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The Canadian Wound Care Education Framework

Abstract

Purpose

This article aims to outline a conceptual framework for the development of wound care knowledge and illustrate how members of the interprofessional health care team can enhance their understanding and practice of wound management within the Canadian context.

Methods

We used a qualitative descriptive research design with a qualitative content analysis approach for this study. A review of the literature regarding professional education frameworks combined with an exhaustive search of Canadian wound care education programs, guided the data collection of this study. To guide the development of the conceptual framework, we utilized a metaphor of a tree and identified educational pathways through both academic and experiential methods.

Results

The Canadian Wound Care Education Framework is presented along with the Model of Canadian Wound Care Education. This framework will assist those looking to develop their understanding of wound management and the options available to do so within a Canadian context. This framework will also provide an overview of available educational opportunities, gaps in the current wound care educational options and an improved understanding of wound management knowledge creation.

Conclusions

We have introduced a comprehensive conceptual framework for developing wound care knowledge and guiding learners through multiple educational pathway options in Canada. Utilizing a tree metaphor and exploring academic and experiential branches offer insight into available wound care education opportunities. Furthermore, the framework outlines gaps within the current wound care educational landscape in Canada and supports those looking to improve their understanding of wound management through a deeper understanding of knowledge creation and learning progression within a Canadian context.

Keywords: Wound healing, conceptual framework, interdisciplinary health team, health education, educational pathway

Le cadre canadien de formation en soins de plaies

Résumé

Objectif

Cet article vise à présenter un cadre conceptuel pour le développement des connaissances en soins de plaies et à illustrer comment les membres de l'équipe interprofessionnelle peuvent approfondir leur compréhension et leur pratique en

soins de plaies dans le contexte canadien.

Méthodologie

Nous avons utilisé une méthodologie de recherche descriptive qualitative avec une analyse de contenu. Une revue de la littérature portant sur les cadres de formation professionnelle, combinée à une recherche exhaustive des programmes canadiens de formation en soins de plaies, a guidé la collecte des données. Pour orienter le développement du cadre conceptuel, nous avons utilisé la métaphore d'un arbre et nous avons repéré autant les trajectoires éducatives académiques qu'expérientielles.

Résultats

Le Cadre canadien de formation en soins de plaies est présenté, accompagné du Modèle canadien de formation en soins de plaies. Ce cadre aidera les personnes souhaitant approfondir leur compréhension de la prise en charge des plaies et des options disponibles à cet égard dans le contexte canadien. Il offrira également un aperçu des possibilités de formation existantes, des lacunes dans l'offre de formation actuelle en soins de plaies, ainsi qu'une meilleure compréhension de la création de connaissances dans ce domaine.

Conclusions

Nous avons présenté un cadre conceptuel complet pour le développement des connaissances en soins de plaies, qui oriente les personnes apprenantes à travers de multiples parcours éducatifs au Canada. L'utilisation de la métaphore de l'arbre et l'exploration des branches académiques et expérientielles permettent de mieux comprendre les possibilités de formation disponibles en soins de plaies. De plus, le cadre met en lumière les lacunes dans l'offre de formation actuelle en soins de plaies au Canada, et soutient les personnes souhaitant améliorer leur compréhension de la prise en charge des plaies par une meilleure compréhension de la création de connaissances et de la progression de l'apprentissage dans un contexte canadien.

Mots-clés : cicatrisation des plaies, cadre conceptuel, équipe interdisciplinaire en santé, éducation à la santé, parcours éducatif

Conflicts of Interest: CH is the current President of Nurses Specialized in Wound, Ostomy and Continence Canada and previous consultant for the Wound, Ostomy and Continence Institute. BB is a previous board member of Nurses Specialized in Wound, Ostomy and Continence Canada and program development consultant with the Wound, Ostomy and Continence Institute. No other authors have identified a conflict of interest.

Availability of Data and Materials: The authors confirm that the data supporting the findings of this study are available within the article.

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Introduction

In 2003, David Keast noted that wound care education in Canada was in its infancy.¹ Over the past two decades, educational programs related to wound management have continued to evolve. An article discussing the availability of wound care education in Canada noted that the available educational options cover everything from novice to expert, from single courses and multi-day events to degree-granting programs.² As the educational landscape surrounding wound management continues to grow, it is important that those looking to begin their education or further their knowledge in the specialty are aware of the opportunities available.

