A year of big changes at CANDJ

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The year 2025 will be an exciting one for the *CAND Journal*. We have updated the tech platforms in our virtual head office(s) and have been working with our publishing team at SG on a comprehensive journal guideline review and update, which will be completed later this spring. We will also be creating a journal fact sheet—a concise version of what we do—for people who might be new to the idea of a naturopathic professional journal, or who are curious about submitting but would like an overview of how things work. We are also working on developing policies around the use of artificial intelligence (AI) programs such as ChatGPT to generate content, an issue which is proving to be an ethical challenge across the spectrum of medical publishing (all publishing, in fact), not just for us.[1]

We also have two big project announcements for this year: first is that *CANDJ* will be moving from subscription-based to open access format to coincide with our Cancer Care Special Edition in June. We are doing this now, as we believe we are at a point in our evolution where the quality of the work at the *CAND Journal* really speaks for itself; we have a growing global audience, and we are now looking to create impact and readership within the larger healthcare community, as well as among healthcare stakeholders and the general public. After close to 4 years on our digital platform, we have a strong editorial and production team, including a growing body of subject matter experts providing vigorous peer review for all research submissions. We stand by the quality of our content and believe it's a great time to let everyone else know about it as well. There will be further updates on what open access at the *CAND Journal* means for readers, contributors, and the profession as a whole as we get closer to our launch date in June.

Our second major project is our long-awaited application to PubMed Central (PMC). This has been years in the planning stages, but the editorial and publication teams feel we are now ready to make our application to this highly competitive database of the US National Institutes of Health's National Library of Medicine (NIH/NLM). Currently, we are already indexed on CrossRef and EBSCO*host*. However, being on PubMed would open up our content to larger audiences in a way that we could not possibly manage, even with the most effective search engine optimization (SEO), and would give our research the possibility of being read and cited well beyond our core readership. It would also demonstrate the quality and credibility of the *CAND Journal* and the content we publish and increase the impact of the work our researchers and clinicians do to support this publication for the CAND.

Applying to PubMed is a multi-step process that involves an initial application screening, scientific quality review, and technical evaluation, and can take 6 to 12 months to complete. We plan to start after we finish our guideline updates and open access transition (May/June 2025), and we will keep our readers updated as we progress.

This edition's offerings lead off with two commentaries, one from the Ontario Association of Naturopathic Doctors' (OAND) Government Relations Director, Kevin Draper, who discusses some of the progress and challenges over the past year as they seek to expand naturopathic scope on prescriptions and diagnostic tests. As Ontario is the largest of our regulated provinces, progress here will hopefully translate into breakthroughs in other provinces, but as he points out, advocating for NDs among decision-makers within the various health ministries, as well as the provincial regulators, requires strong communication skills, as well as the development of relationships with political stakeholders and allied professional associations. Sometimes there are clear breakthroughs, but often these come at the culmination of many years of hard work by Association volunteers and staff. At the same time, working with regulators is subject to the same ebb and flow as advocacy and bi-directional communication.

Our second commentary is a first-person narrative by Dass on her experience as a BIPOC (Black, Indigenous and people of colour) ND and a member of the Naturopathic Doctors' Dismantling Racism group. As one of an emerging generation of voices in the profession, she challenges colleagues to consider that a lack of diversity in ND graduates from our training programs in Canada can lead to BIPOC colleagues feeling "othered" in our professional spaces. She goes on to discuss what we can and should

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do—in leadership and the profession at large—to make everyone feel included.

As a preview of our Cancer Care Special Edition coming later this spring, we have a submission from Rizzolo et al. that discusses the results of a recent survey of practicing North American NDs to determine the extent of cancer care provided by NDs, as well as identify knowledge gaps that can be addressed with professional clinical resources. There is currently a move in the profession towards creating more independent professional development; at the *CAND Journal* we see published surveys like this as a crucial step in identifying where to direct appropriate clinical resource development, away from an over-reliance on events directly developed by industry.

