustaining knowledge use (Sibley et al., 2018). PTs working in Canadian rehabilitation hospitals represent a unique population of health care providers by virtue of the socioecological conditions in which they work, and the complex, ongoing nature of their physical interventions with patients. Although research has come a long way in defining and refining the IKT approach (Graham et al., 2022; Nguyen et al., 2020), we are still learning about the KU engagement concepts, environmental factors, and participation dynamics that allow the IKT approach to accomplish its stated aims in rehabilitation, specifically in physiotherapy. Through the qualitative descriptive exploration of PT experiences partnering in research, this study aimed to advance the science and practice of the IKT approach to health research partnerships in physiotherapy.

At the time I was engaging PTs for this study, Canada had 27,004 PTs licensed to practice (CIHI, 2022). Of those, most PTs (70%) were in clinical practice, practiced at least 11 years (65%), identified as female (70%), and were an average ~42 years of age (CIHI, 2022). In public hospital settings, rehabilitative services are prescribed and provided to both inpatients and outpatients. Inpatients are generally among the oldest adults in the population, they are on a fixed income, and they present with frailty and other comorbidities that make personal care and activities of daily living difficult to impossible (CIHI, 2022). Inpatients may require physiotherapy related to balance issues stemming from neurological impairments including dementia or musculoskeletal impairments including hip and spine fractures (CIHI, 2022). Outpatient populations have changed since the COVID-19 pandemic. Prior to the COVID-19 pandemic, outpatient populations were comprised of a larger proportion of younger, healthier people who required physiotherapy for balance issues stemming from such events as surgery or trauma to the brain and spine (CIHI, 2022). Since the COVID-19 pandemic, outpatient populations have become comprised of a larger proportion of older adults with limited or fixed incomes who are discharged from hospital with advanced disease states and greater degrees of acuity and frailty (CIHI, 2022). These data point to changes in the way Canada’s public health care delivery system decides which patients receive physiotherapy, where patients receive physiotherapy, and whether patients pay for physiotherapy. These data also point to impacts on the physiotherapy profession and the people depending on it. I think we can generally acknowledge that changing patient population profiles, altered person-to-person interactions, emergent online technologies, and pressures to adapt care environments are straining health care providers in ways difficult to predict or understand. I believe IKT health research that deliberately engages PTs as equal partners is an efficient way of addressing the complex factors that bely health care decisions while driving toward a stated health care aim.

Research questions

I set out to investigate the PT perspective on KU engagement in these IKT health research partnerships with three main aims. (1) I wanted to know about the PT experience with being engaged as a KU in the IKT health research partnership (i.e., *what happened?*). (2) I wanted to know about features in the environment that affected PT engagement in the IKT partnership experience (i.e., *what enabled it to happen?*). (3) I also wanted to know about PT perceptions of KU engagement, the IKT partnership process, and whether or to what extent the resulting research evidence is still being used (i.e., *what do you think?*). I hope this study provides useful advice to researchers and their partners on how to engage PTs and other similar KU groups deliberately and efficiently in IKT health research partnerships, especially in hospital settings from within the Canadian public health system. I use “deliberate” to describe an informed approach to KU engagement that is specific to the IKT approach to health research in Canada’s public health system context, and “efficient” to describe an informed approach to KU engagement that considers concepts related to feasibility, risk, culture, change, and resources. I hope this research evidence helps adopters of the IKT approach consider the factors that PTs say influence their long-term use of new research evidence in practice and how this might extend to other similar KU groups. Finally, I hope this research evidence better aligns KU engagement processes with broader sustainability efforts in health system change.

CHAPTER II: LITERATURE REVIEW

I examined peer-reviewed English-language literature in July 2020 in preparation for my proposal defense, and I updated my review in July 2023 to prepare for the defense of this thesis. I wanted to see how the IKT approach had been used in Canada in the last few years. I focused on papers that either addressed an issue in IKT scholarship or used the IKT approach in practice to research an issue in health affecting a Canadian adult, non-Indigenous population. Studies in IKT scholarship described specific advancements in the way we understand and apply the IKT approach, whereas studies in IKT practice described health research partnerships that took an IKT approach to accomplish stated research aims in Canadian public health settings. Since IKT was first proposed, proponents and adopters of the IKT approach have committed to examining its relevance (Graham et al., 2006, 2013, 2022). The literature has advanced from questioning the boundaries of IKT and its effectiveness to focusing on the conditions under which the IKT approach is most likely to accomplish its stated aims (Kreindler, 2020). The literature now describes nuanced IKT health research partnership strategies for special populations such as Indigenous communities, children, youth, and families (Graham et al., 2022). My literature review begins with a discussion of the origins of IKT and its evolving boundaries, to the current state of IKT scholarship and IKT practice in rehabilitation and physiotherapy.

IKT origins

Early discussions of an “integrated” approach to health research gained prominence in the sentinel article “Lost in Knowledge Translation: Time for a Map?” published by field pioneers Graham et al., 2006. This paper has now been cited more than 5,000 times with implications for researchers and decision-makers in health care. The authors described costly knowledge-to-practice gaps and proposed a new vision for knowledge creation and knowledge use in health care with the Knowledge-to-Action (KTA) framework (see Figure 1).

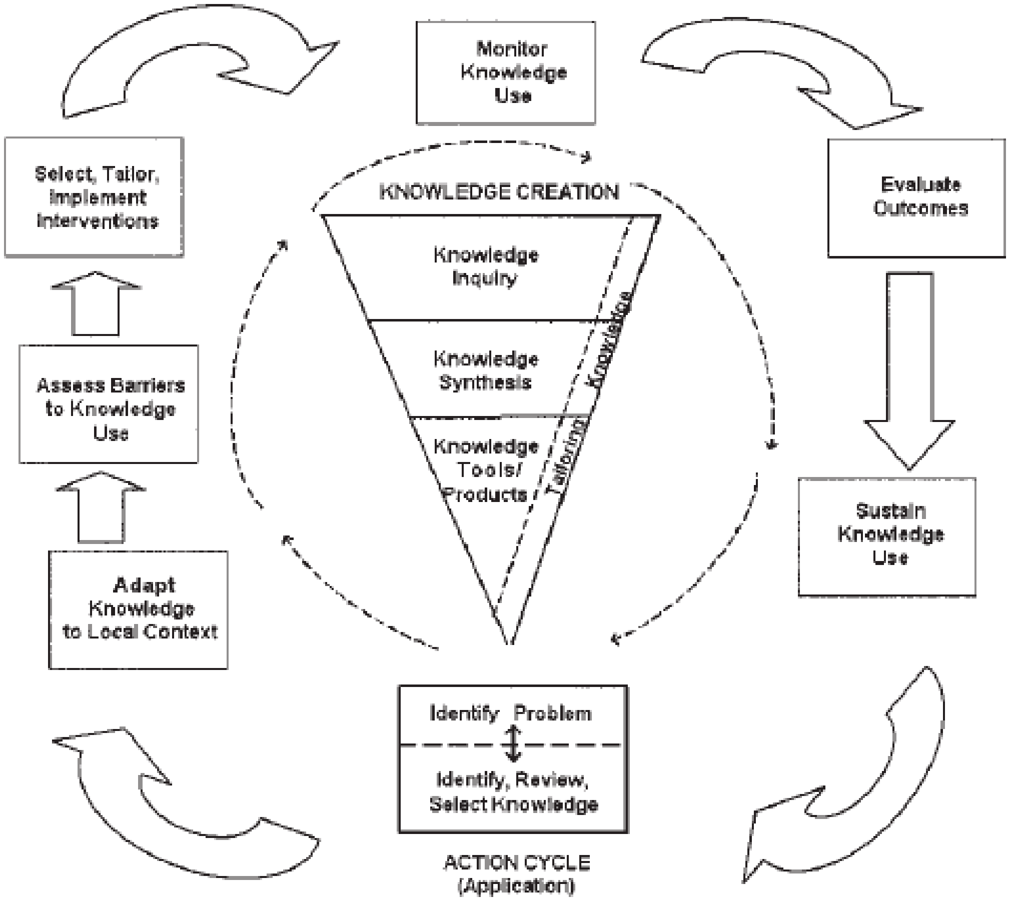


FIGURE 1. Knowledge-to-Action (KTA) conceptual framework, original illustration.

Source: Graham, I. D., Logan, J., Harrison, M. B., Straus, S. E., Tetroe, J., Caswell, W., & Robinson, N. (2006). Lost in knowledge translation: time for a map?. Journal of continuing education in the health professions, 26(1), p.7.

A 2016 scoping review of the literature from 2005-2014 by Gagliardi et al. was a critical synthesis and among the first to characterize engagement with decision makers in the context of IKT research partnerships and identify early gaps in the field (Gagliardi et al., 2016). The authors identified 13 eligible articles from countries including: Canada (n=4); Lebanon (n=1); Netherlands (n=1); Sweden (n=1); United Kingdom (n=4); and the United States (n=2). Most of these IKT research partnerships were based on inclusion criteria from government funding agencies.. Most KU engagement in IKT research partnerships included meetings, presentations, and workshops, but the timing, frequency, duration, and nature of those engagements was not reported. How partnerships were initiated or led was not reported; nor were strategies for identifying and selecting partners, nor ways of engaging them in research These authors said that neither relationship quality nor mode of engagement could be associated with IKT research impacts and outcomes due to reporting challenges. The most reported outcome was increased capacity for research. Identifying and describing KU engagement strategies and standardized methods for evaluating them were identified as areas for future research.

Many ideas about KU engagement in IKT research came from established research partnership approaches, such as community-based participatory research (CBPR). A 2017 critical examination of IKT and CBPR by Jull, Giles & Graham described the democratic ways these collaborative research approaches strive toward the co-creation and integration of knowledge in health systems (Jull, Giles & Graham, 2017). Three points of convergence and divergence were identified by these authors in the areas of motivation, social location, and ethics. First, both IKT and CBPR are processes that converge on their motivation toward the co-creation of knowledge for the benefit of society; however, where IKT is focused on creating usable knowledge, CBPR is focused on achieving social justice. Second, both IKT and CBPR converge on their attention to meaningful KU engagement in research; however, with respect to social location, their origins are different. IKT emerged from within a health system context, whereas CBPR emerged from within a grassroots community context, and although both are solution-driven, they diverge in their overall aims. IKT aims to research and resolve issues in health care whereas CBPR aims to research citizen-identified health and social problems and resolve injustices. Third, with respect to ethics, both IKT and CBPR converge on being disruptors of the way health research involving people is done. However, these approaches diverge on their attention to power relations among research partners. IKT did not originate to resolve power differentials, but CBPR did. Where IKT seeks to empower KUs toward knowledge cocreation with shared decision-making throughout the research process, CBPR seeks to establish an equitable balance of power and careful, mutually beneficial relationships among research partners and the communities they represent. Divergence in attention to power relations results in a unique balance of benefits. Increased capacity for research is a commonly reported benefit with both IKT and CBPR partnerships, but who or what benefits from capacity-building is different. With IKT, capacity-building takes place at individual, procedural, and organizational levels; that is, creating more opportunities for KU engagement in IKT research processes, and setting the stage for future research to occur in previously engaged health care environments. With CBPR, capacity-building ideally takes place at individual and community levels, increasing the likelihood that similar people and communities will engage in future research. These three distinctions in motivation, social location, and ethics related to power relations give rise to important considerations in the selection of an appropriate partnership approach to health research.

IKT scholarship

I define IKT scholarship as research that is designed with the aim of advancing the science and practice of IKT. In 2017, IKT scholars proposed a research agenda that calling for investigations into the processes, roles, determinants, and research designs that were becoming organic to the IKT approach (Gagliardi, Kothari & Graham, 2017). The IKT scholarship agenda called for common language, effective processes, appropriate roles, ways to support people and organizations, ways to measure impacts and system changes, and clarity with reporting (Gagliardi, Kothari & Graham, 2017). Among the ways IKT scholarship has advanced through new work includes: describing theoretical underpinnings of IKT; distinguishing IKT from other research partnership approaches; providing ways of planning and operationalizing IKT; teaching trainees how to apply IKT; understanding reasons for engaging in IKT; identifying which KU groups are being included and excluded from IKT research partnerships; engaging knowledge brokers in IKT; offering approaches for KU engagement; developing IKT theories, models, and frameworks; evaluating IKT impacts and outcomes; understanding COVID-19 impacts on IKT partnerships; and understanding issues in IKT partnerships related to power, place, and sustainability (Boland et al., 2020; Cardwell et al., 2021; Cassidy et al., 2021; Chowdhury et al., 2021; Crosschild et al., 2021; Foord, 2021; Hoekstra et al., 2020; Hoekstra et al., 2022; Holmes, 2020; Kontak et al., 2023; Kriendler, 2020; Ludwig et al., 2020; Laberge et al., 2020; McLean et al., 2023; Medeiros et al., 2022; Mrklas et al., 2023; Mrklas et al., 2023; Pelletier et al., 2020; Nguyen et al., 2020; Sibley et al., 2022; Sibley et al., 2023; Tittlemeier et al., 2023; Verville et al., 2021; Wine et al., 2022; Yeung et al., 2021; Zych et al., 2020). Standards for IKT reporting remain vague, but the tendency for authors to include detail about their IKT approach has improved, resulting in IKT studies with more replicability. My discussion here centres on articles that helped satisfy the current research agenda for understanding IKT research partnership concepts in Canadian health care, which is helping others to interpret and apply the IKT approach, including in rehabilitation and physiotherapy contexts.

IKT has been described a context dependent experience with context dependent outcomes. Hoekstra et al., 2020, conducted a review of reviews to synthesize global health research partnership literature from inception to 2018 (Hoekstra et al., 2020). They considered CBPR, PAR, and IKT approaches among others and synthesized the literature into 17 principles used to guide partnerships, 11 strategies used for research coproduction, and 20 impacts and outcomes that were realized at several levels. These three categories of overarching principles, strategies, and impacts and outcomes were further grouped into subcategories. Principles and strategies included subcategories for: relationship between partners; co-production of knowledge; meaningful stakeholder engagement; capacity-building, support, and resources; communication process; and ethical issues related to the collaborative research activities. Impacts and outcomes included five subcategories: researchers; KUs; the partnership; broader community or society; and the research process. Overall reports were positive. Research partners said the experience was beneficial, gaining capacity, knowledge, skills, and experience in research, and producing quality results. Some reports were negative. For example, at the individual level some partners felt an increased burden of stress related to time, budget, and power relations; at the relationship level, there were some reports of conflict among partners; at the project level, there were concerns for biased data. Special populations such as children and youth, parents, people with cognitive disabilities, and ethnic groups who partnered in research had unique issues related to tokenism, disempowerment, and feeling overburdened in the research process. Across all categories and subcategories, these authors asserted that health research partnerships are highly contextualized experiences, and that the principles, strategies, and impacts and outcomes of partnership are context dependent.

IKT has been distinguished from other approaches to health research partnerships. Nguyen et al., 2020, compared IKT to CBPR among other similar approaches including engaged scholarship, Mode-2 research, knowledge coproduction, and participatory action research (PAR). Four characteristics distinguish IKT. (1) IKT is the only approach to doing research that was established from within a health care context. Specifically, and uniquely, IKT was pioneered within the Canadian public health care delivery system to start gaining efficiencies. (2) In terms of research scope, IKT has an implementation component that drives focus on achieving specific ends such as knowledge use and impact. This uniquely includes the improvement of health care delivery systems, and innovations in health care products and services**.** (3) IKT as an approach to doing research in partnership with others is epistemologically neutral and works well within other scientific research philosophies. IKT as an approach to knowledge cocreation among researchers and KUs leans into social constructivism. (4) The term “knowledge users” is unique to IKT. IKT stands apart for explicitly engaging KUs throughout the research process in an equal or equitable role, and for an explicit focus on engaging KUs who are positioned to influence change or implement resulting research evidence.

We know more about how, when, and why IKT research partnerships happen, and under which conditions they can succeed in accomplishing stated aims. Hoekstra et al., 2022, investigated these ideas using SCI research partnerships in rehabilitation. These authors looked at a few specific roles people occupy in IKT research partnerships, such as those researchers and KUs who are regarded as leaders, champions, or early adopters in the relationship. They pointed to the Rogers Diffusion of Innovations Theory to explain the unique set of personality characteristics and role these individuals have in catalyzing interest and adoption of new ideas. Discussion centred on the importance of understanding why these people are motivated to engage in partnership research in SCI health. Three reasons were offered. (1) Fundamental attitudes should be constructivist. Viewing people with SCI as valued experts and coresearchers promotes meaningful contributions from those historically excluded from research. (2) Inspiration should come from close role models. Supervisors and peers with a history of research engagement are key to inspiring and leading others to engage. These leaders were driven by moral reasons to create change. (3) Partners should have opportunities to build relationship and interact face-to-face. KUs engaged as partners in research who do not occupy leadership roles were motivated by aspects of autonomy, relatedness, and competence that they got out of the experience. Moore & Graham, 2022, published a commentary on the social and physical infrastructures required in research partnerships in physical and rehabilitative medicine to increase the likelihood of success. The authors viewed IKT in rehabilitation through an evidence-based practise (EBP) lens, explaining EBP as an impetus to adopt IKT, and framing comments around implementation goals. Social and physical environments were identified as critical to supporting IKT research and implementing results. Ways people contribute to an ecology of partnership research in rehabilitation were organized into KU groups, such as: funders of research; funders of health care; educators and educational institutions; organizations, individuals, and teams; the people who pay for physical medicine, and the people who consume physical medicine. IKT implementation strategies had similar aims to build a culture of collaborative research by directing resources to areas that would incentivize, support, and reward participation.

The IKT approach, with Eurocentric origins in a colonialist Canada, has been criticized for neglecting aspect of health equity. Now we have tools to help with consciousness raising in IKT research partnerships. Sibley et al. took an IKT approach to developing and user acceptability testing tools for incorporating intersectionality in IKT research (Sibley et al., 2022). Individual experiences with either privilege or oppression may be situational or circumstantial. For example, certain populations, such as Black women, face multiple forms of intersecting oppression within health care systems and health research paradigms resulting in health and healthcare disparities when compared with their white women counterparts. Since the IKT approach has social and environmental components that scholars are helping to refine and improve, there are opportunities to address certain individual experiences by incorporating a suite of tools that guides intersectionality in IKT partnerships. These tools provide guidance on which people to engage in IKT research, and how people are engaged in partnership.

Federally and provincially funded health research partnerships have common characteristics that have trended over time. Sibley et al. conducted a retrospective analysis to understand the landscape of partnership work in Canada from 2011-2019 (Sibley et al, 2023). The aspects of health care being investigated with the IKT approach had changed over this period of review, resulting in more health care issues being investigated. Most early studies were centred on issues in health care in primary care, but the breadth of later studies indicates the IKT approach is appealing to more fields. The way health sciences research is funded had changed, resulting in fewer partnerships overall. Larger grants are administered to fund larger, multiphased projects over longer periods. This change has led to efficiencies within research agendas but reduced the total number of people and teams engaged in health research.

IKT often includes use of theories, models, and frameworks. Tittlemeier et al. scoped the literature to characterize the types of tools being used in research partnerships, and the ways they were being used (Tittlemeier et al., 2022). Only 5% of the identified models and frameworks were founded on theory, with the rest developed from literature reviews. Models and frameworks were most frequently used by researchers in health research partnerships to guide or manage aspects of the partnership itself, such as KU engagement. Concepts related to KU engagement in health research partnerships had been identified by Jull et al. (Jull et al., 2019), which these authors used in their analysis. People most often used models and frameworks to guide ethical procedures in partnership research with specific focus on principles and values, followed by relational processes, and ways to prepare and support KUs. People least often used models and frameworks to guide methodology, which is, perhaps, methodologically consistent with the intentionally flexible IKT approach.

Gaps exist between KU engagement concepts in partnership research and ways of measuring them, but now we have a better sense of which aspects of health research partnerships are being assessed, and how assessments are being made. Mrklas et al. conducted a systematic review to understand how partnerships were being assessed for their impacts and outcomes, and which measurement tools were being used (Mrklas et al., 2022). Although a range of partnership assessment tools are being used, few are either based on theory or pragmatically validated for the scientific advancement of partnership research. Most studies reported long-term outcomes rather than short-term impacts, although the words used to describe what was meant by outcomes and impacts were poorly defined and conceptually confused. For example, there is temporality to these measures, but that was not always reflected in measurement tools or reports. Outcomes tended to be reported at individual and partnership levels, whereas impacts were reported at individual and organization levels. Both outcomes and impacts were reported in terms of personal, functional, and contextual effects, but only outcomes were reported in terms of structural effects. Outcomes and impacts were mostly positive and related to knowledge, skills, and capacity-building. Negative reports were related to insufficient leadership, poor relationship quality, and poor engagement quality, with negative effects at the individual level. As the use of partnership approaches to researching issues in health care broadens, there is a growing need for pragmatic, psychometrically-sound tools to measure what are ultimately returns on research investments in health care.

To justify the continued use of IKT and other partnership approaches to health research, we need to know which aspects of partnership drive projects to accomplish stated aims. Mrklas et al. conducted a systematic review to create a list of the globally available, validated tools for assessing the impacts and outcomes of health research partnerships (Mrklas et al., 2023). Newer professional practices or disciplines, such as the IKT approach to partnership research, often undergo a pragmatic process of scientific validation. Field scholars identify concepts that decide the utility, degree of effectiveness, and overall value of the practise, and then find ways of measuring them. Return on investment in IKT research, for example. These authors identified 58 tools from the literature. Tools were designed to assess partners, communities, researchers, patient populations, advocacy groups, as well as members of public. Nearly all tools assessed aspects of partnership process. Some tools had the psychometric and pragmatic strength deemed acceptable to the partnership research field. Pragmatic criteria included: scientific rigour, partner perspectives, comprehensiveness with respect to context and process, and usability. Few tools assessed outcomes and impacts, terms that are consistently confused in the literature, but that are conceptually critical to understanding the extent to which research partnerships achieve their stated aims. In IKT research, the terms have temporality and context sensitivity. IKT research impacts are immediate and short-term, whereas outcomes are late and long-term. Perceptions range in terms of who and/or what is impacted and how or when to measure those outcomes, making these concepts contextually dependent.

KU engagement in IKT research partnerships in rehabilitation has previously been described. A 2015 scoping review of studies from 2003-2009 by Camden et al. remains the earliest and most comprehensive report I have found to specifically describe KU engagement in rehabilitation research partnerships (Camden et al., 2015). These authors reported that initial interest in KU engagement concepts in rehabilitation research emerged in 2003 from high income countries including Canada. Various KU types were identified as partners including people with lived experience and occupational therapists, but there was no specific mention of engaging PTs as partners in research. KU engagement issues were present at all stages of research, starting with who to engage and how to engage them, and later with incentivizing and supporting engagement. KU engagement strategies and research outcomes were rarely evaluated, but perceived outcomes included increased KU empowerment in research and more applicable research results. These authors suggested that future research identify effective KU engagement strategies with measurable outcomes.

Examination of KU engagement in IKT research partnerships in rehabilitation and physiotherapy has grown. Roberge-Dao et al., 2019 conducted a mixed methods study including document reviews, surveys, and interviews with clinicians to investigate the impacts, outcomes, and experiences of 53 funded IKT research partnerships in rehabilitation in Quebec, Canada from 2009. This was very different from the Camden review (Camden et al., 2016), which was secondary research of existing papers on the topic from sources worldwide. These authors identified four themes about these IKT research partnerships. (1) Project planning included framing each project within a greater organizational effort (e.g., such as an organizational mandate to reduce falls that gives rise to research about falls, assessing falls, caring for falls, etc.). Project planning also included using an established model or framework to guide effort and preparing for sustainable practice change early in the process to maximize return on effort. (2) Intended and unintended outcomes were hard to measure because the IKT research process and products impact on different people and organizations differently, sometimes reach was limited to the KUs who were engaged and later became agents of change, and whether target audiences were affected by broader dissemination efforts was unknown. (3) IKT research projects may be considered successful in different terms, such as whether impacts were immediate, realized over the short-term or long-term, or whether impacts were sustainable, making assessment ambiguous. (4) Important considerations for IKT research partnerships with clinicians in rehabilitation included understanding clinical context because organizational structures can help or hinder research, understanding individual clinicians' reasons for engaging as KUs in research partnerships may impact on downstream effort to sustain results, and ensuring all research partners understand what is feasible to do in research and with the results.