Many health care students find it difficult to secure sufficient wound care learning opportunities or experience at the undergraduate level.³ Campbell et al. highlighted the minimal coverage of wound care across Canadian health care disciplines, noting the inconsistent adoption of best practices guidelines related to wound management.⁴ The issue has since emerged as a global concern, with studies conducted in England, Germany, South Africa, Ethiopia and Spain demonstrating gaps in the wound care knowledge of health care practitioners.⁵⁻⁹ Two of these studies pointed to a lack of training in undergraduate nursing education programs, highlighting the need to better understand where health care providers can and should be obtaining their foundational wound care knowledge.^{6,8}

High-level degree-granting programs focused on wound management are becoming more common worldwide. Canada has several graduate-level wound care education programs designed to equip learners with the expertise needed to practice within this specialty. This article will explore the Canadian context, highlighting both entry-level education and resources for advanced education in wound care. The benefit of advanced educational degrees focused on wound management is becoming recognized internationally. For instance, the School of Medicine at Cardiff University offers a master of science in wound healing and tissue repair, and the University of Nottingham offers PhD opportunities in skin integrity.^{10,11}

To outline the various levels of complexity in wound care education in 2003, Keast presented the 6-step pyramid model of wound care education in Canada that Dr. Gary Sibbald had originally proposed.¹ This conceptual model focused on the various programs available at that time,

and the pyramid concluded with knowledge translation by the learner. However, many of the courses discussed in the development of this model are no longer available, and numerous new courses have emerged since its inception. Recent studies, such as a 2017 article by Harding, have outlined new wound care education programs for Canadians, though it remains unclear how these fit within the previously established conceptual model.² This raises the question of whether a new framework is needed to better encapsulate the evolving landscape of Canadian wound care education, knowledge and inquiry. Such a framework could provide deeper insights into not only how learners are acquiring their knowledge but also how new knowledge is being developed and integrated into the educational system. This new conceptual framework would focus on knowledge formation and dissemination rather than on knowledge translation. With this in mind, this article develops and analyzes a conceptual framework of current Canadian wound care programs, offering a comprehensive tool that outlines current wound care education in Canada.

Methods

The Canadian Wound Care (CWC) Education Framework was developed using a descriptive qualitative design and qualitative content analysis, as discussed by Sandelowski, to explore the current landscape of Canadian wound care education programs.¹² The framework was developed through a review process, which included an explanation of wound care education programs, literature and educational frameworks from a variety of specialties of professions.

Framework development began with an exhaustive review of wound care education programs across Canada, considering program aspects, such as length of the program, program characteristics, designation or credential provided, the targeted audience and content disseminated, among other factors. Information used in the review was obtained by reviewing program websites. We did not use restrictive criteria to determine program relevancy. We conducted a literature review to determine what peer-reviewed and non-peer-reviewed journal articles on Canadian wound care education programs were available.

We also reviewed educational frameworks from other health care professions, such as nursing and allied health, and from other fields, such as education, to gather insight into framework development and structure. Focus was placed on the theoretical foundations and methodological structure of these frameworks.

The data collected through the review process was utilized to identify structures, patterns and processes related to wound care education in Canada. Given the availability of academic educational opportunities related to wound management within Canada, the framework was structured to acknowledge the different levels of academic wound care

knowledge, while recognizing opportunities for knowledge development and lifelong learning through experiential rather than traditional academic approaches. As educational programs develop and opportunities for knowledge obtainment grow, there will be further opportunities to develop and refine the CWC Education Framework.

The Canadian Association of Schools of Nursing (CASN) framework was used to define the terms *baccalaureate*, *master's* and *doctoral*.¹³ A baccalaureate nursing program prepares generalist practitioners with a solid, broad knowledge base. This definition was used because there are minimal programs in Canada that offer specific wound care courses at the undergraduate level, with the exception of universities in Quebec. A master's degree aims for graduates to display advanced knowledge specific to the field of wound care, while a doctoral degree prepares students to create new knowledge in wound care.¹³

Theoretical Underpinnings

The CWC Education Framework, though initially inspired by a stepwise approach like that utilized by Keast in the 2003 article, is grounded in a number of critical educational theories, providing a strong conceptual foundation for its structure and application.¹ Constructivist learning theory was one such theory considered during the development of the framework, which, as Bada explains, involves learners integrating new knowledge with existing experiences.¹⁴ The initial recommendations for education begin with self-directed learning, and the stepwise approach in the framework demonstrates how each component prepares the learner to build on prior knowledge. This is particularly relevant when considering that learners may begin their educational journey along many points on the learning continuum, depending on their background and prior experience.

