

Knowledge Mobilization in the Canadian Naturopathic Community



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ABSTRACT

The process of applying new scientific knowledge to clinical decision-making is critical for the provision of optimal health-care delivery; however, this process is often slow or inconsistent. Knowledge mobilization is the iterative and bidirectional process that involves the generation, dissemination, and translation of knowledge between researchers and knowledge users. Incorporation and application of knowledge mobilization in health care is being increasingly recognized across all fields, including naturopathic medicine. This review explores generally employed knowledge mobilization approaches. Additionally, it summarizes the knowledge mobilization strategies currently being used by the Canadian naturopathic profession and makes recommendations on the strategies which might be used in the future to bridge the gap between research evidence and clinical practice.

Key Words Naturopathic, naturopathy, knowledge translation, knowledge mobilization, knowledge transfer

INTRODUCTION

The process of applying new scientific knowledge to clinical decision-making is critical for the provision of optimal health-care delivery. This process, however, is often slow or inconsistent¹; it has been estimated that it takes an average of 17 years for clinical practice to change in response to new research findings.² Attention to this issue has been steadily increasing in the past two decades and has led to the development of strategies to close the gap between knowledge and action.^{3,4} These strategies have been described using a range of terminology. The Canadian Institutes of Health Research (CIHR) defines knowledge translation (KT) as “a dynamic and iterative process that includes synthesis, dissemination, exchange and ethically-sound application of knowledge” involving interactions between researchers and knowledge users with the goal of positively impacting health outcomes and the health-care system.⁵ A related term is knowledge mobilization (KMb), defined by the Social Science and Humanities Research Council (SSHRC) as “the reciprocal and complementary flow and uptake of research knowledge between researchers, knowledge brokers and knowledge users”; this includes a broad array of activities including “knowledge synthesis, dissemination, transfer, exchange and co-creation or co-production by researchers and knowledge users.”⁶ Although KT and KmB describe similar activities related to moving knowledge into action, KmB places an additional emphasis on a bidirectional flow of activities and engagement between researchers and stakeholders.⁷ This

engagement allows knowledge to be refined into a format that is understandable and tailored to the needs of the user in order to increase the likelihood of effecting change compared with simple dissemination.⁸ The process, and the ethics, of moving knowledge into action is being increasingly recognized for its importance, and research in this field is expanding.

In order to effectively research the process of closing the gap between knowledge and action, systematic study using clear terminology and conceptualization is required. One obstacle to this process is the large number of words or phrases that have been used to describe the process of closing the knowledge–action gap. Beyond KmB and KT, at least 100 additional terms have been identified.⁴ Other frequently used terms include knowledge transfer, knowledge exchange, implementation, and dissemination, and research utilization.³ The CIHR Knowledge-to-Action Model was created to conceptualize the process of mobilizing knowledge.³ Rather than viewing the process of bringing knowledge to action as a one-way street from researchers to knowledge users, this circular model represents a non-hierarchical, multi-directional, iterative, and ongoing process. It highlights important steps such as the identification of knowledge gaps, assessment of barriers to change, adaptation of knowledge to the local context, and selection, tailoring, and implementation of interventions. Further steps include evaluation of outcomes and efforts to sustain ongoing knowledge use.³ In response to a need to systematically research methods used to promote the transfer of research evidence into clinical practice and health-care policy,

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a new field of study was created. Implementation science (IS) is defined as “the scientific study of methods to promote the systematic uptake of research findings and other evidence-based practices into routine practice, and, hence, to improve the quality and effectiveness of health services.”⁹ These efforts to define, conceptualize and study the process of mobilizing knowledge are essential to improving the uptake of research evidence by clinicians as well as the communication of research between relevant stakeholders.

Incorporation and application of knowledge mobilization in health care is being increasingly recognized across all fields, including naturopathic medicine. Naturopathic medicine is a distinct system of health care which uses traditional and natural therapies in combination with modern scientific knowledge.¹⁰ A set of guiding principles unify a fundamental approach to clinical care.¹⁰ Naturopathic medicine is typically considered a type of complementary and alternative medicine, as services are not provided within Canadian hospitals and are not eligible for reimbursement by provincial health insurance plans.^{11,12} Within Canada, naturopathic medicine is currently regulated in six provinces: British Columbia, Alberta, Saskatchewan, Manitoba, Ontario and Nova Scotia.¹³ Registration as a Naturopathic Doctor (ND) requires the completion of an undergraduate degree, a full-time, 4-year naturopathic medical program offered by an accredited institution, as well as proof of liability insurance, completion of licensing and provincial board examinations, and expectations for continuing education.¹⁰ There are approximately 2,400 NDs in Canada.¹³ In provinces where naturopathic medicine is unregulated, practitioners with various levels of experience or training may use similar titles (for example “naturopath” or “naturopathic practitioner”)¹²; however, these unlicensed practitioners are not the focus of the present publication. In recent years, there has been increasing attention paid to the way in which the foundational principles of naturopathic medicine interface with modern scientific evidence and how these different types of evidence might be incorporated into clinical decision-making.