We also have two case reports for this edition, one from a British Columbia–based team on regenerative injection therapy (prolotherapy and platelet-rich plasma [PRP]) for chronic severe low back pain, and a second on a constitutional homeopathy treatment of rumination syndrome in a 6-year-old. While homeopathy has been a part of classical naturopathy for many years, the use of prolotherapy and PRP is relatively recent and is currently limited to NDs practicing in British Columbia, partially due to Health Canada defining plasma as a scheduled substance (drug) in 2019. Those colleagues who use this therapy often report positive outcomes; however, to date, there are few published trials in the rehabilitation literature, particularly on PRP. We hope this case report will encourage these colleagues to generate more reports and eventually safety and efficacy trials on these therapies to fill the gaps.

While we are working on these important changes to the *CAND Journal* website, guidelines, and platform, we hope you enjoy this edition and, as always, encourage feedback and letters to my new email address at editor@cand.ca.

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CONFLICTS OF INTEREST DISCLOSURE

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Advancing Supportive Cancer Care: A Survey of Naturopathic Doctors to Identify Practice Patterns, Knowledge Gaps and Resource Needs

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ABSTRACT

Background: Clinical guidance for naturopathic doctors (NDs) in supportive cancer care is limited, highlighting a potential need for resource development.

Objectives: Describe naturopathic practice, identify oncology-related knowledge gaps, and determine preferred clinical resources.

Methods: A 40-item online survey was distributed to NDs through naturopathic associations, social media, and informal networking. Questions varied based on whether respondents provided cancer care ("cancer stream") or not ("general stream"). The survey ran from September 2023 to March 2024. Data analysis included frequency distributions and descriptive statistics.

Results: Among 149 eligible responses, 62% practiced in Canada, 36% in the United States, and 2% elsewhere. The cancer stream (n = 99) primarily worked in community settings, offered hybrid care, and did not exclusively treat cancer patients. The largest knowledge gaps were related to intravenous (IV) green tea extract and curcumin, photodynamic and ozone therapy, managing tinnitus, and interactions between naturopathic interventions and stem cell transplants and photodynamic therapy. Time constraints were the main barrier to addressing knowledge gaps. The smallest gaps were reported for exercise counselling, the Mediterranean diet, IV vitamin C, vitamin/mineral infusions, and managing constipation, anxiety, diarrhea, fatigue, hot flashes, and depression. In total, 97% supported the development of clinical resources, with no format preference. In the general stream, 58% indicated that additional training would increase their likelihood of offering cancer care.

Conclusion: This survey highlights oncology-related knowledge gaps, which were generally highest for less commonly used and studied therapies, and strong clinician support for resource development. Varied resource formats may accommodate different learning styles and improve dissemination.

Key Words Supportive cancer care, naturopathic research, clinical practice survey, integrative oncology, naturopathic medicine, naturopathic oncology

INTRODUCTION

Naturopathic medicine is one of the most commonly used traditional, complementary and integrative medicine (TCIM) systems in the Western world.[1] Naturopathic doctors (NDs) use interventions such as natural health products (NHPs), nutrition counselling, lifestyle and behaviour changes, and acupuncture to treat disease and support health.[2] Studies suggest use of naturopathic medicine is higher among those with cancer.[1] The use of TCIM therapies, including naturopathic medicine, for those with cancer is referred to as "integrative oncology," defined as "a patient-centred, evidence-informed field of cancer care that utilizes mind and body practices, natural products, and/or lifestyle modifications from different traditions alongside conventional cancer treatments."[3]

As the term "oncology" is a protected medical term in some jurisdictions, this paper will refer to the practice of NDs in integrative oncology as "naturopathic cancer support" or "naturopathic cancer care." The goals of naturopathic cancer care include educating patients on adopting healthy lifestyles, managing side effects, improving response to conventional treatments, reducing risk of recurrence, and optimizing overall health.[4]

Formal training and clinical guidance, such as clinical practice guidelines (CPGs), in naturopathic cancer care are limited. In 2019, the Oncology Association of Naturopathic Physicians (OncANP) published principles of care guidelines on patient-centred naturopathic care for those with cancer.[4] This guideline is an excellent initial step to support NDs in providing safe and effective care, but it does not provide specific therapeutic guidance. To

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date, five CPGs on integrative therapies have been created, one each for breast cancer, pain management, anxiety and depression, and cancer-related fatigue, and one on the use of cannabis and cannabinoids in adults with cancer.[5-9] Despite the advent of CPGs, many gaps remain, as the existing guidance only addresses a fraction of conditions and concerns faced by those with cancer, and also focuses broadly on integrative cancer care, rather than exclusively on naturopathic management.