IKT practice

I define IKT practice as research that uses the IKT approach to investigate an issue in health care. A range of people connected by disease, such as people with lived experience and their caregivers, advocates, and health care providers have been engaged as KUs in in Canadian

IKT health research partnerships. For example, since 2020 people with systemic diseases affecting the brain, heart, lungs, kidneys, musculoskeletal system, and nervous system were among those engaged as partners in IKT research, as were people with financial insecurity and those living in remote and rural areas with reduced access to healthcare (Barn et al., 2023; Boychuck et al., 2020; Cardwell et al., 2020; Clewes-Lawrason et al., 2022; Cossette et al., 2020; Davis et al., 2022; Dix-Cooper et al., 2021; Dixon et al., 2022; Donald et al., 2023; Elliott et al., 2021; Gainforth et al., 2021; Howard et al., 2023; Keefe et al., 2020; Lau et al., 2021; Linkewich et al., 2022; Lewis et al., 2022; Massougbodji et al., 2022; Ma et al., 2020; Mendelson et al., 2021; Miller et al., 2021; Munro et al., 2021; Nykiforuk et al., 2023; Oelke et al., 2021; Rochette et al., 2022; Sanderson et al., 2022; Sherman et al., 2022; Strong et al., 2021; Sweet et al., 2021; Tomasone et al., 2020; Terbilcock et al., 2022; Verville et al., 2022; Ruest et al., 2020; Suderman et al., 2020; Wideman et al., 2022). These IKT research partnerships investigated a range of issues in health care, with some projects establishing research agendas including priority areas for future partnered research. Some examples included peer support programming and physical activity interventions, online tools for self-managed care, nonpharmacological therapies, and overcoming access-to-care barriers. Few articles addressed IKT health research partnerships among researchers and clinicians in rehabilitation settings, and the literature on associated impacts and outcomes was equally scarce. My discussion about the IKT practice literature is focused on those IKT studies that took place in rehabilitation contexts, especially in physiotherapy settings.

IKT practice has advanced with increased reporting consistency of methods and results, which are aspects of the IKT research practice that had been neglected in the past. Unlike early IKT research papers, newer studies explicitly described KU engagement formats, activities, and the resulting knowledge products. Researchers got creative with engaging a range of KUs in research, and people found more meaningful ways to work together that embraced new technologies. The ways people came together for IKT research had expanded from meetings, presentations, and workshops to include a range of engagement formats, such as: program appraisals; case reviews; nominal group technique; hackathons; digital storytelling; network mapping; and advising search strategies for various types of reviews (Barn et al., 2021; Boychuck et al., 2020; Cardwell et al, 2020; Cardwell et al., 2021; Howard et al., 2023; Ludwig et al., 2020; Oelke et al., 2021; Rochette et al., 2022; Sanderson et al., 2022). As a result, knowledge products became more diverse and had greater utility within specific groups of people. Among the knowledge cocreations to emerge from KU engagement the past few years were online and app content; clinical tools, procedures, and programs; practise guidelines; COVID-19 responses; research dissemination programs; and numerous research codesigns (Davis et al., 2022; Donald et al., 2021; Dix-Cooper et al., 2021; Cossette et al., 2020; Lau et al., 2021; Massougbodji et al., 2022; Miller et al., 2023; Munro et al., 2021; Nykiforuk et al., 2023; Sherman et al., 2022; Strong et al., 2021; Sweet et al., 2021; Suderman et al., 2020; Trebilcock et al., 2022; Vervilee et al., 2021; Verville et al., 2022). Some of the problems KUs worked in partnership to resolve with the IKT approach itself included ways of identifying research topics and research partners. They did this by establishing principles to guide partnership, research agenda setting, establishing priority research areas, and strategic planning for Canada’s top health advocacy organizations (Elliott et al., 2021; Keefe et al., 2020; Lewis et al., 2022; Mendelson et al., 2021; Tomasone et al., 2020).

Six articles described recent IKT research partnerships in rehabilitation. Three papers addressed issues in health care in physiotherapy (e.g., physical activity interventions; access to stroke rehabilitation; pain education in physiotherapy programs); two addressed issues in spinal cord injury (e.g., partnership guidelines; physical activity interventions); and one addressed an issue in occupational therapy (e.g., bathing equipment selection in home care). Ma et al. engaged ~300 Canadian PTs and people living with spinal cord injury (SCI) as KUs in IKT research to codevelop a physical activity intervention (Ma et al., 2020). Most KUs were engaged independent of one another, and from locations convenient to each person rather than clinical settings. KUs were engaged in a literature review, interviews with people with SCI, an online survey of PTs, an expert panel, and a randomized controlled trial (RCT) of the codeveloped intervention. Authors were unclear about how PTs contributed to the codesign of the intervention. Authors said the RCT component was led by PTs in clinics to assess program feasibility in rehabilitation settings and will be reported in a future article. Despite guidance for KU engagement in IKT research from the literature, Ma et al. did not identify or describe principles or strategies for engaging PTs as equal partners and making decisions, and they did not report on impacts and outcomes of the IKT research partnership experience. Linkewich et al. used the IKT approach with clinicians at five rehabilitation hospitals in Toronto to improve access to inpatient rehabilitation for people post-stroke with cognitive impairment (CI) (Linkewich et al., 2022). KUs included PTs, occupational therapists, speech-language pathologists, nurses, and health care providers with a direct role in post-stroke care. KUs were engaged in the development, implementation, and evaluation of a cognitive intervention aligned with Canadian Stroke Best Practice Recommendations for cognitive rehabilitation (Linkewich et al., 2022). KU engagement activities included a workshop and clinical implementation. Environmental supports included in-person meetings; onsite visit from a protocol instructor; physical resources; infrastructure support; regularly scheduled teleconference meetings; onsite consolidation sessions; sustainability planning; onsite leadership and champions for change. Evidence use outcomes were determined at two levels. Upstream impact included KU-reported increases in knowledge, skill, and confidence with treating people with post-stroke CI. Downstream impact included an increased use of rehabilitation care by people with post-stroke CI, although authors said the increase could be attributed to other variables. KU experiences will be discussed in a future paper. Wideman et al., 2022, used the IKT approach to codevelop a pain education template for integration with Canada's formal PT education programs. This was the first in a multi-phase study. This was not a clinical study. KUs included people living with pain, PT educators and directors from each Canadian PT program, leaders of Canada's national professional association for PTs, as well as current PT students and recent graduates. None of the PTs engaged were practicing. KUs were engaged in a consensus-building process that included a meeting and interviews. Engagement experiences and features of the research environment were not described. Research resulted in a strategic plan for improving pain education in Canadian PT education programs, which is informing subsequent phases of the study, including curriculum codevelopment, implementation, and evaluation. This KU group included people at a late training and early career stage in physiotherapy, which was unique compared with other IKT studies in rehabilitation. However, what struck as odd is the lack of engagement with experienced PTs in clinical settings for this study, since educational programming has delayed but persistent effects on health care delivery over the course of a PTs career.

Another related set of articles in rehabilitation, spinal cord injury (SCI), also used an IKT approach to research. These articles were relevant by proxy because they demonstrated another aspect of rehabilitation that was using IKT to address issues in health care for a specific neurological patient population. These articles were useful because they schematized IKT. For example, Gainforth et al., 2021, used IKT to codevelop guiding principles for engaging people with SCI as partners in research. KUs were engaged in a multidisciplinary expert panel over two days, follow-up surveys, and through an online feedback portal. KUs included SCI researchers, clinicians (unspecified), people living with SCI, representatives from community-based SCI groups, health care policymakers, professional organizations, funders of SCI research, and industry partners. Neither experiences nor environments were described. Evidence included a document of guiding principles for conducting and disseminating future SCI research in partnership. Authors plan to evaluate future projects for their adoption of the guiding principles. For example, Clewes-Lawrason et al., 2022, adopted the principles to guide KU engagement in their IKT research to support physical activity among people living with SCI who walk. KUs included people living with SCI and representatives from community-based SCI groups who were engaged to codevelop physical activity content for a mobile app. Authors did not indicate whether PTs were among those engaged. KU engagement included activities centred around planning and developing app content; however, details were not provided. The research environment was not described, but this was not clinical research. Authors indicated future research to engage KUs in user acceptability testing (UAT) and evaluation of app content. Ruest et al., 2020, situated their IKT research in occupational therapy to make recommendations for bathing equipment and personal hygiene equipment selection. KUs included occupational therapists and their supervisors, as well as people using public homecare services. KU engagement included case study reviews, semi-structured interviews, and focus groups. Although the research environment was not described, engagement experiences were assessed and reported for patient partners in relation to KU perceptions of the IKT process. Occupational therapists and their supervisors were not included in the assessment of engagement experiences or perceptions of the process, leaving an ongoing gap in what we know about IKT research from the point of view of those working in rehabilitation settings.

IKT practice in physiotherapy

Dr. Sibley is a Canadian researcher who has adopted an IKT approach to health research partnerships in rehabilitation. Her work is situated in the physiotherapy domain where she commonly partners with PTs to do health research. Dr. Sibley launched three research projects that took an IKT approach with PTs who were engaged as KUs in the process. I will collectively refer to the three IKT health research partnerships led by Dr. Sibley as “the Sibley Studies” from this point forward. Each of the five PTs were engaged in the three Sibley Studies to investigate the balance measurement practices taking place on their respective units in Canadian public rehabilitation hospital settings. The IKT research projects were conducted at five health care delivery sites in two Canadian provinces: three sites in Ontario (n=3), and two sites in Manitoba (n=2). All three IKT research projects had the following characteristics in common: 1) Dr. Sibley was the lead researcher; 2) she took an IKT approach to health research partnerships; 3) PTs were engaged in the health research partnerships as KUs from conception through completion; 4) the research partnerships investigated balance measurement practices; 5) the research partnerships took place in Canadian hospitals; 6) the research partnerships aimed to advance balance measurement practices among PTs in Canadian rehabilitation hospitals. One of the IKT projects took place at three sites in Ontario, Canada. This study aimed to increase use of reactive balance measurement through a 12-month intervention that engaged PTs at three sites in Ontario (n=3) and included group meetings, champions, and health record insertions (Sibley et al., 2016; Sibley et al., 2018; Beauchamp et al., 2021). At the three Ontario sites, research partners conducted an uncontrolled, before-and-after study to determine whether an implementation intervention for physiotherapists resulted in increased evidence use (i.e., greater reactive balance measurement). Primary study findings were published in 2018. Research partners evaluated the proportion of medical records with a documented reactive balance measure and found that reactive balance measurement was 31% greater than baseline during the IKT research collaboration, but only partially sustained at 19% greater than baseline once the collaboration had ended (Sibley et al., 2018). The second IKT project took place at a Manitoba site (n=1), where research partners aimed to establish validity and reliability for a balance measure in outpatient stroke rehabilitation, and to explore how training and collecting study data influenced PT perceptions about balance measurement and their use of a balance measurement in clinical practice. Research partners conducted a psychometric pre/post evaluation of PT perception. Primary study findings were submitted for publication in 2020, with one study published (Beauchamp et al., 2021) and another in review. The third IKT project took place at a (n=1) Manitoba site. These research partners aimed to establish validity and reliability of a balance measure in inpatient geriatric rehabilitation, and to explore how training and collecting study data influenced PT perceptions of balance. Data collection is ongoing. However, the study was suspended due to COVID-19 and remains suspended due to staff turnover with plans to resume next year, in 2024.

Summary

Within the broader field of knowledge translation, IKT focuses on how to engage a specialized group of people called KUs (Gagliardi et al., 2016; Graham et al., 2022). IKT has Eurocentric origins in numerous research partnership approaches but has emerged the only approach envisaged within a Canadian health care context to help solve complex problems (Jull, Giles & Graham, 2017; Nguyen et al., 2020; Sibley et al., 2022). The approach is widely being used in Canada (Sibley et al., 2023). We are still learning about the IKT research partnership principles, strategies, impacts and outcomes that enable engagement in a range of health care environments, as well as the tools used to measure and report on partnership, but we do know that IKT partnerships are highly contextualized experiences (Hoekstra et al., 2020; Mrklas et al., 2022). Prudently, IKT scholars and adopters of the approach are focusing efforts on the unique, contextualized ways IKT achieves its stated aims in pockets of health care, such as with practicing PTs in public rehabilitation hospitals (Graham et al., 2022). PTs have long been engaged as partners in research, but the ways they have engaged, and the impacts and outcomes of their engagement are largely unknown (Camden et al., 2015). With respect to PT engagement in IKT research in Canada, at least a few studies have been published in each of the last three years, indicating the approach has merit with KU groups in rehabilitation and physiotherapy (Roberge-Dao et al., 2019; Ma et al., 2020; Ruest et al., 2020; Gainforth et al., 2021; Clewes-Lawrason et al., 2022; Linkewich et al., 2022; Wideman et al., 2022). Canadians have long needed new ways of researching and implementing evidence-based change in the Canadian health care system, and that need has increased because of and since COVID-19 (Brouwers et al., 2021; Dix-Cooper et al., 2021; Groot et al., 2021). Identifying and describing KU engagement strategies and understanding impacts and outcomes of partnership are ubiquitously identified as areas for future IKT research. Dr. Sibley's research in the rehabilitation and physiotherapy domain have specifically identified a need to investigate the expression of fear among practicing PTs related to reactive balance measurement practices, as well as factors contributing to their fear related to reactive balance measurement in clinical and virtual practice settings as areas of future research, aspects of which are addressed with this study (Sibley et al., 2022). I hope this work helps narrow knowledge gaps for IKT scholars and adopters of the approach in physiotherapy by improving what we know about PT experiences as KUs in IKT research, what they say is needed to enable IKT partnerships with them, and what they think about the resulting evidence and its use.

CHAPTER III: METHODOLOGY AND METHODS

Positionality

Positionality gives rise to the individual bias that lies within each of us and our work (Ravitch & Carl, 2016; Crotty, 1998). Individual bias is impossible to eliminate from qualitative scientific research because of the way people ascribe meaning to information, ideas, and events over the course of life (Ravitch & Carl, 2016; Crotty, 1998). Since bias is inescapable, researchers are advised to become more self-aware by reflecting on their own positionality and acknowledging sources of their own bias (Ravitch & Carl, 2016; Crotty, 1998). I consider my own positionality as a new scientific researcher against an ecology of maturity that spans more than four decades of life. At the time of this research study, I was middle age. I began this study at age 40 and completed this study at age 45. My life experience is punctuated by several critical life events, including: (1) an early education and career in journalism and communications; (2) a personal experience with disease and disability confounded by an issue in health care; (3) an advancement in my education and entrepreneurial start-up; (4) and, the coincidental timing of the COVID-19 pandemic with my mother’s cancer diagnosis, which cast me in the role of her caregiver. My first adult accomplishment came in 1999 when I graduated college with a diploma in journalism and communications. An internship got my career started in business marketing. I admired the knowledge, skills, and confidence of the people I would interview or for whom I would help to sell business ideas, but I wanted a path of my own to explore. My motivation to change the way the Canadian public health care system delivers care started in 1999-2001 when I encountered what I called a “knowledge-gap” that had negative short-term impacts and long-term outcomes on my health. I used to be a long-distance runner and ultimate frisbee player until a chronically painful and physically debilitating athletic injury prevented me from bearing any weight on my right ankle joint. I had been misdiagnosed repeatedly with a sprain for two years. By the time I received my bone scan, which had been identified as the gold-standard diagnostic protocol for bony avascular necrosis in the literature, the articulating aspects of my talus bone had died (see Figure 2).

FIGURE 2. Radiographic imaging of my right ankle joint in 2001 showing advanced disease (avascular necrosis) and deformity in the talocrural and subtalar joints.

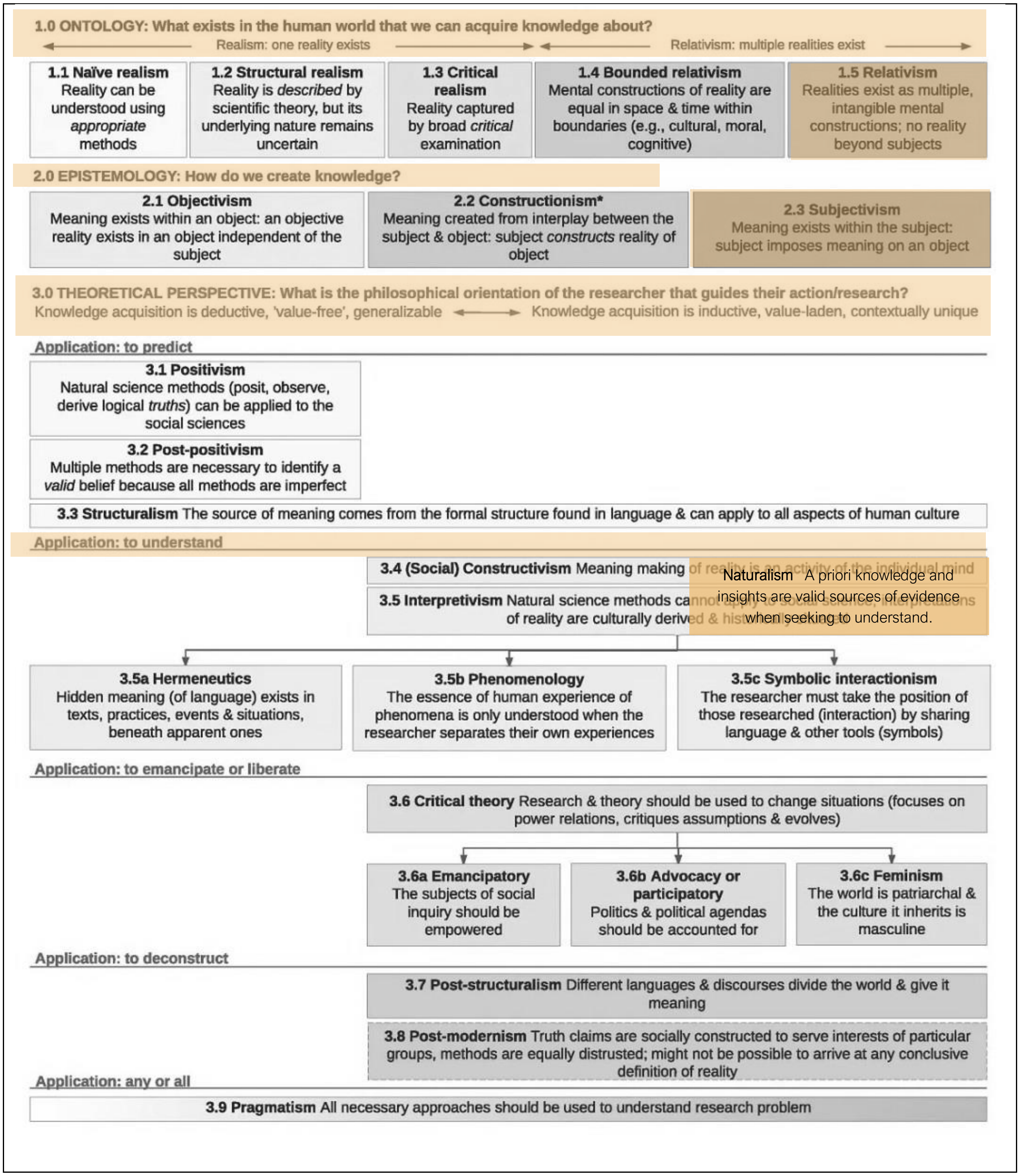
I never ran again, but the process fascinated me and led me to university. In 2005 I began my pursuit of a Bachelor of Science degree majoring in Exercise Science and Neuroscience. I studied the effects of all kinds of stress on the human body and I loved the experience. In 2010 with a new degree and passion for the health sciences, I was appointed instructor for several university-level courses in kinesiology and applied health. The more I engaged with academics in teaching and research environments, the more I realized that the “knowledge-gap” I had experienced in health care extended to health research as well. So, in 2015, I started a small business helping academic researchers in the health sciences domain to better mobilize their research results. This work was centred on creating and disseminating either professional development tools for health care providers and their clinic staff, or public health information and awareness tools. The effort was not aligned with metrics so there was no way of knowing whether health care practices were affected. Despite a lack of metrics, I wondered if this was the way to affect change. Then, in 2019, I networked my way to Dr. Sibley, and she introduced me to “integrated knowledge translation,” an idea unfamiliar to me, but so began this graduate research project. Ten months into the process, COVID-19 hit. Twenty months into the process, and during the pandemic, my mother received a cancer diagnosis (see Figure 3).

FIGURE 3. Mom and me, shortly after we received her terminal cancer diagnosis, and before the onset of her cancer treatments.

She moved in with me so that I could provide care until she died, which was critical because the health care system we were counting on was so badly stressed and, in some areas, even broken. With a rich life history that has developed my sense of self relative to processes of knowledge acquisition and knowledge creation, I valued what I knew at the onset of this study, and I was well-positioned to reflect on my life experiences and experiential knowledge. I found my age and experiential knowledge exquisitely useful in the process of becoming philosophically oriented, in designing and implementing this study, in conducting interviews, and in choosing the words I used to author this paper.

Philosophy

Research spans real and relative time, geographically distinct locations, sociopolitical circumstances, and individual lives. Researchers who identify philosophical foundations at the onset of research increase the transparency and trustworthiness of their work (Ravitch & Carl, 2016; Crotty, 1998). Ontological, epistemological, and theoretical foundations of scientific research offer assumptions about the origins of life and knowledge that help orient thinkers, such as researchers, and their work within a greater universe that contextualizes knowledge and origins of life within social boundaries (Moon & Blackman, 2014; Ravitch & Carl, 2016; Crotty, 1998). These philosophical orientations give rise to a logic system that helps increase the trustworthiness of the researcher, the research process, and the resulting research evidence (Moon & Blackman, 2014; Ravitch & Carl, 2016). I understand that scientific research has ontological, epistemological, and theoretical qualities that I interpret as a sequence of nested concepts (see Figure 4). There is congruence among nested concepts (Moon & Blackman, 2014). Whereby ontology informs epistemology informs theoretical perspective, these multidimensional philosophies combine to guide researchers toward suitable research methodologies and methods for exploring ideas, and importantly drive toward an application of research.



1.0 ONTOLOGY: What exists in the human world that we can acquire knowledge about?

← Realism: one reality exists → ← Relativism: multiple realities exist →

1.1 Naïve realism Reality can be understood using *appropriate* methods

1.2 Structural realism Reality is *described* by scientific theory, but its underlying nature remains uncertain

1.3 Critical realism Reality captured by broad *critical* examination

1.4 Bounded relativism Mental constructions of reality are equal in space & time within boundaries (e.g., cultural, moral, cognitive)

1.5 Relativism Realities exist as multiple, intangible mental constructions; no reality beyond subjects

2.0 EPISTEMOLOGY: How do we create knowledge?

2.1 Objectivism Meaning exists within an object: an objective reality exists in an object independent of the subject

2.2 Constructionism* Meaning created from interplay between the subject & object: subject *constructs* reality of object

2.3 Subjectivism Meaning exists within the subject: subject imposes meaning on an object

3.0 THEORETICAL PERSPECTIVE: What is the philosophical orientation of the researcher that guides their action/research?

Knowledge acquisition is deductive, 'value-free', generalizable ↔ Knowledge acquisition is inductive, value-laden, contextually unique

Application: to predict

3.1 Positivism Natural science methods (posit, observe, derive logical *truths*) can be applied to the social sciences

3.2 Post-positivism Multiple methods are necessary to identify a *valid* belief because all methods are imperfect

3.3 Structuralism The source of meaning comes from the formal structure found in language & can apply to all aspects of human culture

Application: to understand

3.4 (Social) Constructivism Meaning making of reality is an activity of the individual mind

3.5 Interpretivism Natural science methods cannot apply to social science; interpretations of reality are culturally derived & historically situated

Naturalism A priori knowledge and insights are valid sources of evidence when seeking to understand.