The uptake of new knowledge into clinical practice is a critical component of evidence-based medicine (EBM) or evidence-based practice (EBP), defined as “the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients” through attention to and integration of best available scientific evidence, patient values and preferences, and clinician experience.¹⁴ Research has identified several benefits related to the use of EBP in medical practice, including improved patient outcomes and a decrease in health-care costs.¹⁵ A recent review was published summarizing the evidence related to Canadian NDs’ attitudes, skills, and usage of EBP.¹⁶

While there are indications that Canadians NDs are seeking out new evidence and applying it to clinical care, it also appears that, as in many professions, this use falls below optimal levels. In order to facilitate the use of evidence within the Canadian naturopathic profession, consideration of Kmb strategies is important. To date, no previous reviews have attempted to identify the Kmb strategies currently used in the Canadian naturopathic community. The present publication aims to address this important gap.

OBJECTIVE

Based on an exploration of generally employed Kmb approaches, the purpose of the present publication is to summarize the Kmb strategies currently being used by the Canadian naturopathic profession, including international strategies that involve the participation of Canadian NDs, and to make recommendations on those which might be used in the future to bridge the gap between research evidence and clinical practice.

RESULTS

While the purpose of the present publication is to review the Kmb strategies being used by the Canadian naturopathic profession and to make recommendations on those that might be used in the future, it is important to first describe Kmb strategies more generally. The Kmb strategies have been investigated using a variety of research approaches, including randomized controlled trials, interrupted time series trials, cohort studies, and qualitative studies, which have captured results related to patient outcomes, professional/process outcomes, and economic outcomes, as well as cultural and attitudinal shifts.¹⁷ This section will begin with a summary of the different characteristics of Kmb strategies, as these can impact the intervention’s cost, accessibility, acceptability, degree of involvement by different stakeholders, and effectiveness in changing behaviour. Following this will be a review of the types of Kmb strategies that frequently target health professionals, including their effectiveness and some of the advantages and disadvantages of the different strategies. Lastly, the strategies currently being used in the Canadian naturopathic community will be presented.

Characteristics of Kmb Strategies

Passive and Active Strategies

Passive strategies do not involve interaction between the knowledge-creator and the knowledge-user. These include publication of peer-reviewed journal articles, clinical practice guidelines, websites, and textbooks. Passive strategies do not tailor the message to a targeted recipient, and the dissemination is not planned or controlled.¹⁸ These strategies are typically lower in cost¹⁹; however, effectiveness is highly dependent on the audience’s motivation and efforts to look for them,¹⁸ and as a result, they are considered to be less effective.²⁰ Active strategies involve targeting and packaging information for an indented audience. These include conferences, lectures, workshops, outreach visits, and audit and feedback interventions. Active strategies are generally considered to be more effective than passive ones²¹; however, examples of successful passive strategies exist, including one study that found similar improvement in use of guidelines with passive and active dissemination.²²

Push, Pull, and Exchange Strategies

Push strategies (also described as “research-push” or “producer-push”) are projects where the researcher initiates and conducts

the study as well as the transfer of findings. In contrast, pull (also described as “user-pull”) strategies take place when the knowledge user or decision maker commissions the research to address a need. Exchange strategies involve a collaboration between researchers and knowledge users to generate research which is relevant to both groups.²³ These knowledge exchange strategies align with the knowledge-to-action cycle³ in that they are interactive, iterative, and involve ongoing collaboration. The result is information that is perceived as relevant and useable to the researcher and the user; there is evidence that this results in increased application of the findings.²⁴