Limited formal training opportunities exist for NDs interested in supportive cancer care. A handful of residency programs are available, and the American Board of Naturopathic Oncology offers a fellowship (FABNO) to support the advanced training of NDs. Criteria to receive FABNO designation include a 2-year residency in naturopathic oncology or 5 years' experience with 2,250 oncology patient contact hours, as well as submitting case reports and acquiring continuing education credits on cancer-related topics and passing the board certification exam.[10] According to the ABNO database, as of September 2024, 127 NDs across North America have their FABNO designation. The limited formal training may, in part, contribute to the lack of recognized specializations in naturopathic medicine. Identifying clinician-determined knowledge gaps is the first step to addressing them.

In this work, we distributed a survey with three objectives: 1) describe the type and extent of care provided by NDs; 2) characterize knowledge gaps of NDs who provide naturopathic cancer care; and 3) determine how NDs prefer to receive educational resources related to cancer care. Our overarching goal is to enhance naturopathic cancer care by facilitating the creation of clinical resources for NDs and other integrative healthcare providers (HCPs) who work with patients with cancer.

METHODS

This manuscript adheres to the Checklist for Reporting Results of Internet E-Surveys (CHERRIES).[11]

Survey Development and Design

SurveyMonkey was used for survey development and distribution and data collection. The survey contained an introductory page with a description of the survey, informed consent, and criteria for participation, followed by four distinct sections (parts A through D). Prior to distribution, the survey was pilot tested by three NDs not involved in its development. Feedback was provided on content and average completion time. Part A gathered demographic and clinical practice information and part B included questions related to knowledge translation and preferences for clinical resources. Respondents were then asked if they provide care to patients with cancer. This was the only mandatory question in the survey and it divided respondents into two streams: the "cancer stream" and the "general stream." The cancer stream included part C, with questions about cancer-focused clinical practice, and part D, on knowledge gaps related to naturopathic cancer support. A wide variety of question types were used, including multiple choice, checkboxes, dropdowns, matrices, Likert scales, and open text fields. Respondents were able to go back and review or change their answers using a "previous" button. Responses pertaining to knowledge gaps were collected using a Likert scale of 0–3 (no gap, minor gap, moderate gap, and major gap) with an option to select "not applicable" if the ND did not work with or recommend the item in question. Respondents in the general steam did not complete parts C or D and were instead asked about their interest in providing cancer support, as well as perceived barriers to providing cancer care. The survey included 40 items across 6 pages (screens): 19 for both streams, 18 exclusively for the cancer stream, and 3 exclusively for the general stream. The average number of questions per section (i.e., per screen) was 6.6. See Appendix A, Part 1: Survey Questions, for the full survey details.

Participants and Setting

This was an open survey distributed to NDs electronically, via naturopathic associations, social media, and informal networking. Respondents were eligible to complete the survey if they had graduated from a program accredited by the Council on Naturopathic Medical Education and were currently practicing naturopathic medicine. Distribution primarily took place through advertisements in national, provincial, territorial, state, and cancer-specific naturopathic associations across Canada and the United States. In total, 16 associations distributed the survey to their membership, including the Canadian Association of Naturopathic Doctors, the American Association of Naturopathic Physicians, and the Oncology Association of Naturopathic Physicians. The survey was available from August 29, 2023 to March 1, 2024. All respondents who completed the survey had the option of providing their email address to receive up to CA$150 as a matched amount by the company Vitazan to put towards the purchase of any NHPs from the Vitazan Professional line. The primary coordinating centre was the Patterson Institute for Integrative Oncology Research, a research division of the Canadian College of Naturopathic Medicine (CCNM), with staff and research associates located in Ottawa, Toronto, and Halifax, Canada.