3.5a Hermeneutics Hidden meaning (of language) exists in texts, practices, events & situations, beneath apparent ones

3.5b Phenomenology The essence of human experience of phenomena is only understood when the researcher separates their own experiences

3.5c Symbolic interactionism The researcher must take the position of those researched (interaction) by sharing language & other tools (symbols)

Application: to emancipate or liberate

3.6 Critical theory Research & theory should be used to change situations (focuses on power relations, critiques assumptions & evolves)

3.6a Emancipatory The subjects of social inquiry should be empowered

3.6b Advocacy or participatory Politics & political agendas should be accounted for

3.6c Feminism The world is patriarchal & the culture it inherits is masculine

Application: to deconstruct

3.7 Post-structuralism Different languages & discourses divide the world & give it meaning

3.8 Post-modernism Truth claims are socially constructed to serve interests of particular groups, methods are equally distrusted; might not be possible to arrive at any conclusive definition of reality

Application: any or all

3.9 Pragmatism All necessary approaches should be used to understand research problem

FIGURE 4. Research philosophy in the social sciences. A research guide consisting of ontological, epistemological, and theoretical perspectives. Highlights indicate how I used this guide as a decision tree leading me towards naturalism as a theoretical perspective, which I have added as a nested concept.

SOURCE: Moon, K., & Blackman, D. (2014). A guide to understanding social science research for natural scientists. Conservation biology, 28(5). Pp. 1169.

Ontology

Ontology is the branch of philosophy that deals with knowledge acquisition in the human world, and is concerned with the subject of study (Moon & Blackman, 2014; Ravitch & Carl, 2016; Crotty, 1998). I aligned myself with ontological relativism. Relativism assumes that reality is the result of mental co-constructions that are balanced equally in space, time, and context (Moon & Blackman, 2014; Ravitch & Carl, 2016; Crotty, 1998). I applied ontological relativism to decisions about the breadth of research; that is, how wide I wanted to explore my topic. I aimed to explore the experiences of PTs from within a human-designed health system context. I was interested in individual descriptions of experience, and I considered each experience as equally important and contextually related. Context mattered to my work. I was neither interested in expanding my research sample because I wanted to focus on an exquisitely similar group of individuals, nor in expanding my research questions because I wanted to focus on the context of the experiences. I expected unique variables to emerge from stories that were separated by time, space, and circumstance because knowledge sharing is a highly adaptive process.

Epistemology

Nested under ontology is epistemology. Epistemology is the branch of research philosophy that deals with knowledge creation in the human world, and is concerned with the validity of research methods (Moon & Blackman, 2014; Ravitch & Carl, 2016; Crotty, 1998). I aligned this study with epistemological subjectivism. Subjectivism assumes experiential knowledge influences individual perceptions of reality, and that reality varies from person-to-person (Bradshaw, Atkinson & Doody, 2017; Moon & Blackman, 2017; Ravitch & Carl, 2016; Crotty, 1998). Experiences with reality are shared among individuals using stories, and storytelling is a highly individualized meaning-making process that occurs in the mind of the beholder (Bradshaw, Atkinson & Doody, 2017; Moon & Blackman, 2014; Ravitch & Carl, 2016; Crotty, 1998). With repeated accounts and interpretations, knowledge is adapted to fit individual or group needs, and reality becomes increasingly more subjective, but also more useful. I aimed to learn how PTs assigned meaning to an experience with IKT research that they had in common. I wanted to share a range of understandings about the reality of IKT research partnerships in the physiotherapy context and from the PT point of view. I applied epistemological subjectivism to decisions about the method I used to explore my topic, and the way I analyzed data.

Theoretical perspective

Theoretical perspective is a set of beliefs that motivates particular action (Moon & Blackwell, 2017). Theoretical perspective situates the researcher and the research study relative to one another and establishes reasonable limits for the depth of the investigation (Moon & Blackman, 2017; Ravitch & Carl, 2016; Crotty, 1998). Theoretical perspective also drives toward an application of research. Applications of research may include aims to predict, understand, liberate, or deconstruct (Moon & Blackman, 2017; Ravitch & Carl, 2016; Crotty, 1998). I oriented myself and this study design toward an application of “understanding” in the exploration of PT experiences with KU engagement in IKT research in Canadian public rehabilitation settings, which led me to philosophical naturalism.

Several views of naturalism in science have given rise to its various forms. I adopted Quine’s view. Quine’s naturalism is a widely accepted philosophical view that asserts psychological insights are continuous with science as a measure of all things (Cappelen et al., 2016; Haig, 2016; Goldman, 2010). Quine’s naturalism is more interested in case content than in individual cases, embraces variation across accounts, and supports intuitive judgement as good evidence for framing ideas and arriving at philosophical conclusions (Cappelen et al., 2016; Haig, 2016; Goldman, 2010). This naturalistic view of evidence has order, whereby first-order evidence is the raw data, and second-order evidence is the intuitive interpretation of data (Goldman, 2010). Trustworthiness, then, sits with how one makes sense of the data, opening researchers, their processes, and their results up to empirical and non-empirical debate. To increase confidence in these results and position myself for debate within the context of a thesis defense process, I strived for philosophical consistency over the course of research with naturalistic commitment to my preferred methodology.

Methodology and method

Research methodology is a prescriptive way of doing research. Of the many ways to conduct a study, research methodologies are categorized under the umbrellas of quantitative, qualitative, or mixed-methods research (Ravitch & Carl, 2016; Crotty, 1998). For philosophical consistency, I chose basic qualitative descriptive research methodology to explore subjective, relative PT experiences with IKT research from a naturalistic lens. Basic qualitative descriptive research is an approach to eliciting information directly from those with the experiential knowledge under investigation using such methods as focus groups or various types of interviews (Bradshaw et al., 2017; Sandelowski, 2000). When I set out to tell the stories of PTs with experience engaging as KUs in IKT research, I was neither interested in establishing theory about PT engagement in IKT research, nor in underlying ethnocultural or sociocultural contexts in physiotherapy. Rather, I was interested in specific KU experiences with IKT research in a specific profession embedded in a larger public health system context. Basic qualitative descriptive research is an approach to eliciting information directly from those with the experiential knowledge under investigation using such methods as focus groups or various types of interviews (Bradshaw et al., 2017; Sandelowski, 2000). I chose semi-structured interviews because time and resources were limited and my sample size was small and focused, which allowed me the flexibility to explore on a budget and amid COVID-19 social distancing policies (Bradshaw et al., 2017; Kim et al., 2017). Basic qualitative descriptive research complements Quine’s naturalism by regarding the researcher as a valid and reliable interpretive instrument in the collection and reporting of data (Bradshaw et al., 2017). I wanted an inductive process that could report on an insider-point-of view with fidelity to the words and meanings ascribed by participants, but I wanted freedom to use personal interpretations of the primary data in reporting (Bradshaw et al., 2017). This was important to my exploratory research, which sought to understand and contextualize the PT perspective within a research approach and within a public health system. I was targeting the PT point-of-view, and from that lens I wanted to know more about the KU engagement experiences that gave rise to their respective IKT research partnerships. Basic qualitative descriptive research is ideally conducted in an environment natural to participants to facilitate recollections and thick description reporting, but this was not feasible to do with this study (Bradshaw et al., 2017).

Theoretical frameworks

Among the ways researchers continue to benefit from one another's work is by adopting a recognized theoretical model or framework (Ravitch & Riggan, 2016; Ravitch & Carl, 2016). Where theory defines the phenomena under investigation and connects new ideas to previous work, frameworks model known relationships among variables and offer new explanations for, or predictions about, emerging relationships (Ravitch & Riggan, 2016; Ravitch & Carl, 2016). Although research is not necessarily strengthened by strict adherence to a theoretical framework (Ravitch & Riggan, 2016; Ravitch & Carl, 2016), there is evidence to support their use, and ongoing debate about their use in the conduct and evaluation of IKT research partnerships (Bhattacharyya et al., 2006; Eccles et al., 2005; Nilsen, 2006; Strifler et. al, 2018). Without theory, researchers risk repetitive work that fails to advance knowledge. Strict adherence to theory narrows the investigative lens, and researchers risk observations in a rapidly changing world (Ravitch & Riggan, 2016; Ravitch & Carl, 2016). Balanced use of theory extends an ongoing discussion in the literature. To validate this research study as an extension of a discussion that started long before me, this research design needed to be well-informed by prior work in the field, and consistent with my philosophical orientations. I wanted this research project to be a conduit for PTs to uniquely express their ideas, and for readers to see where ideas converge and diverge to tell a fulsome story about KU engagement with PTs as research partners in public rehabilitation hospital settings. I needed flexible methods for data gathering and content analysis that supported authentic storytelling with limited outside influence, but I needed to be informed by related work. I chose an established theoretical framework for KU engagement in health research partnerships to inspire the development of my research instruments, such as my research proposal, semi-structured interview guide, and this thesis document.

Jull framework

I wanted this thesis to continue a discussion in the literature that started before me, so the Jull framework, being a familiar tool in IKT research, was a great place from which to evolve discussion about KU engagement. Jull et al. selected aspects of KU engagement from the literature from May 1995 to December 2017 and then consensually agreed on a theoretical framework for KU engagement in health research partnerships (Jull et al., 2019). The authors, from Canada and the United States, collaborated from within a United States-based patient-centred outcomes point-of-view. Results were reported using an illustration that has since become accepted as a theoretical framework for KU engagement concepts in health research partnerships, not exclusive to, but including IKT. The framework considers 15 KU engagement concepts equal and nonsequential. The authors interpreted the concepts as fluid and not required, but their illustration suggests an order of operations in the preparing, planning, and conducting research, as well as in applying research evidence (see Figure 5). In this sense the Jull framework might be perceived as a workflow diagram, but the model has its limitations. The Jull framework was not specifically designed for use with the IKT approach or to resolve issues in health care, and it was not developed from within the context of the Canadian public health care system. The Jull framework does, however, provide a useful summary of KU engagement concepts that had been identified in the partnership research literature at the time. I used Jull et al., 2019, to help summarize what was known about KU engagement concepts in my research and ethics proposals, but I also used it to summarize what was not known, laying the groundwork for my exploration. I had originally proposed using the Jull framework to deduce codes from interview transcripts in what would have been a directed content analysis. However, with the Jull Framework having been researched and developed outside of a Canadian health care context, I believed more could be gleaned from the data with an inductive approach. The Jull framework was too general for guided use in rehabilitation and physiotherapy contexts, in my opinion, so I used it to build reasonable questions and prompts into my semi-structured interview guide, and to inform decisions about the clustering and sequencing of questions. I figured the Jull framework provided sufficient insight to make general workflow sense to interviewees, and that the relative importance and sequencing of certain KU engagement activities in these PT's IKT research experiences would come out in interviews.

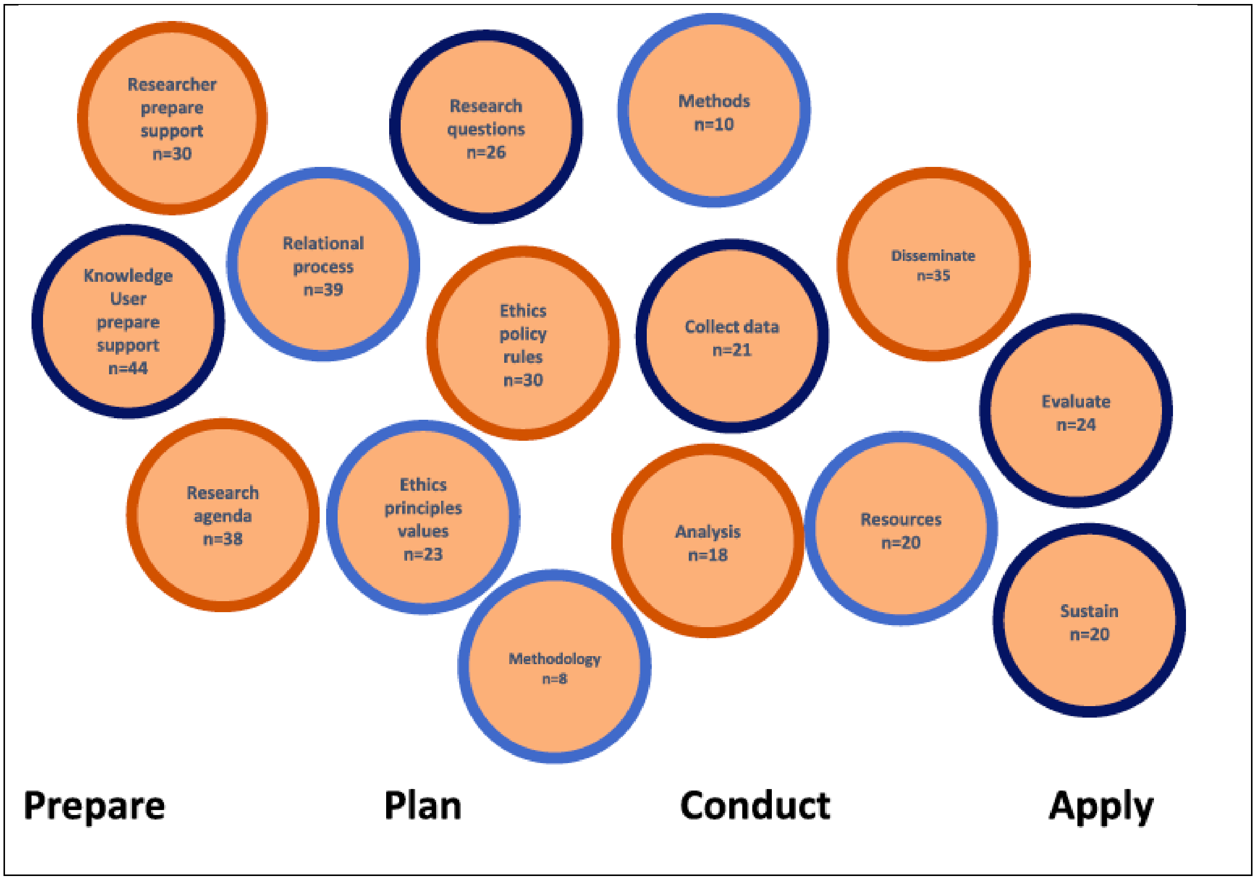


FIGURE 5. The Jull Framework: a report of fifteen knowledge user engagement concepts mapped across four stages of research. Concept frequency is indicated as an n-value of the 54 included articles.

SOURCE: Jull, J. E., Davidson, L., Dungan, R., Nguyen, T., Woodward, K. P., & Graham, I. D. (2019). A review and synthesis of frameworks for engagement in health research to identify concepts of knowledge user engagement. BMC medical research methodology, 19. Pp. 8.

I liked the Jull framework (Jull et al., 2019) for consolidating what had been scattered ideas about KU engagement, and for re-imagining those ideas from within a health research partnership context. The Jull research team imagined health research partnerships against a general research workflow process, with opportunities for KU engagement occurring as fluid concepts along the way. I selected the Jull framework as one of many possible lenses through which to view KU engagement because it was a succinct, timely, and relevant starting point for this study. Although I liked the Jull framework, my prior knowledge about the business-end of organizational change management, the logistics of resource allocation and/or reallocation, and the politics of risk in health care delivery highlighted some gaps in the framework for me. For example, heading into this study, I knew from experience that research partners and host institutions are advised to identify and address issues related to resource allocation, change management, and risk management as early and as often as needed over the course of health research partnerships. However, the Jull research team did not introduce the concept of resources in their research workflow diagram until the “conduct” and “apply” stages of research, which occur at the end of the research workflow process, conceivably at stages too late in the process for meaningful problem-solving related to resource allocation. In another example, I noticed that workflow and evidence limiting concepts related to change management and risk management were not at all addressed in the Jull framework, but that I know are frequently identified in end-of-grant KT work in the field. These investigative oversights within the Jull framework may have occurred because of limitations within the research methodology and method, or because the framework was codeveloped in a blended health system context with insufficient representation from Canada’s diverse range of health regions. I hoped this study would increase our understanding of the KU engagement concepts that practicing PTs said gave rise to their respective partnership experiences.

Sampling

I used purposeful sampling to guide participant selection for this study. Purposeful sampling is the intentional selection of research participants based on individual, situational, or environmental characteristics (Ravitch & Carl, 2016). I found purposeful sampling consistent with my philosophical foundations for this research because I was exploring a specific set of subjective experiences that could only be shared by a specific group of people. To be eligible for this study, I purposefully selected a pool of five PTs (n=5) with experience engaging as a KU on an IKT health research partnership related to balance that took place in Canadian rehabilitation hospital settings. Further, I purposefully selected this group of five PTs (n=5) because their experiences with IKT research partnerships were relatively standardized by a common lead researcher. All five PTs (n=5) were successfully recruited and retained for the balance of this study. Had I been unable to recruit and retain this pool of PTs, I would have expanded my selection to include a broader range of people who had engaged as KUs in rehabilitation and physiotherapy contexts. This study design and interview questions asked would have worked with a modified sample possessing the same experiential knowledge.

The Sibley Studies

There is tremendous variability in the way the IKT approach is interpreted and applied each time a new research partnership is formed (Graham et al., 2022). This is because scholarly aspects of the IKT approach are considered interpretivist, whereas application of IKT towards the coproduction of knowledge is considered constructivist (Graham et al., 2022). I wanted to learn about the IKT experience from pioneers in the field, but I needed to simplify my exploration to keep this project manageable and within scope. I purposefully selected a group of individuals whose subjective experiences with KU engagement and the IKT approach to health research were connected by a common lead researcher, whose own subjective interpretation guided an IKT process that was repeated over several consecutive studies. I purposefully selected the PTs who engaged as KUs in those studies because I believed them to hold valuable insights into the KU engagement experience in IKT research partnerships in Canadian rehabilitation hospital settings that would help advance our understanding of how to engage in IKT research partnerships with similar KU types and under similar contextual conditions.

An important characteristic of the Sibley Studies for me to consider throughout this research was the physical nature of the intervention that these IKT research partnerships investigated. Risk occurs on a continuum in physiotherapy, depending on factors related to the characteristics of the treatment population and the nature of the rehabilitative intervention (CIHI, 2022). In rehabilitation, the treatment population describes a group whose characteristics, treatment needs, and qualifying interventions are inextricable (Stineman, 2001). These factors are typically assessed on admission to a rehabilitation program (Stineman, 2001). Some of these factors may include onset of a health-related event, type and degree of impairment or disability, chronological age, presence of co-morbidities, living situation, and risk for falls (Stineman, 2001). These characteristics affect the probability of individuals within a particular patient population achieving certain physiologic goals, and clinicians such as PTs use these in in discussions with patients and their families about the feasibility of treatment plans, goals, and quality improvement benchmarks (Stineman, 2001). Reactive control or reactive balance is the ability to recover from destabilization and is the component of balance responsible for avoiding a fall (Sibley et al., 2011). Therefore, patient populations at greatest risk for falls may be considered higher risk in treatment, and reactive balance may be considered a higher risk assessment (in terms of triggering a health-related event) and intervention with this group. This risk factor may be an important consideration in any IKT research partnerships that engage practicing PTs as KUs from within Canadian public rehabilitation settings (Sibley et al., 2022).

Data collection

Basic qualitative descriptive research designs embedded in philosophical naturalism commonly include interviews (and their transcripts) and researcher reflexivity memos for data collection (Bradshaw et al., 2017; Kim et al., 2017; Sandelowski, 2000). I chose semi-structured interviews, interview transcription, in vivo coding, and conventional content analysis methods. I took fieldnotes during interviews and completed researcher reflexivity memos following interviews to offer deeper personal insights and interpretations of the data, a useful strategy when relevant theory is limited or when little is known (Ravitch & Carl, 2016). I used a questionnaire to facilitate thick description reporting of participant characteristics. To support this data collection effort, I developed three data collection tools: 1) an interview guide; 2) a questionnaire; 3) a research memo template. I revised each of these tools iteratively and in consultation with my research advisory committee prior to use. I also pilot-tested each of these tools with colleagues to ensure that my data gathering instruments would look, sound, and behave as intended when used in research.

Interviews

Interviews are the mainstay of qualitative research. Interviews gather data and insights about lived experiences, constructions of reality, and relationships with concepts from prior research (Ravitch & Carl, 2016). Semi-structured interviews are used to guide general discussion, such as about IKT research partnerships, and focus on specific concepts, such as KU engagement in partnership research (Ravitch & Carl, 2016). A semi-structured interview guide organizes the interview and includes specific questions supported by prompts, but the instrument is flexibly adapted within and across interviews (Ravitch & Carl, 2016). For example, the specific wording used to ask questions and the sequencing of questions is tailored in real time to flow with conversation. I developed a six-item semi-structured interview guide for my online, recorded interviews (see APPENDIX A – Interview Guide & Preamble). Developing the interview guide was an independent, iterative process done in consultation with a research advisory committee. I used the Jull framework to inspire questions and prompts related to KU engagement concepts in partnership research.

The semi-structured interview guide led with a two-part preamble. The first part of the preamble included a practical introduction to the interview process and what to expect, a technology review and check-up, and informed consent proceedings. This component of each interview was not recorded. Interviewees were given the option to proceed with all, some, or none of the interview. Consensual interviews proceeded with recording. The second part of the preamble included a conceptual introduction to the IKT approach and KU engagement. This was a first opportunity for interviewees to engage in meaning-making around KU engagement concepts in IKT research. Six specific questions were asked of all interviewees, establishing the breadth of each interview, and all interviews led with the same first question. The first question was about how the IKT research partnership got started. Interviewees were flexibly asked about how they got involved, how the relationship was initiated, how the research topic was decided, and how decisions in research were made. Conversation flowed from there, covering five more specific questions and associated prompts, such as: why they engaged and how they were supported; what was needed to prepare; how they described their role and contributions; what they thought about the resulting evidence; and how their engagement impacted the process and results. Prompts added depth to conversation, expanding on KU experiences with details about each IKT research approach, environmental context, evidence usage, and perceptions of the impacts and outcomes of engagement. I concluded each interview with what to expect in terms of next steps, and an opportunity for interviewees to revisit concepts or add to the conversation. Interviewees were satisfied with their real-time responses.

Fieldnotes

Fieldnotes are taken live, in the conduct of research, to help with recollections (Ravitch & Carl, 2016). Fieldnotes are used to collect data about experiences with research, aspects of data, interactions with participants, my skills as a researcher, and ways I think I have influenced the data (Ravitch & Carl, 2016) I printed one hardcopy of the interview guide for reference in each interview, which I also used to capture real-time fieldnotes in my handwriting. These physical instruments with my personal handwriting helped jog my memory over time because I could look back on my personal impressions related to each question within each interview context. I used fieldnotes in live interviews to revisit ideas, for example, repeating back my impressions for validation with interviewees. I also used fieldnotes to add thick description to interview responses in the reporting of these results.