Tailored Interventions

Tailored interventions are initiatives aimed at changing professional behaviour that are designed with consideration of prospectively identified barriers that could limit the intervention’s effectiveness.²⁵ Categories of barriers that have been identified by The Cochrane Effective Practice and Organisation of Care include patient expectations, financial disincentives, clinical uncertainty, standards of practice, sense of competence, perceptions of liability, and administrative constraints.²⁶ A 2010 review reported that tailored interventions are more likely to impact behaviour change than no intervention or printed educational materials and guidelines.²⁵

Multifaceted Interventions

Multifaceted interventions combine two or more individual components with the goal of overcoming multiple barriers. While the results of one systematic review suggest that multifaceted interventions improve effectiveness,²⁰ an analysis of multifaceted interventions did not find a greater effect associated with a larger number of interventions,¹⁹ and consideration of additional costs and potential interactions between individual components are potentially relevant considerations.¹

Strategies Targeted at Health Professionals

Printed Educational Materials

Printed educational materials are published or printed documents, including peer-reviewed journal articles, clinical care recommendations, guidelines, or monographs. They can include audio-visual components and may be published electronically. The audience may be targeted, or the materials may be distributed broadly through mass mailings.²⁷ The purpose of this widely used Kmb method²⁷ may be an increase in knowledge or motivation among recipients. A benefit of printed educational materials is their feasibility and relatively low cost.²⁷ A recent Cochrane review synthesized the results of 84 studies, including 32 RCTs, that tested the effectiveness of this Kmb strategy. The review found, with moderate certainty, that the materials improved practice compared with no intervention but exerted little or no impact on patient health outcomes. No difference was found between paper-based and computer-based delivery of the same material.²⁷

Educational Meetings

Educational meetings are widely used in continuing medical education. Educational meetings include conferences, workshops, and lectures. Meetings vary with respect to their content, length, number of participants and degree of participant interaction.²⁸ Didactic meetings are better suited to address knowledge gaps while interactive workshops can be used to address attitudes and skills.¹ A Cochrane review reported the findings of 81 RCTs assessing the impact of educational meetings on clinical practice or patient outcomes.²⁸ When assessing behaviour change in comparison with no intervention, educational meetings resulted in a risk difference of 6% (interquartile range [IQR]: 1.8–15.3%) for comparison trials and a 10% adjusted percent change for continuous outcomes. There was also a benefit to patient outcomes. A greater impact was associated with higher attendance, mixed interactive/didactic meetings (vs either alone), meetings targeting less complex behaviour change, and those addressing more serious medical conditions.²⁸

Educational Outreach Visits

Also known as academic detailing, educational outreach involves the personal meeting of a trained individual and a clinician in their practice setting and the provision of information aimed at altering clinician behaviour. The most common target behaviour is physician prescribing practices.²⁹ A Cochrane review of 69 studies reported a 5.6% mean adjusted risk difference (IQR: 3–9%) in desired practice and a 21% improvement in continuous outcomes (IQR: 11–41%). It has been suggested that surveying clinicians in order to identify barriers prior to intervention design is an important component of this strategy.²⁹ While the one-on-one nature of this intervention can be resource-intensive, a small number of studies have assessed cost-effectiveness and reported benefit related to changes in prescribing behaviours.²⁹

Local Opinion Leaders

Local opinion leaders are clinicians whose colleagues have nominated them as “educational influencers.” These leadership roles are not based on a formal position but rather on the view of this person being likable, credible and trustworthy.³⁰ These individuals influence others’ attitudes or behaviour in an informal manner through a central position in interpersonal communication networks and an elevated social status. The impact of opinion leaders is typically in the areas of knowledge, attitudes, and social norms within their group of colleagues; however, their effectiveness is dependent on the presence of social networks within professions.³⁰ It has been recognized that opinion leaders are often specific to particular medical conditions and that the individual operating in this role changes over time. Costs associated with this strategy include those related to identifying and training the individual. A Cochrane review, updated in 2019, included 18 studies assessing the impact of opinion leaders. Overall, there was a mean 12% increase in behaviour compliance (IQR: 6–14.5%) with this form of Kmb, although significant heterogeneity and a lack of clear intervention description was noted along with the absence of patient-outcome or cost-effectiveness data.³⁰