Regulatory Adherence

Ethics approval was obtained by the Research Ethics Board of CCNM prior to distributing the survey. All respondents were required to read an introductory page which outlined eligibility criteria and informed consent prior to answering any questions. Data from Survey Monkey was transferred to a secure server managed by CCNM. Only those involved in the project had access to the data.

Outcomes

The objectives of this survey were to:

1. Describe the type and extent of cancer care provided by NDs
2. Describe cancer-related knowledge gaps reported by NDs working in cancer care
3. Determine the way NDs would like to receive educational tools and clinical resources related to naturopathic cancer care

Data Presentation and Analysis

Analyses included all respondents who completed the survey. Partial responses and responses of ineligible respondents were excluded. Descriptive statistics and frequency distributions were the main methods of analysis. If respondents were asked to give a response on a Likert scale, each option was given a numeric value from 0 to 3, with mean scores calculated accordingly. *P* values in the supplemental materials were calculated using the Chi-square test. Any data not explicitly reported in the manuscript is presented in Appendix A, Part 2: Supplementary Tables.

Patients and Public Involvement

Patients and the public were not involved in the design or conduct of this study, the collection or interpretation of the data, or the dissemination of this research.

RESULTS

Respondent Characteristics

In total, 170 responses were collected. Nineteen incomplete responses were removed, and two respondents indicated they were students and thus did not meet inclusion criteria, leaving 149 responses eligible for analysis. The view rate and number of unique site visitors for the survey were not calculated due to feasibility. Calculating an exact response rate is not possible given that respondents could have received the survey from multiple sources; however, it is estimated that there are 3,000 practicing NDs in Canada[12] and 6,000 in the United States,[13] with 75% (6,750) being members of provincial, state, or national organizations. Using this entire pool of potential respondents as the estimated denominator, our response rate was 2.2%. All questions had a ≥ 95% response rate. IP addresses were cross-referenced to search for duplicate entries. None were found.

Of the 149 respondents, 105 (71%) identified as women and 113 (76%) were 45 years of age or older. Ninety-nine respondents (66%) were in the cancer stream, and 50 (34%) were in the general stream. Of the 39 respondents who identified as men, 31 (79%) provided supportive cancer care. A greater percentage of NDs from the cancer stream had higher levels of education (i.e., a master's or PhD) compared with the general stream (29% vs. 4%, respectively). The majority of respondents (60%) had graduated from CCNM, and 48% had attended the Toronto campus. A full list of respondent demographics is presented in Table 1, and additional academic and professional qualifications are provided in Appendix A, Table S1.

TABLE 1 Respondent Demographics

Item	General Stream *n* (%)	Cancer Stream *n* (%)	Total *N* (%)
Gender (prefer not to answer n = 2)			
Man	7 (14)	32 (32)	39 (27)
Woman	41 (84)	64 (65)	105 (71)
Non-binary	0	1 (1)	1 (1)
Self-described	1 (2)	1 (1)	2 (1)
Age (years)			
< 30	6 (12)	7 (7)	13 (9)
30–44	2 (4)	21 (21)	23 (15)
45–59	24 (48)	33 (33)	57 (38)
≥ 60	18 (36)	38 (38)	56 (38)
Graduating school			
Bastyr University	4 (8)	19 (19)	23 (15)
Bridgeport University	0	3 (3)	3 (2)
CCNM: Boucher	11 (22)	7 (7)	18 (12)
CCNM: Toronto	31 (62)	40 (40)	71 (48)
National University of Health Sciences	1 (2)	1 (1)	2 (1)
National University of Natural Medicine	3 (6)	24 (24)	27 (18)
Sonoran University of Health Sciences	0	5 (5)	5 (3)

n (general) = 50; *n* (cancer) = 99; *N* (total) = 149.
CCNM: Canadian College of Naturopathic Medicine.