Kolb's Experiential Learning Theory is a well-known educational theory that plays a vital role in the CWC Education Framework. This theory involves the change of knowledge based on one's experience.¹⁵ This idea heavily influenced the inclusion of the experiential pathway as knowledge acquisition through methods such as fellowships, mentorships and practical experience, acknowledging the learning that can occur in real-world settings.

The inquiry-based learning theory, which encourages learners to discover new relationships and address real-world issues by developing hypotheses and conducting experiments or making observations, also informs the framework.¹⁶ This influence is evident in the framework's emphasis on inquiry and research, where, no matter the branching path chosen, the learner can contribute to the development of new wound care knowledge.

Through the use and integration of these theories, the framework provides a conceptual foundation for how

knowledge can be obtained and developed and will be relevant for educators within the wound care specialty. Moreover, these theories ensure that the framework is both systematic and evidence-based, allowing educators to use it as a tool to inform learners about wound care education and preparation for practice within the specialty.

Results

The tree depicted in Figure 1 as the Canadian Wound Care Education model is utilized as a metaphor for the CWC Education Framework. The model illustrates how health care professionals may begin their journey of wound care education at different stages. Each stage of growth, beginning with the roots of the tree, prepares the learner for further development. Starting from the roots, which symbolize foundational knowledge, learners progress through various levels of development. As the health care provider develops their knowledge through academic or experiential tracks, the knowledge, represented by the leaves of the tree, grows and eventually falls to the ground to nourish the ground and sustain the ongoing cycle of wound care education development, both for the learner and the specialty. The following sections will explore each part of the tree metaphor, identifying pathways learners may follow to develop their wound care expertise. While the framework presents a sequential approach, it also acknowledges that health care professionals may start or continue their individual journey to wound care knowledge at any stage of the wound care education framework.

Roots: Self-Directed Learning

Self-directed learning is a continuous process whereby the learner gathers foundational knowledge using multiple ways of knowing, including educational formats, such as conferences, presentations, journal articles, webinars, workshops, digital technologies and peer-to-peer knowledge sharing.

Conferences

Both Nurses Specialized in Wound, Ostomy and Continence Canada (NSWOCC) and Wounds Canada host national conferences on wound care and related topics.^{17,18} These conferences frequently offer multiple ways of learning, from workshops to oral presentations. Conferences also provide an opportunity for the learner to both learn and share the results of their own inquiry through mechanisms such as poster presentations.

Presentations / Webinars

Presentations often take place at the aforementioned conferences.^{17,18} In clinical settings, wound care presentations can also provide education, such as group or one-on-one virtual or in-person in-services.¹⁹ Presentations may also come from industry in the form of education on new dressings, techniques or tools available to assist in clinical practice.

Journal Articles

At present, Canada has two primary wound-related journals. The NSWOCC *Advance*, now the *Canadian Journal of Wound, Ostomy and Continence*, is focused on wound, ostomy and continence and is the official journal of Nurses Specialized in Wound, Ostomy and Continence Canada (NSWOCC).²⁰ Wounds Canada also publishes *Wound Care Canada*, a journal dedicated solely to wound management.²¹

Workshops

Many workshops occur during conferences provided by both NSWOCC and Wounds Canada. Wounds Canada also offers hands-on workshops led by wound care clinicians in local communities throughout the year.²²

Digital Technologies

Digital technologies promote self-directed wound care learning. Mobile health applications, for example, increase access to wound education, scientific updates and best practice guidelines as discussed by Gagnon et al.²³ Technologies such as virtual reality are also being used to provide wound care simulation training, allowing clinicians to gain knowledge from errors without compromising patient safety.²⁴ Utilization of artificial intelligence also shows promise with its ability to develop large language models that provide easier access to wound care knowledge and allow for real-time personalized feedback and insight to learners.²⁵