Audit and Feedback

Audit and feedback initiatives objectively measure clinician performance over a period of time, with the purpose of changing behaviour. The process may also include recommendations for action.³¹ Behaviour may be measured by assessing medical records or databases or through direct observation and can be facilitated by a variety of internal (e.g., clinician office) and external (e.g., peer, employer, or regulator) processes. It has been reported that health-care providers overestimate their compliance with guidelines.³¹ Audit and feedback processes are thought to create cognitive dissonance between perceived and actual behaviour as a stimulus for change. Costs related to this strategy include those associated with obtaining and analyzing data and communicating findings. The availability of meaningful data impacts the usefulness of this strategy. A systematic review including 140 studies reported a 4.3% risk difference (IQR: 0.5–16%) among studies with dichotomous outcomes and a 1.3% (IQR: 1.3–28.9%) change in continuous outcomes compared with the control.³¹ This type of intervention was more effective in cases where baseline performance was low, when delivered by a colleague or supervisor, when delivered more than once, when feedback was provided in both written and verbal forms, and when explicit targets and action plans were included.³¹

Reminders

Reminder strategies include specific prompts to remind a clinician of information that will cause them to perform or avoid a particular action in the course of clinical care. Reminders may be provided verbally, on paper, or electronically.³² A Cochrane review identified 28 studies using reminders. Improvements were identified in process outcomes, medication prescribing, vaccination, and test ordering. When pooled, the median improvement was 5.6% (IQR: 2–19.2%). This strategy has the benefit of being low-cost. The features of reminders that are most likely to yield benefit have yet to be identified; however, reminders within electronic medical records that alert clinicians while they are delivering care are considered promising.³²

Communities of Practice and Social Media

A community of practice is defined as a group of people who share expertise and passion and interact in order to deepen their knowledge and expertise.³³ While communities of practice can take many forms, it has been suggested that health-care providers have created viable virtual communities of practice using social media.³⁴ Social media includes a range of technology-mediated platforms that allow users to create and share content within virtual communities. A recent scoping review of the use of social media in medical KMB found a large number of articles related to the following platforms: Twitter, blogs, Facebook, podcasts, video archival platforms, and Wikipedia, as well as several others.³⁵ Types of platforms included open social media platforms, interactive multimedia, direct peer-to-peer contact, and closed platforms. The benefits associated with this KMB strategy include real-time speed of sharing, communication across geographic regions, the ability to connect with

experienced colleagues,³⁶ and the ability to communicate information outside the typical channels such as conferences and publications.³⁵ The review acknowledged that studies of these strategies typically did not assess cost, although these are thought to be primarily related to the time needed to set up, monitor, and maintain the platforms. Few studies have assessed the direction of effect, and there is some recognition of the impact on professionalism as well as other challenges in this more “open-forum” style of KMB strategy.

Mass Media

Mass media strategies involve dissemination through public channels, such as newspapers, posters, television and radio broadcasts, and websites. A Cochrane review of 20 studies using mass media included campaigns to promote immunization, cancer screening, and HIV education.³⁷ Methodological quality was variable; however, the direction of effect was consistent, and several studies detected statistically significant differences in health behaviours, such as frequency of screening. When observing changes in rates of screening, for example, it is difficult to differentiate the effects of the mass media interventions on health-care provider and consumer behaviours. Cost may be a disadvantage of this strategy; however, a thorough analysis of cost-effectiveness has not been completed.³⁷

Knowledge Brokering

Knowledge brokers (KBs) are individuals who facilitate the transmission of knowledge between researchers and research users through human interaction.³⁸ Several roles have been described as part of this strategy. Knowledge brokers act as information managers, by translating and applying knowledge. They act as linkage agents by developing relationships between knowledge creators and users. They act as capacity builders by increasing knowledge users’ skills and increasing their capacity to identify and apply knowledge.³⁹ A systematic review attempted to analyze the effectiveness of this strategy, but insufficient data precluded conclusions.⁴⁰

Practice-Based Research Networks (PBRNs)

Practice-based research networks have been defined as groups of affiliated community-based clinical practices, primarily focused on clinical care, with the goal of investigating questions relevant to community practice.⁴¹ They are frequently affiliated with a professional or academic organization and include 15 to several hundred practices.⁴² Practicing clinicians contribute their experience and perspective in the development of relevant research questions often related to practice patterns, the process of care and clinical outcomes in “real-world” settings. More recently, the potential for PBRNs to serve as communities for learning, to promote evidence-based culture and to facilitate collaboration between researchers and research users is being explored.⁴² It has been suggested that fewer dissemination efforts are needed when clinicians are involved in planning what to study, how to study it and how to evaluate outcomes.⁴² There has been an increase in the use of complementary alternative medicine (CAM)-focused PBRNs globally in the past decade.⁴³