General Clinical Practice

Part A of the survey, general clinical practice, was completed by all respondents. Ninety-two respondents (62%) practiced in Canada, 54 (36%) practiced in the United States, and 3 (2%) practiced outside North America. Responses came from 6 provinces and 19 states; however, the overwhelming majority were from Ontario (36%) and British Columbia (17%). No other province or state contributed more than 6% of respondents. Despite a larger number of responses from NDs practicing in Canada, 46 out of 54 (85%) respondents from the United States provided supportive cancer care compared with only 50 out of 92 (54%) from Canada. Data suggests that respondents in the cancer stream had more clinical experience than those in the general stream, with 35% vs. 10% of NDs having ≥ 20 years of clinical experience, and 21% vs. 38% with < 5 years' experience. Almost all respondents provided one-on-one consultations; however, 31 (21%) also offered live group programming and/or pre-recorded material. Eighty-seven percent of NDs offered both in-person and virtual consultations. Practice settings were relatively evenly distributed between sole practitioner, multi-ND practice, and multidisciplinary practice (43%, 34%, and 38%, respectively). Only four NDs (3%), all from the cancer stream, practiced in a hospital setting. Table 2 presents information on Part A. Any information on general clinical practice not found in Table 2 can be found in Appendix A, Tables S2 and S3.

Cancer Stream, Clinical Practice

Part C of the survey gathered information on the cancer-related practice of the 99 NDs in the cancer stream (Tables 3 and 4). Of these respondents, 50% practiced in Canada and 46% practiced in the United States. Sixty-two percent of respondents reported ≤ 50% of their practice was related to cancer care. Sixty-seven percent of respondents reported they were a member of a cancer-specific organization, such as the OncANP, and 25% had a

TABLE 2 General Clinical Practice

Item	General Stream *n* (%)	Cancer Stream *n* (%)	Total *N* (%)
Country of practice			
Canada	42 (84)	50 (50)	92 (62)
United States	8 (16)	46 (46)	54 (36)
Other	0	3 (3)	3 (2)
Years in practice			
< 5	19 (38)	21 (21)	40 (27)
5–9	11 (22)	16 (16)	27 (18)
10–19	15 (30)	27 (27)	42 (28)
≥ 20	5 (10)	35 (35)	40 (27)
Method of care delivery (multiple selections allowed)			
One-on-one visits	49 (98)	98 (99)	147 (99)
Live group programming	6 (12)	14 (14)	20 (13)
Pre-recorded material	8 (16)	10 (10)	18 (12)
Membership programs	3 (6)	2 (2)	5 (3)
Time in patient visits (hours per week)			
< 10	9 (18)	10 (10)	19 (13)
10–29	35 (70)	62 (63)	97 (65)
≥ 30	6 (12)	27 (27)	33 (22)
Practice setting (multiple selections allowed)			
Community – sole practitioner	25 (50)	39 (39)	64 (43)
Community – multi-ND practice	16 (32)	34 (34)	50 (34)
Community – multidisciplinary practice	20 (40)	36 (36)	56 (38)
Hospital	0	4 (4)	4 (3)

n (general) = 50; *n* (cancer) = 99; *N* (total) = 149.

TABLE 3 Cancer Stream, Clinical Practice

Item	N (%)
Percent of practice related to cancer care	
1–25	42 (42)
26–50	20 (20)
51–75	9 (9)
76–100	28 (28)
Oncology fellowship	
FABNO	25 (25)
Type of cancer care (multiple selections allowed)	
Primary prevention	83 (84)
Secondary prevention	91 (92)
During active conventional treatment	90 (91)
After conventional treatment	95 (96)
Having declined conventional treatment	62 (63)
End-of-life care	48 (48)
Ability to perform qualified acts[1] (multiple selections allowed)	
Prescribe select pharmaceutical medications	65 (66)
Perform acupuncture	55 (56)
Administer intravenous infusion therapy	59 (60)
Perform injections[2]	73 (74)

N = 99.
[1] These acts require additional training and/or certification and may not be permitted depending on the province or state of practice.
[2] Excludes intravenous therapy (i.e., subcutaneous, intramuscular, intradermal).
FABNO = American Board of Naturopathic Oncology Fellowship.