Peer-to-Peer Knowledge Sharing

Peer-to-peer knowledge sharing as it relates to wound management can occur at any level of wound care proficiency. In acute care clinical settings, for example, nurses have expressed interest in group in-servicing and one-on-one bedside wound education to develop foundational knowledge over other educational formats, such as posters, handouts and learning modules.¹⁹ In the Keast 2003 article outlining the 6 levels of wound education, the final level focuses on knowledge translation, such as participation in guideline development, associations and educational faculty.¹ During these activities, knowledge experts often focus on guideline and research evaluation and on providing insights on developing new recommendations and educational activities.¹ Participants gain new knowledge as new understandings of the wound specialty are gathered, shared and evaluated.

Pathway to Advanced Education

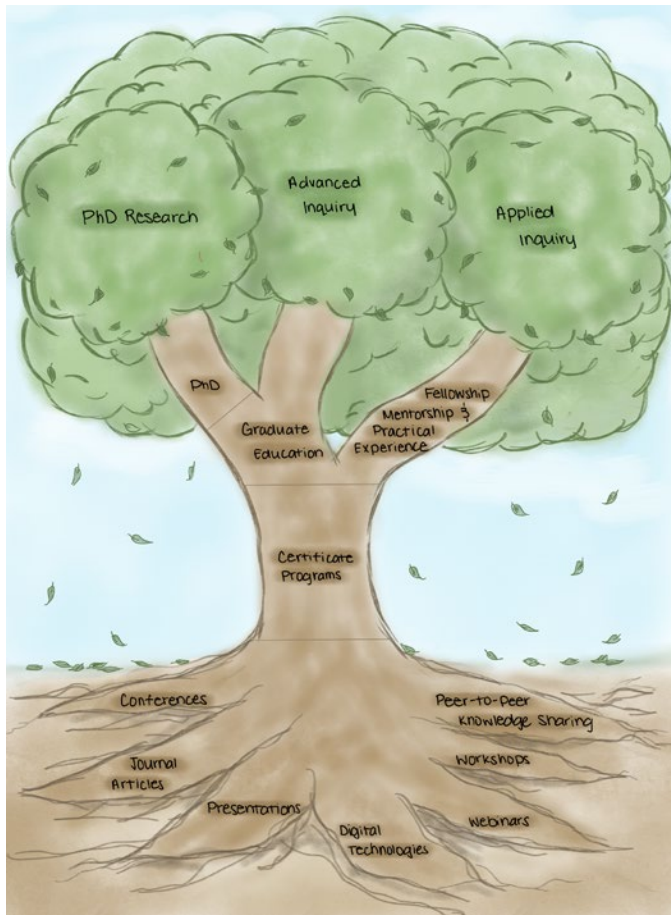
Two Canadian educational certificate programs prepare the learner to move into advanced academics related to wound management. These programs are recognized by universities as providing credits toward graduate-level education in wound related master's degree programs.

Nurse Specialized in Wound, Ostomy and Continence Education Program

The Wound, Ostomy and Continence Institute (WOC Institute), which NSWOCC owns and operates, runs the

Nurse Specialized in Wound, Ostomy and Continence Education Program. It is a 12-month virtual program incorporating three 75-hour preceptorship placements in each of the areas of the tri-specialty.²⁶ This certificate program is accredited by the Canadian Nurses Association and the World Council of Enterostomal Therapists. It has been recognized by Curtin University, Perth, Australia, and Western University, Ontario, Canada, for recognition of prior learning in their respective wound-care-related master's degrees.^{27,28} The NSWOC certificate program requires the nurse to have a bachelor's degree and 2 years of full-time employment in the last 3 years as a registered nurse (RN) in a relevant area of clinical practice.²⁶

Figure 1: Model of Canadian Wound Care Education



Canada offers various certificate programs for additional wound care education, differing in content, delivery, and goals. The following paragraphs highlight a non-exhaustive list of examples.