Transcripts

Real-time recording and transcription of interviews is the hallmark of basic qualitative research and often considered a first step in data analysis (Ravitch & Carl, 2016). Transcription is the process of converting oral accounts into written words (Ravitch & Carl, 2016). Interview transcription is a vital aspect of data collection because the act of transcription is subject to the interpretation of the transcriber (Ravitch & Carl, 2016). Interview transcription is also a vital aspect of data analysis because the written word facilitates rigorous and repeated readings, as well as deeper engagement with the text and features of the data (Ravitch & Carl, 2016). I discovered three popular ways to arrive at an interview transcript, each of which presents a layer of interpretive bias: 1) autogenerated by the interview recording technology, 2) researcher-generated, ideally by the person who conducted the interview, or 3) professionally generated by a colleague or third-party service. Autogenerated transcripts such as those produced by online meeting platforms like Zoom and Microsoft Teams are used by researchers because transcripts are relatively instantaneous and effortless to produce. However, the artificial intelligence technology powering these tools currently fails to interpret critical, context-sensitive language such as technical and professional jargon, which results in errors and omissions that affects data analysis. Researcher-generated transcription is considered the gold-standard in basic qualitative research (Ravitch & Carl, 2016). Researcher-generated transcripts are made better by memories, reflections, and fieldnotes that contribute to real-time interpretations of the interview event (Ravitch & Carl, 2016). However, researcher-generated transcription is time-consuming detail-oriented work that is not always feasible with project timelines. Professionally generated transcripts such as those produced by third-party services are frequently used by researchers who have more budget than time, and whose work would benefit from the availability of a fast, reliable transcriptionist (Ravitch & Carl, 2016). Although professionally generated transcripts have less errors than autogenerated ones, researchers must devote time familiarizing themselves with their data in written format to ensure consistency with the original interviews (Ravitch & Carl, 2016). Regardless of the transcription method used, interpretations of ambiguous audible content such as idioms of speech, acronyms, interjections, and filler words affect whether a transcript is more reflective of spoken or written language, and the extent to which a transcript is considered a verbatim or interpretive account of a conversation.

I hired a third-party service to expedite interview transcription and neutralize interpretive bias in the process (Ravitch & Carl, 2016). I made this decision because I experienced numerous delays with this research that occurred both directly and indirectly due to the global COVID-19 pandemic. These delays ultimately tightened my research project timelines, and I was looking for ways to expedite aspects of the research process. A budget surplus enabled me to hire a neutral, third-party professional service to expedite transcription, which allowed me more time for transcript familiarization following a gap in exposure to the data. For philosophical consistency, I also wanted to neutralize my interpretive bias in the interview transcription process to increase the authenticity of the transcripts for member-checking and data analysis. I shared Sony-generated MP3 audio files with TranscriptHeroes.ca, a Canadian professional transcription service, using their online file transfer protocol in January 2022. I received raw transcripts back from TranscriptHeroes.ca in Microsoft Word format via email in February 2022. I assigned unique filenames to each transcript. I adopted a standardized file naming and organizing convention to reflect and preserve the iterative course and nature of each read-through and interaction with a transcript file. I prefixed each transcript file name with unique participant identifiers, and then suffixed each file name with the final state of the transcript following each read-through (i.e., Raw, Redacted, Checked, Summarized, Checked, Reread). I also assigned page and line numbers to each transcript, creating a system for identifying words, wordforms, passages of text, and direct quotes (Ravitch & Carl, 2016). Page and line numbers were later used so that each instance of each code in each transcript could be mapped and easily located. I redacted personal and other identifying elements from each transcript and reviewed each transcript for accuracy against corresponding interview recordings, fieldnotes, and memos. I asked each interview participant to fact-check their respective transcript for validation purposes. Some participants made minor corrections to their transcripts to clarify ideas and redact identifying features. I made no other changes to the returned transcripts.

Reflexivity memos

Interview recordings and their transcripts are more reliable sources of fact than fieldnotes and memos because the latter are mediated by memory. However, interviews without fieldnotes or researcher memos are considered mere memories, and not data (Ravitch & Carl, 2016). I created a semi-structured memo template to standardize the way I reflected on research (see APPENDIX B - Reflexivity Memo Template). Reflexivity memo templates captured interview data, such as date and time, and allowed space to diarize my thoughts immediately following each interview. Topics for reflection were noted in the footer of the template as prompts, such as: positionality; social identity; interest in the research topic; reasons for pursuing the research topic; assumptions about the research topic; assumptions about the research process; personal bias, implicit theories, and their potential influence on this work; guiding ideologies, beliefs, and political commentaries; features of the researcher and the researched; reasons for wanting to engage these people; and intended audience for the results. I used reflections throughout this manuscript to describe my positionality, validate findings, contribute thick description to reporting, and conceptualize recommendations.

Questionnaires

Questionnaires are used to gather anonymous information about attitudes, beliefs, and behaviours (Ravitch & Carl, 2016). Although questionnaires are methodologically aligned with quantitative research because of their highly structured format, they are useful in qualitative research as part of a larger data collection plan. Questionnaires are fast and easy to administer, providing at-a-glance summaries of research characteristics (Ravitch & Carl, 2016). Research characteristics help with thick description in qualitative research by offering additional explanations and contextual details. I designed and implemented a 16-item self-administered questionnaire to further contextualize IKT research partnerships using characteristics of the partners themselves (see APPENDIX C – Participant Characteristics Questionnaire). Questionnaires were divided into four sections of questions that gathered individual, social, contextual, and experiential details that might have contributed to interviewee accounts. I designed questionnaires in multiple-choice format. The first section of questions asked participants to characterize themselves using some demographic criteria such as age, gender, ethnicity, education, career stage, and geographic location. The second section asked participants to characterize their work experience, including their patient population. The third section asked participants to characterize their history of research engagement using some prompts with definitions. I sent PTs their questionnaires via email during the informed consent process in September 2021. Participants independently completed their questionnaires and returned them to me via email.

Data/sampling saturation

Data/sampling saturation in qualitative research describes the point at which ongoing data collection is redundant (Ravitch & Carl, 2016; Crotty, 1998). At data saturation the research sample is considered sufficient in size and data collection has sufficiently answered the research questions with a recurring pattern of concepts (Ravitch & Carl, 2016; Crotty, 1998). Data saturation is sometimes decided in consultation with others, such as a research advisory committee or stakeholder group; however, decisions about data saturation can also be made using the philosophical underpinnings of research (Ravitch & Carl, 2016). I designed this research study using the philosophies of naturalism, relativism, and subjectivism, and I believe that data saturation is philosophically impossible. These philosophies are consistent with one another in asserting that reality is subjective, varies from person to person, and is uniquely expressed through language. Further, these philosophies are consistent with one another in extending the subjective reality of the storyteller to the interpretive bias of the heeder. Since neither humanity nor the human experience are finite concepts, there must be infinite ways of expressing and interpreting reality. If people have infinite ways to express their experiences with and ideas about reality with one another, there must also be infinite ways for researchers to consider their data for analysis and reporting. This philosophical reality suggests that data collection and data analysis on a topic could go on forever. Saturation sampling in qualitative research is used to close the sample size and stop the capture of new data (Ravitch & Carl, 2016). Since all studies must come to an end and data saturation was not among the stated aims of this study, I instead strived toward and achieved sampling saturation.

Data analysis

Transcript familiarization

I received raw, verbatim transcripts from TranscriptHeroes.ca in February 2022. To familiarize myself with my data before I engaged in any analysis or coding, I read each transcript front to back, word-for-word, in the order in which each interview was conducted and the corresponding transcript received numerous times. I became comfortable with the content of each transcript through passive and active reading exercises, whereby I would either read and review the text of the transcript or interact with the text of the transcript by way of making highlights and taking notes. First, I read each transcript in its entirety. Second, I read each transcript in its entirety while watching the corresponding video-recorded interview to help resolve audio discrepancies (e.g., misheard words, such as acronyms, that were elucidated by lip-reading or contextual cues). Third, I read each transcript in its entirety looking specifically for identifying features and redacting those details, and then asked participants to check their respective interview transcripts. Fourth, I read checked transcripts looking for any changes or areas of ambiguity that required clarification. Fifth, I read transcripts looking specifically for responses to each of the six main interview questions and then condensed each roughly 30-page interview transcript into a short, roughly three-page interview synopsis. This fifth reading activity preceded an abrupt and substantial break from this research when my mother, Cathy Lee Moser, was diagnosed with brain cancer. She died in September 2022. Following an eight-month hiatus including a gap in exposure to my data, I returned to this work in January 2023. I resumed my work by reading each transcript twice more for refamiliarization purposes. I also took time to reconnect with participants via email, reconfirm their informed consent to participate in my study, and verify that my synopses were consistent with their recollections. Figure 6 illustrates the steps I took to familiarize with my interview transcripts before and after my mother's death.

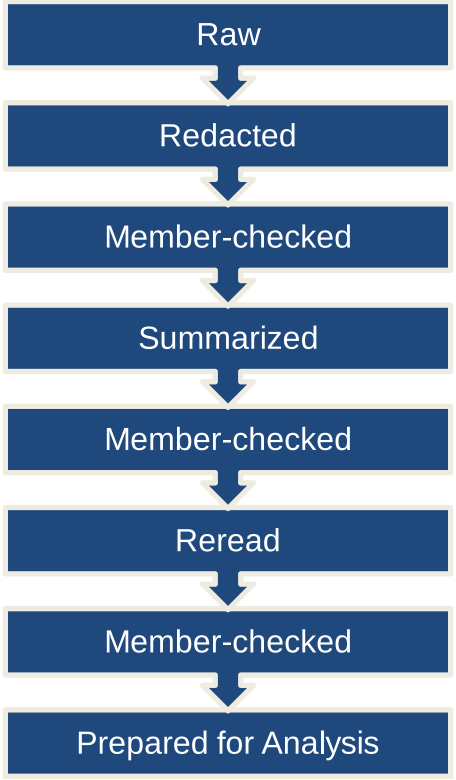


FIGURE 6. Workflow diagram illustrating the sequence of transcript familiarization activities.

Conventional content analysis

Knowledge creation in research is either deductive or inductive, the former requiring the use of a theoretical model or framework to guide analysis, and the latter leaning into the content of the interviews (Moon & Blackman, 2017; Ravitch & Carl, 2016; Crotty, 1998). An inductive approach to coding data for analysis stays as close to the data as possible to preserve an insider point-of-view (Ravitch & Carl, 2016). A deductive approach is determined a priori, using an outsider point-of-view (Ravitch & Carl, 2016). These approaches to analysis differ based on their orientation toward internal or external features of the data to make either bottom-up (inductive) or top-down (deductive) decisions (Ravitch & Carl, 2016). I chose an inductive analysis method.

Conventional content analysis is an inductive method that involves reading, coding, organizing, and interpreting raw narrative data within context (Hsieh & Shannon, 2005). Conventional content analysis is a low-interference approach to data analysis appropriate for exploratory research studies that aim to describe an experience when little is known (Hsieh & Shannon, 2005). I used conventional content analysis as a means of allowing new insights to emerge from the data so that my research evidence more closely aligned with participants' words and ideas rather than my own, and rather from existing theory (Hsieh & Shannon, 2005). The most practical aspect of conventional content analysis is coding. Coding involves closely reading passages of text in an iterative manner, identifying ideas contained within the text, and then establishing codes and categories that link those ideas together (Ravitch & Carl, 2016; Hsieh & Shannon, 2005; Crotty, 1998).

In Vivo coding

In vivo is a verbatim coding strategy for studies that prioritize participants’ perspectives because fidelity lies with the specific words, wordforms, expressions, and short phrases used by participants to tell their stories (Ravitch & Carl, 2016). I chose in vivo coding for two main reasons: 1) methodological consistency with naturalism, relativism, and subjectivism; and 2) ease of use. Quine’s naturalism focuses an analytical lens on individual variation in case content and supports researcher intuition as good evidence. Relativism and subjectivism value the participant perspective with fidelity to participant words in reporting. I chose to codify highly contextualized terms that were frequently used by PTs. For example, “the test” and “the measure” were terms often used by PTs when describing the clinical measure for balance assessment that was at the centre of their respective IKT research partnerships. I also chose to codify jargon embedded in the PT reality. For example, “treat to outcome” or “treat to the outcome measure” are commonly used phrases by PTs that refer to a specific aim of their profession driving clinical decisions and evidence use. I am a new qualitative researcher and in vivo coding is a common approach, familiar to many of my colleagues and supported by many accessible training tools. By consulting with colleagues and using free online training videos I quickly learned the iterative process of in vivo coding.

I did In Vivo coding by hand. Using a printed hardcopy of each transcript that included page and line numbers to facilitate re-reads and cross-referencing, I highlighted exact keywords and phrases, and maintained code memo notes in the margins. I repeated this process with each transcript, arriving at codes, categories of codes, and exemplar quotes. Since this work was philosophically oriented towards naturalism, relativism, and subjectivism; the nature of my data was linguistic; the language used was English; and, analysis was driving towards a written document, I chose a quaternary coding structure that aligns with English language typology.

The English language follows an “SVO” word order and sentence structure. In linguistic typology, this sentence structure places first the subject, which may include a grammatical agent; second the verb; and third the object. Often confused, the subject and grammatical agent are distinguished by the type of information they communicate about the verb. Agency is characterized by volition and sentience, oriented towards action, and results in change. Where people use the subject of a sentence to share information about an observation, agency is used to communicate emotion and intent related to the verb in the sentence. I used linguistic typology to organize codes as primary (1º), secondary (2º), tertiary (3º), or quaternary (4º).

In vivo coding is an iterative process. See Figure 7 for the process I followed. I derived primary codes from sentence subjects to establish breadth of responses. Primary codes framed the overall experience and described what happened. I derived secondary codes from sentence verbs or action-words, and I used them to establish depth of responses. Secondary codes provided actioned examples of the experience and ultimately described how it happened. I derived tertiary codes from sentence objects, and I used them to add depth to responses. Tertiary codes provided contextual details about how the experiences happened. Primary, secondary, and tertiary codes were identified throughout all interview transcripts because of the way I asked questions, which were designed to elicit episodic memories about experience and environment. Quaternary codes were only identified towards the end of each interview when I asked PTs to share their thoughts and feelings on semantics related to evidence. I derived quaternary codes from grammatical agents, and I used them to facilitate interpretations about the evidence and its use. Quaternary codes communicated information about observations and experiences that contain clues about intent to change. I compiled all codes into a codebook that I created using Microsoft Excel software. A codebook or coding frame is an index of codes that includes definitions and references and is maintained in a file separate and distinct from any coded transcripts (Ravitch & Carl, 2016). The first iteration of my codebook contained a codified version of each interview transcript appearing on five discrete worksheets in a single workbook. The second iteration of my codebook consolidated all codes onto a single worksheet where I could categorize them. Codes were derived from interviews, but categories were created by me, and vetted with my research advisory committee in a data triangulation meeting. I organized all codes into categories that addressed my research questions about the experience (*what happened?*), environment (*what enabled it to happen?*), and the evidence (*what do you think?*). Before committing to a coding frame to support the reporting of research evidence, I engaged my research advisory committee in a review of my coding process and resulting codebook.

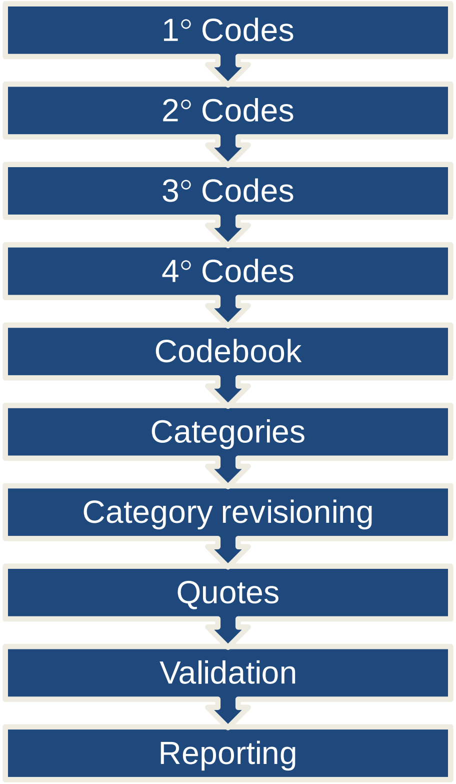


FIGURE 7. Workflow diagram illustrating my conventional content analysis process.

Validity, trustworthiness

I used eight established strategies were used to increase the validity and trustworthiness of this qualitative research: purposeful sampling; dialogic engagement; strategic sequencing; member-checking; structured reflexivity; data triangulation; thick description; standardized reporting (Ravitch & Carl, 2016). I employed each strategy prudently. (1) Consistent with purposeful sampling, described earlier, I recruited a select sample of individuals whose experiences were united by a common person, IKT research process, health care context, and health care issue. (2) Dialogic engagement with colleagues in research helps challenge interpretations about process, data, and results (Ravitch & Carl, 2016). I regularly consulted with my primary advisor and advisory committee in the design and conduct of this research. Consultations included one-on-one conversations that were conducted online and in-person as appropriate, presentations for committee members followed by action-oriented discussions that were conducted online, and written email communications directed at specific aspects of research. For example, I engaged these individuals in revising my data collection instruments, such as my questionnaire, interview guide, and memo templates, as well as in revising my research ethics board proposal. Everyone contributed valuable insights, some that helped maintain fidelity in data gathering with my research questions, some that helped suitably position my research within a Canadian physiotherapy context, and some that helped keep me and my work within ethical bounds. In another example, I engaged one of my colleagues in a review of my participant-facing recruitment, informed consent, and email communications tools to ensure clarity for a new audience. We also did a technology check-up and a dry run of the interview guide together to increase the chances of a smooth process for interviewees. (3) Strategic sequencing in study design is the planning and execution of an intended sequence of research activities (Ravitch & Carl, 2016). I used within-methods strategic sequencing to build the interview guide for my semi-structured interviews. The semi-structured interview guide is ideally built from the interviewee's perspective and supports the ability to have an authentic conversation (Ravitch & Carl, 2016). I anticipated a natural conversational flow in considering the order in which questions were asked and how prompts were clustered with questions. I was prepared to modify my interview guide following the first interview in case questions needed to be better structured for flow, but I instead learned how to use my interview guide differently to conduct interviews. For the first interview, I referenced the interview guide on a tablet. This limited view of my overall plan for the interview guided me down a mostly linear path with the first interviewee and complicated my ability to be flexible with questions in response to recollections. I used a printed copy of the interview guide that included visual landmarks for quick conversational pivots in all subsequent interviews. By changing visual formats and modifying my behaviour, my data-collection tool was better positioned to capture planned and spontaneous aspects of each interview, as well as fieldnotes within conversational context. (4) Structured reflexivity is strategic engagement with one's own bias in a way that critically identifies the researcher as a data collection instrument (Ravitch & Carl, 2016). I used a memo template following all interviews to document aspects of self that came out in the process. Following interviews two through five, I also used a printed copy of the interview guide to capture contextual notes that I later reflected on in the memos. (5) Member-checking is consulting with research participants about their contributions to the data (Ravitch & Carl, 2016). I asked each interviewee to review their respective interview transcript for accuracy and completeness. I also asked each interviewee to review my subsequent synopsis of their respective interview for gestalt. Interviewees neither added to nor edited transcript and manuscript documents, but some clarified misheard or mistyped comments, and some further redacted identifying details. (6) Thick description is a qualitative research strategy for the straight reporting of conversations that helps preserve contextual details (Ravitch & Carl, 2016). In the reporting of results, I adapted my writing style to provide straightforward one-sentence summaries and relative frequencies of various accounts, each supported with an exemplar quote. I enriched my results in the discussion with reflections about the data from the questionnaires, reflexivity memos, fieldnotes, and prior related literature. (7) Data triangulation involves examining aspects of research from multiple viewpoints (Ravitch & Carl, 2016). I engaged my advisory committee in a review of my codebook so that we could discuss my interpretation of data and its reduction into codes and exemplar quotes. We discussed and resolved issues related to bias, such as the unintended substitution of my own words as codes, and the over-generalization of interviewee words into codes that were better served with quotes. (8) This study is compliant with a broadly accepted qualitative reporting tool that is used to uphold research reporting standards (Ravitch & Carl, 2016). The COREQ checklist guides qualitative researchers to include specific items in reports of focus groups and interviews, such as researcher characteristics, research methods, research study context, data analysis methods, and interpretations of data resulting in the evidence reported (Tong, Sainsbury & Craig, 2007; see APPENDIX D – Completed COREQ Checklist).

CHAPTER IV: RESULTS

Participant characteristics

Dr. Sibley brokered contact with all five PTs (n=5) in August 2021 because she had prior relationships with each of them by virtue of the IKT research projects. Dr. Sibley, my research advisory committee, and I had planned for ethical issues and concerns with respect to these overlapping relationships, since my work is essentially a study of the work done by others. We took care over the course of this research to protect the anonymity of interviewees. For example, I password-protected all interview recordings and stored them in a secure location, and I did not share raw interview recordings or transcripts with Dr. Sibley or anybody else. I anonymized transcripts and redacted any identifying features before research advisory committee members were engaged in the results of this study. I engaged other research advisory committee members in early coding activities, such that when Dr. Sibley was finally exposed to the content of this study it was in a report format and details could not be traced back to individual interviewees.

I successfully recruited all five PTs (n=5) by email in August 2021 and retained them (n=5) for the duration of this study (see Figure 8). I received written informed consent and completed participant characteristics questionnaires from all five PTs (n=5) via email in September 2021.

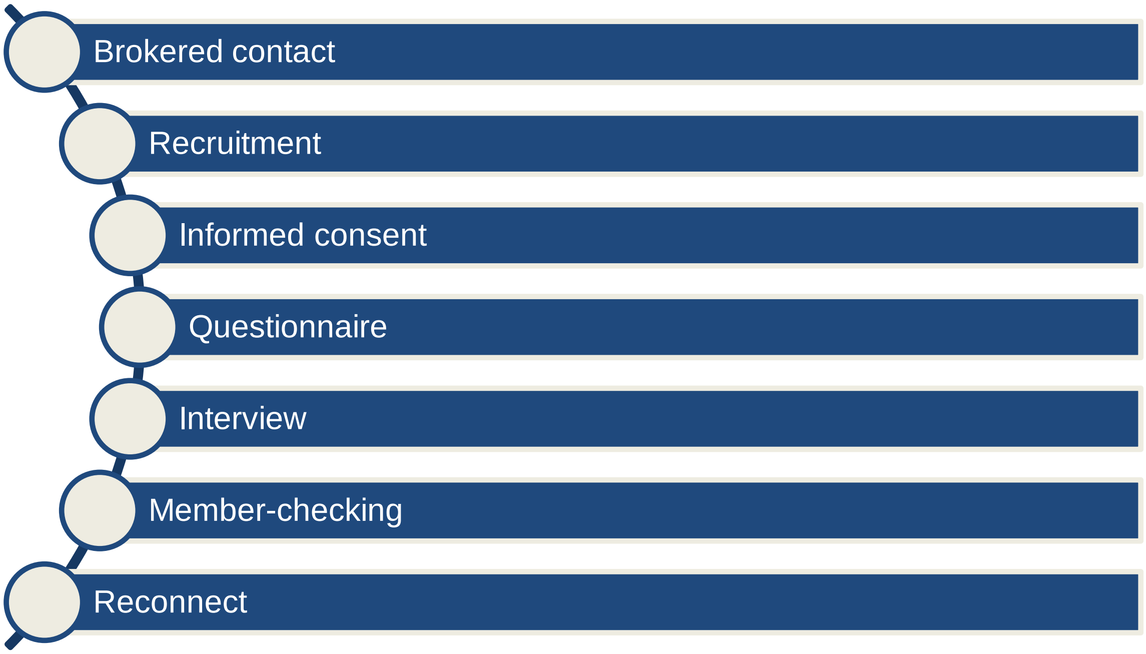


FIGURE 8. Recruitment and retention steps over the course of research.

I entered data from the completed questionnaires into a Microsoft Excel spreadsheet as I received them back, and then created a summary table of participant characteristics (see Table 1).

TABLE 1. Summary of participant characteristics.

