Vital Link

The journal of the Canadian Association of Naturopathic Doctors

Feature Articles

Canadian Association of Naturopathic Doctors

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Association canadienne des docteurs en naturopathie

Naturopathic Geriatric and Longevity Care

Volume 27, No. 3

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Contents

Volume 27, No. 3

Featured Articles

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Volume 27, No. 3
Naturopathic Geriatric and Longevity Care

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The *Vital Link* is the flagship journal of the Canadian Association of Naturopathic Doctors (CAND). It publishes on a wide variety of topics related to the research and practice of naturopathic medicine in Canada, promoting our profession to Canadians, government, other health care professionals and insurance companies, raising awareness of our unique role in supporting the health of Canadians.

Forthcoming Themes

Vol. 28, No. 1 Health Equity
Vol. 28, No. 2 Technology & Virtual Care

Submissions
As a general naturopathic medical journal, we encourage submissions related to themes of our upcoming editions, and also in our identified core areas of concern including: mental health, health of vulnerable populations, community and planetary health. Contributors should keep in mind that while the main audience for the *Vital Link* is practicing Naturopathic Doctors, we encourage authors from any discipline to submit articles to our editoral team for peer review. Current Submission Guidelines are available in the Members' area of the CAND website or on request from our Editor at drmtrevorrow@cand.ca.

Circulation
The *Vital Link* is published four times per year and is distributed to over 2300 qualified Canadian NDs and students of CNME-accredited naturopathic programs in Canada and the U.S. The *Vital Link* is also distributed to the CAND's corporate members and in our media kit. The journal is available in print and e-formats, by paid subscription. Additionally, the *Vital Link* is a tool promoting qualified naturopathic doctors to corporations, insurance companies, and the provincial/territorial, and Federal branches of government in Canada.

Advertising
The *Vital Link* provides advertisers with the largest circulation to qualified Canadian naturopathic doctors of any naturopathic publication. We invite vendors providing NHPD/Health Canada-compliant products, and/or other services to naturopathic doctors to advertise in the *Vital Link*.

Geriatric and Longevity Medicine

Marianne Trevorrow, MA, ND

It's been quite a 2020 at CAND *Vital Link*. As we are in production for this edition in late December, we are seeing new public health restrictions in many areas across Canada, and along with most Canadians, we hope that as a profession we come out of this pandemic with increased regard for our community, for social determinants of health, for mental health, and health equity. We are a resilient profession, and we have much to offer the Canadian health care system as it transitions to recovery from the COVID-19 pandemic.

In the Canadian naturopathic community, there is big news this month with the merger between the two Canadian ND programs at the Canadian College of Naturopathic Medicine (CCNM) and Boucher Institute of Naturopathic Medicine (BINM). We've brought in an update for our members from the President of CCNM, Bob Bernhardt, about what the amalgamation will mean for students and faculty in both programs, as well as for the greater Canadian naturopathic community. He points to increased opportunities for our career researchers to collaborate and develop protocols that will be designed to support naturopathic best practices, while maintaining our emphasis on wholistic, patient-centred care.

This issue is focused on Geriatric and Longevity Naturopathic Care. There has been a revolution underway in the past few decades at how we perceive aging, in both good ways and bad. In many ways, our profession has been 'ahead of the curve' by our promotion of healthy and sustainable diet, exercise and connection with nature, community, and spiritual pursuits. For naturopathic doctors, these aren't just words on a checklist, but primary ways we engage with our patients in practice.

On the other hand, the COVID pandemic has brought unpleasant revelations about the level of care we give to our seniors, both in the community at large as well as assisted living or long-term care (LTC) facilities. In their guest editorial for this issue, emerging Canadian ND voices on seniors' care, Erika Buckley-Strobel and Romi Fung, argue that there is an urgent need for more comprehensive naturopathic clinical training in this area, and, make a compelling case for increasing the number of continuing professional development (CPD) opportunities—courses, mentorships, residences—focusing on this area of care.

Buckley-Strobel expands on this argument in her practice article, where she proposes greater integration of naturopathic medical services into existing community care for seniors and lays out how this would complement existing primary care and deliver cost savings to the conventional system. We have practice reviews from Fung about current evidence for curcumin as a treatment for cognitive decline in seniors, and from Duizer on using VO2 max testing as a clinical tool for designing exercise programs to increase lifespan. Our final practice article is from Bhavraj and Lander at CCNM on naturopathic care of older patients who have been discharged from conventional cancer treatment, but are often still struggling with disability and ongoing morbidity. As the authors point out, there is much we can offer these patients to improve their quality of life and healthspan. Finally, we have an original research study from an NUNM team lead by Hourston. This study evaluated ND student's self-assessed competency, comfort and training needs for working with patients with disabilities as they progressed through their clinical training. As the authors point out, this is the first study of its kind to evaluate ND education in care for patients with disabilities. Its conclusions indicate that a re-evaluation of the ND curriculum in this area may be warranted to help better prepare students to work with this important patient population.

Looking ahead to 2021, we encourage our CAND members to be engaged with *CAND Vital Link* as we move to a quarterly format this year. Upcoming editions and deadlines for 2021/2022 will be posted in the Members' area of the CAND website soon, along with PDF copies of our Submissions Guidelines and an (upcoming) Guide for early career writers on how to develop their expertise in writing for professional publications such as ours and the blinded peer review process. We are always happy to mentor new writers, as part of our ongoing work to develop the journal as the independent and credible voice of the Canadian naturopathic medical community.

Marianne Trevorrow, MA ND
Editor in Chief

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Update from the Chair and Executive Director

Mark Fontes, ND, Chair and **Shawn O'Reilly,** Executive Director

Dear members,
As we approach the end of 2020, we wanted to take a moment to reflect on the work that the CAND has done on behalf of the profession over the year and look ahead to 2021. It goes without saying that this year provided many challenges to you and the naturopathic profession as a whole. You have been required to adapt to an ever changing health and business climate while continuing to provide excellent patient care.

At the CAND, in addition to our regular work supporting the profession, we had to pivot our focus earlier this year to engaging with the federal government to ensure appropriate financial aid was available to naturopathic doctors, providing regular updates to you on COVID-19, and, furthering our relationships with Health Canada and the Public Health Agency of Canada.

The CAND is a member of the Public Health Agency of Canada's (PHAC) Health Sector and Allied Health Sector Table. As the only CAM organization, our participation has been invaluable in ensuring PHAC, as well as the allied profession participants understand the education and training of naturopathic doctors and the value their expertise brings to the table. It has afforded us the opportunity to provide input and recommendations on the various guidance documents published by PHAC. We have also shared the Rapid Reviews and White Paper prepared by the WNF with PHAC and Health Canada. The documents are currently under review by both agencies. At our December meeting, PHAC acknowledged the importance of its relationships with the stakeholder professional organizations and the value of the constructive input we have all provided. The Guidance documents and regular weekly PHAC updates are posted on the members' portal of the CAND website for your review. Our participation with PHAC, Health Canada and the Ministry of Finance will continue in the New Year and we will continue to update members with new or changing guidelines or financial benefits.

We are now focused on 2021. The CAND Board of Directors held a virtual planning meeting on November 21 to revisit our goals and strategies on how we can best support the profession going forward. We will provide you with updates on the work ahead on our continuing advocacy to advance the profession with the federal government, insurance companies, media and allied health care professionals. The CAND also chaired the Canadian Naturopathic Coordinating Council virtual meeting on November 28, bringing together the leaders of the naturopathic stakeholders from across Canada, to discuss how we can best support one another at this time and plan for a successful 2021. A further meeting is planned for early in 2021.

Over the next year, we will also focus on expanding our communications and engagement strategy, "Better Health, Together", focused on pro-active positive messaging about our profession and the important role we have in the health care system. The campaign is doing well on all our social media platforms and we continue to gain new followers daily. In November alone our posts achieved almost 24,000 impressions. Please contact the CAND if you have a story to tell on how naturopathic medicine contributes to the health and wellness of Canadians and highlights the collaborative relationships you have with other healthcare professions.

We would like to thank the Vital Link team, Marianne Trevorrow ND (Editor in Chief) and Cyndi Gilbert ND (Associate Editor), for their dedication and hard work this year in producing such a high quality journal. We would also like to thank the Vital Link editorial board and all authors for their submissions and excellent articles.

On behalf of the CAND Board of Directors and staff, we thank all of our members for your continued support. We look forward to a healthy and productive 2021 and to continuing our work on your behalf.

Thank you,

Mark Fontes, ND
Chair

Shawn O'Reilly
Executive Director

Leading the Way in Naturopathic Gerontology: Current Status and Future Possibilities

Erika Buckley-Strobel, ND and **Romi Fung,** ND, MSc

Abstract:

The need for strong, compassionate advocates for seniors' health has never been more urgent and obvious than now, in the middle of the current COVID-19 pandemic. Care for seniors is an emerging area of study within the naturopathic medical community. For this to evolve further, it will take individuals with leadership skills and a passion for the elderly and their health. While there are other areas of focus that have been more developed within the profession (such as women's health, pediatrics and care around specific diseases), seniors' health brings together a unique set of challenges to naturopathic practitioners. This is a set of challenges that must be faced, despite a lack of adequate training and experience. By bringing awareness of the skills and experience needed for naturopathic doctors (NDs) to embrace leadership and advancements in this area, we hope that more NDs will demand improved education, choose to focus care on this greatly underserviced community, and make great changes in our world.

This educational void started with the lack of training in and exposure to seniors' health topics at the naturopathic medical school level, and it is our understanding that this still has not changed. For leaders in naturopathic gerontology to emerge, it requires exposure to this field within the core curriculum of the naturopathic educational program. In reviewing the curriculum of the Canadian naturopathic colleges there was a lack of content related to geriatrics, gerontology or seniors' health. The Canadian College of Naturopathic Medicine (CCNM) does not include geriatrics/gerontology as part of the core curriculum.[1] When questioned about this deficit, we were informed that although geriatric topics are currently infused in many of the courses, there is no course that focuses on geriatrics specifically.[2] However, the core and/or elective curriculum does include such special topics as: pregnancy, labour and newborn care; pediatrics; emergency medicine; mental health; and sexual and reproductive health.[1] Our opinion is that this is a serious deficit that needs to be fixed.

Boucher Institute of Naturopathic Medicine (BINM), which will soon merge with CCNM, does include a survey course on geriatrics in its curriculum, but it is only 6 weeks long.[3] It is our experience that this is not sufficient to cover all the essential topics of aging in adequate detail, such as physiological changes, metabolism changes, polypharmacy, diseases of aging, caregiver stress, mental health, ageism, end of life topics, spirituality and meaning, and the list goes on. Upon graduation, we felt unprepared to deal with this patient population. Treating a condition is one aspect, but there are intricacies considering the unique needs of the elderly. There are challenges of considering multimorbidities, polypharmacy and communication with patients and their caregivers, including clarity, the brevity of speech, negotiation, and even listening capabilities.

If the goal of the naturopathic colleges is to prepare NDs for the patients they will be seeing in the average community-based health practice, then prepare them! Currently, 92% of Canadian seniors live in the community,[4] so primary care will continue to be essential for this community. The need is there and will only grow in the future.

Naturopathic students are aware of this void and have advocated for expanded education and training in seniors' health, although it appears to be falling on deaf ears. In 2013, a group of students collaborated to write a formal proposal to create a geriatric focused shift and a geriatrics course in the curriculum. This request was not supported. By not supporting this request, students do not have the opportunity to learn the foundations and intricacies of seniors' health. We also feel that students will not gain the depth of understanding of age-related factors of disease and care without understanding the older adult. Students and clinicians can overlook ageism, capacity, consent, elder abuse, social determinants, and ethics that can affect patient rapport, treatment effectiveness and can potentially harm the patient. As a result, clinical training in geriatric care is a result to what degree students have geriatric patients on their shifts, and also to what extent clinical supervisors have adequate training in this topic.

This void in seniors' health education and training also continues with professional naturopathic associations. To date there have been few naturopathic continuing education seminars directed towards illnesses or special considerations around seniors' health. Granted there have been a few more recently, but the percentage of offerings remains low in comparison with number of seminars available for more common topics such as IV therapies, gastrointestinal diseases, and environmental medicine. If the goal is to keep the ND's skill set current and applicable, we encourage the planners of our national and provincial associations to increase the number of seniors' health presentations in upcoming conferences, or even consider making this the theme of an entire conference. This is not because seniors' health is an up-and-coming trend, but because these are necessary skills that all NDs need to provide safe, effective, and appropriate care to the aging population.

When the existing organizations and leadership fail to provide forward-thinking opportunities for the naturopathic community, leadership and educational development falls to grassroots ideas from individual practitioners. Solutions from other fields of focus in naturopathic medicine, for example, could be applied to a seniors' health approach quite easily. In the early 2000s a group of NDs in the Greater Toronto Area (GTA), with a common interest in prenatal and perinatal health came together and started the Association of Perinatal Naturopathic Doctors (APND).[6] This grassroots initiative started as a forum for the sharing of knowledge, as well as hosting continuing education events specific to this field of study. Today it has developed into an organization of NDs who have further developed their interest in providing care to families throughout preconception, pregnancy, labour and the postpartum period.[7] This model illustrates that leadership does not always come from established, professional organizations, but passionate individuals, who can make a difference for patients in need of a more developed approach to care. As NDs we know that when standard approaches fail, it is time to look outside the box. History shows us we have done this before and can do it again. Learning from mentors, being a mentor, offering a course or webinar to our colleagues, the options are endless. In October 2020, one of the authors presented a 2-part webinar series of "Naturopathic Applications to Dementia" to 229 registered NDs and students. This seminar received considerable feedback regarding the value of the material and that this was an area of continuing professional development (CPD) that was lacking.