Example KMb Strategies Used in the Canadian Naturopathic Community

Printed Educational Materials

1. Peer-reviewed publications: The World Naturopathic Federation (WNF), an organization that represents naturopathic doctors and naturopaths from 37 countries with the goal of uniting, defining, and promoting the profession, has undertaken projects that aim to measure ND involvement in research and KMb activities. A recent bibliometric analysis identified all peer-reviewed, indexed publications authored by at least one ND.⁴⁴ A total of 2,218 research articles met the criteria, of which 18% were authored by Canadians. While interventional and observational studies made up 19% and 28% of the articles, respectively, 23% of the studies were synthesis research (reviews and meta-analyses) and 16% commentaries; monographs, case reports, and other article types made up smaller percentages. Stemming from this work, the WNF has also assembled a soon-to-be published Health Technology Assessment for the profession, which outlines the practice, effectiveness, costs and safety associated with naturopathy as defined by peer-reviewed publications authored by NDs (or equivalent title) globally.⁴⁵
2. Books: The WNF has identified a list of textbooks, professional books, and consumer books written by NDs globally that included 1,335 entries.⁴⁶ Of these, 8% were textbooks and 73% were published since 2000. In terms of authorship, 44% were written by North American NDs.
3. Guidelines: Although some guidelines include therapies within the scope of an ND, few naturopathic clinical practice guidelines exist; however, guidelines have been created in the field of adjunctive cancer care. The Society for Integrative Oncology, an organization with members from a range of health professions, including NDs, has created guidelines for the use of integrative therapies during and after breast cancer treatment⁴⁷ and integrative medicine in the treatment of lung cancer.⁴⁸ The KNOW Website (Knowledge in Integrative Oncology Website) is a clinical tool that contains up-to-date summaries of research related to integrative oncology so that clinicians can quickly access information required for evidence-informed practice.⁴⁹ This project was an initiative of the Oncology Association of Naturopathic Physicians in collaboration with the Ottawa Integrative Cancer Centre, an ND-led organization.
4. Professional publications: Several naturopathic professional publications disseminate evidence summaries to practicing NDs. These include publications created by the Canadian Association of Naturopathic Doctors (CAND) and The Ontario Association of Naturopathic Doctors (OAND), The American Association of Naturopathic Physicians (AANP) and The Naturopathic Doctor News and Review, among others. An international survey of naturopathic organizations and publishers, undertaken by the WNF, attempted to quantify the number of reference-based

articles written by NDs and published by naturopathic organizations.⁵⁰ Approximately 15,000 articles published in 24 journals were identified; of these 71% were published open-access. The target readership included NDs and students, as well as other health professionals, and the article types included commentaries, systematic reviews, practice-based articles, research summaries, and original research articles. Over 80% of the professional journals were in the process of achieving standards such as a peer-review process, diverse editorial board and authors, and editorial and publishing policies.

Educational Meetings

1. Conferences: Several organizations host conferences which are attended by Canadian NDs. A small selection of these conferences includes those offered by the OAND, CAND, AANP, Canadian Interdisciplinary Network of Complementary and Alternative Medicine Research (INCAM), International Congress on Integrative Medicine and Health, International Congress on Naturopathic Medicine, Oncology Association of Naturopathic Physicians (OncANP), Gastroenterology Association of Naturopathic Physicians, Pediatric Association of Naturopathic Physicians, Psychiatric Association of Naturopathic Physicians, and Academy of Integrative Health and Medicine. Conferences typically include didactic lectures, experiential sessions, and workshops, include speakers from within and outside of the naturopathic profession, and have expectations for both inclusion of peer-reviewed content and disclosures of conflicts of interest for presenters.
2. Continuing education (CE) courses/webinars: Many organizations offer in-person or virtual courses on a variety of topics. Canadian-based organizations include the Canadian College of Naturopathic Medicine (CCNM), OAND, Collaborative Education,⁵¹ and BRB CE group,⁵² for example. Currently, approval of CE activities is completed by regulatory authorities; however, in other health professions, a national organization exists with the purpose of accrediting CE courses. Created recently by the Federation of Naturopathic Medicine Regulatory Authorities (FNMRA), the North American Naturopathic Continuing Education Accreditation Council (NANCEAC) seeks to ensure that CE activities are of high quality and free of commercial bias.⁵³