Age (n=5)		
45-64 years	n=5	100%
Gender (n=5)		
Man	n=1	20%
Woman	n=4	80%
Ethnicity (n=5)		
Asian origins	n=1	20%
European origins	n=4	80%

Highest Education Achieved (n=5)		
Bachelor’s degree	n=2	40%
Master’s degree	n=3	60%
Geographical Location (n=5)		
Ontario	n=3	60%
Manitoba	n=2	40%
Clinical Experience (n=5)		
Mean	24 years	
Career Stage (n=5)		
Mid-career	n=2	40%
Late-career	n=3	60%
Practice Setting (n=5)		
Inpatient	n=2	40%
Outpatient	n=3	60%
Experience in Practice Setting (n=5)		
Mean	20 years	
Caseload (n=5)		
Mixed	n=3	60%
Neurology	n=1	20%
Orthopedics	n=1	20%
Approximate Percentage of Caseload with Balance Impairment (n=5)		
Min.	40%	
Max.	80%	

History of Research Involvement (n=5)		
Principal Investigator	n=2	40%
Co-Investigator	n=3	60%
Collaborator	n=4	80%
Participant	n=4	80%

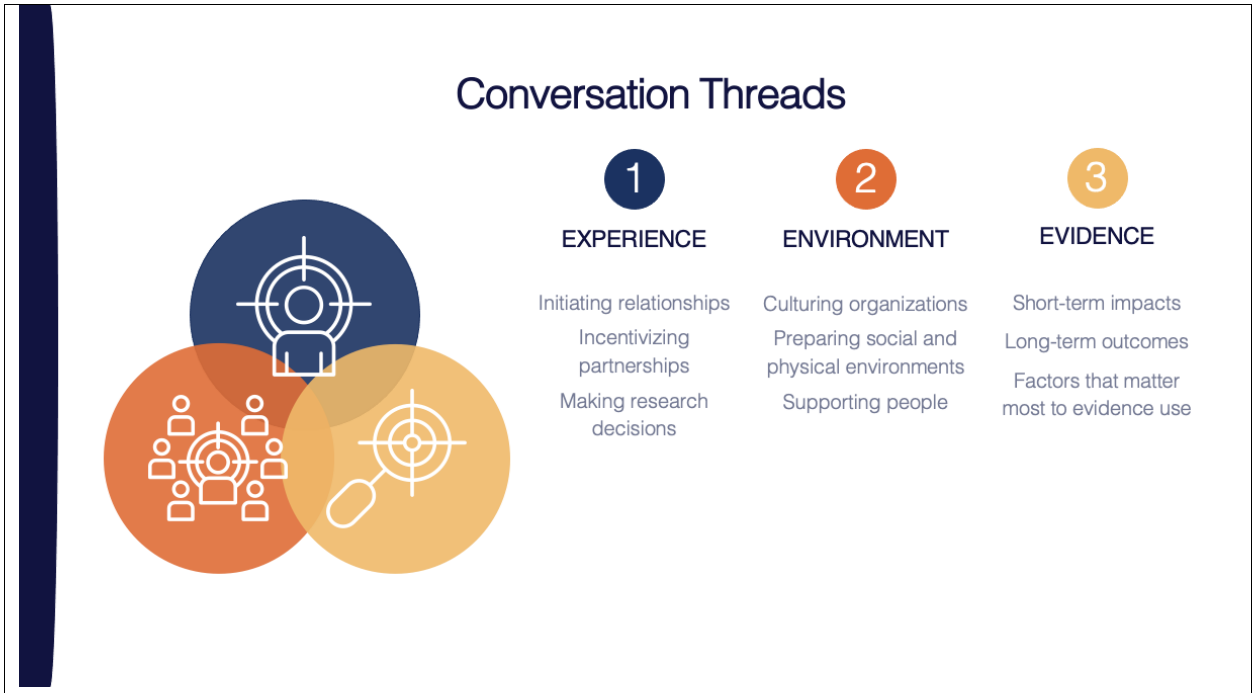
All five PTs (n=5) were geographically located in two Canadian provinces; three PTs (n=3) were situated within rehabilitation hospitals in Ontario, and two PTs (n=2) were situated within rehabilitation hospitals in Manitoba. All five PTs (n=5) remained in these same locations while they participated in this study. At the time of this study all five PTs (n=5) were aged between 45-65 years, four PTs (n=4) identified as women, and one PT (n=1) identified as a man. All five PTs (n=5) had entered the field of clinical practice holding a Bachelor's degree, and three of the five PTs (n=3) also held a Master's degree. Years of clinical experience ranged from 17 to 27 years with an average 24 years across all (n=5) participants. Three PTs (n=3) described themselves as late-career, and two PTs (n=2) described themselves as mid-career. Of the three PTs (n=3) who described themselves as late-career, two (n=2) had left their positions in clinical practice for positions in clinical management since engaging in IKT research. While in clinical practice and for the duration of their respective IKT research partnerships, three PTs (n=3) worked in inpatient settings, and two PTs (n=2) worked in outpatient settings. Years of clinical experience in these respective settings ranged from 16 to 26 years with an average of 20 years across all five (n=5) participants. Area of clinical practice, or clinical population served, was described by three PTs (n=3) as mixed caseload, one PT (n=1) as neurology, and one PT (n=1) as orthopaedics. Five PTs (n=5) approximated that 40-80% of their patients were living with balance impairment.

I also used to the questionnaire to ask PTs about their history of research participation, not including my current study. Research participation was defined for PTs on the questionnaire as including any of four roles: 1) principal investigator, 2) co-investigator, 3) collaborator, and 4) participant. These four terms are commonly used in Canada in health and social sciences research, and each term had been defined for PTs directly on the questionnaire as follows. In response, two PTs (n=2) said they had been a principal investigator, three PTs (n=3) said they had been a co-investigator, four PTs (n=4) said they had been a collaborator, and four PTs (n=4) said they had been a participant.

Interviews

I conducted interviews with all five participants (n=5) between November and December 2021. COVID-19 social distancing constraints at the time required that all five interviews be conducted online. The Microsoft Teams online meeting platform was used with video enabled. Interviewees blocked 90-minutes for their respective interviews. Actual interview times ranged from 45-65 minutes. Interviews were video recorded using Microsoft Teams recording and transcription features for my personal data verification purposes only. Interviews were also audio-recorded using a handheld digital Sony recording device to protect the anonymity of participants for the interview transcription and data analysis processes.

Qualitative research is a rigorous approach to learning from storytellers and their stories. Context is important to writers as they interpret and describe qualitative data, but also to readers as they assess the validity of findings. Contextualizing qualitative data for writers and readers can be accomplished with thick description (Ravitch & Carl, 2016). Thick description is a validation strategy for reporting qualitative research results that involves the capture of contextual factors, participant characteristics, and the individual meanings participants ascribe to their experiences (Ravitch & Carl, 2016). In the reporting and discussion of these results, I have used thick description to describe and interpret the socioecological contexts under which each IKT research partnership occurred, as well as the social behaviours that took place among KUs within each of those IKT research partnership contexts (Ravitch & Carl, 2016). Descriptions and interpretations are organized into three main conversation threads or categories of thought: (1) experience, (2) environment, and (3) evidence (see Figure 9).



Conversation Threads

1 EXPERIENCE	2 ENVIRONMENT	3 EVIDENCE
Initiating relationships	Culturing organizations	Short-term impacts
Incentivizing partnerships	Preparing social and physical environments	Long-term outcomes
Making research decisions	Supporting people	Factors that matter most to evidence use

FIGURE 9. Summary of results by conversation thread.

Experience: “What happened?”

My first aim with this study was to describe the IKT research partnership experience from the PT perspective. Conversations with interviewees took four general directions: (1) ways the IKT research partnership was initiated, (2) reasons for engaging, (3) ways decisions were made, and (4) reflections on the experience.

Initiating IKT research partnerships

Interviewees said that IKT research partnerships were initiated in any one of three ways: directly, whereby Dr. Sibley and the interviewee made contact; referred, whereby the interviewee was referred to Dr. Sibley by a co-worker or colleague; or jointly, whereby the interviewee had a prior relationship with Dr. Sibley based on a mutual research interest. There was one example of the IKT research partnership arising from direct contact with Dr. Sibley. For example, interviewee 9KNSI said the relationship arose from a presentation. "I suppose Dr. Sibley did an initial presentation to our department. I don't remember the specific topic, but certainly she was pitching her availability to partner in future projects. And I think we went from there." There were three examples of the IKT research partnership arising from a referral. For example, interviewee 0F0Y4 said, "I can recall [Dr. Sibley] was put in touch with me through our research sciences [department], and the relationship grew from there." In another example, VWXSG said "it was through my director at the time, the Director of Professional Practice at the time." 8B9HL said the relationship was the combined result of a referral and personal initiative.

> *"So, when I took over the position, he had left me some notes on potential projects, and one of them was to connect with Dr. Sibley about a possible research project on balance… I would say I initiated contact with her to discuss possibilities. She arrived here and we sat down and discussed it. Talked about what would work for both parties."*

In one case, the IKT research partnership developed from a prior professional relationship between the interviewee and Dr. Sibley resulting in a joint initiative. U3MFW said, "I have a definite love and interest and connection to balance work and [Dr. Sibley] knows that… I forget how we initially got connected, but it certainly was a good fit and made sense."

Reasons for engaging in IKT research

Interviewees talked about reasons for engaging in the IKT research partnerships that were directly related to organizational setting and research topic. Interviewees identified three main reasons to engage: organizational requirement to do research; organizational interest in the research topic; and personal interest in research and/or the topic. All interviewees discussed an organizational commitment to research that is embedded in individual roles within the organization. For example, U3MFW described the interplay between professional role, research interest, and research topic. "My direct job is to facilitate changes in practice and ensuring we're providing best practice to our patients and certainly, wearing that hat gets me involved in a number of different areas of best practice, including falls prevention." U3MFW also described the organizational context in which the job is embedded.

> *"For me in this role, there is an expectation to engage in research, so being a part of a research study is certainly encouraged and valued. We are an academic organization so that's valued, generally speaking, but it's also a key part of my role. So, a key part of my role is to engage in research and to encourage research activity and knowledge translation within my role and within the program, so it was a complete natural fit in terms of my job, so that's certainly one part of it."*

9KNSI described strong overlapping organizational, professional, and personal interests in research and the topic of balance.

> *"Older physios have been branded with the use of the [old tool] and I was certainly aware of its shortcomings and realising that there's got to be some more there, so that was a part of the hook. And then the hook, too, was that, as I was saying, our job requirement has us looking for*

> *these research involvements… And then the other thing, it's often life's all about planets aligning, so the other planet that was aligning at the same time was, once a year, [funding source] puts out a call for research proposals. So, there was essentially money available at that time. So, I think the timing was such that we could apply for that. We could address my job description needs, but we could also address how many of us had our interests piqued in terms of pursuing better assessment and treatment of balance."*

0F0Y4 talked about personal interest in the research topic, desire for clinical research experience and professional development, as well as rewards.

> *"It was an interesting topic, very relevant to our patient population so, there wasn't a reason not to… Because it was teaching our staff a new tool and how to use it… There were probably three or four in person visits and touch bases… over lunch time with lunch provided, not that would have mattered, but it certainly helps people. And then there was a stipend at the end, also not that wouldn't have stopped us if there wasn't a stipend, but the stipend was a nice a nice thing to have at the end."*

Making decisions in IKT research

All interviewees said they collaborated on decisions about aspects of the research topic, such as which PTs and patient populations would be included; which balance assessments and feedback scales to use; which data to collect and with which instruments to collect it; and the frequency and duration of data collection. However, interviewees said the research topic itself was decided in any one of three ways: independently, whereby one person, Dr. Sibley, made the research topic decision; jointly, whereby two people, the interviewee and Dr. Sibley made the research topic decision; or collaboratively, whereby several individuals on the research team including the interviewee and Dr. Sibley made the research topic decision. There were three examples of the IKT research partnership coming with a topic that was decided independently by Dr. Sibley. For example, VWXSG said, “As far as I knew, when I came on board, the research topic was decided. It came to me with a topic. I didn’t have any part in making the decision about what the topic was.” With the other two examples, interviewees said having the research topic in advance was the pitch and impetus for the IKT research partnership because of its interest to PTs, and relevance with certain patient populations. 9KNSI said:

> *“[Dr. Sibley] was giving a presentation to our department on, look at this research that we're doing with balance, and that was kind of attractive to physios. But it was also a presentation on knowledge translation… So, the balance stuff was the hook and then I think sort of the pitch was made, well, this could also be used in your populations.”*

There was one example of the IKT research partnership arising from a common research interest in balance, but the specific research topic was decided jointly. U3MFW said:

> *“My Master’s degree looked at how physical therapists use, and why they use outcome measures in their practice. This is probably why we got connected because it’s very connected to the study, because we looked at the [new test] so my whole Master’s Degree looked at how and why they used outcome measures in their practice and how they specifically use that information to make decisions… um, we became connected that way as well because she was also familiar with my Master’s Degree.”*

There was one example of the research topic being decided collaboratively within the context of a research team. 8B9HL said:

> *"It was collaborative. It was based on some research that [Dr. Sibley] had done in the past with another group… And so she had some ideas, but my role was to explain our population here, and to discuss the pros and cons of doing the study with different pockets of our population here at [our organization] … She didn't come in with her own ideas. She came in with lots of background information and we came up with the project I think together."*

Reflecting on the IKT research partnership experience

Overall reflections on the IKT research partnership were positive, with interviewees using terms such as "proud" and "satisfying" to describe their accomplishments and "fulfilling" to describe the experience. 8B9HL talked about research engagement as a source of pride for PTs and their patients. With respect to PTs, "I would say there's pride for sure in being somebody who does research. And as somebody who's considered you know, the – it's sort of leading change in the profession and challenging some of the long-held beliefs." With respect to patients, "I think that there was a sense of pride in many of the patients of being involved in something that might actually be helpful down the road." 9KNSI talked about pride, satisfaction, and fulfillment with the IKT research.

> *"Well, it was, yeah, it was a source of pride, I guess and it was a fulfilling one. Another study that I've been involved with years ago, where I was [co-investigator]. I found that one probably a little bit less satisfying… and in some ways, I found the results a little bit less*

> *dramatic. Not that the results were hugely dramatic with [this study] either, but it felt a little bit more exciting, and a little bit more, I guess, applicable to a broad group of people."*

Three negative words were used to describe the experience: risky, frustrating, and overwhelming. The word "risk" (and associated word "fear") was used often throughout interviews to describe PT thoughts, feelings, and reactions to the research protocol, especially with certain patient populations. The word frustrated was used by an interviewee related to evidence use, and the word overwhelming was used by an interviewee related to interruptions in the research process. 9KNSI talked about compliance with evidence use. "So yeah, personally it was quite satisfying, but frustrating in the sense though, that I wish that it resulted in more compliance. And if certain champions continued in that role, maybe it will." 8B9HL talked about interruptions to the IKT research process.

> *"We were doing so well and then COVID-19 shut us down. I guess one of the things that I've been doing is trying to keep it going. People get tired and there's a lot of other things going on in health care right now as you can imagine. And so, the concept of starting over at this point is a bit overwhelming for folks. But I really think it's worth it for us to do that. And I really want to ensure that there's recognition of the people that were involved so that they make sure that they feel part of it."*

Interviewees talked about benefits to individuals and organizations resulting from the experience. Among the benefits to individuals were increased research capacity, professional recognition, and both personal and professional pride. Among the benefits to organizations were increased research capacity, new CoP relationships, desired changes in organizational culture, desired changes in individual behaviour, better health outcomes for some. Broader benefits related to public health include more clinical research evidence related to falls and reactive balance in the literature, resulting in at least some changes to health care delivery in these areas.

Environment: "What enabled it to happen?"

My second aim with this research was to describe features in the host environment that PTs said affected their experience. Conversation with interviewees flowed with their recollections, as they described things outside of themselves, such as relationships and resources, that enabled the IKT research partnerships to occur, such as: (1) culturing the organization, (2) preparing people, and (3) supporting people.

Culturing the organization for IKT research

Interviewees segued into aspects of their respective organizational cultures that were conducive to IKT research. All interviewees emphasized the importance of embedding IKT research within a social and physical environment that supports the effort. They described engaging in IKT research from within this organizational context. For example, 9KNSI described an organizational commitment to research.

> *"And in my role as clinical advisor at the time, there's a portion of that job that is devoted to research ideally. So, we're always looking for opportunities. We don't have a lot of time to do with it, but [Dr. Sibley] made it very easy. It felt like it sort of fell into our collective laps here, it was yes, this was a good fit."*

U3MFW described an organizational commitment to falls prevention.

> *"Our organization was really doing a transformation around like just trying to promote this just culture around falls and falls prevention and really trying to understand falls better, and balance is connected to falls… And now I'm in this leadership role within the musculoskeletal rehab program, it was pretty clear that the clinicians that I was working with were not necessarily using outcome measures in their practice. So, there were sort of three beautiful fits there really… in terms of my job specifically and organizationally looking at falls prevention and just, you know, noticing that outcome measures themselves were not really being utilized in our program, whereas they really were in other programs."*

8B9HL described an organizational commitment to evidence-based practice and quality optimization.

> *"As a clinical service lead it is my job to optimize quality, to make sure that the interventions we're using, the evaluations we're using, are evidence-based. And for a number of reasons that's important to making sure that financially it makes sense how we're using our resources and directing them to an area that is giving us the most bang for our buck. Always working to try to put [our organization] on the map… seeing us considered a centre for excellence."*

Preparing to engage in IKT research

Interviewees then talked about preparing to engage in IKT research. To help jog their memory, I referred to prompts in my semi-structured interview guide that had been inspired by KU engagement concepts in the Jull framework. Although each interviewee organically arrived at many aspects of their own recalled experiences, some interviewees benefitted from prompting, such as with respect to IKT research ethics. For example, two interviewees identified and addressed ethical issues and concerns independent of my prompting, whereas three interviewees did not recall much about ethics, and only one of those three interviewees added more detail about ethics with my prompting. I was not seeking consensus, so I have reported on all preparations that interviewees identified and discussed. They described six general steps to preparing to engage in IKT research: 1) provide training and practice; 2) align professional, clinical, and research goals; 3) build a research team; 4) adapt the research environment, instruments, and process; 5) get ethics approval. First, interviewees talked about their individualized processes for providing training and practice. All interviewees described learning new ways of thinking and doing because of their engagement in the IKT research partnership. This included receiving training on the research protocol, creating and/or adapting training materials, and delivering training sessions to PTs. They described a collaborative approach to learning about clinical assessments and measures for reactive balance, and how to design and implement research protocol. For example, 9KNSI described training, practice, and consensus-building:

> *"We practiced the instrument with each other, and then we actually had, I think we had some training videos, but we also took videos of each other. And we wanted to make sure we are arriving at a consensus. So, it was a little bit like a calibration exercise. So, even before the research study started, we were essentially calibrating ourselves to essentially score subjects in the same way with the instrument. Because, like any instrument, there's some ambiguity with each of the test items."*

8B9HL described learning about research protocol and elaborated on training and scoring:

> *"So, we sat down with [the research team] and we figured out, you know, sort of the methodology that we might use. And then [Dr. Sibley] came in and started with training. And some of the training initially involved us watching some videos from another site… and going through item by item how to run the test. And then we created our own videos, training videos. And then we would score them separately to ensure that there was... interrater reliability. So, you know, more than one of us scoring similarly… And then certainly when we had questions, or when we had divergent ideas about how to score something, we would sit down together and try to come up with …a more consistent approach."*

Second, interviewees talked about aligning professional, clinical, and research goals. Interviewees emphasized the professional importance of aligning clinical practice with target health system outcomes, delivering evidence-based clinical practice, and treating to the outcome measure. Interviewees said that although there was substantial research evidence with a focus on measuring falls risk, there was less guidance on how to implement a clinical change with new outcome measures. All interviewees said an important aspect of their engagement was aligning the aims of their respective IKT research partnership with the aims of the PT profession and the needs of their patient populations. For example, VWXSG talked about the clinical need for the research topic.

> *"There was research to support the need to assess reactive balance, and the fact that we weren't doing here… as a practice leader at that time, it would be an objective or goal to try to lead and ensure that we had*

> *evidence-based approach. This was something that spoke really loudly to our practice portfolio, to our practice objective, and to me as, as a physio working in, at that point, working in outpatient."*

9KNSI talked about a direct link between the research topic and patient needs.

> *"So, the balance stuff was the hook and then I think sort of the pitch was made, well, this could also be used in your populations, and I do teach a little bit at the university. I've taught balance issues before and thought oh yeah, this makes sense. And with populations I worked with, with people's spinal cord injuries, amputees, neurological conditions, I thought that could make sense."*

U3MFW talked about an evolving clinical role that intersects with the research topic.

> *"Interestingly, now I also now have a clinical role, and 50 percent of me is doing this advanced practice physio role and I see all of the hip fracture patients, so every single one of them has had a fall, so I'm dealing with trying to prevent falls with my patients now on a regular basis as well."*

Third, interviewees described building a research team, which included establishing a clear and regular communication pattern among team members. All interviewees identified Dr. Kathryn Sibley as the research lead, and generally described her as the person in charge of research. Most interviewees also identified a "Research Assistant" who worked with Dr. Sibley as part of a "research team" to provide academic research support to the project. Some interviewees also identified a "Rehab Assistant" who provided clinical research support. All interviewees identified themselves as the clinical lead and person in support of research with various responsibilities to the project, but only some interviewees were engaged in data collection. In most cases, PTs were engaged for data collection. For example, U3MFW said:

> *"It was very organized. Um, it was very much overseen by [Dr. Sibley]. We were kept up to date. There was – the meetings were not too often but they were regular enough for us to be able to be on track and what's the next step. I didn't have to do any of the, er, you know organizing of technology even. Like there was always somebody onsite to help with all of that so I really just had to show up and… give my experience with respect to our patient population and what might be the particular challenges with my staff that were involved in it. There was also critical support implemented within the implementation of this study itself with respect to the participants, so the staff members… There was a really very thorough, um, presentation provided, not only on all of the background related to the tool, um, but also there was hands-on practice provided for staff… There was hands-on practice and demonstrations, so that was key."*

Interviewees said they assembled PTs to engage in the IKT research based on the patient populations they served. Interviewees said they identified patients for whom research evidence showed a clinical need for and benefits associated with reactive balance assessment, as well as patients for whom there were no reactive balance recommendations in the literature. All interviewees said they were careful recommending patient populations for inclusion in the study, having many discussions with research partners about risk, fear, and mitigating efforts. For example, 0F0Y4 said:

> *"So, the inpatient people, not that they wouldn't find this useful, but they were more scared to use it, more so than the outpatient folks who were participating because outpatients you have – your balance is better. So, they were willing to take a little bit more risk than the inpatient people who were at risk of reinjuring someone."*

VWXSG said research partners had important discussions about risk and fear.

> *"Practicing [the test] was helpful because it was a new outcome, a new tool at [our organization] for balance testing. One of the themes at [our organization] was this fear of doing this test on our patients, and the fear… that the risk of the test was greater than the benefits of it, especially with some. Our patient populations are fearful that by doing this test I might actually be leading to a fall."*

U3MFW talked about the impact of organizational culture on risk, and fear as a barrier in the context of the IKT research.

> *"Our organization had the best of intentions around promoting this culture of learning and not being penalized. Staff, still to this day, because we put such a focus on discussing it and talking about it, they still have this sense that they're being looked at and being maybe possibly penalised for the fact that their patients have fallen."*

9KNSI talked about the implications of risk in the context of the IKT research.

> *"And I think we quickly found out that there were some therapists that, well therapists varied in terms of how comfortable they felt in [using the test], and they thought it was perhaps dangerous for some subjects and*

> *other therapists felt a little bit more or a little bit less risk averse. And not that there was a huge risk. I mean, there's always a risk of falling in physio. But it came apparent that certain therapists were more likely to do this with their patients than others who would say, "No, in terms of them being screened, I would screen them out just because they're not high functioning enough."*

8B9HL discussed risk mitigation specific to the IKT research study topic.