FABNO designation. Across the cancer care continuum, almost all NDs worked with primary prevention, secondary prevention, and during active conventional treatment; however, only 48% offered end-of-life care, and only 63% offered care to patients who had declined conventional therapy. Ninety-one percent had additional education and/or training to be able to perform qualified acts such as acupuncture, parenteral therapy, and/or prescribing medications. Sixty-three percent of respondents indicated they communicate with conventional medical providers once per month or less. Any information about cancer-related clinical practice not found in Table 3 can be found in Appendix A, Tables S4 and S5.

Table 4 reports how frequently NDs in the cancer stream recommend various naturopathic interventions or refer out for them. General nutrition counselling, nutritional supplements, and herbal medicine were recommended most often, with ≥ 87% of NDs frequently offering these treatments. Intravenous (IV) infusion therapy use was the most variable, with 45% of NDs frequently recommending it and 23% never recommending it. The least used therapies were ozone therapy, low-level laser therapy, and photodynamic therapy, with more than 75% of NDs reporting that they rarely or never use these treatments.

The majority of NDs (61%) provide care to children or adolescents; however, only 4% selected that they "frequently" provide care to this population (Appendix A, Table S6). NDs provide care to people with breast cancer most often, with 82% reporting that they see these patients frequently (Appendix A, Table S7). Sarcomas were seen least often, with 65% reporting that they rarely or never see patients with these cancers.

Cancer-Related Knowledge Gaps

Part D of the survey gathered information about perceived knowledge gaps by NDs providing supportive cancer care (Figures 1–3). Notably, respondents could select "not applicable" if they did not provide care to patients receiving the therapy in question, did not manage a particular symptom or side effect, or if the intervention was not in their scope of practice. This option was included to protect the validity of responses, by removing those for whom the knowledge area is not relevant.

In general, NDs reported relatively minimal knowledge gaps related to interactions between naturopathic interventions and surgery, hormonal therapy, chemotherapy, or radiation therapy (no gap or minor gap: 80%, 74%, 71%, and 70%, respectively) (Figure 1). NDs reported a moderate or major gap most often regarding interactions between naturopathic interventions and monoclonal antibodies (49%), oral targeted therapies (53%), stem cell transplant (68%), and photodynamic therapy (71%).

Regarding knowledge gaps related to managing cancer and treatment-related symptoms and side effects (Figure 2), the greatest knowledge gaps were reported for tinnitus, palmar plantar erythrodysesthesia, and sexual dysfunction. Of the 32 symptom

TABLE 4 Cancer Stream, Use or Recommendations of Naturopathic Interventions

Intervention	Frequently (3)	Occasionally (2)	Rarely (1)	Never (0)	Mean Score (/3)	*N* (Reponses)
Nutrition counselling – general	94 (95%)	4 (4%)	1 (1%)	0	2.9	99
Nutritional supplements	93 (94%)	4 (4%)	2 (1%)	0	2.9	99
Herbal medicine	87 (88%)	9 (9%)	3 (3%)	0	2.8	99
Nutrition counselling – specific diets	77 (78%)	16 (16%)	5 (5%)	1 (1%)	2.7	99
Probiotics	67 (68%)	21 (21%)	10 (10%)	1 (1%)	2.6	99
Mind–body therapies	71 (72%)	12 (12%)	13 (13%)	3 (3%)	2.5	99
Exercise counselling	65 (66%)	25 (26%)	4 (4%)	4 (4%)	2.5	98
Mental health counselling	62 (63%)	23 (23%)	11 (11%)	2 (2%)	2.5	98
Acupuncture or TCM	46 (46%)	34 (34%)	14 (14%)	5 (5%)	2.2	99
Non-IV injections	48 (48%)	20 (20%)	19 (19%)	12 (12%)	2.1	99
Body-based therapies	42 (42%)	33 (33%)	18 (18%)	6 (6%)	2.1	99
OTC medications	39 (39%)	29 (29%)	24 (24%)	7 (7%)	2.0	99
Hydrotherapy	29 (29%)	37 (37%)	26 (26%)	7 (7%)	1.9	99
IVIT	43 (45%)	15 (16%)	15 (16%)	22 (23%)	1.8	95
Homeopathic remedies	31 (32%)	28 (29%)	21 (21%)	18 (18%)	1.7	98
Cannabis	21 (21%)	40 (40%)	24 (24%)	14 (14%)	1.7	99
Prescription medications	19 (19%)	28 (29%)	20 (20%)	31 (32%)	1.4	98
Hyperbaric oxygen	13 (13%)	24 (24%)	32 (32%)	30 (30%)	1.2	99
LRHT	12 (12%)	15 (15%)	35 (35%)	37 (37%)	1.0	99
WBHT	9 (9%)	19 (19%)	30 (31%)	40 (41%)	1.0	98
Ozone therapy	11 (11%)	12 (12%)	23 (23%)	53 (54%)	0.8	99
LLLT	9 (9%)	14 (14%)	26 (26%)	50 (51%)	0.8	99
Photodynamic therapy	7 (7%)	4 (4%)	19 (19%)	69 (70%)	0.5	99