If educational opportunities lack within our naturopathic circles, we must then look to the non-naturopathic organizations for leadership and learning opportunities. We have both completed post graduate programs in seniors' health, from Selkirk College and Queen's University respectively, that have offered extensive education and expanded our abilities and passions in serving the senior community. In a less formal setting, local opportunites also exist; community organization such as PHAC designated Age Friendly communities provide opportunites for NDs to collaborate with other stakeholders in supporting seniors living active, socially engaged, independent lives.[8] These also provide opportunities to network and learn from others as health professionals who provide care to seniors, representatives of community organizations that serve seniors, and seniors themselves. By working with organizations such as these, NDs are not only learning new skills but are being provided with a great opportunity to build bridges with various health professions by working towards a common and worthy goals of aging in place and social acceptance.

Actions to Take, Long Term Goals and Conclusions

To not miss the opportunity to provide full, holistic care to the underserviced seniors' community, a top-down approach is needed. First, the naturopathic schools need to revisit their curriculum and acknowledge that there is a gap in the foundational training they are providing to future NDs. These NDs will not only be seeing seniors in their practice, but even more seniors than the generations of NDs that preceded them. Let us not fail to provide them with the skills to be successful.

Secondly, we need more opportunities in naturopathically-focused CPD opportunities to fill this gap in our clinical education. Professional associations and those organizing conferences, seminars and webinars need to provide not only the occasional offering but to consider making this the focus of a conference or webinar series. There are more than enough topics of clinical significance to fill multiple such events.

Finally, we call on the profession to please share its knowledge of seniors' healthcare with each other. This is how our profession started and was built into what it is today. Be a mentor, get involved with community organizations, advocate for changes in curriculum, share resources, be a leader! Let us not allow the opportunity to serve and show the community the value of naturopathic care for seniors slip through our hands. Although these are big goals, that is what leadership is all about. "Leadership involves dreaming of possibilities, believing that there can be a better work, exploring uncharted waters and asking questions such as 'Why not' ".[9] So, let us ask ourselves, "Why not?".

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Competing interests: none declared

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The opinions expressed in editorials are those of the authors. Publication does not imply endorsement by the Canadian Association of Naturopathic Doctors (CAND).

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The Emerging Role of Naturopathic Medical Care in Health Promotion and Aging

Erika Buckley-Strobel, BSc, ND

Abstract:

The numbers of seniors as a proportion of the Canadian population has never been higher. This has created strain on provincial health care budgets across Canada, as rates of patients with chronic diseases and complex needs continues to rise. Given these challenges, the need for a collaborative and health-promotion focused model for seniors' health care has never been more urgent. There is a strong argument to be made that naturopathic doctors (NDs) are ideally suited to fill this gap, because of their unique training and philosophies of care, and should be funded in a community health model. The benefits of this solution are: for ND clinicians, greatly expanded practice opportunities; for communities, that seniors will increasingly be able to age in place successfully; and for government, that cost savings will accrue to provincial health budgets from decreased chronic disease burden and demands for hospital and long-term based care.

The healthcare of an ever-aging Canadian population is one that has planners and providers considering options as to how to best provide for the medical needs of seniors today and into the future. Health promotion is one concept that has shown the ability to look ahead and help decrease the need for chronic care in hospitals, thereby decreasing the costs to the provincial governments. Health promotion and disease prevention strategies are key in achieving healthier and more productive seniors in our society[1] thereby decreasing demand on the health care system. For some time, governments of various levels in Canada have been recognizing the need to shift toward creating more resources for delivery of preventive care, as well as moving away from institution-based delivery systems to what has been called a network of caregivers approach.[5] This includes an inter-disciplinary model of care involving the integration of services provided by health professionals providing the complex care required for older adults with chronic conditions.[5] Creating an efficiently integrated system would include utilizing all health professionals to the full scope of their practice.[5]

Naturopathic Medicine and Health Promotion

Naturopathic doctors could readily play a role in this collaborative model. NDs are well positioned in terms of education and philosophy to fill a current and future gap by providing holistic primary care, from a health promotion perspective, to Canada's aging population. The current underutilization of NDs could be turned around to find a ready source of professionals poised to provide health promotion and preventative healthcare to the senior population.

Health promotion is foundational to naturopathic philosophy. One of the principles within the Naturopathic Doctors' Oath is to teach the principles of healthy living and preventive medicine.[6] In other words, the profession is founded on educating patients in health promotion and disease prevention along with providing patients the tools to make this attainable. Another principle, address the fundamental causes of disease,[6] indicates that health promotion for seniors starts with primary care interactions that can occur in the early senior years and even earlier. Similarly, the principle of healing the whole person through individualized treatment illustrates the holistic perspective of naturopathic medicine that lends itself towards the unique considerations of each senior's care.[6]

In an increasing number of regulated Canadian provinces, NDs have additional training to meet standards for prescriptive authority, providing a framework to balance naturopathic and conventional therapeutics.[7] When this additional level of therapeutic knowledge is added to lifestyle-based education and a philosophy of patient-centred care, there is reason to believe that over-reliance on medications will lessen, reducing the risk of adverse events related to drug interactions.[8,9] This is an issue of particular concern to seniors' care. In 2010–2011, 1 in 200 Canadian seniors (more than 27,000 seniors) experienced an adverse drug reaction (ADR)-related hospitalization.[10] With advanced training in prescribing, it can be argued that NDs could provide an extra layer of protection for elderly patients to identify and correct adverse effects of medication, minimizing the risks associated with polypharmacy.

Gaps in the Current Healthcare System

Ninety two percent of Canadian seniors currently live independently in their communites.[11] In most Canadian communities however, (particularly acute in rural settings), having access to family doctors

does not actually ensure timely access to primary care. Canada continues to perform below the international average for timely access to primary care (44%), with almost two-thirds (59%) of seniors unable to get a same- or next-day appointment and 1 out of 8 Canadian seniors waiting at least 2 weeks to see their family doctor.[12]

Even those who can access primary care often find that these visits do not provide them with adequate time to have their complex concerns addressed. In 2012, this challenge was clearly stated by the College of Family Physicians of Canada (CFPC) when discussing the impact of chronic or complex conditions on a physician's caseload, summarizing that 15-minute visits are just not enough.[13] Patients with chronic care disease management cases require routine patient visits, greater time requirements and more resources. In their report, the CFPC referenced that it would take 7.4 hours per working day to provide all recommended preventive care to the average roster of daily patients, plus 10.6 hours to adequately manage chronic conditions.[13]

As well, in response to constraints on billing for family practice visits in many provinces, many physicians have similarly had to limit time spent managing individual complaints. In Ontario, this trend has been increasing in recent years.[3] There are concerns from the CFPC and many patient care advocacy groups that setting limits to one or two concerns per visit may prevent seniors from sharing symptoms that could potentially be indicative of more serious health problems.[3] This becomes more challenging when there are often multiple chronic conditions and overlapping symptom pictures.

Health Promotion and the Chronic Diseases of Aging

Poor management of chronic conditions can lead to declining health, reduced independence and ultimately death. In Canada, one third of seniors live with at least 3 chronic conditions, 32% take 5 or more regular medications and 14% face a mental health problem such as depression or anxiety.[13] Hypertension, the most prevalent condition amongst Canadians over 65, affects over 50% of Canadians seniors. Urinary incontinence, the eighth most common chronic disease of the elderly, affects one in ten Canadian seniors.[12]

FIGURE 1:
The top 8 chronic diseases being faced by Canadian seniors[12]

Hypertension	Coronary Heart Disease
Osteoarthritis	Osteoporosis
Low back pain	Type 2 diabetes
Ophthalmic problems	Urinary incontinence

According to the World Health Organization (WHO), the top three causes of chronic disease worldwide are unhealthy diet, physical inactivity, and tobacco use, all addressable from a health promotion perspective.[14] Increased intake of vegetables and fruits has shown many positive effects in terms of chronic disease outcomes including hypertension, CHD, and stroke.[15] A prospective cohort study of over 96,000 people, The Adventist Health Study 2, investigated the impact of plant-based diets on all-cause mortality and showed a decreased mortality risk with plant-based diets in comparison with non-vegetarian diets.[16] In terms of more specific conditions, the increased consumption of fruit and vegetables has a risk-reducing influence on dementia and diabetes.[15, 17]

In addition to diet, physical activity primarily prevents or delays the onset of chronic diseases, indicating that chronic disease may not be the foregone conclusion of the aging process.[18] In the case of dementia, exercise has been shown to not only reduce the incidence, but also slow the progression of this disease.[19] In China, a program combining lifestyle counselling and exercise was effective in lowering the blood pressure of medicated hypertensive patients aged 55 and older.[20]

Health Promotion and Mental/Emotional Health

A primary care environment is many seniors' first line of health promotion when it comes to their mental/emotional well-being. Because this can be time consuming for primary care physicians, screenings and brief interventions can be effectively delivered by other health professionals in primary care settings.[21] There are many key conditions to be assessed for in the senior population, including dementia, depression and anxiety.

More than 419,000 Canadians (6.9%) aged 65 years or older are living with diagnosed dementia[22] and this number is expected to double in the next 20 years.[23] Twelve modifiable risk factors in early life (e.g. education), midlife (e.g. hypertension, hearing loss) and later life (e.g. depression, physical inactivity, social isolation) account for around 40% of dementia worldwide, many of which can be assessed and addressed through not only public health professionals, but also through individual interventions throughout the life course.[22]

Mental health and cognitive problems among older adults are still commonly under-diagnosed in primary care in part due to patients not seeking help when symptoms appear, and hurried office care visits.[25] These are significant risks; loneliness and depression are two factors that have been found to increase cognitive decline over time, independent of age, education, socioeconomic status and initial health status.[27] It is important for naturopathic doctors to look for potential precursors to depression, such as loneliness or social isolation, as older adults who have strong personal networks, with a large and diverse set of social contacts, have been found to have the overall lowest risk of all-cause mortality.[26]

Additionally, there are many tools available for the primary care assessment of dementia symptoms, each having their own benefits and limitations. Currently, the Mini Mental State Exam remains the most frequently used cognitive screening instrument but may not be best for identifying mild cognitive impairment (MCI) in a primary care setting.[24] In terms of tests that can be delivered in a short time in a primary care setting, the Quick mild cognitive impairment screen (Qmci) and Phototest were found to be preferable tools for detecting MCI.[24] Although it takes longer, the Montreal Cognitive Assessment (MoCA) seems to be a promising (pencil and paper)

screening test,[24] and, with longer appointment times, could be feasible for administration in a naturopathic setting.

With the recent COVID-19 pandemic, and the social distancing measures that have resulted from efforts to limit community transmission, social isolation and loneliness are disproportionately affecting older adults' health outcomes.[28,29] One proposed solution to this challenge is to develop methods to identify and address social isolation and loneliness in health care settings.[29] The tools used to identify mental health and cognition changes are all ones that could easily be delivered by NDs within a primary health care team setting or independent practice. This extended time with patients in typical naturopathic clinical encounters also allows time to build rapport, which is essential so that patients feel more comfortable sharing symptoms of a mental/emotional nature.

Health Promotion and Life Satisfaction

In 2010, 97% of Canadian seniors expressed general satisfaction with their lives[31] and 8 out of 10 Canadian seniors, a higher proportion than the international average, rate their health as excellent, very good or good.[12] This is despite one third living with at least 3 chronic conditions, 32% taking 5 or more regular medications, and 14% facing a mental health problem such as depression or anxiety.[12] However, this can also be seen as encouraging as it indicates that life satisfaction is based on something more than physical health.

In face of the social isolation and mental health challenges related to the COVID-19 pandemic, it is important to implement strategies to maintain life satisfaction among seniors. There is evidence of a significant relationship between self-care and self-esteem in the elderly. Discussing and implementing strategies that promote individualized self-care routines for physical and mental well-being of elders in a primary care setting leads to increases in health and significant reduction of physical and mental complications.[32] During the intake process, NDs should encourage discussion of life satisfaction and challenges through open-ended questioning. This provides seniors with an environment to discuss these sometimes-sensitive topics in a non-rushed and non-judgmental way.

Conclusion

As the population ages, the need for a health promotion approach to seniors' care continues to grow. It is evident that there are gaps in the current system as primary care struggles to provide both acute care and a health promotion approach to seniors' health. Licensed health professionals to fill these gaps already exist in the form of naturopathic physicians/doctors (NDs). As health promotion and disease prevention is the cornerstone of naturopathic practice, NDs are ideally suited to this role. Incorporating health promotion into a collaborative care model that includes NDs and beginning health promotion and lifestyle education at an earlier age, we may be able to decrease negative chronic disease outcomes amongst seniors in the future.