> *"Yeah, it helps to understand because [Dr. Sibley] will fully admit she's not a physiotherapist. And so, for her to understand, you know, how are we actually going to make this work as far as logistics, and how we mitigate risk, you know? Because obviously there are – there's a lot of judgment, and there's a lot of grey area as far as deciding is this a safe thing for my patient to take on? Because it is balance related, right? So, there's a risk. You know, there's inherent risk in evaluating that. And so, we all had to sort of figure out what we were comfortable with. What level of risk we were comfortable with taking with our patients, and making sure that they were fully informed. But to be able to talk to other physiotherapists who had done similar testing before was really helpful to problem solve."*

PTs whose patient populations were a fit for the study and who were willing to engage as partners in research were recruited. Interviewees described using physical recruitment posters onsite in conjunction with email communications to coworkers. Interviewees said that recruited PTs were asked for input on the research study design and help implementing research study protocol with their patients (i.e., reactive balance assessments, measurement, and scoring). All interviewees said that communications with research team members took place early and often in the research process. They described email and in-person communications that were led by Dr. Sibley and her Research Assistant. For example, U3MFW said:

> *"[Dr. Sibley] was excellent at always keeping every one of us up to date and communicating with us. Having that onsite person, who also would communicate with me and we would troubleshoot together… there certainly wasn't a burden put upon me, which made it possible in terms of workload. But there was also a lot of very clear communication and there were onsite meetings with my staff that were involved in the study. All of that completely organized."*

Interviewees said while some communications aimed to inform and educate PTs about research protocol, other communications targeted experiences with research protocol. Interviewees said the ease of communications among team members and across physical locations created an atmosphere of collaboration, flexibility, and responsiveness. For example, VWXSG talked about collaboration during training:

> *"As we were going through the training sessions, I know that the clinical team, the physio participants, identified that it would be helpful to have pictures. I know that we went over the different tests. We practiced it on each other. And then the research team was very responsive about coming up and creating pictures of the different tests."*

9KNSI talked about brainstorming:

> *"So to have informal brainstorming sessions on how to work on dynamic balance, that sort of thing. And again, some people because they're risk averse, brainstorming a little bit more. Well, we've got three burly assistants who could be a second assist as a standby if you're worried about that. And so those were some of the examples of using other strategies for getting people more engaged."*

U3MFW talked about troubleshooting:

> *"[Dr. Sibley] was excellent at always keeping every one of us up to date and communicating with us. Having that onsite person, who also would communicate with me and we would troubleshoot together so it was very – there certainly wasn't a burden put upon me, which made it possible in terms of workload, but there was also a lot of very clear communication when there were onsite meetings with my staff that were involved in the study. All of that completely organized."*

Fourth, interviewees described adaptations to their respective organizational settings to create environments more conducive to doing research, as well as adaptations to research instruments and processes. Interviewees gave practical examples of adaptations to their organizational settings that were made to accommodate the study, but also cultural adaptations to overcome issues related to practicality and risk. 9KNSI described adaptations to the physical and digital clinical environment including reminders and specialized equipment that were implemented for the IKT research partnership and persisted afterwards.

> *"So yeah, changes to our department, certainly, there's a file folder now with [scoresheets for the new test] that people would access. It exists on*

> *the scheduler so when people are doing their discharges, it's aligned to one of the drop-down menus… But yeah, and I guess the other thing is that permanently now we have a little cart, a [new test] cart that has the cushion and the incline on it, and stopwatch, so there are some physical reminders of it."*

8B9HL talked about practical aspects such as staffing and resourcing the project.

> *"We needed extra staffing to backfill… we needed some special materials for the balance exercises to do with cushions and um, or like a-a pillow basically that you put on the floor, and a various number of things. And we put together sort of a kit of sorts. And created a list of materials so that we would make sure that the therapists would come in and have to do the test, but not have to be searching for everything."*

All interviewees talked about how research protocol was flexible and adapted as required. Organizational culture was frequently mentioned in this context. For example, interviewee 0F0Y4 described adaptations to the organizational culture that affected the acceptability of the IKT research partnership because of risk.

> *"It sparked a lot of discussion amongst people that we don't normally challenge our patient's balance. We sort of do what they can do, but we don't take them that step further. Again, because there's a risk of falling and we don't want that to happen."*

8B9HL said that although PTs and their patients are generally cultured to tolerate risk in treatment for physical health benefits to occur, PT risk perception led to research adaptations.

> *"I sort of presumed that we needed to be very rigid with using the test precisely as it was written. But [Dr. Sibley] was flexible as far as making sure that we made it realistic. That we were able to still perform this test and acknowledge that we made some adjustments based on our clinical judgment."*

VWXSG described adaptations to data collection instruments and patient medical charts.

> *"I also remember we worked with health records to create a form because we wanted to make sure, again, that the work the clinicians were doing is relevant and appropriate to their patients, so it's not just information that you would do on the side [that] doesn't go to the patient charts. We had to work to figure out how we would incorporate this information into the medical chart."*

U3MFW elaborated on similar adaptations.

> *"And even during the study, if they realized as they started to fill out these forms that were critical to the study and how things were going, they were able to adapt that as things went – er, went along and they were able to say, you know what? This is actually – you could probably improve this by changing this section or adding this piece – and then things would get changed. So that was – that was very, um, very helpful, um, and I think rare. I think a lot of studies, you know you've got this one size fits all, and for a lot of good reasons. I can understand why somebody would want to do that in a multi-site, huge study but with this – with this, um, individualizing it in terms of the needs of the various*

> *organizations and the staff using the different tools supportive of the study, was very critical."*

VWXSG further described adaptations to research study protocol related to the patients engaged.

> *"One key note that came up was when we were practicing the [new test] with clinicians. And then once they were starting to use it on their patients there was a, because of the varied patient populations across [the organization], there was an ask from the physios who participated in the research about what was the meaning around the scores. Was it different? Should it be different from different patient populations? And so that was also something that the research team was really quite responsive to. They went back and looked at the research to see, is there a different cut-off series or a normal range for a certain patient population. And so that was helpful… actually making it meaningful and relevant to our patient population."*

Fifth, all interviewees were aware of getting appropriate research ethics board approvals, and most interviewees discussed some of their site-specific ethical considerations, but none of the interviewees gave details due to what they described as limited recollections or limited involvement in the process. Some interviewees did not remember much about it, such as interviewee VWXSG, who said:

> *"I'm sorry to say that I don't remember about research ethics and all that, what, and what, what took part. I think [my colleague] may have… taken the, more of the lead on that part of it." All interviewees identified*

> *research ethics board approvals as being among Dr. Sibley's responsibilities in the IKT research partnerships.*

In another example, U3MFW described an active part in ethics.

> *"We would have meetings together with [Dr. Sibley], for sure, and she collaborated with us right from the beginning around the research ethics piece, because there was separate requirements in each organization for this study so it was a really big load of work for [Dr. Sibley], that's for sure… sometimes it would just be [Dr. Sibley] and I needing to – to sort through some of the, um, requirements within the organization and our research ethics board, and then other times we would come together as a larger group to discuss some of that with respect to the study."*

Most interviewees discussed site-specific ethical considerations, such as with recruitment, screening, and informed consent. For example, interviewee 0F0Y4 described being "the go-between the research coordinator and our health records" during study recruitment, as well as other related activities.

> *"So, it was a matter or recruiting interested parties, interested physiotherapists to be part of the study. Also, I believe we had to recruit patients as well. And I remember this because it was a matter of getting permission to put a little poster up on one of our communication boards about the study… and the therapists would recruit from their own caseload, but we still had to go through the whole consent."*

Interviewee 8B9HL described an ethical issue that arose related to screening and acquiring informed consent.

> *“Yeah, so we had a few interesting questions to ask ourselves. One was to do with consent. In this population we had a real challenge in that some of them do have cognitive changes, and some of them are mild, but we had to decide on a threshold by which we would decide that they were capable of pro-providing informed consent but also consider that we didn't want to bias the study by not involving people who had cognitive challenges. Because many people in this population that have balance challenges also have cognitive challenges. So there was definitely some ethical concerns from the perspective of you know… saying that we could not involve them if their Mini Mental Status Exam (MMSE) or whatever was less than a certain amount.”*

All interviewees said the central issue of ethical concern in the IKT research partnership was mitigating the risk introduced by doing something new in practice. For example, 9KNSI said:

> *“I think we quickly found out that there were some therapists that, well therapists varied in terms of how comfortable they felt in [doing the new test], and they thought it was perhaps dangerous for some subjects and other therapists felt a little bit more or a little bit less risk averse. And not that there was a huge risk. I mean, there's always a risk of falling in physio. But it came apparent that certain therapists were more likely to do this with their patients than others who would say ‘no’ in terms of them being screened. I would screen them out just because they're not high functioning enough.”*

Supporting people to remain engaged in IKT research

Interviewees described necessary supports to maintain their engagement, as well as the engagement of their practicing PT colleagues, over the course of IKT research. All interviewees said they felt supported to engage over the course of the IKT research partnership by Dr. Sibley, who was well-organized and made herself and various research supports available as needed, and their host organizations, which were willing to devote time, people, resources, and physical space to the project. Among the human resource supports that interviewees named were their respective organizational leaders, project champions, people with research experience, research assistants, research participants, which were PTs and their patients, as well as other community-of-practice (CoP) relationships. For example, VWXSG talked about leadership support:

> *"I was a practice leader. Point two of my time was dedicated to practice, and practice initiatives. So having the support from my Director of Practice at that time, being able to connect with the research team, being able to present it as a research project to our physiotherapy team and department and knowing that there was interest helped to move this forward."*

9KNSI talked about dedicated time for research, and the support of colleagues:

> *"Well, I guess there's some dedicated time, which it's always easy to fill time with other things, but certainly I have time from my employer to do that and to address that. And then I guess, specific skills and experience in proposal writing and yeah, research design, that I felt I didn't have personally. There were some of my co-workers that did have a little bit more of that experience, but they had limited availability. Whereas it felt*

> *certainly early on, like [Dr. Sibley] was available, as available as needed to do that."*

0F0Y4 commented on receiving support from Dr. Sibley and her Research Assistant with respect to training, education, and administrative aspects of the project.

> *"The whole team was quite supportive, there were – because it was teaching our staff a new tool and how to use it there were several in-person visits from [Dr. Sibley] and parts of her team. We felt very well-supported… Yeah there was a – someone who was involved who organized all the meetings and, you know, calendar invites and all that kind of stuff. So, that was also very helpful that it didn't all fall on me to do that. So, it was very, very well-organized, very well-communicated."*

8B9HL mentioned support from Dr. Sibley with procuring special materials for the balance exercises including an equipment checklist to help guide PTs through the new process, and futher elaborated on a supportive work environment that included internal project champions and external CoP relationships that helped with breaking down barriers and securing financial resources.

> *"The manager that we had here at the time was very supportive of us doing research and did her best to try to um, support us and be uh, I guess you would call her a um, sponsor of sorts to make sure… Somebody who would move – who would go up higher to senior management and um, help us make sure that she could break down any barriers that there were to doing the research. We also developed a relationship, and I had already had a bit of a relationship, with [funding*

> *source] who had never really traditionally supported research. So, we sort of really broke down that barrier, where we actually went and we did a presentation to them and they gave us $20,000 and they had never done that before to our knowledge."*

Evidence: "What do you think?"

My third aim with this research was to describe how PTs perceived the impacts and outcomes of engagement, including their thoughts on the resulting research evidence. Conversations included: (1) PT perceptions of short-term impacts; (2) PT perceptions of long-term outcomes, and (3) shared their thoughts and feelings about the resulting research evidence, and (4) factors affecting evidence use in practice, especially since COVID-19.

Short-term impacts

Interviewees were asked to describe their individual roles and contributions to the IKT research process. All interviewees first grounded themselves in a description of the clinical roles and responsibilities they occupied at the time of their respective IKT research partnerships, which included such titles as Practice Leader, Advanced Practice Leader, Clinical Advisor, and Clinical Service Lead. Then interviewees described how they regarded their role relative to others in the IKT research partnership using a wide range of terms, including: administrator; change agent; creator; coordinator; organizer; primary contact; project manager. Some interviewees described their roles as being persistent and enduring over the course of the IKT research partnerships, while others described their roles as evolving with the needs of the project. For example, 0F0Y4 described occupying a consistent role.

> *"I'd say I was mostly the, the organizer… We had to create a new, a new, because we're still on paper charts – we had to create a new form that the test, the balance test, was sort of written out on so that was easy to collect the data. So, that was another you know, formatting, creating a form formatting it, having it go through the forms committee to get approved. All that. That's part of my role, but yeah, besides that mostly like organizer."*

Conversely, VWXSG described occupying various roles over the course of the project:

> *"I think I was likely the, the change agent that helped to move this forward… I ended up doing a lot of the administrative um components of the research project. But what I found difficult is that by the time the project um, the research project um was live, and we were ready to practice test with patients, I was no longer doing clinical uh practice at that time. So, although I was still the, the champion, I was doing more administrative duties. I was working with the practice leader who was actually, um, practicing the, the tool. ... In the manager role there was a lot of coordinating and booking and scheduling and booking rooms and all that."*

In these various roles, interviewees described their individual contributions to research as including such activities as: recruiting and screening PTs and their patients; creating forms such as for data collection; getting oversight approvals such as from within the organization and ethics; updating patient charts; managing PT engagement; guiding the PT treatment approach using the new tool; performing research activities such as data collection and concurrent testing;

administrative tasks such as coordinating, booking, communicating, and organizing; developing and publishing manuscripts; recognizing individual contributions to research. For example, 0F0Y4 talked about organizing the project, creating content, such as data collection forms, pursing appropriate approvals for using new materials in clinic, and being central to the project happening in the organization.

> *"I don't know… that it would have happened otherwise. Like, I don't know that a researcher coming in and just asking clinicians to participate doesn't always work… They usually have someone like me come in and sort of like be the point-person. The therapists don't have time to do that; to be the point-person, do some recruiting, some organizing... I'm the go-to person for the researcher coming from the outside."*

8B9HL talked about advising the research team on the pros and cons of doing the study with PTs and with different patient populations, making the process practical, engaging in data collection, organizing the project, and maintaining PT engagement over the course of research.

> *"I think I'm quite realistic with what it's really like. Um, in practice… I still am a frontline therapist as part of my role. And so, to be able to really understand practically the realities of time management, and to be able to provide a, you know, provide a test that's actually going to be something that a therapist would use. So, I think that that's helpful. But at the same time, I maybe have more interest in running this, and pushing it than maybe some of the frontline therapists."*

Interviewees talked about how their contributions impacted on the IKT research process. Interviewees said they contributed by providing the research team with increased clinical access, such as to PTs and their patients. Interviewees discussed how incorporating some of their ideas into the IKT research partnerships helped add meaning to their engagements, regardless of their role. For example, 8B9HL although less administrative work was preferred, there was enjoyment in creating new ways of doing things.

> *"We created some of our own processes and our own spreadsheets and whatnot to make sure that we kept organised. And I liked that part of it. I like feeling like I'm sort of on top of it, how many people we've got, and how many more we have to get."*

Some ideas interviewees said they infused into the research processes were creating within-site and between-site champions for change; creating a division of labour to facilitate workflow; brainstorming solutions related to risk and risk perception; keeping PTs engaged in the study; calibrating scores; and incorporating outcome measures into practice so that patients received meaningful care. VWXSG talked about meaning making: "One of the contributions was really about looking for the meaning behind the scores for patient populations… I helped to change some of the discussion we had in our teams." 0F0Y4 talked about contributing ideas related to data collection and scoring that persisted afterwards. "As I recall we had to troubleshoot it how we were going to collect… So, well let's create a form for this so, that it's – and we wanted this test to become part of daily practice so, why don't we have this form that we can use for the study, and then keep using afterwards." 9KNSI talked about ideas to keep PTs engaged in the study. "Well offhand, I don't know if the ideas are mine, but we came up with them together, but certainly I was noticing some therapists maybe being a little less engaged. So that was kind of the impetus for thinking, OK, what do they need that will get them more engaged?" 9KNSI said some strategies for getting people more engaged included role modelling, informal brainstorming, identifying champions, and sharing early numbers.

> *"Well, like I said, telling them about my caseload, talking about how treatment could be enhanced by… treating to the outcome measure… So, to have informal brainstorming sessions on how to work on dynamic balance, that sort of thing. And again, some people because they're risk averse, brainstorming a little bit more… and it was always helpful to highlight and draw attention to one or two of the therapists who were engaged with [the study] and saw the benefits of [the test] and… identifying those champions… I think any updates that we provided, especially with some preliminary numbers, I think people liked that… it gives you a kind of a snapshot, a functional snapshot of our caseload in a sense."*

Long-term outcomes

Interviewees perceived long-term outcomes at individual and organizational levels. At the individual level, PTs perceived long-term outcomes related to their abilities in professional practice and clinical research, as well as their personal contributions to the spread of knowledge within and beyond groups. 0F0Y4 explained that the IKT research topic and experience got people thinking more about reactive balance, and whether there were better clinical options than their choices at the time.

> *"We tend to sort of stick with what we know and what we're comfortable with and people don't always want to go outside their wheelhouse to*

> *learn new things. But I know a lot of people sort of learn by osmosis… it's adding another tool to their wheelhouse and it's getting people comfortable with research."*

All interviewees said that because of staff members who have persisted within each host organization since the IKT research partnership, there are pockets of PTs with increased awareness of a medical problem and increased access to a broader range of tools to address it. For example, 0F0Y4 said:

> *"I think in the long-term or the medium-term, having these therapists learn about these tools will eventually give better outcomes to patients because now we're focusing on things that are more functional than more so things that we – that maybe aren't as functional that we thought were functional, but like now realizing oh, this is actually a more functional thing to do with the patient rather than what we were always doing. So, it gives them that other tool to use, umm, to help deliver better care."*

Two interviewees talked about spreading knowledge and championing change both within the host organization and in a broader community of practice (CoP). 9KNSI said:

> *"Yeah, and I guess further to the champion end of things… I'm in a rehab hospital, but I didn't go the acute side [because] a lot of their folks, I mean, they're just trying to get them out of bed and get them discharged. But the folks that were there for a longer amount of time, if they were perhaps doing balance work with them, [I was] exposing them to that instrument. And then also, I think going to [organization] when they were*

> *starting their study on the same thing with their patients. So, again, championing it a little bit broader. And then also, a little bit with [another organization], with that group."*

8B9HL talked about championing change as well as reputational outcomes for organizations and professions who engage in IKT research:

> *"I have worked in with some other projects at [another organization]. Not necessarily specifically research-based, but bringing in new knowledge, and so on. And not necessarily doing the research but using the evidence and moving forward with new projects. And I enjoyed seeing us considered a centre for excellence because unfortunately sometimes in physiotherapy people consider the pinnacle of a career to be working in sports medicine or working with younger people. We think that the work we do here is equally important, but different. We wanted people to understand more what we do here, and why it's important. I think it was partly the public relations piece as well. Within our profession and beyond."*

At the organizational level, PTs perceived long-term outcomes related to new programming and increased capacity for research. All interviewees talked about new opportunities for employees of the host organizations to engage in more research since engaging in the IKT studies. VWXSG talked about the IKT research experience leading to more individual research opportunities.

> *"I guess the, the positive is that, again, at that time we were very new to clinical research, and this was a great way to get into, to experience firsthand what clinical research was like… I've done more research*

> *since, but it was my first experience with clinical research. And it was a very positive one."*

U3MFW described the launch of a new program since engaging in IKT research:

> *"We have a new initiative rolling out in our organization called Therapeutic Falls and so we are now, er, rolling this out across and piloting this in a couple of programs… We're engaging patients in Therapeutic Falls where we go ahead and take that risk – and we fully allow them to go ahead and walk independently, even though we want to desperately hang onto them and give them hands on support because we're afraid they might fall, and this is a whole new exciting thing we're engaging in right now."*

8B9HL talked about a new research award since the IKT research experience.

> *"And so, since then they've developed a research award. And every year there's a research award. And I help to create the criteria for that award. So, there are opportunities for people to do research [here]. I like to think that we are one of the reasons that started."*

Similarly, 0F0Y4 talked about new funding for more PTs to do research.

> *"We keep track of these things umm, so, I'm because of my involvement in this study and others I've been involved in, I'm now on the education research grant of our hospital. Umm, so, you know, the more people on that the better… It gets people sort of thinking, because then we do have umm, research innovation… we have grants for that every year for sort of lay people, therapists, that want to do a quick little research project there is money towards that. So, if they, you know, sort of got their foray to research*

> *through this and then like oh, now I want to study that, it's more interesting."*

Resulting research evidence

Interviewees talked about many aspects of the resulting research evidence. They talked about (1) confidence in the reliability and validity of the research evidence they coproduced, (2) the role of evidence in practice, (3) reasons the evidence may or may not be used, and (4) indicators of ongoing or intended evidence use. For example, 9KNSI talked about how adaptations in the IKT research process made the evidence more useful.

> *"The evidence that we came up with? Well, I think I'm quite confident in it. We had to make some decisions early on, in terms of how we wanted to score certain items, depending on how patients presented, so we're arriving at a consensus. But as a result, it created some fairly broad categories."*

Conversations evolved to discuss the overall role of evidence in practice, as well as issues related to practicality and utility when reflecting on whether the evidence is being used now that the IKT research partnerships are over. 0F0Y4 said those who weren't participating wouldn't necessarily have used it unless they were watching somebody else address it.

> *"We tend to sort of stick with what you know and what we're comfortable with and people don't always want to go outside their wheelhouse to learn new things."*

U3MFW was not sure about evidence use for the same reason but spoke confidently about increased clinical awareness as a secondary benefit.

> *"Whether it encouraged them to use the tool itself? I don't think we're there yet, but it did bring an important part or element that they were not assessing; an awareness about that. It did introduce a tool that I have heard since the odd staff member has used it since the study. So that's good that they were introduced to an important assessment tool that they may not have been aware of beforehand, and also an awareness that they are not assessing this, and they are not managing it, so that's critical."*

VWXSG spoke similarly and identified increased access to evidence as another benefit of engagement in IKT research.

> *"The long-term impact is, again, I think, I believe the [new test] is actually still being used on the ABI unit. So, it, it was uh incorporated into, I'm going to say a bag of tools. It's not, I don't know that it's used all the time, but it's now a tool that is um considered regularly for ABI patient population. For the other units, I'm not sure if they use it regularly, but it's a tool that they're aware of. So, it's at least at the very minimum we're, we're um informing our clinicians of other outcomes measures that are based on evidence that they could use is helpful. And it's good to know that there's other… that I guess evidence is evolving. It's making sure that we stay abreast of what's out there and, and hopefully making sure that the care that we're providing, the assessments that we're providing, are based on evidence."*

Interviewees talked about making pragmatic decisions to use the evidence resulting from the IKT research partnerships within certain patient populations. They said that PTs treat to the outcome measure, so clinical tests must produce scores that can be translated into meaningful advice for patients and their families. 9KNSI talked about the need for ongoing brainstorming to keep evidence relevant and useful.

> *"Physiotherapists treat to the outcome measure to sort of help people to score better on a low score item on the [old test]. That's what they would practice. So, if clients aren't doing very well on [new test] items, how do we treat towards that? So, to have informal brainstorming sessions on how to work on dynamic balance, that sort of thing. And again, some people because they're risk averse, brainstorming a little bit more."*

8B9HL elaborated on aspects of the evidence that failed to address complex health care problems, such as with certain patient groups:

> *"This test has an interesting threshold. In that even for somebody who is very agile, somebody like me who's young, you wouldn't be expected to score perfectly. And so that's great except for our population is so low functioning physically, like mobility wise that the assumption that this test can be used for that population shows a lack of understanding of how poorly these people function… I need something that's meaningful to them and is going to help me with decision making."*

VWXSG also talked about the hidden value of evidence in PT practice, which is always to make meaning for patients and their families.

> *"So, our medical rehab patients, like the feedback I received at the time was um these are complex, these are older complex individuals with multiple morbidities. The last thing I want to do is push them and they*

> *did not react, and I need to figure out how to catch them. Stroke patient population was like, it's challenging already. And many of the physios were like, 'Well this is one more test. What, what information does it actually provide me?' So, if there's no um standardized score for a specific age or patient population, if it, if it's not meaningful then really all I'm doing a test, I'm just doing a test to do a test."*

0F0Y4 said there were cases where the evidence did not apply.

> *"Some of the inpatients were just not appropriate to have it done. Like, it's just not, you know, it's too early. But it did get some people thinking of you know, oh, maybe we could do more of this. And maybe that would be more useful than what we are currently doing."*

U3MFW said the evidence pointed to more opportunities to learn and try new things.