International Interdisciplinary Wound Care Program

The International Interdisciplinary Wound Care Course (IIWCC) is a certificate of completion program offered through WoundPedia in partnership with the University of Toronto. It provides the option to obtain a University of Toronto and Queen's University IIWCC Advanced Certificate for Wound Care.²⁹ This program is a 9- to 12-month course designed for those with a health professional degree or a minimum

of 5 years of relevant skin and wound care experience. This program is a combination of virtual modules, skill sessions and selective mandatory 3-day education sessions. The program can be used for credits towards the University of Toronto Master of Clinical Science in Wound Prevention and Care program for those who meet the admission criteria. The program is also recognized for credits towards the NSWOC Education Program for those nurses who complete the course.

Competency-Based Programs

Competency-based certificate programs focus on developing specific competencies and skills, often through practical learning. Gervais defines competency-based education as "an outcome-based approach to education that incorporates modes of instructional delivery and assessment efforts designed to evaluate mastery of learning by students through their demonstration of the knowledge, attitudes, values, skills, and behaviors required for the degree sought."³⁰ In addition to the NSWOC Education Program described above, several competency-based programs are outlined in the following paragraphs. These programs differ in focus and target audience.

The Skin Wellness Associate Nurse (SWAN) program is a 5-month self-directed program with support from an academic advisor and biweekly interactive learning sessions.³¹ This program focuses on educational preparation for registered/licensed practical nurses and those RNs without a bachelor's degree. The program covers topics including the integumentary system, wound management, ostomy and continence care.

The Paramedic Wound Care Associate Course is a 6-week, self-paced program that focuses on initial triage, treatment and minimization of further damage.³² Furthermore, the Wound Care Champion Program (WCCP), accredited by the CNA, the University of Toronto, and Dalhousie University, is an 80-hour, self-paced, hybrid program with in-person skills labs, online modules and virtual workshops developed for regulated health care providers.³³

Comprehensive Overview Programs

Comprehensive overview programs, such as the certificate programs discussed above, provide a broad range of information related to wound management, often over a longer duration of learning. Other comprehensive overview programs exist, such as the 2-part, 14-week Wound Management for Health Professionals Micro-Certificate at the University of Victoria.³⁴ Université de Sherbrooke also provides an in-person microprogram in advanced practice in complex wound care. This program includes 3 courses focused on principles and best practices in wound care, management of complex acute and chronic wound care and management of wound care practices.³⁵ Other universities and colleges have also developed short-term wound-related basic overview programs that are provided virtually or as hybrids, such as Conestoga College, Canadian Institute of

Management and Technology College and Saskatchewan Polytechnic.³⁶⁻³⁸

Focused Overview Programs

Focused overview programs provide targeted educational topics or targeted overviews of the basics of wound management, often offered over a shorter duration. The Wound Management Course is an online, self-paced, 6-week, CNA-accredited enrichment series from the WOC Institute meant to provide health care professionals with a foundational level of knowledge related to wound management and collaboration with the interprofessional and wound specialist team.³⁹

The Skin Health Advocate and Resource Professional (SHARP) Program, available through Wounds Canada, also provides regulated health care professionals with foundational wound education. This program includes 22 self-paced modules and 8 live webinars and takes an average of 45 hours to complete.⁴⁰

Programs for personal support workers in Canada, such as the WOC Institute's 6-week self-paced program for PSWs and caregivers, provide a basic level of knowledge to assist with their understanding of wound care.⁴¹ Wounds Canada also provides the Skin Health Program for Personal Care Providers through a partnership with the Registered Nurses Association of Ontario (RNAO). It is composed of 11 virtual modules and a live webinar.⁴²

Other wound care programs provide an overview of specific aspects of wound management. The WOC Institute's Advanced Wound Debridement Course, a 6-week, virtual, self-paced program, provides health care practitioners with knowledge related to wound debridement.⁴³ Wounds Canada also provides focused educational modules for registered and unregulated health care providers, such as modules on diabetic foot ulcers, arterial leg ulcers, skin tears and more.⁴⁴

Branches: Specialized Growth Pathways

Those who have developed a foundational knowledge of wound management through a certificate program are prepared to move through the branches of the educational tree. Those with the required academic background, such as a bachelor's degree, may choose to move forward to develop their wound care education in a graduate degree at a master's and then perhaps a PhD level. Those who choose not to take the academic approach to further wound education may choose to continue their lifelong learning through an experiential approach such as a fellowship, a mentorship or practical experience.