About the Author

Erika Buckley Strobel, BSc, ND graduated from the Canadian College of Naturopathic Medicine in Toronto where she completed the ND (Naturopathic Doctor) program in 2004. A member of the "sandwich generation", she now balances her time between family and practice in beautiful Golden, British Columbia. In the spring of 2018, she completed the two-year Advanced Certificate in Gerontology from Selkirk College. She not only brings this knowledge to her practice, but to her community as well by sitting on the Golden Age Friendly Committee. Her goal is to inspire and educate seniors and NDs alike of the vital role that naturopathic medicine can play in healthy, active aging.

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Review: The Efficacy of Curcumin in Cognitive Impairment

Romi Fung, ND, MSc

Abstract:

Background Dementia is a syndrome characterized by a progressive cognitive decline that can interfere with everyday function. The presence of inflammation is associated with the progression of cognitive decline. Treatment of inflammation-induced cognitive decline has been proposed through the use of anti-inflammatories. One intervention studied is curcumin, a compound extracted from the spice turmeric with anti-inflammatory properties. This paper reviews the efficacy of curcumin in cognitive decline.

Purpose This review seeks to understand how effective curcumin is an intervention for optimizing cognition in older adults ages 55 and older compared to placebo. This study will benefit the naturopathic doctor investigating curcumin's current literature and its efficacy in treating cognitive decline.

Methods A literature search was conducted in accordance with literature review methods. Using the keywords [curcumin OR turmeric] AND [Alzheimer's disease OR dementia], a preliminary search for relevant articles on this topic was conducted on MEDLINE, PubMed, CINAHL, Embase and Cochrane databases screened for article titles containing dementia, Alzheimer's disease and curcumin, and filtering for articles published from 2000 onward and in English.

Results Six studies were found eligible after considering inclusion and exclusion criteria. Of these studies, four of them have shown positive cognition improvements, and two studies have shown no improvement in cognition.

Implications Curcumin may have potential as an intervention for the treatment of cognitive decline. However, due to insufficient studies, more research is warranted to understand better if curcumin is beneficial as an adjunctive treatment for Alzheimer's disease.

Key Messages

- Inflammation plays a potential role in Alzheimer's disease. Curcumin is a compound extracted from the spice turmeric and possesses anti-inflammatory properties.
- Curcumin may be a potential adjuvant in treating mild cognitive impairment, but likely not for those diagnosed with dementia.
- Future research on curcumin use is needed to better address and understand its efficacy on individuals living with mild cognitive impairment and dementia.

Introduction

Dementia is a syndrome characterized by a progressive cognitive decline that can interfere with everyday function.[1] Activities such as planning, bathing, eating and grooming can be affected, requiring assistance when appropriate. Symptoms commonly associated with dementia include progressive memory loss, increasing confusion, reduced concentration, behaviour changes and the eventual loss of ability to do everyday tasks. Six cognitive domains affected by dementia are learning and memory, language, complex attention, executive function, perceptual-motor and social cognition.[1] Dementia is an umbrella term that describes the clinical syndrome of cognitive decline. Under the umbrella of dementia, Alzheimer's disease is the most common type of neurodegeneration, with roughly 60% to 80% of cases of dementia.[1] The remaining subtypes of dementia include vascular dementia, Lewy body dementia and frontotemporal dementia.[1]

Currently, approximately 564,000 Canadians live with dementia and this number is expected to almost double to 937,000 Canadians in 15 years.[2] The Alzheimer's Society reports that there are 25000 new cases of the disease each year.[2] This growth affects social and economic implications on medical costs and burden for families, caregivers and the health system.[3] 1,100,000 Canadians are affected directly or indirectly by dementia, leading to an annual cost of $10.4 billion to care for those living with dementia.[2]

The hallmark of Alzheimer's disease (AD) is the presence of beta-amyloid plaques deposited in the parenchyma of the hippocampus amongst other locations,[4] with one of the earliest documented articles about amyloid being published in 1839.[5] Contained in the amyloid plaques are amyloid-β-peptides resulting from cleavage from the amyloid precursor protein (APP).[6] The significance of accumulation of beta-amyloid plaques is shown to disrupt glial cell function and also responsible for the production of inflammation markers such as IL-1, IL-6, and TNF-α.[7]

A theory now emerging in research is how inflammation influences the pathogenesis of Alzheimer's dementia.[7] Local and circulating inflammatory cytokines can have an impact on the central nervous system.[8] High plasma levels of IL-6, CRP, and TNF-α-related factors have been predictive of cognitive decline in older populations.[9-11] Elevated levels of IL-6 and TNF-α in the blood are also associated with the AD development.[12,13] In mice studies, chronic systemic inflammation has been reported to influence changes that correlate with Alzheimer's disease.[14] These findings of elevated inflammatory markers associated with AD development can suggest a potential intervention using anti-inflammatories.

Curcumin is a compound extracted from the spice turmeric. There is a growing body of evidence that supports the efficacy of curcumin in controlling the treatment of inflammatory conditions.[15] Curcumin modulates inflammation through down-regulation of COX-2, lipoxygenase and inducible iNOS enzymes,[16] inhibition of TNF-α,[17] IL-1,[18,19] IL-2,[20,21] IL-6,[17,22] IL-8,[17,23] and IL-12 production,[24] and down-regulation of mitogen-activated and Janus kinases.[25] Besides its anti-inflammatory action, curcumin is found to have anticarcinogenic, antimicrobial, hepatoprotective, cardioprotective and thrombosuppressive actions.[26]

The proposed research question is: "How efficacious is the use of curcumin in improving memory scores in seniors ages 55 and over compared to placebo?"

Methods

Search Strategy

An electronic bibliographic literature search was conducted in accordance with the preferred reporting items for reviews.[27] Using the keywords [curcumin OR turmeric] AND [Alzheimer's disease OR dementia], a preliminary search for relevant articles on this topic was conducted on the following databases selected to incorporate extensive medical and health care evidence: PubMed, CINAHL, MEDLINE, Cochrane, and Embase. Search articles were organized and screened for the terms dementia, Alzheimer's, and curcumin in the title and abstract; duplicates were manually removed and filtered for articles (1) published from 2000 onward for recency, (2) human studies, and (3) in English.

Screening Process

Article titles and abstracts were screened for the use of curcumin as an intervention for closer review. In addition, abstracts were screened for any use of objective tests to determine cognitive ability, such as MoCA, to quantify efficacy. Characteristics that are crucial in this research are the intervention, population, and outcome.[28]

Selection Process

Full articles were obtained for selected abstracts and reviewed for inclusion. The process of selection is presented in Figure 1. The inclusion criteria for this review were: (a) Curcumin as the intervention, (b) seniors ages 55 and older as subjects, (c) to have an objective measure for memory scores such as MMSE and MoCA at baseline, and (d) controlled trial or clinical trials.

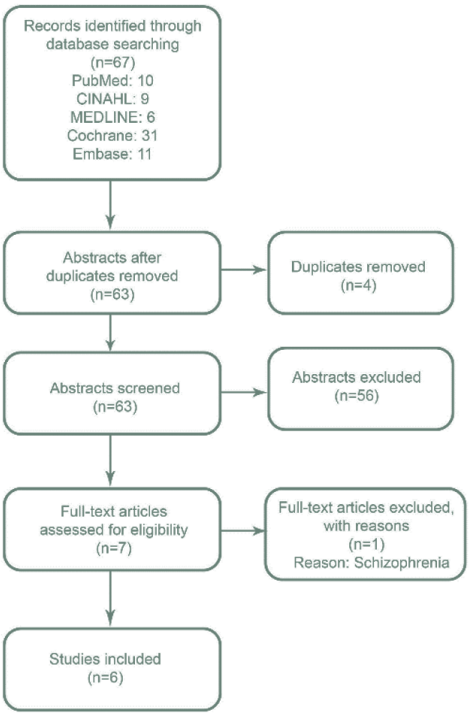
Data Extraction

The author independently extracted data to evaluate and classify the quality of each study. The articles were extracted utilizing the following headers in Appendix A. These include: sample size and key features, intervention, study design, length of study/follow-up period, other interventions, memory test, memory changes, and appraisal findings.

Analysis

Data were extracted from each article and compared and contrasted. Besides the results and amplitude of change of memory scores, points of analysis included the type and dosage of curcumin supplement utilized and their apparent effectiveness in the studies, length of the studies, how the authors reflected on the results, and the variations in sex distribution and the results.

FIGURE 1: PRISMA Chart



Results:

Overview

A total of 67 articles were identified, with four articles removed for duplicates. There were 57 articles excluded, leaving with seven full-text articles. Out of the seven full-text articles, 1 article was excluded because it did not focus on Alzheimer's disease but rather schizophrenia.

A total of six articles were eligible for this review. This included five double-blinded and placebo-controlled randomized control trials and one open-label study. In compiling the studies, the total number of 273 people were studied across the six studies. The sex distribution across the studies ranged from 12.5% to 90% male. The dosages of the studies ranged from 90mg to 4g of curcumin.

The location of the studies ranged from Australia, America, China and Japan. Amongst these studies, several older adults from senior homes, dementia clinics and independent living were sampled. Lengths of studies ranged from four weeks to eighteen months. Each study utilized curcumin as their intervention; however, curcumin can come in many different forms and dosages based on the supplement and the market. The studies selected for this review utilized various curcumin formulations, including C3 Curcumin, Biocurcumax, Longvida Optimized Curcumin and Theracurmin. An extraction chart summarizing the data described in the Methods section under Data Extraction is provided (Appendix A).

Results of the studies were mixed. The primary outcomes observed are that curcumin improved cognitive scores, and curcumin did not improve cognitive scores.

Safety and Adverse Effects

There is previously demonstrated safety and tolerability in human studies for curcumin.[29,30] Gastrointestinal complaints such as nausea and gastritis accounted for most adverse events in the studies.[31,32,35,36] No severe adverse events were observed.

Improvement in Cognitive Scores

In synthesizing the articles, one outcome that arose was that the intervention supported improvement in memory scores—four articles in this review support this theme. The study done by Small et al.[31] recruited 40 non-demented adults and randomized subjects into two groups. Those in the intervention group were given 90mg curcumin in the form of Theracurmin twice daily, and those in the control group received a placebo for 18 months. The study utilized Visual Memory Measures and Measures of Attention to assess for cognition. The verbal memory outcome measure consisted of a long-term recall and found that there was a 28.1% improvement of verbal memory in the curcumin group versus a 2.6% improvement in the placebo group.

Another study that supports this outcome was done by Rainey-Smith et al.[32] The study recruited 96 community-dwelling older adults and randomized them into two groups. Those in the treatment group were given 1500mg daily of Biocurcumax and compared to placebo. This study lasted for 12 months. For eligibility, subjects needed to demonstrate a baseline MoCA score of greater than or equal to 26 out of a maximum score of 30, which is considered normal cognition. Post-treatment, the mean MoCA scores improved by 0.64 points in the treatment group and by 0.09 points in the placebo group compared to their baseline scores.

The third study that supports this outcome was done by Cox et al.,[33] where they enrolled 60 individuals and screened them with the MMSE. Subjects were randomized into two groups: the treatment group was given 400mg of Longvida Optimized Curcumin daily, and the control group was given a placebo. Subjects were tested before the first dose with a serial three subtraction exercise task. One hour after taking the intervention, subjects were subjected to another serial three subtraction task, and again after four weeks. There was a significant effect on the number of correct responses in the curcumin group, increasing by 16% from pre-dose performance versus a 2% increase in the placebo group. This effect continued after four weeks, where the number of correct responses in the curcumin group increased by 17% from baseline versus 3% in the placebo group.

The fourth study that supports this outcome was done by Tabira & Kawamura,[34] where they did an open-label study consisting of 2 trials. The two trials enrolled 19 participants and were given a

supplement containing Huperzine A and curcumin. Subjects were screened with the MMSE and ADAS-Jcog and then subjected to ADAS-Jcog post-supplement at 6-12 weeks and 22-28 weeks. In both trials, the ADAS-Jcog scores improved significantly in both cohorts when compared to baseline.

No Improvement in Cognition

The other significant outcome synthesized in the selected articles is that the intervention showed no improvement in memory scores. Two articles supported this theme. The first article is by Ringman et al.,[35] where they recruited 30 participants with mild to moderate probable Alzheimer's disease screened with the MMSE and obtained a range between 17 and 29, with the mean score 22.5. Participants were randomized into three groups. One group was assigned to take 2 grams of C3 Curcumin daily; a second group was assigned to take 4 grams of C3 Curcumin daily; and a third group was assigned a placebo. The length of the study lasted for 24 weeks, with an open-label extension to 48 weeks. At the end of the period, participants were followed up, and their cognition was measured with the Alzheimer's Disease Assessment Scale – Cognitive Subscale. At 24 weeks, the authors concluded that there was no clinical evidence of efficacy against Alzheimer's disease.

The second article that demonstrated no improvement of cognition was done by Baum et al.,[36] which recruited 34 participants: nine from nursing homes and 24 from dementia clinics. Twenty-two participants completed the study and were randomized into three groups: 4 grams of curcumin daily, 1 gram of curcumin daily, or placebo. This study was conducted for six months. Participants were assessed using the MMSE as baseline and post-treatment. Participants in the 4 gram treatment group exhibited a 0.7 (+/- 1.1) change on their MMSE score, a -0.6 (+/- 1.0) MMSE score change for those in the 1 gram treatment group, and a 1.3 (+/- 0.6) MMSE score change for those in the placebo group. In other words, there was no significant improvement observed in this study.