> *"It definitely showed me that I have a lot of work still to do with my particular therapists in our program because I do think that my organization was one of the organizations where there was less uptake of this outcome measure. So certainly, use of outcome measures is one struggle that I think, er, we're still struggling with, um, and I do think that, er, the clinicians are still coming up with these barriers around reasons to not use it."*

All interviewees talked about whether their respective host organizations plan to continue using the evidence resulting from the IKT research partnerships. For example, 0F0Y4 said there are onsite indicators.

> *"Umm, are people still using the tool now? Not sure. I think not really, umm, but I do still see the forms on the unit collecting forms for something else and the form is still there. So, they want to use it."*

9KNSI also talked about some signs of intended evidence use over the longer term.

> *"So yeah, changes to our department, certainly, there's a file folder now with [new test] scoresheets that people would access. It exists on the scheduler. So when people are doing their discharges, it's aligned to one of the drop down menus… And people probably with the scheduler were only tweaked into that after they discharged somebody, because that's really when you're entering the information. But maybe it would serve as a reminder to the next patient… I guess the other thing is that permanently now we have a little cart, a [new test] cart that has the cushion and the incline on it, and stopwatch. So, there are some physical reminders of it."*

VWXSG said evidence use seems to be limited to those PTs who had engaged in IKT research, and who were comfortable using it within their patient populations.

> *"I think we maybe had seven, somewhere between seven and 10 physios who were participating in the research. I think the only patient population in our organization is still doing [the new test] to this day is our ABI, which is our young, typically our younger patient population who has had a brain injury and um there's less risk, right? So, our medical rehab patients, like, the feedback I received at the time was these are complex, these are older complex individuals with multiple*

> *morbidities. The last thing I want to do is push them and they did not react, and I need to figure out how to catch them. Stroke patient population was like, it's challenging already. Um, our ortho MSK patients are like a lot of our patients we're seeing at the time were hip fractures or multiple fractures that didn't feel comfortable doing this. So to this day, I think the I think there's still a handful of therapists who still endorse doing the [new test] and its primary on the ABI unit."*

U3MFW commented on the need for a paradigm shift in the host organization's culture around falls.

> *"But then in terms of using a tool, like the [new tool] and assessing and managing reactive balance, that requires a complete culture shift in the organization… How we discuss incidents with our staff. How we encourage, um, some elements of taking risk if we except to do anything around changing patients' balance and preventing – um, and always looking at falls prevention in a way that is actually meaningful and going to have beneficial results for the patients, but we have to think about the whole system, right?"*

8B9HL addressed the role of organizational culture in evidence use.

> *"It takes a lot to challenge people's paradigm, challenge people's thoughts about it. Because that's just what we do. We definitely do challenge things, and start thinking, why am I spending my time doing this? I'm not sure that this is really helping, and nobody else seems to be sure, and push against what would be the overwhelming feeling in the*

> *medical community that this is just what we do because this is just always what we've done."*

8B9HL talked about the functional limitations of various patient populations and further discussed the importance of doing more research to increase the utility of the resulting research evidence.

> *"What I would say is that even if that's not necessarily a – it's not necessarily that it's super useful at least we're recognizing the need for something. Maybe there's an option – an opportunity to develop something. Where we can actually say this is what's missing. This is the information that we don't have from that."*

Factors affecting evidence use in practice

Interviewees discussed factors that affected these PTs' decisions to use the resulting research evidence in practice. Interviewees started general and got specific with their explanations. All interviewees said that for research evidence to be practical and useful to PTs in clinical settings, evidence needs to be (1) timely, (2) practical, and (3) supported by a key centre of influence. (4) They also talked about persistent COVID-19 impacts on patients and professional practice. From a lens of timing, interviewees said that the ideal time to introduce new research evidence to professionals is either of two career stages: during professional training, such as graduate school, or during early career, such as when shadowing others in practice settings. For example, 9KNSI talked about the potential for greater impacts on newer PTs and those still in training programs.

> *"Well, offhand, I don't know specifically what's being taught about that instrument now at the college, right. But I'm hopeful that newer grads*

> *and newer employees will see its benefit more than the old folks who were baptized and branded with the [old test] and have a hard time seeing beyond that. So yeah, I would see the university having a role, like I said. And then those, the people that were champions during the study who coincidentally weren't - will probably be employed for a while yet as therapists, they would continue in that champion role."*

All interviewees talked about making practical decisions in practice. They said PTs make decisions about which tests to use based on timing, ease of use, feasibility especially with follow-up, meaning making for patients, and ability to treat to the outcome measure. For example, VWXSG spoke generally about the role of practicality on evidence use in PT practice.

> *"I guess from a practice perspective I would say the role of evidence. So, if it's strong evidence to support improved patient outcomes. And then I would also think, from a practicality perspective, how easy it is to implement, like if it's about just doing a quick test, um, does it require equipment? Does it take two months of training? I don't know. But I think it's how easy the access to the information is, evidence. And um, and then from a practicality perspective, how easy it is to implement."*

8B9HL said evidence needs to be meaningful.

> *" I need it to mean something. And right now, [the test] as of currently anyway doesn't have anything associated with it to make those recommendations… It's not that useful… I mean. it's time consuming, which is definitely a factor, but even if I had all the time in the world I'm not sure how much I would use it. But I'm trying to be open minded."*

U3MFW described barriers to using outcome measures themselves.

> *"You know there's always – I'm aware of these barriers myself from my own Master's Degree – so, barriers around using outcome measures in and of itself, right, with respect to taking the time to use them – and understanding what the value could be of these tools. Having an ability to interpret what the results of these tools mean and these are all some of the barriers that make them not rely on using them."*

All interviewees identified various centers of social influence on physiotherapy practice. Without IKT or similar research partnerships to encourage live innovation within health care, PTs say they learn about new evidence and receive encouragement to adopt because its either forced or endorsed. Centers of social influence in physiotherapy may include esteemed professionals such as celebrities or colleagues regarded as leaders; CoPs such as professional associations; and governing bodies such as insurance companies. For example, 9KNSI said:

> *"Well, certainly anything on a national level... anything coming out of the [national institute and professional association]... [Insurance companies], they want forms, of course, to show the changes in their clients to continue funding their therapy, let's say… So again, to get people standardised. All those educational resources that come our way, using those to certainly impact my practice, as well as the practice of others. So yeah, the [national institute] ones would come to mind and the stuff that was coming out of the [professional association] at the time."*

All interviewees talked about the IKT research process and resulting evidence relative to the COVID-19 pandemic because of profound ongoing changes to their patients and the way they practice. For example, U3MFW commented on changes in patient acuity that affect evidence use.

> *"They get a lot of patients coming over, er, very acute, very complex and they're coming sooner and sooner from – they're getting discharged from acute care sooner and coming to us. We have a lot of turnover and there's this hesitancy to push our patients with respect to challenging their balance and even assessing their balance."*

9KNSI talked about a hesitance to try new things since the COVID-19 pandemic due to factors such as health care provider burnout, and a move to online practice that has since become a mainstay in the profession.

> *"Yeah. I think, unfortunately, with COVID too, I think everybody's kind of in survival mode. And so COVID probably will contribute because it's probably been a while since people have focused on their normal caseloads. So, a lot of these outpatient populations were addressed virtually, through Teams like we're doing. And if there was reluctance to do this outcome measure in person, they're definitely not going to do it over a virtual platform. So unfortunately, I think COVID might deliver a larger hit. Because we did have therapists who it happened at least once, if not twice, that I can think of, where they were seeing somebody through Teams and the person fell on the other hand… Certainly it will impact people's reluctance to do anything that they would see as risky."*

8B9HL commented on changes in health care since COVID-19 that affect the way clinical tools created prior to the pandemic are being perceived by those intended to use them.

> *"Maybe this assumption that the creators of the test have said that this is a great test for everybody. Maybe just be – we're challenging that. Because I really don't think most people realize when somebody comes in for geriatric or rehabilitation and we just had somebody do a research proposal here. Saying that the requirements were that the person have no cardiac history, no dizzy spells, no congestive heart failure. That they need to be able to stand on their own with no gait aid for two minutes. And they need to be able to walk 50 feet independently. Well, they're out to lunch because we don't have those people. And if we do, we send them right back home. We would have 15 years ago, but these people are coming in more and more frail. They are – and just to get them home to spend as much time as home – at home as they can. I think it's a knowledge and understanding of the population and how much different health care is than it used to be. Those people used to be inpatients. Now they're lucky if they make it to an outpatient clinic."*

0F0Y4 talked about changes to patient population characteristics that affect the delivery of health care since COVID-19:

> *"Yeah, so, the strokes that we're getting are more and more severe. Umm, we're getting more and more of them, uh, therapists have less and less time to do certain things. A whole number of factors as to why it may not be used. And then you add the pandemic on top of that."*

U3MFW talked about COVID-19 distracting from other work in health care and the importance of keeping research findings relevant.

> *"We need to keep talking about it. We need to keep – if we don't keep talking about the research and keep updating them on what –because they don't have the time potentially to go off and read a whole bunch of – um, the latest research – so I think we need to talk about it and problem solve and take cases together. I think we need to be encouraging more of that in our organizations. I mean it always comes down to time and what's going on. Lately it's COVID is everything."*

Summary

I set out to explore the PT perspective on KU engagement in IKT health research partnerships with three main aims. My first aim with this study was to describe the IKT research partnership experience from the PT perspective. This conversation thread served to jog memory in the minds of interviewees. Initially PTs recalled elements of the process, such as how the IKT partnerships were initiated, who made first contact, how the topic was decided, and how research decisions were made thereafter. Deeper into conversation interviewees talked about the reasons people and organizations had for engaging in IKT research, and they shared personal reflections on the experience. My second aim with this research was to describe features in the host environments that PTs said affected their respective IKT research partnership experiences. This conversation thread included recollections of extrinsic factors, such as relationships and resources in the environment, that enabled the IKT research partnerships. My third aim with this research was to describe how PTs perceived the impacts and outcomes of engagement, including the resulting research evidence and its use. This conversation thread got interviewees talking about how they perceived themselves relative to others in the process, and what was lost or gained because of engagement. Interviewees talked about the overall quality and utility of the evidence they coproduced, and how they make decisions about evidence use in practice. COVID-19 was brought up by interviewees in several contexts throughout interviews, but especially in relation to evidence use. The PTs engaged in this study identified as 45-64 years old and mid- to late-career with at least one decade of experience in practice. These PTs were engaged as KUs in IKT research partnerships related to balance in Canadian public rehabilitation settings between 2013 and 2020, with some engagement ongoing due to pandemic-related interruptions. These PTs estimated that as much as 80% of their patient caseloads suffered from balance impairment. All PTs said falls and balance were relevant considerations in practice, and that the research topic was a factor in deciding to engage in IKT research. All PTs described host organizations that were positioned to enable the IKT research partnerships. PTs in the Sibley Studies commented positively on aspects of engagement in IKT research, especially hands-on opportunities for practice, suggesting that intervention effects may be related to such factors as rehearsing skills, receiving feedback, solving problems, making decisions, setting goals, and role modelling desired behaviours (Sibley et al., 2018). The Sibley Studies found evidence of increased knowledge, confidence, and use of reactive balance measurement both during and post-intervention, as well as some sustained use of reactive balance measurement on completion of the intervention (Sibley et al., 2018). The Sibley Studies used a multi-site research design. There were significant differences in reactive balance measurement across sites, which demonstrated that the study interventions had a range of effects, increasing our understanding of the application of evidence in rehabilitation practice (Sibley et al., 2018). Differing site population characteristics were thought to be a contributing factor influencing reactive balance measurement, but the relationship between patient-related factors and reactive balance measurement was not clear (Sibley et al., 2018). Other factors that may have contributed to varied reactive balance measurement practices across sites included: clinical practice area; organizational culture; shared attitudes, values, and beliefs; and behavioral norms (Sibley et al., 2018). These findings complement and extend those of the Sibley Study, offering advice and solutions to some of the issues these PTs identified as ongoing factors affecting their balance measurement practices in Canadian public rehabilitation hospitals.

CHAPTER V: DISCUSSION

My goal with this work was to provide future academic adopters of the IKT approach in the rehabilitation sciences and physiotherapy with practical advice for the deliberate, efficient engagement of PTs in IKT health research partnerships, especially from within Canadian public rehabilitation settings. I interviewed PTs with the experience, and conversations with these PTs followed three general threads: 1) experience (what happened?), 2) environment (how did it happen?), and 3) evidence (what do you think?). These PTs described procedural aspects and reflections on their experiences. They talked about things outside of themselves that enabled the IKT research partnerships to occur in the host environments. Finally, they talked about the resulting research evidence, and contextualized research evidence use within the profession, especially because of and since COVID-19. This research extends an ongoing discussion in the literature about KU engagement in IKT research partnerships and adds to a growing discussion about how to engage practicing PTs as partners in IKT research that takes place in Canadian public rehabilitation settings.

Experience

We knew from the literature that IKT research partnerships were generally perceived as positive experiences by those engaged (Hoekstra et al., 2020; Mrklas et al., 2022). Negative experiences tended to be reported at the individual level, such as an increased burden of stress related to increased demands on time, budget, and relationships (Hoekstra et al., 2020). In rehabilitation and physiotherapy, KU engagement issues have been identified at all stages of research, such as with initiating, incentivizing, and maintaining engagement, and whether experiences are perceived as positive may be related to factors such as communication, culture, power sharing, and resources (Camden et al., 2015). Strategies for promoting positive partnership experiences in rehabilitation and physiotherapy may include motivating partners to participate, providing institutional support, increasing proximity of research partners, and recruiting partners who have a history of research engagement (Roberge-Dao et al., 2019). Overall, IKT research partnerships have been described as highly contextualized experiences with context-dependent impacts and outcomes (Hoekstra et al., 2020; Mrklas et al., 2022; Roberge-Dao et al., 2019). Considerations for partnering with clinicians in research are reported to include understanding clinical context, understanding reasons for engaging in research, and ensuring partners understand project feasibility, especially in relation to the results (Roberge-Dao et al., 2019). In rehabilitation and physiotherapy, achieving evidence-based practice has been identified as an impetus to adopt the IKT approach, and achieving implementation goals the main reason for engaging in partnership research (Moore & Graham, 2022). Recent adopters of the IKT research partnership approach in physiotherapy have investigated a range of health care issues, but not with practicing PTs from within a clinical context, and reporting on experiences remains vague (Ma et al., 2020; Linkewich et al., 2022; Wideman et al., 2022). One study reported fear and risk as novel findings that help explain factors affecting the IKT research experience and resulting evidence use related to reactive balance measurement practices in physiotherapy (Sibley et al., 2022). This study identified the need to develop and test of strategies to address the fear factor in physiotherapy, such as understanding the role of organizational culture, and the importance of trust in the relationship between physiotherapist and patient (Sibley et al., 2022).

When asked about their IKT research partnership experiences, these PTs talked process. They talked about the reasons they had for engaging, how their partnerships were initiated, and how decisions were made from the point the research topic was decided. These PTs said their main reasons for engaging in the IKT research partnerships were directly related to the organizational settings in which they worked, which favoured research and the topic of falls and balance. Interviewees also identified a personal interest in research and the research topic. Consistent with the prior literature, each of these PTs identified a history of research engagement that likely contributed to their enthusiasm for engagement. These PTs reflected on their experiences with emotion, optimism, and intentionality. Consistent with the literature, overall experiences were described by these PTs as positive and beneficial to the people and organizations engaged. Pride, satisfaction, fulfillment, and being regarded as a leader in the profession were among the positive comments these PTs made about their experiences. Negative experiences were reported, but they were not aligned with the earlier literature, perhaps because of the exquisitely physical and precarious nature of the IKT research topic and associated intervention (i.e., reactive balance testing involves a fall stimulation from a standing position with people who are injured or ill), also the coincidental timing of some IKT research partnerships with the COVID-19 pandemic. The word frustrated was used by an interviewee related to compliance with evidence use, and the word overwhelming was used by an interviewee related to interruptions in the research process caused by COVID-19. This research contributes to what we know about physiotherapist fear as a mediating factor in contrasting perceptions about measuring reactive balance in practice (Sibley et al., 2022). Risk (and associated word fear), discomfort, and overwhelmed were used by these PTs to describe reactions to the research protocol with certain patient populations. The choice in words and overall context in which the negative words were used speaks to a sense of powerlessness in the IKT research process, and in the implementation of the reactive balance measurement intervention that was experienced by these PTs in certain scenarios with certain patients. Ideas about power were discussed in the context of decision-making in IKT research, which included risk mitigation efforts. These findings further demonstrate the complex nature of decision-making in physiotherapy practice, the importance of trust between the physiotherapist and their patient, as well as how risk and fear attenuate perceptions affecting the use of a high-risk intervention; in this case, reactive balance measurement (Sibley et al., 2022).

Although most of these PTs said the IKT research partnership came with a research topic, all described being actively involved in shaping the research process by adapting aspects of the topic and research protocol to suit their practice environments and patient populations, making the process flexible and more comfortable for all engaged. Interviewees talked about benefits to individuals and organizations resulting from the experience that were consistent with earlier reports in the literature. Among the benefits these PTs described at the individual level were increased research capacity, increased professional recognition, as well as personal and professional pride. Among the benefits these PTs described at the organizational level were increased research capacity, desired changes in organizational culture, desired changes in clinical behaviour, and the potential for better health outcomes for some. These PTs also talked about broader benefits related to public health, such as new knowledge and clinical research evidence related to falls and reactive balance in the literature.

Environment

We knew from the literature that broader systemic influences and organizational structures may either help or hinder IKT research partnerships and evidence-use efforts (Camden et al., 2015; Moore & Graham, 2022; Graham et al., 2020; Hoekstra et al., 2022; Sibley et al, 2022; Roberge-Dao et al., 2019). Grooming social and physical environments is critical to supporting IKT research and implementing results (Moore & Graham, 2022). Within the environment, IKT research partners need devoted resources to incentivize, support, and reward engagement, but how best to do that with specific KU groups such as practicing PTs is unknown (Moore & Graham, 2022). Established from within a Canadian health care context, IKT scholars have identified the IKT approach has Eurocentric origins which is presumed to neglect aspects of health equity by virtue of circumstantial privilege (Sibley et al., 2022). Fewer and less frequent IKT health research partnerships are receiving federal funding in Canada, tightening the privilege of partnership research with fewer opportunities for engagement (Sibley et al., 2023). However, the IKT research projects that do receive federal funding are receiving larger sums to accomplish greater research aims over longer periods of time (Sibley et al., 2023). Alternative funding for IKT research projects, especially in the context of privatized health care settings, may result in a broader range of people engaged in healthcare research partnerships, and increased opportunity for innovation with lower resistance from governing bodies. Since a known bias is embedded within the IKT approach, and there is a decrease in the total number of

IKT research engagement opportunities, and there is an increase in the size, duration, and strength of those IKT projects being funded, adopters of the IKT approach must address social and physical aspects of their research environments with context-sensitive solutions. With fewer funded projects spanning greater periods of time, there are increased opportunities to course correct when problems arise. For this reason, IKT scholars recommend that adopters of the approach lean into existing tools such as models and frameworks to guide relational processes and culture a research environment that adequately prepares and supports partners to engage (Jull et al., 2019; Tittlemeier et al., 2022; Sibley et al., 2022). New to this thinking is the use of intersectionality frameworks that help reduce Eurocentric barriers to partnership by guiding who to engage and how to engage them as partners in IKT research (Sibley et al., 2022). At the planning stage of research, adopters of the IKT approach should also position their research projects within a greater organizational strategy or business plan in the host environment (Roberge-Dao et al., 2019; Lewis et al., 2022). Recent IKT research in physiotherapy, perhaps due to the timing of the COVID-19 pandemic, has not taken place in clinical research environments with practicing PTs, limiting what we know about the social and physical factors that enable this work (Ma et al., 2020; Linkewich et al., 2022; Wideman et al., 2022). Only one recent IKT research project in physiotherapy described environmental supports that included proximity of research partners, physical resources and infrastructure supports, leadership support and colleague advocates (Linkewich et al., 2022).

These PTs spoke a lot about organizational culture, necessary preparations, and necessary supports for the IKT research partnerships to occur. Consistent with the literature, these PTs described engaging in IKT research from within organizational environments that were committed to initiatives around falls prevention, academic research, and improving service delivery through evidence-based practice. These PTs described how they and others worked to prepare for IKT research in five general steps, such as training, goal setting, assembling a research team, making adaptations, and getting ethics approval. Based on the extent to which these PTs described each of these activities, not all were considered equally as important. These PTs emphasized the importance of aligning professional and clinical practice goals with IKT research project goals. They spoke about target health system outcomes, delivering evidence-based clinical practice, and treating to the outcome measure as being important considerations over the course of their IKT research projects. These PTs also emphasized the importance of taking a collaborative approach to training and educational processes as well as research design and implementation processes with clinicians because they regard themselves as experts within their treatment populations, especially with the risks they are willing to take with patients. Although the word proximity was not used by these PTs, they spoke often about the accessibility of the research team (i.e., Dr. Sibley and her Research Assistant) and the benefits of regular meetings and communications with them, such as keeping the projects organized and on-track. These PTs described engaging other KUs in the IKT research, such as practicing PTs, based on the patient populations they served. Support for engagement came from those PTs whose patient populations would benefit more than incur risk from the IKT research intervention. Risk mitigation efforts were required due to the physical nature of the IKT research project. These PTs described receiving various supports to mitigate risk, such as specialized equipment, devoted space, and additional staff. They also described receiving support from the research team by way of being flexible and adaptive with the research process and protocol. These PTs emphasized the importance of identifying and addressing aspects of risk and fear early and often in the IKT research process, as well as collaborating on solutions. Organizational culture was critical to the success of these IKT research projects because of risk perception. These PTs described brainstorming and troubleshooting to overcome issues related to risk, as well as related to the practicality and utility of research evidence. Issues related to risk also affected research ethics. These PTs talked about site-specific ethical considerations that affected who else could be engaged as KUs in the study. The central issue of ethical concern that these PTs identified in their IKT research partnerships was mitigating the risk introduced by doing something new in practice that in and of itself had a component of risk.