Branch 1: Advanced Academics: Development of Graduate Level Expertise—Master's Programs

No bachelor's degree programs specific to wound management are currently available in Canada. However, some undergraduate programs, such as those at the

Université de Sherbrooke, do provide courses within the program to educate learners on wound management. This is in contrast to other global educational programs, such as that offered by Birmingham City University, United Kingdom, which offers a bachelor of science (honors) degree in tissue viability (Professional Practice).⁴⁵ Within Canada, one may obtain a bachelor's degree in a number of interprofessional fields such as nursing, nutrition or kinesiology as examples. Should healthcare professionals obtain a bachelor's degree, they would then have the opportunity to develop their wound management expertise at the level of a master's degree.

There are currently two master's degree programs in Canada, both located within the province of Ontario. The Dalla Lana School of Public Health at the University of Toronto offers a Master of Science in Community Health Specializing in Wound Prevention and Program.⁴⁶ This is a 5 full-credit master's level program that requires the learner to complete courses in wound prevention and care, public health and teaching and learning and includes a minimum of 160 hours of practicum. Western University also offers a Master's in Advanced Health Care Practice—Wound Healing.²⁸ This degree includes courses related to wound management, research and leadership and requires a minimum of 100 hours of clinical mentorship. Both the University of Toronto and Western University master's degree programs utilize a course-based degree approach.

Scholarly Achievement—PhD Programs

Those choosing to advance their wound healing knowledge past a master's degree may do so by pursuing a Doctor of Philosophy PhD Degree. While no Canadian PhD program offers a degree in wound management, it can be included as part of the research proposed by a PhD candidate. While a PhD supervisor who specializes in wound management is not a prerequisite to obtaining a PhD while researching a wound-related topic, there are universities in Canada, such as Queen's University in Kingston, Ontario, that do have professors accepting doctoral students in the field of wound care.⁴⁷

Branch 2: Fellowship, Mentorship and Practical Experience

Not all clinicians follow an academic path in their wound care education. Instead, they continue as lifelong learners through fellowships, mentorships and a practical approach. The meaning of the term *fellowship* varies according to the setting. However, in the context of clinical education, it often refers to short-term supervised and specialized education. Fellowships related to wound management include those for RNs and nurse practitioners (NPs), such as the RNAO Advanced Clinical Practice Fellowship, which provides RNs and NPs the opportunity to advance a project within their organization while being supported by mentors and RNAO.⁴⁸ An example of a clinical practice fellowship related to wound management can be seen in a publication on pressure injury education in a long-term care setting by Evers et al.⁴⁹

Mentorship can be both formal and informal. Formalized mentorship programs related to wound management are

available in specific instances, such as the NSWOC Peer Mentor Program, which runs through NSWOC.50 This program aims to support students throughout their wound care education as well as while they move into clinical practice. An example of this form of educational support can be seen in an issue from the Canadian Home Care Association in which they discuss a clinic in Winnipeg, Manitoba, that had been designated as a wound care center for excellence for providing mentorship to nurses and physicians.⁵¹

The new Nurse Retention Toolkit developed by the Canadian government discusses the importance of mentorship and makes note of Patricia Benner's *From Novice to Expert*, which outlines how skills and knowledge develop through a combination of education and experience.⁵² While the knowledge gained through practical experience may not be evidence-informed, as discussed by Graham et al., in the phases of knowledge creation, the practice-based evidence can present as the precursor to knowledge aggregation.⁵³ Practical inquiry whereby a clinician learns through trial and error, for example, may be the precursor to larger studies, with ideas shared in many formats that influence self-learners, such as those mechanisms described as the roots in the tree metaphor.

Bushes of Leaves: Research and Inquiry

The bushes of leaves at the top of the tree represent the accumulation of knowledge based on research and inquiry. Here, the tree branches into three subsets of research and inquiry: applied inquiry, advanced inquiry and PhD level research. As defined by the Association of College & Research Libraries, "The spectrum of inquiry ranges from asking simple questions that depend upon basic recapitulation of knowledge to increasingly sophisticated abilities to refine research questions, use more advanced research methods and explore more diverse disciplinary perspectives."⁵⁴ It is important to note that in this framework, inquiry encompasses all investigations of field-related information, including research.