Communities of Practice and Social Media

1. Social media platforms: Several closed social media groups provide knowledge sharing among Canadian NDs. Some are broad in scope, with large numbers of members, while others are smaller and narrower in scope. Topics include discussion of challenging clinical cases, sharing research, and discussion of ideas and philosophies, among others.
2. INCAM Naturopathy Special Interest Group (N-SIG): The N-SIG is a special interest group of INCAM dedicated to advancing naturopathic research. Its members include NDs who are researchers and clinicians. Previous activities

include surveying the profession to identify interest, barriers, and enablers to participation in research.⁵⁴

Local Opinion Leaders

Local opinion leaders have not been formally recognized in the naturopathic profession; however, several individuals who hold leadership roles in various naturopathic organizations and academic institutions fulfill this role. Others have established leadership roles informally through an accumulation of expertise in a particular subject matter and participation in many of the activities listed previously, including teaching CE courses, publishing articles, and social media discussion forums.

DISCUSSION

A range of KMb strategies have been used in health care with varying rates of effectiveness. Overall, strategies that are active, interpersonal, and tailored to a specific audience in order to meet their unique needs at a particular time are considered advantageous.²⁴ Strategies involving bidirectional collaboration between knowledge creators and knowledge users are consistent with the CIHR Knowledge-to-Action model. A number of KMb strategies are used within the Canadian naturopathic community; however, opportunities exist to increase these efforts.

While naturopathy has been regulated in Ontario since 1925,¹² it has been considered an emerging profession in Canada, undergoing several steps towards professionalization in recent decades.⁵⁵ These include regulation under the Regulated Health Professions Act in Ontario and self-regulation or title protection in additional Canadian provinces,^{13,56} as well as rapid membership growth, from 500 to 2,400, over two decades⁵⁵ and degree-granting status at the largest Canadian naturopathic college. At the same time, significant efforts to generate knowledge related to naturopathic treatments have occurred. The results of the WNF surveys related to codification of naturopathic knowledge revealed that 75% of all publications, and 97% of peer-reviewed articles, have been created since the year 2000. As in other professions,⁵⁷ insufficient naturopathy-related research is cited as a barrier.⁵⁸ This is due to the relatively recent history of naturopathic research and the small number of researchers—a recent survey of 201 Canadian NDs identified 22 currently involved in conducting research.⁵⁴ Despite the field's small size, naturopathic research has been described as “fighting above its weight class”⁵⁹; there is evidence that, with the current steps forward in professionalization, the generation and transfer of knowledge is increasing.

Within the field of implementation science, there is increasing attention to the factors and contexts that influence the effectiveness of KMb. The process by which new knowledge impacts behaviour is thought to proceed through three steps: awareness, acceptance, and, finally, adoption,⁶⁰ each of which may be impacted by the unique contexts of a health profession. A recent commentary on the topic of IS of complementary medicine (CM) highlighted several considerations that could influence these steps.⁶¹ With respect to awareness, one challenge is the underdeveloped professional and organizational infrastructure in many CM professions.

Because awareness and persuasion may occur through multiple avenues within an organization (infrastructure, oversight, change agents), community-based practice settings, common in CM, may pose a barrier to increasing awareness and subsequent behaviour change.⁶¹ Awareness of new research also depends on the practitioner's ability and opportunity to search for and review relevant literature. Insufficient skill at identifying and appraising scientific literature, and lack of time, are widely cited barriers among many professions including naturopathic medicine.^{58,62-64} KMb strategies should be tailored to address barriers to awareness.

With respect to the acceptance phase of knowledge uptake, Canadian NDs have a relatively positive view of evidence, although a spectrum exists, and several barriers related to acceptance have been identified. A qualitative study investigated the perceptions and attitudes of North American and Australian ND students and faculty towards the role and influence of traditional and scientific knowledge in naturopathic education. One of the themes that emerged was the goal of finding a balance between traditional and scientific knowledge. An older study of Australian naturopaths reported the perception that scientific evidence could undermine traditional knowledge by devaluing and eroding its role in clinical practice.⁶⁵ Consideration of traditional knowledge in the development of KMb strategies is likely to be important. Another qualitative study explored the development of attitudes towards pediatric vaccination among medical, chiropractic, and naturopathic students as a case study of professional enculturation.⁶⁶ A powerful influence of both formal education and informal socialization was reported. One of the largest influences on student perceptions, in all three professions, was the view of senior or respected individuals in their field, such as professors. It was noted that these influences were also the least likely to be critically examined. These findings may illuminate how historical attitudes may be perpetuated within a profession at the expense of the uptake of new best practices and serve as important considerations for the design of tailored KMb strategies.