Baseline and Cognitive Changes

In observing the above results, studies that showed improvement involved community-dwelling older adults with MoCA scores greater than or equal to 26[32] older adults[33] and non-demented older adults with MoCA baseline averaging approximately 26.[31] Whereas the remaining studies by Ringman et al.[35] and Baum et al.[36] did not show any positive outcomes, the samples tested for baseline involved a clinical diagnosis of dementia.

Discussion

This review has outlined five randomized controlled trials and one open-label study using curcumin intervention and observing any changes in cognition and memory scores in participants. Based on the results, four studies demonstrated improvement in cognition, and two studies did not show improvements in cognition. This discussion will interpret these results and evaluate and discuss potential biases that may have affected the studies' findings.

TABLE 1: Baseline Measures and Cognition Changes

Citation	Inclusion Criteria Regarding Dementia	Cognition Result
Cox et al. (2015)	Healthy older subjects	Enhanced cognition
Rainey-Smith et al. (2016)	Elderly subjects	Mean MoCA score increased, but no significant difference between groups
Small et al. (2017)	Non-demented subjects	Significant improvement in memory performance
Ringman et al. (2012)	Mild-to-moderate Alzheimer's disease	No differences
Baum et al. (2008)	Alzheimer's disease	No difference in MMSE
Tabira & Kawamura (2018)	Alzheimer's disease, Lewy Body dementia, Mild Cognitive Impairment	Improvement in ADAS-Jcog

Some studies support the idea that curcumin can be potentially efficacious in treating Alzheimer's disease.[37,38] Three of the four studies that observed improved memory scores involved non-demented or healthy older adults. In deducing from the articles, curcumin as an intervention is potentially effective in healthy individuals for improving cognition and not treating dementia. This may suggest curcumin's role in potentially preventing cognitive decline or that it may likely be a better option for individuals with mild cognitive impairment. Although it is not emphasized as a chronic illness, an expert opinion suggests that there may be a point of no return for Alzheimer's disease.[39] However, with the lack of the number of quality studies, this is not conclusive.

The length of the intervention may affect outcomes. The studies' length ranged from four weeks to 18 months, with four of the five studies taking one year or less. The studies that observed no improvement in cognitive scores had study lengths of 24 weeks and six months; The studies that observed improvements in cognitive scores had study lengths of 4 weeks, 12 months and 18 months. Results are mixed based on the lengths of each study. As dementia is a chronic disease, evidence suggests that the development of dementia takes a significant amount of time, although this varies between patients.[40] Mann, Mohr, Gearing & Chase suggest that this disease progression of dementia ranges from a few years to two decades.[41] If the pathophysiology of Alzheimer's disease takes a great deal of time to develop, then the length of the intervention should reflect and take this process into consideration. The intervention will take time, and may require three to six months to observe subjective or objective improvement in cognition[42] as well as instructions on the length, frequency and intensity of the intervention.

The dosage of curcumin can determine efficacy and if outcomes are dose-dependent. The dosages of the studies ranged from 90mg to 4g of curcumin. Future studies should investigate what an optimal dose of curcumin may be. So far, research can only gauge as to what dose is tolerated. A recent Phase I clinical trial demonstrates that curcumin is safe even at high doses (e.g., 12g/day).[43] Although studies that used the highest dose of curcumin in this review (i.e., 4g daily) exhibited no differences in cognition,[35,36] studies showed cognitive benefits with doses as small as 90mg of curcumin. Dosage may or may not be potentially as important as the formulation, but could be considered for any possible adverse effects such as gastrointestinal symptoms.[29,30]

Besides dosage, the form of the actual curcumin supplementation varied. There are concerns about the bioavailability of curcumin supplementation[44] and whether curcumin can pass the blood-brain barrier for it to take effect. Anand, Kunnumakkara, Newman & Aggarwal explain that although curcumin is safe, humans exhibit low bioavailability, which may be due to poor absorption, rapid metabolism and rapid systemic elimination.[43] In animal studies, no more than 90% of oral curcumin is excreted in the feces.[45] Each study utilized a different supplement, and there was no consistency across the studies with the formulations. Each formulation can exhibit a different bioavailability based on what was incorporated in the proprietary blends. Some studies are attempting to overcome this problem, including the incorporation of piperine, formulating liposomal curcumin, curcumin nanoparticles, and curcumin phospholipid complexes.[46] Some studies did not indicate what kind of curcumin was utilized, and thus results may reflect that.

Additionally, the use of concurrent medications throughout the intervention may pose a challenge. There is an understanding that individuals already diagnosed with cognitive impairment may already be prescribed medication, such as an acetylcholinesterase inhibitor. By taking medications along with curcumin, there will likely be uncertainty about what helps if cognition improves. Interactions between concurrent medications and curcumin could affect outcomes. However, as a part of this review, the participants in studies showing no difference between curcumin and placebo were also on concurrent medications as previously diagnosed. This adds to the suggestion that curcumin may be more beneficial to healthy individuals or those with mild cognitive impairment in maintaining or preventing dementia versus those who are already diagnosed and are unable to function independently.

Limitations

The studies in this review all have small sample sizes. Without a more significant number of participants included in many of these studies, there will not be a good representation and power when it comes to statistical value.

In addition, the samples in some of the studies had disproportionate sex ratios, with the study by Baum et al.[36] having the most significant proportion of female participants and very low rates of inclusion of male participants. This can potentially affect the results if there is no equal distribution of sexes, if sex differences are associated with disease progression or response to intervention.

In discussing representation, this review includes studies from Australia, America, China and Japan. As each group is diverse in their genetics and culture, there is also a need to consider each study's weight in the general population.

Though most of the studies utilized are weak and moderate in strength, as shown in Appendix A, there is not much quality research to answer that curcumin is efficacious. Also included in this review is a weak study that may have further skewed the results of this review. More robust quality studies are warranted in future studies.

This review would be strengthened if the intervention been of the same formulation or brand and consistently administering MoCA as baseline and post-intervention and other cognitive assessments. Future research studies should consider utilizing one specific curcumin supplement that has been identified to have optimal bioavailability consistent with all studies. That will include ensuring that future research includes finding a formulation that will contain a measure of how much curcumin is absorbed into the blood and potentially how long it can stay in the body. All future research can also be strengthened by consistently administering a universal objective measurement of cognition, whether MoCA or ADAS.

There are also limitations to this review. The search did not include all relevant databases, nor were statistical analysis resources utilized for meta-analysis. The author performed all searches independently when there could be many authors to perform a more thorough, unbiased review.

Conclusion

Curcumin shows mixed results as a treatment or preventative intervention for seniors living with or without dementia. The themes presented in this review suggest that curcumin is efficacious in improving memory scores in those without diagnosed dementia compared to those who do have dementia. Thus, it may be more pertinent to suggest for the naturopathic doctor that curcumin may be more reasonable as an intervention for mild cognitive impairment or for use as part of a plan to mitigate the risk of developing dementia from an underlying inflammatory etiology. However, with the lack of studies to date and small sample sizes of the studies in this review, this study warrants the need for more clinical studies to determine the efficacy of curcumin. This review has found mixed results regarding curcumin use and has explored the potential reasons for these results. Future studies involving the use of curcumin should be cognizant of the study period's length, the dosage and the form of supplementation used in the study.

About the Author

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APPENDIX A

TABLE A2: Extraction Matrix

Citation	Sample Size and Key Features	Intervention	Study Design	Length of Study/Follow-Up Period	Other Interventions	Memory Test	Memory Changes	Appraisal Findings
Studies that showed improvement in cognition								
Cox, Pipingas & Scholey, 2015	60 healthy older adults enrolled; Australia Treatment: 40% male Placebo: 33.3% male	400mg Longvida Optimized Curcumin; placebo	Randomized, double-blind, placebo-controlled, parallel-groups	Acute – 1h or 3h Chronic – 4 weeks	No concurrent anticoagulant drugs, anti-cholinergics or acetylcholinester-ase inhibitors or steroid medications	MMSE Screening; Computerized Mental Performance Assessment System (Northumbria University)	1 hour- Increased correct responses of serial three subtraction task; 4 weeks trend towards beneficial effect of correct serial three subtraction	*Overall Quality:* Weak *Strengths:* Consistency of memory testing RCT Relatively equal sex ratio *Limitations:* Small sample size Shortest study length in review
Rainey-Smith, Brown, Sohrabi and Shah, 2016.	96 elderly subjects individuals ingested either placebo (57) or 1500mg of curcuminoids (39); Western Australia Treatment: 33.3% male Placebo: 26.3% male	1500mg/d Biocurcumax or placebo	Randomized, placebo-controlled, double-blind	12 months	None indicated	MoCA scores greater than or equal to 26; Those with 18-25 go through a case-by-case determination of eligibility	Mean MoCA scores improved by 0.64 points in curcumin group and by 0.09 points in placebo group from baseline to 12 months. No significant differences in cognitive test performance between groups	*Overall Quality:* Moderate *Strengths:* Use of MoCA throughout study consistently RCT *Limitations:* Small sample size, but largest amongst review High female proportion
Small et al., 2018	40 subjects; non-demented adults; America Treatment: 43% male Placebo: 47% male	90mg bid curcumin (Theracurmin) or placebo	Randomized, double-blind, placebo-controlled	18 months	None indicated	MoCA baseline 26.7+/-2.6 for curcumin group, 26.9+/-2.5 for placebo group	Significant memory and attention benefits	*Overall Quality:* Moderate *Strengths:* Longest study length within review *Limitations:* Small sample size
Tabira & Kawamura, 2018	10 individuals in Trial 1(9 with AD and 1 with possible DLB), 9 individuals in Trial 2 (3 with AD, 4 with DLB, 3 MCI, 1 vascular dementia)	Trial 1: 6 capsules daily. One capsule includes 60mg curcumin, 25mg H. serrata extract containing 50μg Hup A, 3mg piperine. Trial 2: 2 granules in the sticks. One stick includes 50mg curcumin, 180mg H. serrata extract containing 180μg Hup A.	Open label study	Follow up at 6-12 weeks and 22-28 weeks	Comment on use of lansoprazole due to worsening of chronic gastric ulcers. No other mention of concurrent medication	Trial 1: mean MMSE score 18.8+/- 4.2 and mean ADAS-Jcog score 24.0+/-9.6. Trial 2: Mean MMSE score 23.0 +/- 4.3 and mean ADAS-Jcog score 11.0 +/-4.4.	Trial 1: Most patients showed improvements in ADAS-Jcog scores. Subjective and caregiver comments. Trial 2: ADAS-Jcog scores improved in all cases but for one.	*Overall Quality:* Weak *Strengths:* Use of consistent baseline and post-treatment measure *Limitations:* Very small sample size for both trials Short study length No randomization
Studies that observed no improvement in cognition								
Baum et al. 2008	22 with Alzheimer's disease completed; China. 1g curcumin: 12.5% male 4g curcumin: 27.3% male Placebo: 37.5% male	4g, 1g or 0g curcumin	Randomized, placebo-controlled, double-blind	6 months	Patients permitted to continue with their medications	MMSE scores 15.4+/- 5.8 on 0g 15.4+/-5.0 on 1g 15.6+/-7.9 on4g	MMSE changes 1.3+/-0.6 on 0g -0.6+/-1.0 on 1g 0.7+/- 1.1 on 4g	*Overall Quality:* Weak *Strengths:* Consistency of use of baseline and outcome measures *Limitations:* No indication of the specificity of intervention Very low male sample proportion No use of more substantial cognitive tests such as MoCA
Ringman et al., 2012	36 participants with mild- to moderate probable AD 2g: 33% male 4g: 30% male Placebo: 45% male	2g, 4g, or placebo Curcumin C3 Complex	Randomized, double-blind placebo-controlled trial	24 weeks with an open-label extension to 48 weeks	Acetylcholinester-ase Inhibitors and memantine allowed	MMSE 17-29	No differences between placebo and curcumin, using ADAS-Cog	*Overall Quality:* Moderate *Strengths:* Use of ADAS-Cog, which is preferable *Limitations:* Small sample size Short study period No consistency between baseline and outcome tests

Note: AD – Alzheimer's Disease, DLB – Dementia with Lewy Bodies, MCI -Mild Cognitive Impairment

APPENDIX B

Search String and MeSH terms

Embase	Pubmed	CINAHL	EBM Reviews – Cochrane Central Register of Controlled Trials
1. exp curcumin/ 2. exp dementia/ 3. exp turmeric/ 4. exp cognitive defect/ 5. 2 or 4 6. 1 or 3 7. 5 and 6 8. limit 7 to (full text and (embase or medline) and (clinical trial or randomized controlled trial or controlled clinical trial) and yr="2000 -Current" and article and aged <65+ years>)	1. (curcumin OR turmeric) 2. (dementia OR Alzheimer's) 3. 1 and 2	1. MH "curcumin" 2. MH "Turmeric" 3. MH "Dementia" 4. MH "Alzheimer's disease" 5. S1 OR S2 6. S3 OR S4 7. S5 AND S6	1. Curcumin/ 2. Dementia/ 3. Alzheimer's disease/ 4. 2 or 3 5. 1 and 4

MeSH terms:

Cognitive Dysfunction / prevention & control*
Curcumin / therapeutic use
Dementia / prevention & control*
Dementia / therapy
Healthy Aging
Humans
Inflammation / prevention & control

Cardiorespiratory Fitness Assessment and Treatment for Health Span and Lifespan

David Duizer, ND

Abstract:

Poor cardiorespiratory fitness (CRF) is an important risk factor for age-related diseases including cardiovascular disease, cancer, dementia and osteoporosis. When evaluated through an active metabolism test and reported as VO2Max, or the maximal oxygen uptake during intense exercise, CRF is a highly valued functional marker to assess overall wellness and disease risk in the elderly. For every 3.5ml/kg/min increase in VO2Max there is an associated 13% decrease in all-cause mortality. CRF is trainable in the elderly through endurance and high intensity interval training. A Naturopathic Doctor's holistic approach to optimal wellness includes exercise as a lifestyle intervention and CRF analysis enables their exercise protocols to be individualized for the purpose of improving VO2Max. VO2Max can be improved by up to 11% in 8 weeks with exercise consistency. CRF evaluation and treatment in the elderly population is a high priority of an evidence-informed optimal wellness program and one that Naturopathic Doctors are well trained to lead.