Applied Inquiry

Applied inquiry is the investigation of a field-related subject with the aim of gaining knowledge or understanding that can then be applied in meeting the needs of real-world problems in the field of wound care.⁵⁵ This is conducted without the depth of a master's or doctoral degree. It is focused primarily on the practical application of existing knowledge using established methods and principles and can result in the creation of new information.⁵⁶ An example may be an RN working on an acute care unit who is managing a patient with venous insufficiency disease. The patient has stated they find compression therapy uncomfortable and do not wish to continue. The nurse, having recently attended a conference on compression therapy regarding new, lighter compressions, contacts the industry representative and obtains samples. The patient finds the new compression more comfortable and increases utilization, causing their oedema to decrease and their wound to improve. The nurse now has a better

understanding of the product, which may later be shared with colleagues and peers.

Advanced Inquiry

Advanced inquiry comprises advanced academic research and inquiry indicative of the rigorous and in-depth approach of a master's or professional doctorate degree.⁵⁷ It stresses theoretical understanding and practical application of complex issues and focuses on applying existing knowledge inside and, where appropriate, outside the field of study.⁵⁷ At this level, the critical evaluation of current issues and the recognition of new insights within the wound specialty is expected.⁵⁷ An example may be a nurse tasked with improving chronic wound healing in the diabetic population of their facility. The nurse undertakes a literature review identifying advanced wound care techniques, critically evaluates the research and implements a program to integrate the knowledge into clinical practice.

PhD Research

PhD research involves original in-depth investigation of a highly specialized topic where the ability to conceptualize, design and implement research for the development of new knowledge is expected.⁵⁷ The research may entail study design, data collection, analysis and synthesis.⁵⁸ The PhD researcher generates original research that undergoes peer-review and is appropriate for publication.⁵⁷ PhD researchers understand complex issues and advanced methodologies which contribute to the formation of innovative theories and practices within the field of wound care.⁵⁷ An example may be a randomized control trial to determine the efficacy of a new wound care dressing for venous leg ulcers. The PhD researcher develops a protocol, obtains ethics approval and recruits participants. Data are then collected and analyzed, and the findings are published in a peer-reviewed journal. This research leads to a potential new treatment, contributing new knowledge to the field of wound care.

Cycle of Knowledge Renewal

As new research and discoveries emerge, they are shared through conferences, journal articles and other educational platforms, making them accessible to self-directed learners. This information is then disseminated throughout the "tree," and as others reinforce and further develop it, the knowledge becomes integrated throughout the many stages of the tree, from certificates to informing future innovations and discoveries throughout the educational phases. This process of new inquiry and research mirrors the cycle of leaves falling from the tree, nourishing its roots and perpetuating the continuous cycle of learning and growth.

Discussion

The Tree Metaphor

This framework offers a starting point for clinicians who are entering the field of wound care. We selected the tree to represent the potential educational path for clinicians as

they 'grow' through the acquisition of wound care education. The final level in the framework is the development of information, which the tree's foliage represents. The framework demonstrates a cyclical approach in which developing new information causes a leaf to grow, which then falls and becomes part of the soil, feeding the roots. This symbolizes the integration of new information into the foundation of wound care education.

Understanding the Tree of Wound Care Education

The framework begins with the foundation of self-directed learning, where individuals acquire knowledge from conferences, journal articles, presentations, digital technologies, webinars, workshops or peer-to-peer knowledge sharing. These short educational opportunities provide a foundation of knowledge, preparing the clinician for the next level, a certificate program. There are various certificate programs, and the best fit for the individual will depend on their intended path in wound care education.

The tree then splits into two branches—experiential learning and advanced academics. If the individual follows the experiential learning pathway, they can use applied inquiry to further their wound care education through fellowships, mentorships or practical experience. An individual who has completed an undergraduate degree can choose to follow the advanced academics pathway to secure a master's degree or a PhD. At this stage, the clinician can conduct research and inquiry at an advanced inquiry level.