Another possible barrier to the acceptance phase of knowledge uptake is the compatibility of evidence with naturopathic principles. The principle “Treat the Cause” suggests a need to look beyond presenting symptoms for factors which may have contributed, or increased susceptibility, to illness.¹¹ These factors include environmental, behavioural, lifestyle, social, genetic, and others. This view of illness having unique origins in different individuals and the importance of tailoring treatment plans to address underlying causes may be considered at odds with KMb strategies such as guidelines, in which a hierarchy of interventions is presented based on their level of evidence. For example, if a patient presented with a concern of headaches that coincided with her menstrual cycle, an ND may recommend an intervention that is targeted at improving hormonal balance rather than another intervention which has more evidence for the treatment of headaches in a general population. The naturopathic principle “Treat the Whole Person” is similar to the concept of patient-centred care, defined as health-care decisions and quality measures which are guided by “an individual's specific health needs and desired health outcomes” and in which “patients are partners with their

health-care providers, and providers treat patients not only from a clinical perspective, but also from an emotional, mental, spiritual, social, and financial perspective.⁶⁷ While necessary, research evidence is considered insufficient for clinical decision-making by some proponents of patient-centred care, due to the influence of unique biopsychosocial factors, preferences, beliefs, expectations, and goals⁶⁸; the importance of KMb strategies that are respectful of patient-centred care has been highlighted in the field of CM.⁶¹ While the principles “Treat the Cause” and “Treat the Whole Person” do not preclude the development of guidelines, they may be recognized as possible barriers to acceptance of guidelines, and consideration of the importance attributed to individualization of care may be a relevant consideration in developing guidelines that support clinical practice guided by both naturopathic principles and the best available scientific evidence.

Concerns about potentially limited applicability of “gold-standard” single-intervention RCT findings to real-world clinical situations with multimorbid patients, a population that frequently accesses naturopathic care,⁶⁹ have been cited in medicine⁷⁰ and may be a relevant barrier in evidence uptake among NDs as well. The CAM professions are recognized as having an increased awareness of the limitations of studying complex, multi-modal, individualized clinical interventions using research designs such as RCTs.⁷¹ Evidence generated using a variety of research methodologies such as whole-systems research may have a higher level of model validity and may increase the relevance of KMb strategies in the naturopathic profession. Ongoing efforts to study naturopathic therapies using pragmatic research designs are warranted.⁷²

While these barriers to KMb uptake are significant, strengths and opportunities also exist. For example, practising in complex organizations has been viewed as a barrier to change.⁷³ Because many NDs work in private practice settings, either in solo practice or with other CM professionals,⁵⁸ fewer organizational barriers to change may exist. Furthermore, consistent with the bidirectional nature of KMb, the Canadian naturopathic community has demonstrated an interest in participating in the generation of new research. The survey of 201 Canadian NDs that identified 22 individuals presently involved in research also identified an additional 108 who were interested in becoming involved. There is also evidence that additional NDs are involved in KMb activities. An international survey recently investigated the frequency of ND participation in KMb activities.⁷⁴ The survey was completed by 478 NDs, including 118 Canadians. In response to a question about how respondents share their knowledge, the percentage of individuals who reported engaging in the production of information for different purposes was as follows: publication in scientific journal articles, 18%; publication in naturopathic journal articles, 18%; publication in modern naturopathic clinical text books, 11%; publication in general clinical text books, 9%; for the general public, 73%; product companies, 9%; for patients, 72%; CE events for other clinicians, 28%; clinical training for naturopathic students, 32%. These results are limited by a small sample size and potential self-selection and self-reporting biases. Several research projects undertaken by naturopathic researchers, including whole-practice trials and Delphi studies, have involved collaboration between

researchers and clinicians.⁷⁵⁻⁷⁷ These factors may facilitate the generation and implementation of KMb strategies.