An aging population leads to a rise in age related conditions and the potential for an overwhelmed medical system. The four conditions of note for a lifespan/health span focused physician include cardiovascular disease, cancer, Alzheimer's disease and osteoporosis leading to fracture. A quadruple threat to those who live long enough.

As integrative clinicians, our role is to present evidence-based treatment options for those already afflicted and an equal quality of care to those working in prevention. As we organize our efforts for patients we strive to create protocols that will have the most impact for the least cost and difficulty. Fortunately, in both the treatment and prevention of the diseases of aging, lifestyle modification is impactful. The treatment of cardiorespiratory fitness (CRF) through exercise during active therapy[1] and in the prevention of cardiovascular disease,[1] cancer,[2] osteoporosis,[3] and Alzheimer's disease[4] has proven valuable clinically as a lifestyle intervention. CRF, as a diagnostic tool, is one of the most widely accepted functional markers evaluating overall wellness in the elderly and helps to predict both healthspan and lifespan.[5] Compared with hypertension, lipid abnormalities, smoking, physical inactivity, obesity, diabetes status and other traditional measures of wellness, CRF is a more powerful predictor of risk for poor health and longevity.[9]

In Naturopathic Medicine, we are well trained in lifestyle interventions for the purpose of extending healthspan and lifespan. Fitness programs are an integral part of our holistic protocols. We strive to use our individual experience, education and research to build effective protocols. By evaluating CRF through VO2Max testing and building precision, patient-centred exercise protocols to improve VO2Max we can make positive contributions toward recovery from chronic conditions,[1] actively extend lifespan[5] and reduce age-related decline thus supporting healthspan.[6]

What is the VO2Max Assessment?

VO2Max is the measurement of maximal aerobic capacity,[5] or the maximal oxygen uptake during intense exercise. It describes CRF for patients and can be tested in-office with proper equipment. The test is measured during either a treadmill or stationary bike active metabolism "ramp test" and is documented in the units mL/kg/min. Inhaled oxygen and exhaled CO2 are captured via a metabolic testing device during progressive intensity increases. Total test time is approximately 30 minutes including prep, warm up and cool down. Testing is to exhaustion, when the respiratory exchange ratio crosses 1.0, and often takes patients to 95% of maximum heart rate (220-age x 95%) or HR_{max}. This test is available in most major cities, including at some Naturopathic offices.

Through encouraging the completion of this assessment Naturopathic Doctors are able to quantify CRF for patients, properly set goals for CRF, design appropriate exercise and nutrition routines and estimate and subsequently describe the health benefits achieved through exercise.

What are the risks of the VO2Max Assessment?

Properly preparing a patient for CRF testing is extremely important. The process begins with reviewing the benefits of the test as outlined above, objective measurements obtained and their inherent value and risks associated. CRF testing can be a stress inducing experience as patients often feel a desire to perform well. The following are a list of possible contraindications to CRF testing (general contraindications to high intensity exercise)[8] to share with patients prior to their exam:

a) Physical inability to perform high intensity exercise and include disability, pain or injury
b) Fixed-rate pacemaker or ICD devices
c) Major cardiovascular event within the last three months
d) Chronic atrial fibrillation, Congestive Heart Failure secondary to valvular disease, congenital heart disease or obstructive cardiomyopathy
e) Severe arrhythmia
f) Recent bypass surgery
g) Percutaneous coronary intervention within last six months
h) Left ventricular ejection fraction <45%
i) Severe COPD
j) Unstable angina, uncontrolled hypertension

The following are a list of risks associated with CRF testing to share with patients prior to their exam:

a) The mask can cause claustrophobia during exercise and induce panic
b) There is a risk of falling on the treadmill during this exam
c) All risks and precautions taken with exercise should be reviewed such as chest pain, shortness of breath, lightheadedness, vision changes, nausea and dizziness

What can we expect clinically from VO2Max improvements?

Now that we have our baseline measurement we can help the patient to determine their specific CRF goals. VO2Max grouping categories are often divided into quintiles and progress is quantified by metabolic equivalents (MET) (with 1 MET equal to 3.5 ml/kg/min).[9] It is helpful to illustrate both what can be obtained clinically from accomplishing improvements in VO2Max and how many increases in metabolic equivalents are required to do so. Using the Reference Standards outlined by Mayo Clinic Proceedings based on the *Fitness Registry* and the *Importance of Exercise National Database* we can confidently quantify the fitness levels of patients.[9]

Showing patients which VO2Max quintile they fall within is incredibly powerful. As a marker of health VO2Max has been correlated with increased lifespan independent of age, sex, ethnicity and comorbidities[5] and goal setting should take into account that every 1 MET increase (VO2Max increase of 3.5ml/kg/min) is associated with a 13% decrease in mortality risk.[5] Improving CRF requires work and its benefits are independent of anything else occurring genetically, lifestyle, or condition related.

On average VO2Max declines 1.6% per year[6] and its reduction is associated with the development of obesity, hypertension, coronary vascular disease, stroke, loss of independence, and premature mortality.[6] Understanding where a patient is within that average decline pattern can highlight the influence a presence or lack of conditioning may be having on their wellbeing and disease risk.

Condition related tracking is important as well. The following statistics are powerful when discussing exercise benefit in chronic disease prevention:

- Those in the lowest quintile CRF measurement have a 1.92 fold increased risk of dementia compared to those in the highest quintile of CRF measurement.[4]
- High CRF is associated with decreased cancer mortality,[2] lower incidence of lung and colorectal cancer,[2] fewer toxic effects of radiotherapy, chemotherapy and endocrine therapy in cancer treatment.[7]
- In high CRF postmenopausal women there is a 70% reduction in risk of osteoporosis compared with those with low CRF.[3]
- Increases in CRF of only 1-2 METS are associated with 10-30% lower adverse cardiovascular event rates[10]
- Those in the lowest CRF quintile have a 2-5 fold increased risk in cardiovascular disease or all-cause mortality, independent of other CVD risk factors.[9]

Can we improve CRF in the elderly population?

A holistic approach to wellness includes exercise as a foundational pillar. When working with an elderly population or in a chronic disease setting, for good reason, exercise prescriptions can become more detailed, nuanced and cautious. As outlined above, CRF improvements through VO2Max increases provide significant value to health and likely have the most evidence for longevity benefit of all possible markers.

As we age the efficiency of the cardiovascular system suffers, our skeletal muscle fibre density declines and the oxidative capacity of our muscles reduces.[12] Without aerobic training VO2max will begin to decline 1% per year on average starting after the 3rd decade of life.[13] These impacts are compounded by the increasing risk of chronic disease with aging. From neuropathy and arthritis to polypharmacy and fracture risk, many factors can influence our ability to test overall fitness and implement an exercise prescription. For some cardiovascular performance can only be measured at a submaximal level by the 6 Min Walking Test.[12] This is mainly due to balance issues, frailty and severe chronic disease. During the initial

course of their condition-specific treatment it may be appropriate to implement a 12-24 week program focused on building an aerobic base, strength training, and balance work. This type of work is often facilitated by physical therapists with experience working with this population.

With consistent effort and appropriate exercise prescriptions, VO2Max is trainable, even over the age of 60.[13] After a maximal exercise test measuring VO2Max, deliberate goal setting of 1 MET per 12 week period can anchor an exercise plan and enable the clinician to easily quantify the potential benefit. Also, it is an attainable goal for most. In addition to benefits outlined above, aerobic training in the elderly improves ventilatory efficiency, a marker of lung function (ventilation exchange/volume CO2 slope or VE/VCO2 slope), the ventilatory threshold (the point at which ventilation increases in a non-linear fashion during exercise), and heart rate recovery (the decrease in heart rate at 1 minute after cessation of exercise).[12]

How can we best improve CRF in elderly?[12]

A 2017 study published in the journal *Medicine and Science in Sports and Exercise* subdivided subjects into six categories based on age, with the top age-bracket being those 70 years of age and older.[14] They then implemented an 8 week high intensity interval training program that asked participants to exercise 3 times per week, supervised, using heart rate monitoring for proper zone-specific training.[14] They followed the following routine:[14]

- 10 minute warm-up
- 4x4 minute intervals with an intensity of 90%-95% of HR_{max} with 3 minute active recovery periods at 70% of HR_{max}
- 5 minute cool down (70% of HR_{max})
- Specifics - The training could be done on a treadmill at an incline of 5% or greater or on a stationary bike with a cadence of 60-80rpm.

VO2Max was tested before the study began and after 8 weeks of training. The results showed an improvement in VO2Max of 9%-13% corresponding to an average of 4.1ml/kg/min for males and 4.2ml/kg/min for females.[14] There was no difference between age groups. Those greater than 70 years of age had similar benefit to those between the ages of 20 and 29.[14] This confirms that we can suggest with confidence to patients over the age of 70 that with only 43 minutes of training 3 times per week for 8 weeks we can see a VO2Max improvement of 4.1-4.2ml/kg/min.

In another study published in *Circulation* sedentary subjects over the age of 65 were assessed against age-matched Masters athletes.[15] This study took an approach to the untrained subjects that included building aerobic conditioning before adding high-intensity interval training.[15] They followed a protocol with the following guidelines:[15]

- Month 1 and 2 - Walked or jogged 3 times per week for 25 minutes per session at 75%-85% of HR_{max}.
- Month 3 and 4 - Add one 30 minute session of maximal steady state exercise (85%-90% of HR_{max}) per month.
- Month 5 and 6 - Add two 30 minute sessions of maximal steady state exercise (85%-90% of HR_{max}) per month.
- Month 7 - Add three sessions per month of high intensity interval training. These included 8 repetitions of 30 second intervals with a target heart rate within 5 to 10 bpm of the maximal heart rate (the duration of each interval session was gradually prolonged from 30 to 45, 60 and 75 and were followed by 90 seconds of rest, subsequently adjusted as the sessions progressed to 75, 60 and 45 seconds).
- Month 8 - A 45 minutes/session of "long slow distance" was then added at the eighth month.
- Month 12 - The duration of the "long slow distance" was prolonged to 60 minutes/session by the end of the training program.

After one year of training, in this manner sedentary seniors experienced a 19% improvement in VO2Max, an average cardiac output increase of 11%, and stroke volume increase at peak exercise of 13%.[15] Not only is this type of exercise possible for our advanced-age population, but it is highly effective for improving CRF.

After screening for balance, frailty, and chronic illness preventing maximal exercise testing we can assess VO2Max to achieve a baseline CRF measurement. With the adoption of endurance and high-intensity interval training protocols using the principles outlined above, we can expect VO2Max improvements in as quick as 8 weeks. Commonly exercise protocols clinically are set on 12 week cycles with bi-weekly to monthly check-ins for compliance and safety.

When should we begin assessing VO2Max?

Improving VO2Max reduces mortality, but also improves markers of healthspan in the elderly.[16] Through proteomic pattern analysis, researchers have been able to assess functional markers of healthspan and the impact of aerobic exercise on their regulation.[16] Beyond VO2Max aerobic exercise benefited vascular endothelial function, wound healing, regulation of apoptosis, glucose-insulin and cellular stress signaling, and inflammation/immune responses.[16] This translates to improved immune responses as well as less hypertension and insulin resistance.[16]

In the longest study of VO2Max to date individuals began testing in their mid 40s and were followed for an average of 46 years.[11] They discovered that high CRF was associated with a lower prevalence of hypertension, lower body mass index, lower alcohol consumption, higher physical activity, and increased longevity.[11] The difference in life expectancy between the highest level of CRF and lowest was 5 years.[11] This result means that for every 1 ml/kg/min improvement in VO2Max there was an associated 45 day increase in longevity.[11]

It is never too late to test CRF and implement strategies to intervene. Achieving a baseline in the mid 40's is optimal, as the potential for yearly decline at that time is high and the value for supporting and increasing if necessary is immense. With precision, safety, and guidance we can enable our elderly patients to participate in the benefits of improved CRF through endurance and high-intensity interval training.