It is important to note that the individual's pathway is not limited to linear, upward movement on the tree. The framework can be used in a stepwise approach or as a map of options for advancing knowledge where the individual can move freely through the levels. For example, someone who has or is currently completing their PhD is still encouraged and able to validate and expand their knowledge using the foundational levels. Additionally, an individual who has completed their master's or doctoral degree can still conduct applied inquiry; they are not limited to inquiry or research specific to their level of education. The CWC Education Framework aims to present wound care education in a dynamic way, allowing the individual to acquire knowledge in a way that best fits their needs.

Comparison to Alternate Professional Education Frameworks

In contrast to the 2003 Keast article, which views education as a path to knowledge translation, this framework specifies how knowledge is structured, obtained and developed within the wound care specialty.¹ The manuscript developed by Keast is the only published framework related to wound care education in Canada that we are aware of, and it provided insight into the consideration of education as a stepwise approach.¹ As it is unique with regard to acting as a conceptual model, we then examined other educational frameworks to build our understanding of how knowledge acquisition is structured.

Similar to the Ontario College of Teachers' Professional Learning Framework for the Teaching Profession,⁵⁹ the CWC Education Framework displays the multiple pathways available in wound care education, which is important as individuals in either profession are not limited to a single pathway. The Ontario College of Teachers breaks down the multiple components of teaching education, professional inquiry and scholarly research that are reflected in the CWC Education Framework.

McMaster's educational philosophies for their occupational therapy program were consulted and consisted of the following 5 philosophies: self-directed learning (SDL), problem-based learning (PBL), interprofessional education, experiential learning and inquiry-based learning.⁶⁰ All these philosophies are integrated throughout the CWC Education Framework; for example, both frameworks have a self-directed learning component, and the experiential learning philosophy is comparable to the experiential learning pathway. Additionally, the academic pathway in the CWC Education Framework was modelled in reference to the CASN framework's outline of the movement from master's to doctoral-level education.

Implications for Practice

We found gaps when comparing wound care education programs in Canada to other regions of the world. For example, Cardiff University, United Kingdom, offers the Wound Healing and Tissue Repair Post-Graduate Diploma, and Birmingham University offers a Bachelor of Science (Honors) Professional Practice (Tissue Viability), neither of which has comparable options in Canada.^{45,61} As the specialty of wound care continues to grow, additional levels of education related to wound management may benefit learners in their ongoing educational development.

Regarding PhD education, Canada does not currently have a professional doctoral program focused on wound management. However, this does not preclude an individual from completing a professional doctorate focusing on wound management as the final project by going through another professional department, such as nursing or medicine. Given this, there may be an opportunity in the future to develop dedicated doctoral-level wound care programs as the specialty continues to grow and develop.

The CWC Education Framework will provide both direction to individuals new to the specialty of wound care and assistance to those currently in the field by demonstrating the routes for ongoing professional development. The inclusion of inquiry and new knowledge acquisition further reflects the process of how the specialty continues to develop a knowledge base of its own. Wound care is related not only to the application of dressings or the recognition of underlying causes but also to understanding the decision-making processes and all factors and individuals contributing to the wound healing

ecosystem, including their knowledge base and educational background.

Implications for Research

It is recommended that future research be conducted to both validate this framework and clarify the methods in which certificate-based programs are developed to maximize the way learners prepare for subsequent steps in their education or development of wound care knowledge. Further research should also aim to identify the benefits and opportunities of each unique educational pathway within the framework. Understanding how the learners' education affects their later inquiry and new knowledge development would be beneficial. Finally, future research should focus on improving understanding of how education is created and shared, how it is implemented in clinical settings and how decisions are made based on the knowledge available.

Conclusion

The Canadian Wound Care Education Framework provides a well-rounded and adaptive approach to wound care education. The framework accommodates the needs of learners at various stages of their professional

development. Through the integration of both academic and experiential pathways, the framework provides a roadmap to advance learner knowledge and skills. The integration of research and inquiry as an important aspect of this model emphasizes the importance of lifelong learning and the development of new knowledge.

This framework has been embedded with pedagogical principles pulled from common education theories such as constructivist learning theory, Kolb's experiential learning theory and the inquiry-based learning theory. As the specialty of wound care evolves, the framework's adaptability ensures it remains relevant, offering clinicians multiple pathways to new knowledge. Future research should focus on validating this framework and exploring its application in educational settings with the goal of further enhancing the quality and accessibility of wound care education in Canada. ●



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