Participants were asked to consider how frequently they recommend these therapies or refer out for them for patients with cancer.
IV: Intravenous; IVIT: Intravenous infusion therapy; LLLT: Low-level laser therapy; LRHT: Locoregional hyperthermia; OTC: Over the counter; TCM: Traditional Chinese Medicine; WBHT: Whole body hyperthermia.

prompts, NDs reported a minor gap or less on average for 23 items (72%). None of the respondents reported a major gap for managing appetite loss, hot flashes, anxiety or constipation.

Lastly, cancer stream respondents were asked about knowledge gaps related to the use of naturopathic interventions for people with cancer (Figure 3). NHPs had the lowest average knowledge gap of any treatment modality, with almost all NDs reporting no gap or a minor gap. The only outlier was homeopathic remedies, of which 41% reported a moderate or major gap. Epigallocatechin gallate (EGCG) infusions had the largest knowledge gap by far, with a mean score of 2.1 out of 3.0. This was the only treatment with a moderate to major gap on average. Respondents' knowledge of IV infusions varied greatly, with some therapies (e.g., vitamin/mineral infusion, IV vitamin C) having almost no gaps and others (e.g., EGCG, curcumin) having moderate or major gaps on average. NDs also tended to have higher knowledge gaps for treatments which required the use of medical equipment, additional training, or were outside their scope of practice, such as ozone therapy, locoregional hyperthermia (LRHT), and hyperbaric oxygen therapy.

When asked about reasons why NDs perceived they had these knowledge gaps, the most common responses were a lack of time to find and examine new data (68%) and a lack of formal training (47%). A lower percentage of NDs cited a lack of resources (39%), an inability to critically appraise available data (39%), and an inability to find data and resources (28%). For a complete tabular description of all knowledge gaps, see Appendix A, Table S8.

Knowledge Gaps and Clinical Practice

Across all categories, there were 44 items for which a moderate or major knowledge gap was reported by ≥ 20% of respondents. For 38 of these items (86%), NDs for whom supportive cancer care accounted for only ≤ 25% of their clinical practice reported moderate or major knowledge gaps more often than those whose practice was > 25% cancer-focused. Statistical significance ($p < 0.05$) was reached for 16 of these items (36%). A complete table is present in Appendix A, Table S9.

Knowledge Dissemination and Resource Creation

Directly accessing information through peer-reviewed journals or publication databases was by far the most common way NDs described gathering information, with 143 respondents (96%) frequently or occasionally using these items. Lay resources (e.g., magazines, Google) were used least often, with 49 respondents (33%) indicating they frequently or occasionally use these items. When asked which resources NDs would prefer to use, there was no clear preference. Approximately 80% or more indicated they would "like" or "love" to receive information through clinical