About the Author

David Duizer, ND is the co-owner of Nobile Naturopathic clinic in Vancouver, BC. His clinical focus is chronic disease management and integrative cancer care. He completed his Bachelor of Science in Chemistry and Psychology as part of the Regular Officer Training Program (ROTP) at the Royal Military College of Canada in 2008 and graduated from the Boucher Institute of Naturopathic Medicine (BINM) as a Doctor in Naturopathic Medicine in 2014. Dr. Duizer is on the Board of Directors of the Boucher Institute of Naturopathic Medicine (now CCNM).

Competing interests: Dr. Duizer ND offers VO2Max testing at his clinic using a clinical grade metabolic analyzer.

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Naturopathic Considerations in Supporting Older Adults with Cancer

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Abstract:

When supporting the older adult with cancer, it is essential to account for the unique concerns within this population beyond cancer type and stage. Common concerns in this population include numerous comorbidities, polypharmacy, nutritional status, treatment tolerance, pain management and quality of life. A comprehensive geriatric assessment is essential for elucidating salient concerns among older adults with cancer as it reduces the risk of treatment toxicities and improves treatment outcomes. Using the results of geriatric assessments, naturopathic doctors can recommend therapies to optimize quality of life and prognosis, specifically in the older adult population with cancer.

Cancer has a disproportionate impact on older Canadians. Approximately 60% of cancers are diagnosed in those 65 years of age or older, with 70% of cancer-related deaths in this age group.[1,2] In the context of this article, older adults will refer to those aged 65 years and older. Compared to their younger counterparts, cancer incidence is 11-fold higher in this group; additionally, they have a 16-fold greater age-adjusted cancer mortality rate.[3,4] Despite the high burden of cancer in older adults, there is a lack of evidence regarding the optimal treatment approach for these patients due to their under-representation in clinical trials.[3] For example, randomized trials on many chemotherapy regimens exclude those with multiple comorbid conditions, and as a result, few trials enroll older adults.[2] The lack of cancer studies including older adults is problematic as they have an increased risk of toxicity from cancer treatments combined with a shorter life expectancy. Together these factors can significantly affect the risk-benefit profile of treatment options in this population.[2,5] It therefore becomes important to determine the optimal treatment approach in older adults by completing careful assessments at the outset of cancer treatment planning.[6] In oncology, the comprehensive geriatric assessment (CGA) is the application of various validated geriatric assessment tools to evaluate the older adult's capacity to tolerate treatment and the probability that the patient will experience and recuperate from its adverse effects.[4] Such assessments also allow for the identification of patients who may have a greater likelihood of functional decline and mortality.[6] Thus, healthcare practitioners can identify vulnerable patients and implement measures to improve outcomes.[4] In this way, completing a CGA provides essential information beyond chronological age, cancer type and stage. With a better understanding of a patient's functional age, the CGA allows the conventional oncology team to recommend a treatment plan that will best meet an older adult's individual needs.[7] Naturopathic doctors supporting people with cancer can also use these results to tailor their integrative treatment approach. This article will review the unique challenges that older adults with cancer may experience, including an increased likelihood of treatment toxicities and the presence of risk factors that may lead to worse outcomes.[5] Completing a geriatric assessment to identify these challenges and subsequently inform treatment planning in this population is an important part of caring for older adults with cancer.[4] We will also discuss the evidence for some of the naturopathic treatment options to optimize our patients' quality of life and treatment outcomes.

A CGA consists of validated instruments intended to assess the degree of physical functioning, social supports available, cognitive performance, mobility and balance, mental-emotional health, malnutrition/sarcopenia and comorbidities.[8] One example of a validated assessment tool used as part of a CGA is the Mini Mental Status (MMS) to evaluate cognitive difficulties or the use of the Timed Up and Go (TUG) test to assess mobility and risk of falls.[4] A full assessment of the geriatric patient would also include an evaluation of their current medications, economic status, physical environment, and caregiver support.[9] Moreover, the CGA assesses common geriatric syndromes, including frailty, dementia, syncope, delirium, falls, dizziness and sleep disorders.[10] A geriatric assessment also reveals polypharmacy, which is a particular concern in this population, given the potential interactions between the cancer treatments and the medications used to manage their adverse effects, with existing prescriptions for other co-morbidities.[11] Polypharmacy in older adults with cancer increases the risk of adverse events in an already vulnerable population.[12]

Completing a CGA in people with cancer aged 57 to 94 led to a reduction in the intensity of the treatment regimen among 42%

of participants, more intensive intervention in 39% of patients, and supportive care alone in 19% of the study population.[8] Thus, completing a CGA can reduce treatment intensity in more vulnerable patients while avoiding under treatment in those who are fit to tolerate more intensive therapy.[8] Most importantly, the effects of performing a CGA on clinical outcomes have been demonstrated for the first time in three recent randomized clinical trials[13-15] presented at the 2020 American Society of Clinical Oncology annual meeting. These studies clearly show that the CGA not only improves quality of life and reduces high-grade chemotherapy toxicity but also significantly decreases treatment discontinuation, hospital utilization, and unplanned hospital admissions compared to usual care. Despite the benefits of completing a geriatric assessment, it is still not common practice for older patients with cancer to undergo routine CGA.[16] This is likely due to multiple factors, including lack of awareness of the recent development of practice guidelines, inadequate staffing, and insufficient financial reimbursement for completing these assessments.[16] Although naturopathic doctors in Canada are not typically engaged in conventional cancer treatment planning, we should help advocate for our older patients to undergo CGA by their oncology team. For example, naturopathic doctors can consider completing assessments that are part of the standard CGA such as the Mini Mental State or the Timed Up and Go in office and communicating the results as part of their correspondence with the patient's oncologist.

Naturopathic Interventions:

Secondary Sarcopenia/Cancer Cachexia

Sarcopenia is a gradual decline in muscular strength due to a reduction in skeletal muscle mass and quality.[17] The prevalence of sarcopenia ranges from 5-13% in people aged 60-70 years, and it can be up to 50% in those over the age of 80.[18] The severity of sarcopenia in older adults is further compounded by cancer therapies as well as the presence of cancer itself in the body. For example, hormone deprivation therapy for the treatment of prostate cancer can cause a significant reduction in muscle mass[19] and treatment with chemotherapy can also drive sarcopenia progression.[20] Sarcopenia is a hallmark feature of cancer cachexia, a metabolic syndrome arising from a cytokine-mediated loss of muscle mass, with or without a loss of fat mass.[21] In a state of cancer cachexia, pro-inflammatory and catabolic cytokines are released by the tumour and its microenvironment,[22] leading to systemic inflammation, increased protein breakdown and decreased protein synthesis. These changes, in turn, also cause clinical symptoms such as loss of appetite and reduced food intake resulting in further loss of muscle mass. Thus, while older adults are already at higher risk of experiencing sarcopenia, that risk is significantly increased in the cancer setting.[23]

Low muscle mass is associated with reduced tolerance to chemotherapy, greater chances of postoperative complications, a reduction in performance status, a decline in psychological well-being and cancer-related fatigue.[23] Most importantly, loss of muscle mass has also been associated with a decrease in overall quality of life and survival in people with cancer.[24] Therefore, it is important to carefully monitor weight loss, muscle mass and nutritional status in older patients with cancer.

Several integrative interventions may help maintain weight and muscle mass during cancer treatment, including omega-3 fatty acids, L-carnitine, and vitamin D. Eicosapentaenoic acid (EPA) is an omega-3 fatty acid derived from fish and algae sources.[25] EPA reduces TNF-alpha levels thereby mitigating inflammation-mediated damage to skeletal muscle while enhancing its insulin sensitivity and facilitating the uptake of proteins.[22] The benefits of supplementing omega-3 fats during cancer treatment have been demonstrated in several studies of people with lung cancer, a condition commonly associated with cachexia. For example, in patients receiving chemo-radiotherapy, the concurrent administration of 1 g per day of EPA resulted in significantly better weight maintenance.[26] Another study found that supplementing with 2.02 g EPA and 0.92 g DHA, another marine sourced omega-3 fatty acid, significantly improved quality of life and physical and cognitive function.[27] Yet another trial demonstrated that a greater proportion of those who supplemented EPA at 2.2 g per day alongside their chemotherapy regimen maintained or gained weight compared to those in the standard of care group who lost an average of 2.3 kg.[28] Additionally, omega-3 fat intake may also improve response to cancer treatment. Supplementation with 2.5 g of combined EPA and DHA per day resulted in a better response rate and clinical benefit in patients with lung cancer receiving palliative chemotherapy.[29] Similarly, supplementation of 0.6 g of combined EPA and DHA in people with colorectal cancer receiving chemotherapy increased time to tumour progression.[30]

L-carnitine deficiency has been described in older adults and is characterized by fatigue, muscle wasting, and geriatric frailty.[31] Low levels of L-carnitine contribute to cachexia in older adults with cancer[32] by upregulating inflammatory pathways that mediate the loss of lean body mass.[33, 34] People with pancreatic cancer who supplemented with 4 g per day of L-carnitine along with gemcitabine chemotherapy displayed a significant increase in their BMI compared to a reduction in the control group receiving gemcitabine therapy alone.[33] The group receiving L-carnitine also showed a trend towards increased survival, although this was not statistically significant.[33]

Vitamin D is another nutrient that may help mediate inflammatory processes that expedite the muscle wasting observed in cancer cachexia. A study including people with colorectal adenomas found that the supplementation of 800 IU of Vitamin D per day for six months resulted in a significant reduction in inflammation as measured by CRP, TNF-α, IL-6, IL-8, and IL-1β levels.[35] By alleviating inflammation, vitamin D sufficiency has been shown to enhance survival across various cancer types due to its protective effects on skeletal muscle mass.[35,36] Moreover, vitamin D may also help mitigate the adverse effects of some cancer treatments such as endocrine therapy. For example, people with breast cancer who had vitamin D levels <100 nmol/L experienced increased aromatase inhibitor-associated arthralgias.[37] Joint pain improved in those who

reached serum levels of vitamin D of at least 100 nmol/L.[38] Lower vitamin D status at baseline may also be predictive of a greater risk of developing post-radiation esophagitis and emesis[39] as well as the severe colitis associated with immunotherapy.[40]

In addition to implementing therapeutic strategies to protect muscle mass, it is also important to address barriers to adequate caloric consumption. Many antineoplastic therapies result in side effects that adversely affect appetite and digestion, resulting in decreased energy intake. Compared to their younger counterparts, older adults who present with frailty are more likely to experience complications from various cancer therapies[41] that can affect nutritional intake such as nausea and vomiting, oral mucositis, taste changes and dry mouth. The following sections will describe naturopathic interventions that can be beneficial in alleviating these side effects.

Nausea/Vomiting

It is estimated that approximately one-half of people with cancer will experience nausea and vomiting either due to treatment, as a side effect of the cancer itself, or other reasons including anxiety or pain.[42] Despite progress in the development of antiemetic drugs, up to 60% of patients experience chemotherapy-induced nausea and vomiting (CINV).[43,44] If left untreated, CINV causes physical discomfort, dehydration, fatigue, and adversely affects quality of life.[45, 46] In more severe CINV cases, the chemotherapy regimen may require dose reduction or delay, compromising patient outcomes.[47,48] In a meta-analysis of ten randomized controlled trials, ginger was effective in controlling chemotherapy-induced nausea and vomiting, particularly acute vomiting with the dose ranging from 0.5 to 2.0 g per day.[49] Thus, ginger may be a beneficial adjunctive therapy among older adults undergoing conventional anti-cancer treatment.

Oral Mucositis

Older adults also experience an increased sensitivity to oral toxicity of cancer treatments.[50] Oral mucositis can be a side effect of chemotherapy drugs interfering with DNA synthesis, such as fluorouracil.[51] Mucositis is especially common when a cytotoxic agent such as cisplatin is combined with radiation therapy directed to the head and neck area.[52] Chemotherapy and radiation therapy both negatively affect normal cell turnover of the mucosal epithelium, leading to the damage of these tissues.[53] Oral mucositis can be quite painful, and it may reduce patients' tolerability of conventional treatments, leading to a reduction in oral intake, malnutrition, and dehydration.[53] L-glutamine is a natural agent that can be helpful in the prevention and management of oral mucositis. It is the primary fuel source for cells that line the digestive tract, thereby maintaining healthy oral mucosa.[54] A systematic review on oral L-glutamine for the prevention of chemo- and/or radiation therapy-induced mucositis demonstrated a reduction in the severity and duration of mucositis with L-glutamine supplementation.[55] L-glutamine supplementation was also shown to be effective at preventing weight loss.[55]

Taste Alterations

In addition to oral mucositis, taste alterations due to cancer treatment may also impact nutritional intake. Up to 70% of people with cancer experience taste alterations while undergoing chemotherapy.[56] Taste changes can significantly affect quality of life, leading to malnutrition, fatigue and potentially decreased survival.[57] Zinc plays a key role in taste perception, and there is evidence that depletion of this micronutrient may be linked to taste changes among cancer patients.[58] Moreover, some chemotherapy drugs bind and chelate zinc, leading to deficiency and consequent taste alteration.[59] Radiation therapy may also affect taste perception, which is a frequent side effect amongst people with head and neck cancer.[60] While some people may recover their normal sense of taste six months to one year following treatment completion, others may experience permanent taste impairment.[60] These changes in taste perception due to treatment may be especially detrimental in the older cancer patient population, who may already experience age-related changes in taste and smell as part of the normal ageing process.[61] Zinc supplementation (50 mg, three times daily) throughout radiation therapy and for one month following treatment completion among people with head and neck cancer has been found to prevent changes in taste perception.[62] Another trial investigating the effects of zinc L-carnosine among people with head and neck cancer receiving chemoradiotherapy found significantly reduced rates of taste disturbance, mucositis, pain, xerostomia and pain as compared to control. Caloric intake was significantly higher, and analgesic use was significantly lower in those receiving zinc L-carnosine.[63] Thus, zinc should be considered as part of a supportive care plan to help mitigate taste disturbances among older adults with cancer.