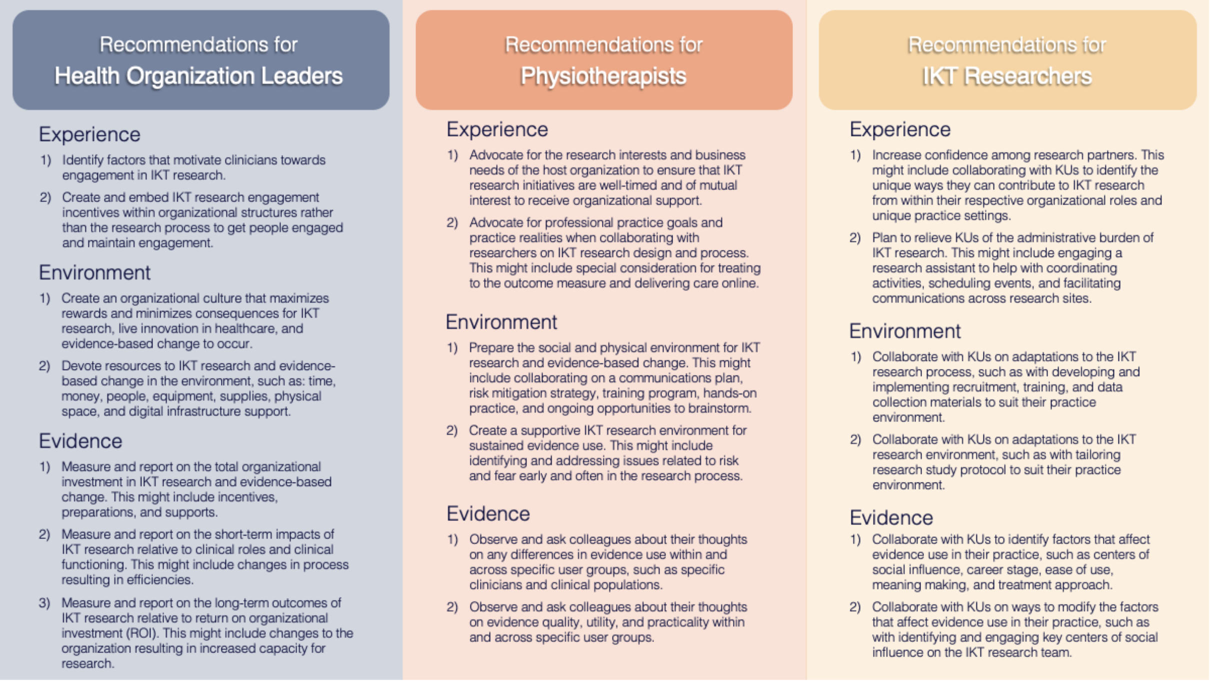
Evidence

IKT research produces intended and unintended impacts and outcomes that are hard to identify and measure (Mrklas et al., 2023; Roberge-Dao et al., 2019). Further, there is a temporal nature to assessing IKT research projects impacts and outcomes that complicates what we know about when IKT research achieves its stated aims (Mrklas et al., 2023; Roberge-Dao et al., 2019). We knew from the literature that IKT research impacts are perceived differently by different individuals, populations of people, and organizations (Roberge-Dao et al., 2019; Mrklas et al., 2022; Mrklas et al., 2023). Impacts and outcomes of IKT research partnerships are perceived relative to the individual, the organization, and the partnership, and they have personal, functional, and contextual characteristics (Mrklas et al., 2022). In rehabilitation and physiotherapy, IKT project reach, or the extent of impacts and outcomes assessment, is often limited to those engaged as partners but sometimes the impacts are broader (Roberge-Dao et al., 2019). We knew from the literature that the specific roles people have occupied in IKT research partnerships in rehabilitation, such as leaders, champions, and early adopters, can help or hinder the spread of new ideas, such as resulting research evidence (Hoekstra et al., 2022). We are still learning about the impacts and outcomes of broader dissemination efforts (Roberge-Dao et al., 2019). We know that IKT research is assessed for return on investment (ROI) and in rehabilitation and physiotherapy, ROI is considered relative to changes in professional practice toward more evidence-based practice (Moore & Graham, 2022; Mrklas et al., 2023). IKT research impacts and outcomes reporting remains vague, however two recent IKT research partnerships in physiotherapy reported on individual increases in knowledge, skill, and confidence and organizational increases in desired practice behaviours (Linkewich et al., 2022; Wideman et al., 2022).

These PTs framed perceptions about the resulting research evidence in a greater conversation about the IKT research process, and the role of research evidence in practice. These PTs described their clinical roles and responsibilities with confidence, and commented on how their clinical positions uniquely situated them to do clinical research. They described their role in IKT research with less confidence than they described their professional clinical roles but spoke confidently of their respective contributions to research. Although they talked about doing administrative-type work, these PTs also recognized that the value they brought to each IKT research partnership had more to do with an insider point-of-view and clinical connection. These PTs talked about short-term impacts in terms of how their engagement changed the IKT research process, and they talked about long-term impacts in terms of how the IKT research process changed themselves and the host organizations. At the individual level, these PTs perceived long-term outcomes related to their abilities in professional practice and clinical research, as well as their personal contributions to the spread of knowledge. At the organizational level, these PTs perceived long-term outcomes related to new programming and increased capacity for research. Roles and responsibilities affected the rate and spread of evidence use within and across organizations. These PTs also said that age and career stage were also factors. Each generation represented in the workplace has a unique way of approaching work that stems back to professional education. Younger PTs, current trainees, and newer graduates of professional physiotherapy programs are more likely to adopt new approaches than their older, earlier trained, and more experienced counterparts who tend to stick with what they know. Where younger generations of PTs are establishing and honing their skills, older generations of PTs tend to operationalize their skills from a place of familiarity and comfort. These PTs said there are centres of social influence that ultimately affect which evidence is adopted in practice, and how fast those ideas spread within and beyond groups. They identified organizational champions, leaders, and related CoPs as being important to their IKT research partnerships when it came to evidence use. With respect to the research evidence they produced, these PTs were confident in it, but did not find it widely useful. For evidence to be useful in physiotherapy practice, these PTs said it must: support the ability to treat to the outcome measure, translate into meaningful advice for patients and their families, consider complex care needs with certain patient groups, and consider cases where the evidence does not apply. Secondary benefits included increased clinical awareness of a medical problem and solution, increased access to supporting research evidence, and increased access to the tools necessary for implementation, which these PTs said is evidence that their organizations still plan to do something with the evidence in practice. However, these PTs also said the COVID-19 pandemic caused profound changes to the health system in which they practice, which has affected the characteristics of their patient populations and the way the profession engages with patients in practice.

Recommendations

Interviewees tended to describe the experience and evidence use in terms relative to their organizational environments and to themselves. Including key centres of social influence is a new dimension to IKT research partnerships that holds promise for evidence use. Recommendations for KU engagement in IKT health research partnerships are organized and expressed relative to one another for health organization leaders, physiotherapists, and IKT researchers (see Figures 10 and 11).



Recommendations for
Health Organization Leaders

Experience

1) Identify factors that motivate clinicians towards engagement in IKT research.
2) Create and embed IKT research engagement incentives within organizational structures rather than the research process to get people engaged and maintain engagement.

Environment

1) Create an organizational culture that maximizes rewards and minimizes consequences for IKT research, live innovation in healthcare, and evidence-based change to occur.
2) Devote resources to IKT research and evidence-based change in the environment, such as: time, money, people, equipment, supplies, physical space, and digital infrastructure support.

Evidence

1) Measure and report on the total organizational investment in IKT research and evidence-based change. This might include incentives, preparations, and supports.
2) Measure and report on the short-term impacts of IKT research relative to clinical roles and clinical functioning. This might include changes in process resulting in efficiencies.
3) Measure and report on the long-term outcomes of IKT research relative to return on organizational investment (ROI). This might include changes to the organization resulting in increased capacity for research.

Recommendations for
Physiotherapists

Experience

1) Advocate for the research interests and business needs of the host organization to ensure that IKT research initiatives are well-timed and of mutual interest to receive organizational support.
2) Advocate for professional practice goals and practice realities when collaborating with researchers on IKT research design and process. This might include special consideration for treating to the outcome measure and delivering care online.

Environment

1) Prepare the social and physical environment for IKT research and evidence-based change. This might include collaborating on a communications plan, risk mitigation strategy, training program, hands-on practice, and ongoing opportunities to brainstorm.
2) Create a supportive IKT research environment for sustained evidence use. This might include identifying and addressing issues related to risk and fear early and often in the research process.

Evidence

1) Observe and ask colleagues about their thoughts on any differences in evidence use within and across specific user groups, such as specific clinicians and clinical populations.
2) Observe and ask colleagues about their thoughts on evidence quality, utility, and practicality within and across specific user groups.

Recommendations for
IKT Researchers

Experience

1) Increase confidence among research partners. This might include collaborating with KUs to identify the unique ways they can contribute to IKT research from within their respective organizational roles and unique practice settings.
2) Plan to relieve KUs of the administrative burden of IKT research. This might include engaging a research assistant to help with coordinating activities, scheduling events, and facilitating communications across research sites.

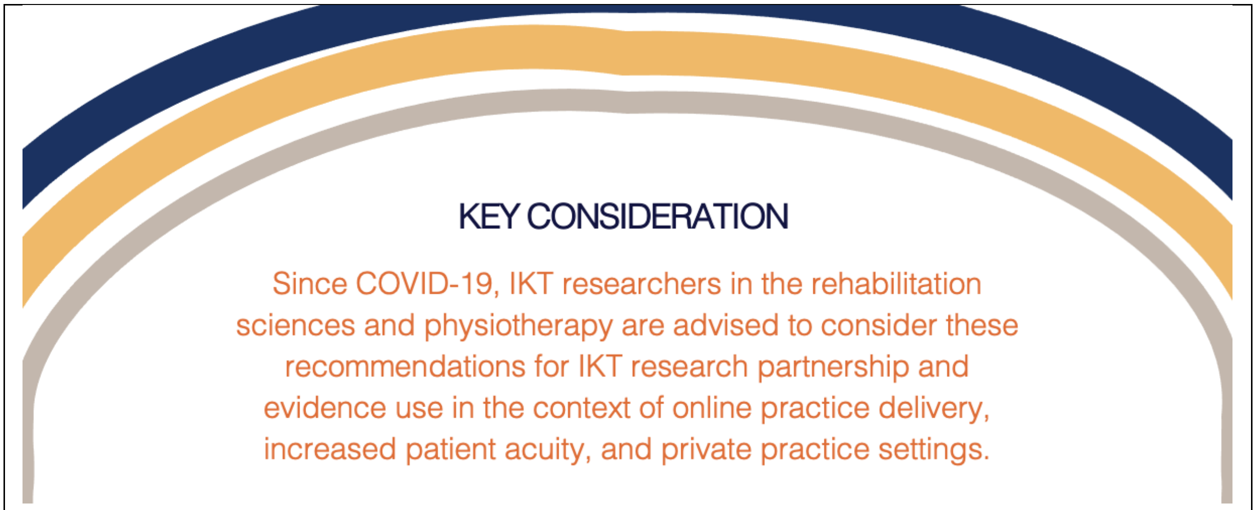
Environment

1) Collaborate with KUs on adaptations to the IKT research process, such as with developing and implementing recruitment, training, and data collection materials to suit their practice environment.
2) Collaborate with KUs on adaptations to the IKT research environment, such as with tailoring research study protocol to suit their practice environment.

Evidence

1) Collaborate with KUs to identify factors that affect evidence use in their practice, such as centers of social influence, career stage, ease of use, meaning making, and treatment approach.
2) Collaborate with KUs on ways to modify the factors that affect evidence use in their practice, such as with identifying and engaging key centers of social influence on the IKT research team.

FIGURE 10. Recommendations for health organization leaders, physiotherapists, and IKT researchers in the rehabilitation sciences and physiotherapy for KU engagement in IKT health research partnerships.



KEY CONSIDERATION

Since COVID-19, IKT researchers in the rehabilitation sciences and physiotherapy are advised to consider these recommendations for IKT research partnership and evidence use in the context of online practice delivery, increased patient acuity, and private practice settings.

FIGURE 11. Overarching recommendations for IKT researchers in the rehabilitation sciences and physiotherapy for KU engagement in IKT health research partnerships since the global novel COVID-19 pandemic.

1. **Aligning IKT research projects with the business needs of the host organization, and offloading the administrative burden is most important to the IKT research experience for those engaged.** Health organization leaders are advised to identify factors that motivate clinicians towards engagement in IKT research, as well as to create and embed IKT research engagement incentives within organizational structures rather than the research process to get people engaged and maintain engagement. Physiotherapists are advised to advocate for the research interests and business needs of the host organization to ensure that IKT research initiatives are well-timed and of mutual interest to receive organizational support, as well as for professional practice goals and practice realities when collaborating with researchers on IKT research design and process. This might include special consideration for treating to the outcome measure and delivering care online. IKT researchers in the rehabilitation sciences and physiotherapy are advised

to increase confidence among research partners with the IKT research process. This might include collaborating with KUs to identify the unique ways they can contribute to IKT research from within their respective organizational roles and unique practice settings. IKT researchers should also plan to relieve KUs of the administrative burden of IKT research. This might include engaging a research assistant to help with coordinating activities, scheduling events, and facilitating communications across research sites.

2. **Maximizing rewards and minimizing consequences is most important to creating an environment conducive to IKT research and live innovation in healthcare.** Health organization leaders are advised to create an organizational culture that maximizes rewards and minimizes consequences for IKT research, live innovation in healthcare, and evidence-based change to occur. Devote resources to IKT research and evidence-based change in the environment, such as: time, money, people, equipment, supplies, physical space, and digital infrastructure support. Physiotherapists are advised to prepare the social and physical environment for IKT research and evidence-based change. This might include collaborating on a communications plan, risk mitigation strategy, training program, hands-on practice, and ongoing opportunities to brainstorm. Physiotherapists are also advised to create a supportive IKT research environment for sustained evidence use. This might include identifying and addressing issues related to risk and fear early and often in the research process. IKT researchers are advised to collaborate with KUs on adaptations to the IKT research process, such as with developing and implementing recruitment, training, and data collection materials to suit their practice environment, as well as on adaptations to the IKT research environment, such as with tailoring research study protocol to suit their practice environment.

3. **Modifying or attenuating the factors affecting evidence use is most important to evidence-based change.** Health organization leaders are advised to measure and report on the total organizational investment in IKT research and evidence-based change, which might include incentives, preparations, and supports. Health organization leaders should also measure and report on the short-term impacts and long-term outcomes of IKT research relative to clinical roles and clinical functioning, such as changes in process resulting in efficiencies, and relative to return on organizational investment (ROI), such as changes to the organization resulting in increased capacity for research. Physiotherapists are advised to observe and ask colleagues about their thoughts on any differences in evidence use within and across specific user groups, such as specific clinicians and clinical populations, as well as their thoughts on evidence quality, utility, and practicality within and across specific user groups. IKT researchers are advised to collaborate with KUs to identify and modify factors that affect evidence use in their practice, such as centers of social influence, career stage, ease of use, meaning making, and treatment approach. IKT researchers are advised to identify and engage key centers of social influence on the IKT research team.
4. **Considering the late and long-lasting effects of COVID-19 on the physiotherapy profession is most important to IKT research engagement in the rehabilitation sciences and physiotherapy moving forward.** The pandemic has stressed the Canadian public healthcare system, resulting in permanent changes to the physiotherapy profession that affect how and where people receive care, partner for research, and implement evidence-based change. Health organization leaders, physiotherapists, and IKT researchers are all advised to consider these recommendations for IKT research

partnership and evidence use in the context of increased online practice delivery, increased patient acuity, and increased healthcare delivery in private practice settings.

Limitations of this research

Study limitations are inherent to doing research. Since all research projects set out to accomplish a few feasible aims within a specific context, no one research project can claim to investigate everything. I identified three main limitations of this research: 1) COVID-19 impacts; 2) workflow delays; 3) theoretical inconsistency; 4) context for these results.

COVID-19 impacts

COVID-19 created an unprecedented environment of stress for people and human-dependent processes all over the world, which affected behaviours and decision-making in the Sibley studies, but also perceptions of recalled events in my study. For people providing health care services and people doing health care research at the time, COVID-19 uniquely impacted on how, when, where, and even if certain health care services could be provided and similarly researched. The PTs interviewed for this study described how the experience of health care delivery in the physiotherapy domain had changed, and how that affected various aspects of engagement and evidence use in the Sibley studies. PTs said that when practice in rehabilitation clinics resumed following social distancing, they noticed a change in the characteristics of their in-patient population. Tightened in-patient screening criteria has resulted in increased in-patient acuity, and PTs said this is raising concern for patient safety, creating a culture of fear, and reducing individual willingness to take risks in the delivery of care. The stressors imposed by rapidly changing COVID-19 policies and procedures over a two-year period has created an environment of fear and discomfort that PTs said affects both willingness and ability to try new things, especially clinical activities perceived as risky or dangerous, such as reactive balance tests because falls are likely. That same overall environment of fear and stress may have affected PTs' perceptions of recalled experiences and thoughts about evidence adoption when sharing their stories for this study.

Workflow delays

Another limitation of this study was workflow delays due to COVID-19 confounded by personal circumstance. I experienced numerous interruptions in the temporality and spatiality of this work during my mother's illness and death that affected my ability to focus and accomplish timely milestones. As a result, new research was published in this area, forcing further adaptations of this work. For example, before I could publish results, new studies had come out with similar findings, reporting them first. This meant I had to work harder to look for new features in my data to add to a growing body of work by IKT scholars. Further, recent adopters of the IKT approach in the rehabilitation sciences and physiotherapy in Canada could have benefitted from the advice resulting from this research, especially during and in the early days since COVID-19.

Theoretical inconsistency

Theoretical inconsistency resulted from COVID-19-related public health policies that limited travel between geographic regions, as well as in-person human contact (i.e., "social distancing"). Basic qualitative descriptive research is best conducted in an environment natural to the participants. Research conducted in a setting natural to the participant and/or the study topic evokes memory and enriches conversation with props and actions, improving the relationship between the researcher and the researched, and expanding the lens of the researcher to catch features tucked in the periphery of the researched (Bradshaw et al., 2017). I believe this study would have benefitted from travel to sites in which the IKT research collaborations took place and embedded in-person interviews with PTs. I likely would have been sensitive to natural features of the physical environment, including patient characteristics, clinical interactions, and an overall sense of organizational culture, and then conversation likely would have flowed naturally from environmental cues rather than the prompts I had planned. Further, I think online conversations are unnatural because individuals are constrained by a variety of technical limitations related to audio and video, framing themselves comfortably in the shot, learning to use continuously evolving technologies, managing network/internet connectivity, and interacting with digital elements such as avatars. We were forced to produce our own discussions, and in attending to those production elements of the meetings, I believe we lost some of the more natural aspects of human-to-human communications such as gesturing, illustrating, and demonstrating. Threats to privacy also increase when people meet online because each conversation participant is required to manage two environments, a personal physical meeting space and a personal digital meeting space. In-person, conversation participants can share responsibility for managing a single, physical meeting space. They can close the door on a private meeting space, lower their voices, use nonverbal communications tactics, or respond to a knock at the door with a break in conversation. Online, conversation participants tend to focus on managing features of the digital rather than real-life environment because that is where attention is directed, and there are more aspects to meeting online that each conversation participant needs to manage. For all of these reasons, I believe the fieldwork memos I have prepared are limited in scope. The data I captured in memos tended toward superficial features of the interactions and clarifying notes, rather than broader or deeper elements embedded in the natural environment.

Context for these results

There are important distinctions between the intended audiences for IKT research partnerships, and Canadian Indigenous modes of inquiry. IKT and Indigenous Knowledge Translation (Indigenous KT) are similar approaches to doing health research that share a commitment to ethical knowledge cocreation among communities. However, Indigenous KT should be regarded as a complementary but separate and distinct research approach with its own collaborative research frameworks. Similarly, there are separate and distinct ways of using the IKT approach with children, youth, and families. My study is neither generalizable to engagement with Indigenous people in IKT or other modes of partnership research, nor to engagement with children, youth, and families.

Future research

I identified four areas for future research. (1) Exploration is needed to understand how fear, risk, and risk management in PT practice settings have implications for KU engagement, IKT research partnerships, and resulting evidence use. Pressures imposed by COVID-19 continue to this day resulting in ongoing changes to the PT profession, PT practice environment, and patient populations seeking care, which may be triggering reluctance to try new things. Unique strategies may be needed to help overcome this unique barrier. (2) Further exploration into Canadian public health care organizational cultures is needed to identify ways of incentivizing, preparing, and supporting PTs and their patients for engagement in IKT research partnerships. Some organizations are leading change by culturing environments conducive to health research partnerships and evidence-based change. Understanding more about these environments would help other organizations adopt critical social and environmental structures for hosting IKT research partnerships and accomplishing stated aims with the evidence. (3) More exploration into key centres of influence on evidence use in PT practice is needed. Health care professionals are subject to social media influence, which holds promise for the rapid adoption and spread of research-driven health care innovation, as we saw in COVID-19. Unpacking the role of social influence on PT practice change is a warranted strategy for increasing the spread of new IKT research evidence across similar Canadian public health settings. (4) Finally, this work may be used to validate or extend existing theories, models, and frameworks for KU engagement in IKT research, especially in rehabilitation and physiotherapy contexts in Canada. The Jull framework is a good general guideline for engaging KUs in the IKT research process, but there are aspects of KU engagement that are more important to evidence use than others. For example, IKT is really focused on implementing health care changes that improve public health outcomes. The Jull framework addresses KU engagement concepts related to dissemination and sustainability at too late a stage in research for either to have effect and offers no guidance on how to operationalize these concepts with a lens for evidence use. Although we have improved at identifying KU groups, planning for partnership, and engaging KUs in IKT research, we need to be more proactive in addressing known issues that affect evidence use. For the approach to remain relevant, we also need to improve our reporting of these strategies and become more consistent with reporting impacts and outcomes. The Jull framework is good for guiding the IKT research process, but there are better frameworks for evaluating aspects of translational research partnerships such as the health and societal benefits of research. For example, the Translational

Science Benefits model (TSBM) supports institutional assessment of clinical and translational research impacts and outcomes using 30 specific and potentially measurable indicators, and the COM-B model supports assessment for behavior change using capability, opportunity, and motivation as three factors contributing to behaviour change (Michie et al., 2011; Luke et al., 2017).

CHAPTER VI: CONCLUSION

The relationship between experience, environment, and evidence in IKT health research partnerships matters when partnering with PTs in Canadian public rehabilitation settings. This study set out to understand how PTs engaged as KUs in an IKT research partnership described, 1) their experience, 2) the environmental conditions that affected their engagement, and 3) whether or to what extent their engagement impacted on the IKT research process and evidence use outcomes. In summary, each of the five PTs interviewed (n=5) for this study reflected positively on their IKT research engagement experiences. The positive assertions PTs made about their experiences were described in three ways. First, PTs described their experiences with IKT research engagement relative to the attributes the PI brought to their respective studies. These included: strong leadership; fast, effective communication; being organized and “on top of things;” providing research support, funding, and material resources; sharing knowledge among research study sites; and building a “community of practice”. These PT characteristics were strong contributors to whether PTs had a positive and manageable experience with a new and unfamiliar process, such as the scientific method and clinical research. Second, PTs described their experiences relative to personal benefits, such as: gaining awareness, knowledge, and skills; leading change in the profession; being seen as somebody who does clinical research; receiving rewards and recognition; having the confidence to engage in more research; feeling proud, satisfied, and accomplished. These personal benefits seemed to increase the appeal of KU engagement in IKT research at the individual level. Third, PTs described their experiences relative to the benefits gained by their host organizations, such as: increased range of clinical treatment options leading to better treatment outcomes; increased ability to adopt change at the clinical level; improved reputation as a centre for excellence; increased organizational capacity for clinical research; more funding for future research; rewards for employee research engagement; culture shift in the organization towards increased risk tolerance; paradigm shift in medicine towards evidence-based practice. Since organizations, individuals, and society may bear the burden of change, these broader benefits may increase the appeal of KU engagement in IKT research partnerships to organizations by demonstrating return-on-investment both in the short- and long-term.

This study also set out to identify the environmental conditions that PTs said affected their engagement over the course of research. Since the crux of KU engagement in IKT research is the rapid adoption of resulting research evidence which requires behavioural change, PTs said creating an environment that is conducive to KU engagement over the course of an IKT research partnership is best supported by organizational cultures that favour innovation and welcome change. Organizations might achieve an innovative and adaptive culture by allocating devoted assets such as time, human, financial, and material resources to KU engagement in IKT research partnerships. However, since innovation and adaptation present risks both real and perceived, organizations might also consider forecasting how various groups of people could be impacted and implementing strategies to manage and/or mitigate risks and impacts. Organizations are advised to examine how people in leadership and management roles author, interpret, and apply organizational policies, procedures, and guidelines that influence social reactions to new and/or stressful situations, as well as individual ability and willingness to change.

Lastly, this study aimed to identify whether, or to what extent, PTs said their engagement impacted on the IKT research process and evidence use outcomes. KU contributions to the IKT research process itself seemed to reside with the unique position occupied by the individual KU from within the Canadian health system. For example, the PTs interviewed for this study described their short-term impacts on the research process to include brokering trusting relationships and preparing people and environments for change. Over the long-term, PTs said that both personal and organizational capacity for research increased. Whether PTs used the research evidence resulting from their IKT research partnerships was influenced by their engagement to an extent. For example, short-term evidence use was limited to the PTs who were engaged in the IKT research partnerships. Long-term evidence use had limited spread to the PTs who were not engaged in the IKT research partnerships. The PTs engaged as KUs in these studies said whether they use research evidence of any kind depends on factors outside of the research process, such as: age, formal professional education, career stage, social influence, ease of use, meaning-making, ability to treat to the outcome measure, and decision-making with increased patient acuity and in virtual practice settings during and since the COVID-19 pandemic.

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