There is also evidence that enablers, such as special interest groups, may have contributed to advancement of KMb efforts in sub-groups of NDs. Overall, guidelines are lacking in naturopathic medicine; however, a notable exception is the area of naturopathic cancer care. This progress relative to other clinical areas may be related to the existence of the American Board of Naturopathic Oncology, which grants the status of Fellow of the American Board of Naturopathic Oncology (FABNO) to individuals with specialized training in oncology.⁷⁸ This clearly defined group of clinicians may have been a factor in identifying needs for coordinated KMb work; the organization may have also been well-placed to initiate these efforts. A relative abundance of research in the area of naturopathic cancer care may have been a further facilitator. The WNF analysis of peer-reviewed articles identified cancer as the most commonly researched condition. Cancer was the subject of 27% of articles, with breast cancer the most frequently studied type of cancer. As more research evidence is generated in other clinical areas and increased mobilization of condition-specific organizations and networks occur, this may facilitate additional KMb efforts such as evidence synthesis and dissemination.

KMb Opportunities in the Canadian Naturopathic Community

Many types of KMb strategies may be well suited for use in the naturopathic profession. A number are described below; however, this list is not intended to be exhaustive. Strategies used by other professions or in other geographic regions will be highlighted. Overall, strategies that are likely to be impactful are those addressing some of the barriers discussed in the previous section. Knowledge mobilization strategies should increase connectedness among widely dispersed community practitioners, address barriers, such as lack of time and skill, prioritize pragmatic research, and respect traditional knowledge, patient-centred care, and naturopathic principles.

1. Practice-based research networks: To our knowledge, there are currently no Canadian-specific PBRNs specifically for NDs. Although neither is currently operating as a PBRN, the International Research Consortium of Naturopathic Academic Clinics (IRCNAC)⁷⁹ and the Naturopathic Physicians Research Institute (NPRI) may have the potential to accelerate the type of infrastructure, culture, and KMb desirable by PBRNs.⁸⁰ The establishment of a PBRN would build KMb infrastructure and facilitate knowledge exchange among community-based NDs and researchers, in addition to creating opportunities for new research studies. A call for PBRNs has been made as a way to refine the approach of IS based on the unique factors related to complementary medicine practice.⁶¹ In Australia, the Practitioner Research and Collaboration Initiative (PRACI) is a PBRN including 14 complimentary medicine professions that was launched in 2015.⁸¹ Efforts have been made in the Canadian chiropractic community towards the development of a PBRN.⁸²

2. Guidelines: Guidelines, and other forms of knowledge synthesis, address the common barriers that clinicians report related to insufficient time and skill in locating and critically appraising research evidence. To date, limited naturopathic guidelines and best-practice documents have been created; however, the existence of best-practice documents in the field of integrative cancer care suggest that this strategy may be feasible and acceptable. Naturopathic guideline development should address the unique aspects of naturopathic philosophy, such as the principle “Treat the Cause” and a focus on patient-centred care. This is in line with other calls that have been made for inclusion of contextual information and qualifying statements in guideline development.⁸³ The Canadian chiropractic profession has undertaken a process of developing clinical practice guidelines.⁸⁴ Further information is available at <http://chiropractic.ca/guidelines-best-practice/>.
3. Continuing education related to EBM: Knowledge and skills related to acquiring and using research evidence are an important part of successful KMb. While Canadian NDs have reported moderate to high perceived levels of skill, an interest in further learning opportunities has been expressed by practicing clinicians.⁵⁸ A CE course on EBP that was co-designed with 22 Canadian NDs is currently being delivered and evaluated. A high level of enrollment and attendance by Canadian NDs suggest that this course is feasible; data on acceptability of the course by this population is forthcoming. Following revision based on the results of participant evaluation, additional education opportunities may be provided to Canadian NDs.
4. Knowledge brokering: We proposed that a knowledge broker position be established to facilitate interactions between clinicians, researchers, and other stakeholders. This individual would be involved in knowledge dissemination but also in identifying the knowledge needs of the profession. Professional and academic organizations are presently engaged in these efforts; however, there is not a dedicated individual focused on these activities. The University of British Columbia’s Physical Therapy Department has created a knowledge broker role with the goal of facilitating “both evidence-informed practice and practice-informed evidence.”⁸⁵

CONCLUSION

The Canadian naturopathic profession has undergone significant changes in recent decades with respect to the use of evidence. There has been increased use of a range of KMb strategies aimed at aligning clinical practice with best evidence. However, many opportunities exist to further develop and implement KMb strategies, paying attention to the profession’s unique characteristics and barriers. This review identifies established KMb strategies that are used successfully and highlights unique considerations and opportunities for KMb in the Canadian naturopathic community.

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