Xerostomia

Xerostomia, or dry mouth, is another distressing side effect of radiotherapy.[64] Approximately 70% of patients receiving radiotherapy to the head and neck develop hyposalivation, increasing the risk of oral infections and causing difficulties chewing and swallowing.[65] Xerostomia may last anywhere between six months to several years following the completion of radiation therapy.[66] Acupuncture may be an effective integrative strategy to prevent and treat xerostomia in patients with head and neck cancer. A systematic review of four clinical trials concluded that acupuncture was associated with objective improvement in salivary flow rates in addition to significantly improved scores for dry mouth.[67] An additional study found that acupuncture significantly reduced patient reports of sticky saliva, needing to sip fluids to swallow food and night awakenings to drink fluids.[68] General recommendations for managing xerostomia include sipping water throughout the day, chewing sugar-free gum, and using a humidifier to keep room air moist. Avoiding caffeine and alcohol-based mouthwashes in addition to chewing sugar-free gum and taking frequent sips of water also alleviates discomfort and helps maintain quality of life.[69]

Pain Management and Quality of Life

It is important to ensure that older people with cancer receive appropriate recommendations for pain management. A meta-analysis of over 100 studies found a 55% prevalence of pain during cancer treatment and a 66% prevalence in the setting of advanced,

metastatic, or terminal disease.[70] There are several unique challenges in terms of pain management among older people with cancer. Most older adults believe that pain is to be expected as part of the ageing process and thus may not communicate openly with their healthcare providers.[71] Moreover, cognitive impairment can also influence the assessment and management of pain in the older adult patient population.[72] To better understand the patient's pain experience, a caring and trusting therapeutic relationship between healthcare providers and older patients is essential.

Naturopathic doctors can also offer cancer-related pain management support through physical modalities such as acupuncture and massage therapy. Acupuncture has been shown to alleviate pain by enhancing the binding of Mu-opioid receptors in several pain and sensory processing areas of the brain.[73] In one study, those who received acupuncture treatments concurrently with their regular pain medication reported reduced discomfort compared to those who were only given analgesics.[74] A meta-analysis found that acupuncture may help alleviate cancer-related pain in the palliative care setting.[75] Additionally, a systematic review concluded that massage therapy is also beneficial in alleviating pain in addition to nausea, anxiety, stress and fatigue among palliative care patients.[76]

Mistletoe, a semi-parasitic plant, is another important therapy for managing pain and enhancing quality of life among older adults with cancer. Mistletoe is widely used as an integrative cancer therapy in Europe, especially Germany.[77] One trial assessed 95 breast cancer patients undergoing chemotherapy who were given subcutaneous mistletoe injections three times per week compared to those who received chemotherapy alone.[78] Those receiving mistletoe injections experienced a significant improvement in their pain, nausea, vomiting, insomnia and loss of appetite.[78] In another randomized trial of 220 patients with advanced pancreatic cancer receiving best supportive care, the addition of subcutaneous mistletoe therapy led to significant improvements in pain, fatigue, physical function, insomnia, and nausea and vomiting.[79] Its primary mechanism of action is thought to be through enhancement of the body's natural immunological defences against tumour cells.[80] Additionally, mistletoe extracts have anti-inflammatory effects accounting for their beneficial effects on cancer-related pain and fatigue.[81,82] Given the importance of maintaining quality of life[83], mistletoe therapy becomes another important consideration among older adults with cancer.

With the total number of older adults with cancer expected to reach two billion[84] by 2050, cancer is an ever-increasing health concern within the ageing population. Given the unique health challenges within this age group, healthcare providers must take a thorough and individualized approach in supporting older adults with cancer. The CGA is a useful tool to help identify the unique aspects of care that must be considered when working with older adults with cancer. [8, 13-15] Naturopathic doctors can also use information derived from a CGA to intervene with therapies that can positively impact quality of life and prognosis. For example, nutritional supplements such as omega-3 fatty acids, L-carnitine, and vitamin D may all help improve body composition, quality of life and prognosis during treatment.[26-38, 40] L-glutamine, zinc and acupuncture may help to mitigate side effects of chemotherapy that compromise caloric intake and nutritional status.[54, 55, 62, 67, 68] Acupuncture, massage, and mistletoe therapy can be used to improve cancer pain and quality of life. [74-76, 78, 79] Given the complex nature of managing older adults with cancer, naturopathic doctors play a vital role in the holistic treatment of this population to ensure optimal outcomes.

Condition/side effect	Intervention	Dose range	Reference
Secondary sarcopenia/ cachexia	Omega-3 fatty acids	2.02g-2.2g EPA and 0.92g DHA	27, 28
	L-carnitine	4g/day	33
Nausea/vomiting	Ginger	0.5-2.0g/day	49
Oral mucositis	L-glutamine	10g three times daily	55
Taste alterations	Zinc sulfate	50mg three times daily	62
	Zinc L-carnosine	Oral rinse for 3 minutes, 4 times daily	63
Xerostomia	Acupuncture	Common points include LI2, LI4, LI20, ST6, ST36, SP6, LU7, KD6, CV24, GV20, and auricular points salivary gland 2, point zero, and Shen Men	67, 68
Pain management/ quality of life	Mistletoe	Type and dosing schedule specific to the cancer type, stage, and treatment, as well as the patient's performance status	78, 79

About the Authors

Sukriti Bhardwaj, ND practices as a resident naturopathic doctor at the Integrative Cancer Centre within the Canadian College of Naturopathic Medicine. After various research experiences during her undergraduate degree focused on topics in naturopathic medicine and oncology, she developed a strong interest in both fields, which inspired her to pursue residency training in naturopathic cancer care. In her clinical practice as a resident, she focuses on supporting people with cancer while engaging in research activities to contribute to literature in the field of integrative oncology.

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Self-Reported Disability Competency in Naturopathic Medical Students

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Abstract:

Healthcare providers often feel unprepared to work with patients with disabilities. There have been no assessments or tools developed to evaluate whether naturopathic medical (ND) students also feel adequately prepared to work with patients with disabilities. We created a survey to assess student comfort levels, competency, and training needs. Surveys were completed by 218 ND students. Cronbach's alpha for all composite scores were >0.90, suggesting that the surveys have internal consistency. Student comfort working with patients with disabilities significantly increased by program year ($p=0.02$). Competency scores increased by program year, but this increase was not significant ($p=0.17$). Over 70% of students indicated that they would like more training on this topic. We were able to assess ND student self-reported comfort, competency, and desire for training with regard to treatment of patients with disabilities. Additional work should be performed to improve disability education for ND students.

A significant proportion of people with disabilities use complementary and alternative medicine (CAM).[1,2,3] Use is higher among most types of CAM categories, including alternative medical systems (e.g., naturopathy).[4] Currently, no studies have assessed how prepared CAM practitioners feel to work with people with disabilities.

People with disabilities face many healthcare barriers. Several barriers exist even within the patient-provider relationship because providers feel uncomfortable or unprepared to work with patients with disabilities.[5,6] These factors may contribute to negative attitudes towards patients with disabilities among healthcare providers, but including curriculum on disabilities early in conventional medical students' education can improve those attitudes and comfort levels.[7,8]

Development of an instrument to measure healthcare student competencies and comfort levels towards patients with disabilities is an important first step in determining educational priorities and in measuring the effectiveness of educational interventions. Of the existing instruments, few target healthcare students, and most only focus on attitudes or on one area of disability (i.e., physical disability, but not other disabilities).[9,10]

In this study we aimed to assess self-reported competencies and comfort of naturopathic medical students when working with patients with disabilities using a novel survey instrument.

Methods

Participants

Participants were recruited from the National University of Natural Medicine in Portland, Oregon. Students had to be currently enrolled in the naturopathic medicine doctorate (ND) program at the time of the survey. ND students attend a four-year to five-year graduate program that includes courses in basic sciences, pharmacology, nutrition, botanical medicine, and other natural therapies, including two years of direct patient care. Students participate in clinical rotations through different clinics, which include primary care clinics and low-income community based clinics. Students train to cover broad aspects of primary care, such as taking a patient history, performing physical exams, providing women's health services, and implementing treatment plans.

Students were emailed through the student listservs during the winter term. The email contained a brief invitation to participate in a 10-minute survey about disability and healthcare, as well as a link to the survey. Students were incentivized with an option to enter a draw for $50 gift cards. Weekly reminder emails were sent for three weeks. The survey was closed one week after the final reminder.

Data was collected anonymously. Study procedures were approved by the National University of Natural Medicine Institutional Review Board.

Survey Development

The survey was developed to include three subscales: comfort, competency, and desire for training. Fourteen individuals with backgrounds as NDs, MDs, CAM providers, allied healthcare providers, disability researchers, and disability advocates provided input for the content of the surveys based on their experiences. The surveys were written so that they may be applicable to other healthcare providers (e.g., MD, DO, NPs), although only ND students were included in this study.

The comfort scale addressed student's comfort working with patients with disabilities. While other surveys have been used to assess comfort, this survey was created to include more details about different disability types: (1) no disability, (2) physical disability, (3) sensory disability, and (4) intellectual and developmental disabilities (IDD); and four different aspects of the clinical encounter: (1) taking a medical history, (2) performing a physical exam, (3) performing a gynecological exam, and (4) delivering a treatment plan. Students responded for each statement on a 6-point Likert scale from "strongly disagree" to "strongly agree." For example, "For patients with physical disabilities, I feel comfortable performing a physical exam." Likert-scale responses were scored from 1-6 (strongly disagree=1). Each subscale had a possible total of 24. Total comfort for working with patients with disabilities added the three disability subscales for a possible score of 72.

The competency scale included nine competencies. Students used a 6-point Likert scale to rate each competency in response to the statement, "I have achieved this competency." The nine competencies were adapted from a combination of two sources: a comprehensive list of competencies for medical students determined by the American Academy of Developmental Medicine and Dentistry (AADMD) and those proposed by Kirchner and Curry in response to the Surgeon General's *Call to Action to Improve the Health and Wellness of Persons with Disabilities*.[11,12] The competencies were adapted for this study to simplify the competencies proposed by the AADMD, in order to make them tenable for a brief voluntary survey. The resulting survey still addresses two content areas from the AADMD that are not included among those proposed by Kirchner and Curry, but were deemed important in the current context. The final competencies we included were: (1) provide patient-centered care to address health concerns, preventative care, sexual and reproductive health, and health promotion for patients with disabilities; (2) understand disabilities in the context of human diversity, illness, the life span, and social constructs; (3) describe and assess different types of disabilities and their impact on health; this includes assessing common comorbidities, associated conditions, and healthcare disparities experienced by people with disabilities; (4) follow general principles and etiquette for interacting with persons with disabilities; (5) identify the roles involved in interdisciplinary care teams and the roles of the patient's support system; (6) identify resources for medical and lay persons on disability healthcare topics, including: medical recommendations, reimbursable series and supports, obtaining durable medical equipment, etc; (7) communicate effectively with patients, their family and support network, and other healthcare providers; and be able to use alternative communication methods when necessary; (8) understand the legal requirements of the Americans with Disabilities Act in healthcare; (9) assess patients for decision making capacity. Likert-scale responses were scored from 1-6 (strongly disagree=1). The highest possible score is 54, indicating more self-rated competency achievement.

The desire for training scale asked students to use a 6-point Likert scale to rate each of the same nine competencies in response to the statement, "I would like more training in this competency." Likert-scale responses were scored from 1-6 (strongly disagree=1). The highest possible score on the scale is 54, indicating desire for more training.

Other Variables

Participants were asked about previous disability experience. Participants were considered to have previous disability experience if they answered "yes" to one or more of the following questions: "Do you personally have a disability", "Are you close to someone with a disability, such as a family member or friend," "Have you ever had any previous work or volunteer experience with people with disabilities?"

Procedures

Study data was collected and managed using REDCap electronic data capture tools hosted at Oregon Health and Science University.[13,14] REDCap (Research Electronic Data Capture) is a secure, web-based software platform designed to support data capture for research studies.

Statistical Analysis

Internal validity was measured using Cronbach's alpha. Alpha scores over 0.70 were considered to indicate internal consistency. Linear correlations between scales were measured by Pearson correlations. A 3-way ANOVA was performed on each scale to determine mean differences and interactions between gender identity, program year, and previous disability experience. T-tests and independent and mixed ANOVAs were used to compare means across program years, gender identities, and questionnaire domains. Significance of all analyses was set at $p<.05$.

Results

Surveys were sent to 443 students; 218 completed the surveys for a response rate of 49.2 percent. Participant characteristics are described in Table 1. Seventy-four percent of survey respondents were female-identified, which reflects the gender identity enrollment ratio (74% female-identified, 24% male-identified, 2% other).

Survey Analysis

Cronbach's alphas were determined for all scales to determine internal consistency (Table 2). Correlations between the scales showed that the competency and comfort scales were significantly correlated ($r = 0.515$, $p<.01$) as well as the competency and desire for training scales ($r = -0.238$, $p<.01$).

Comfort Scale

Students in all program years were less comfortable working with patients with disabilities overall compared to patients without disabilities ($p<.001$ for comparisons in each year). Students were more comfortable working with patients with physical or sensory disabilities than those with intellectual and developmental disabilities (IDDs) (Table 3; $p<.001$ for all students; $p<.001$ for each individual year).

The average disability score significantly increased between years ($p<.001$ for linear trend in year). Comfort increased for all patient types between years (Table 3). Compared to year 1, year 4 students scored 6.2 points higher for patients without disabilities ($p<.001$), but only 3.9 points for the average disability ($p<.001$): 4 points for physical disabilities ($p<.001$), 4.5 points for sensory disabilities ($p<.001$), and 3.3 points for IDDs ($p=0.001$). Looking at year 1 and 4 when comparing the Physical, Sensory, and IDD domains, only the increases for Sensory and IDD disabilities were statistically significant ($p=.02$).

There were significant gender identity differences with regard to working with patients with disabilities, with male-identified students reporting a higher comfort ($p=.04$ by independent t-test). The 3-way ANOVA showed a significant interaction between gender identity and program year ($p=.002$). Further evaluation indicated that female-identified students had higher increases in their reported comfort level working with patients with disabilities relative to male students, who reported a higher initial comfort level which did not change markedly between years ($p=.002$ for year*gender identity interaction). For total comfort scores and average disability scores, the rate of increase per year in female-identified students is significantly higher ($b=2.07$; $p=.001$ and $b=2.60$; $p<.001$).

There were no significant differences on self-reported comfort in working with patients with and without disabilities between students with and without previous disability experience ($p=.09$).

Competency Scale

Average competency scores are listed in Table 4. There was a significant effect of year on total competency scores ($p<.001$ by one-way ANOVA), with a significantly positive trend towards greater scores in later years in the program ($b=2.81$; $p<.001$). Table 5 lists the percent of students reporting that they agreed or strongly agreed that they had achieved the listed competency. No competency in any year had more than 50% of students agree that they had achieved that competency.

There were significant differences in reported overall competency achievement based on prior disability experience ($p=.02$), where students with more disability experience had more self-reported competency. There were no significant differences in self-reported competency achievement based on gender identity ($p=.07$).

Desire for More Training Scale

Over 70% of all students in each year agreed or strongly agreed they would like more training in each competency. Total score for desire for more training was not affected by the student's year of study ($p=.13$), gender identity ($p=.10$), or previous disability experience ($p=.63$).

Discussion

To our knowledge, this is the first study to evaluate disability education for CAM healthcare students, specifically ND students. Overall, students were less comfortable working with patients with disabilities, especially patients with IDD. The difference between comfort level of working with patients with disabilities and without disabilities grew wider between each class year. This indicates that students gain more comfort working with patients as they move through the program, but there were smaller gains for patients with disabilities compared to patients without disabilities.

Achievements in disability related healthcare competencies were assessed. There were no significant differences based on program year of students self-reported competency; i.e., student self-reported competency did not improve significantly by the end of the program. While there were no objective measures of competency assessed in this study, it is still concerning that students themselves do not feel that they have attained competency in these areas. In this study, previous experience with disabilities was the strongest predictor of achieving higher competencies during training, suggesting that students mostly rely on their own life experiences with disabilities and may not be receiving significant instruction on disability topics to increase their disability competency. The majority of students would like increased training in working with patients with disabilities, which is consistent with similar research in other types of medical students.[15]

Gender Biases

Previous studies of medical student attitudes towards patients with disabilities show that male-identified medical students have more negative attitudes toward disability than female-identified students.[16] In this study, the only scale that was significantly influenced by gender identity was the comfort scale. Male-identified students reported higher comfort level than female-identified students. Moreover, comfort levels were similar across training years for male-identified students, whereas they increased with training for female-identified students. There are a couple possible reasons for this difference. As men may be more likely to report higher confidence, it is possible that self-reported comfort levels may have a ceiling

effect for male-identified students.[17,18] Female-identified students may more accurately report their lack of comfort, allowing us to see gains with increased experience. However, the gender identity difference seen in comfort level needs to be interpreted with caution given the small sample size of male-identified students. Each year in the program only had 9-14 male-identified students reporting.

Survey Assessment

We assessed the content and internal validity of this new survey. Fourteen medical professionals (MDs, NDs, PT, & OT), disability researchers, and disability advocates evaluated the survey for content. The three scales achieved high internal consistency, with Cronbach's alpha scores all being greater than 0.9. In addition, the comfort and competency scales showed increased scores with each year in the program, indicating sensitivity to increasing experience. The competency achievement scale and desire for more training scale were significantly inversely correlated. Because students gain more competencies during their program, it was expected that their desire for more training would decrease.

Limitations

There are several limitations to this study. All values are self-reported; we did not include any objective measures of competency. This is a survey study and is subject to many biases associated with surveys, such as recruitment bias. The survey invitation did mention disability and health care topics, so this may bias students that are interested in disabilities to take the survey. These students may be more likely to indicate frustrations about lack of disability education, but may also be more likely to feel adequately prepared to work with patients with disabilities. This was a cross-sectional study, so students were not followed prospectively to measure individual changes in comfort and competency ratings. This is also a single site study and may not be representative of other institutions. We used novel surveys in this study, which have not been fully validated, but we were able to show that they had high internal consistency.

Future Directions

Students were interested in more education on disabilities. There are several possible ways to improve disability education such as increasing the number of educational objectives throughout the program that address care for people with disabilities; including standardized patients who have disabilities; and include people with disabilities in the design of educational objectives.

Conclusion

We used three novel scales to assess ND students' comfort, competency, and training needs for working with patients with disabilities. ND students would like more training regarding patients with disabilities and further curriculum evaluation on this topic is warranted.

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TABLE 1: Participant characteristics (n=218)

Characteristics	n (%)
ND Program year	
1	45 (20.6)
2	48 (22.0)
3	47 (21.6)
4+	78 (35.8)
Gender	
Male	46 (21.1)
Female	162 (74.3)
Other	7 (3.2)
No answer	3 (1.4)
Previous degrees received	
DO	1
MD	3
MS	10
PhD	1
RN	1
Previous disability experience	
Personal disability	13 (6)
Family or friend with disability	92 (42.2)
Volunteer or work experience with disability	146 (67.3)
Have had clinic shifts with patients with disabilities	
Yes	72
No	108
Have not had any clinic shift yet	38

TABLE 2: Internal reliability for each scale and subscale

Scale	Cronbach's alpha
Comfort*	0.96
No disabilities	0.91
Physical disability	0.88
Sensory disability	0.91
Intellectual and Developmental disability	0.92
Competency	.93
Training	.95

* Total comfort is the summary score for physical disability, sensory disability and IDD – does not include patients without disabilities

TABLE 3: Average Comfort scores by program year and overall

Program Year	*No Disability*	*Disability* Average*	*Disability Subscales*		
			Physical	Sensory	IDD
1	14.8	13.1***	13.7	13.2#	12.2###,^^
2	16.9	14.8***	15.6	15.0#	13.8###,^^
3	19.2	16.2***	17.2	16.9	14.6###,^^^
4+	21.0	17.0***	17.7	17.7	15.5###,^^^
Overall	18.4	15.5***	16.3	16.0#	14.2###,^^^

*Average of the three disability subscales.
Significant differences from No Disability (* p<.05; ** p<.01; *** p<.001)
Significant differences from Physical (# p<.05; ## p<.01; ### p<.001)
Significant differences from Sensory (^ p<.05; ^ ^ p<.01; ^ ^ ^ p<.001)

TABLE 4: Average Competency Scores by Program Year

Program Year	*Average*	*SD*
1	23.6	9.0
2	26.2	9.7
3	28.1	9.2
4+	32.1	8.1

Scores increase with increasing years (b=2.81, p<.001)

TABLE 5: Percent of ND students self-reporting that they agree/strongly agree that they have met the following competencies

Competency	ND1 (%)	ND2 (%)	ND3 (%)	ND4+ (%)
1. Provide patient-centered care to address health concerns, preventative care, sexual and reproductive health, and health promotion for people with disabilities.	2.2	10.4	12.8	20.5
2. Understand disability in the context of human diversity, illness, the lifespan, and social constructs.	24.4	31.3	14.9	37.2
3. Describe and assess different types of disabilities and their impact on health. This includes assessing common comorbidities, associated conditions, and healthcare disparities experienced by people with disabilities.	11.1	4.2	8.5	23.1
4. Follow general principles and etiquette for interacting with people with disabilities.	35.6	29.8	21.3	50.0
5. Identify the roles involved in interdisciplinary care teams and the roles of the patient's support system.	13.3	20.8	17.0	24.4
6. Identify resources for medical and lay persons on disability healthcare topics, including: medial recommendations, reimbursable services and supports, obtaining durable medical equipment, etc.	2.2	2.1	6.4	10.3
7. Communicate effectively with patients, their family and support network, and other healthcare providers; and be able to use alternative communication methods when necessary.	17.8	12.5	17.0	28.2
8. Understand the legal requirements of the Americans with Disabilities Act in healthcare.	2.2	2.1	10.6	9.0
9. Assess patients for decision-making capacity.	4.4	6.3	10.6	12.8

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Update: BINM-CCNM Merger

Bob Bernhardt, PhD

On November 17, 2020 the Canadian College of Naturopathic Medicine (CCNM) and the Boucher Institute of Naturopathic Medicine (BINM), both private, not-for-profit institutions, announced their intention to merge. The amalgamated institution will be known as the Canadian College of Naturopathic Medicine (CCNM). The two institutions have been actively working on this since June, and the merger enshrines a vision that many leaders of the profession have held for years.

I think the Boards of both colleges have shown strong vision in the creation of a new entity that is much stronger than either of the institutions on their own. The important legacy of the Boucher Institute of Naturopathic Medicine will be maintained by a vital Vancouver CCNM-Boucher campus. CCNM has the owned campus in Toronto, and the goal is for BINM to once again have an owned campus in the greater Vancouver area. For the future, the Boards envision the possibility of physical campuses in additional locations across Canada, with much greater access for naturopathic medical training for Canadians across the country.

I want to be very clear, this is an amalgamation, not a take over. The two institutions are joining together as partners who are each deservedly proud of what their naturopathic programs provide. Although the plan is that I will be the president of the amalgamated entity, the new Board will be populated by members from both of the current college boards. Faculty will jointly work on identifying the best approach to educating the students. Staff will be comparing the many systems we depend upon to see which ones would best serve the new organization.

What the amalgamation will create is many more opportunities for sharing resources and collaborating. Students will be able to expect broader access to on-line medical resources. Faculty will be able to consult with their colleagues at the other campus to share ideas about the best approach for their particular subject areas. New opportunities will arise in research.

As many CAND members will be aware, CCNM has been a world leader in naturopathic research for years. The college has chosen to support the research department over and above the grants received by more than a quarter of million dollars per year. The Canada Post studies have been referenced in licencing initiatives across North America. The intention is to engage BINM students and faculty in this pursuit of research, and to significantly expand the research undertaken.

Even among those who are overall supportive of this merger, I have heard expressions of concern about losing the items that are cherished at each institution. Both institutions have developed strong cultures, based on the naturopathic principles, but expressed in different ways. My commitment is to respect these cultural differences as we grow a proud pan-Canadian culture that serves to steward the values and legacy that each college holds dear. The amalgamated institution will be committed to the preservation of the traditional roots of the profession alongside the integration of the latest findings in research in naturopathic medicine. This joining together will benefit our students and enhance the profession in North America and abroad.

Students will not experience any immediate change in their programs or the costs associated with the program. We will work to develop greater commonality between the first two years of the program to provide better opportunities for students to transfer between campuses. Currently students who transfer face another year, or more, of studies.

I am not so naïve as to believe that there will not be challenges as we work through this amalgamation. However, I have been overwhelmed by the goodwill and incredible commitment to naturopathic education and research on each campus.

The institutions are both accredited by the Council on Naturopathic

Medical Education (CNME), the professional accrediting agency for naturopathic medicine programs, recognized by the US Department of Education and by all Canadian and American provincial and state naturopathic licensing bodies. CCNM will continue to grant the Doctor of Naturopathy degree, and Boucher will continue to grant the Doctor of Naturopathic Medicine diploma. BINM has initiated a degree granting application and the amalgamated college will pursue that application with vigour.

In the future, as members of the profession look back at the creation of this pan-Canadian institution dedicated to education and research in naturopathic medicine, I believe they will view it as an inflection point marking the much greater acceptance and utilization of naturopathic medicine across the country, and beyond.

About the Author

Bob Bernhardt, B.Sc., M.Ed., LLM, PhD, has served as president of CCNM since 2004. His broad academic background spans science, information systems, administrative law and higher education. He is vice-chair of the Board of Learning for a Sustainable Future, a charity promoting sustainability through improved education. At CCNM, he is accountable for ensuring the College delivers high-quality naturopathic medical education and clinical care, advances ground-breaking research, and advances the acceptance of naturopathic medicine.

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