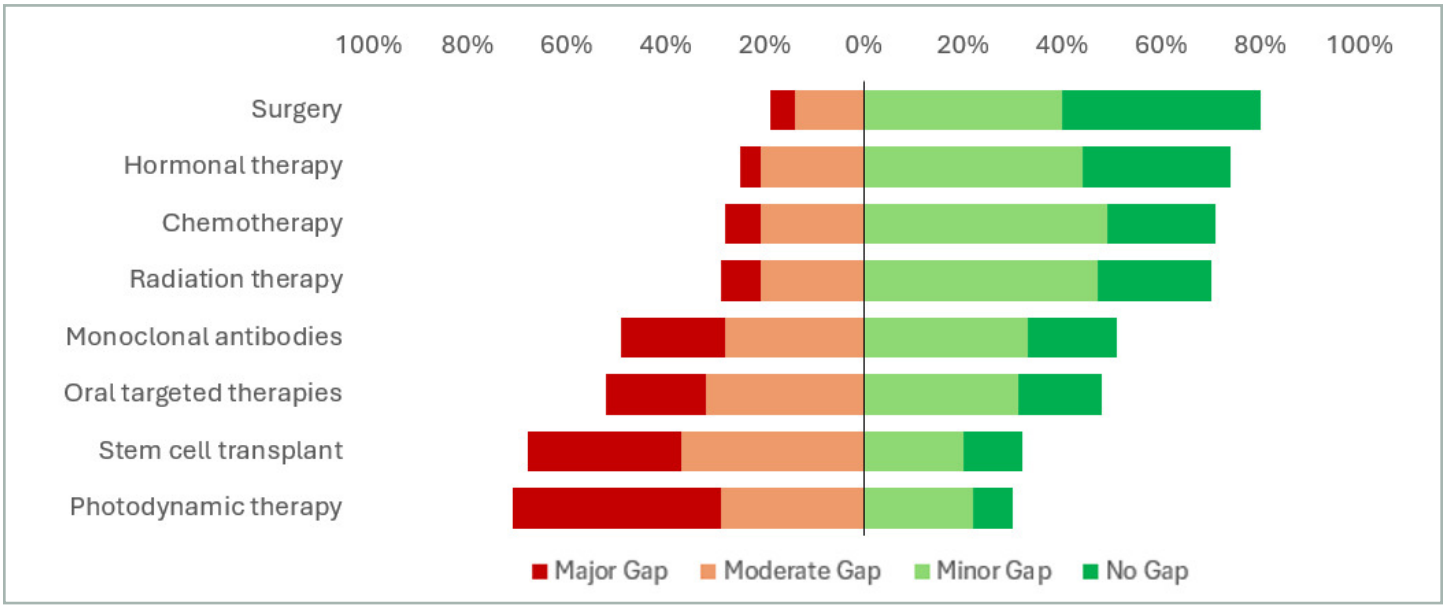

FIGURE 1 Knowledge Gaps Related to Interactions Between Naturopathic and Conventional Treatments. Percentage refers to the percentage of respondents who provided an answer. Respondents were instructed not to answer if they did not provide care to patients receiving the treatment listed. See Appendix A, Table S8, for number of respondents.

decision aids, professional monographs, conference presentations, webinars, clinical practice guidelines, courses, or fellowship programs. Appendix A, Tables S10 and S11 report on how NDs access information and the types of resources they would prefer to use, respectively.

Of the respondents in the general stream, 23 (46%) indicated they were interested in developing skills to support people with cancer, 11 (22%) were not interested, and 16 (32%) were unsure. Excluding those who were not interested, 31 (79%) respondents reported they don't work with cancer populations because of a lack of knowledge or training, and 29 (74%) indicated that the availability of better training and resources would increase their likelihood of providing naturopathic cancer support. More information regarding the interest of the general stream in providing cancer care is presented in Appendix A, Table S12.

DISCUSSION

To our knowledge, this is the first published survey reporting on the clinical practice and knowledge gaps of NDs providing supportive cancer care. Our results demonstrate that NDs provide a wide range of therapeutics to patients with cancer and are generally confident in their scope of practice; however, there are some areas where knowledge gaps exist that could be lessened through the creation of clinical resources and decision support tools.

Type and Extent of Care Provided by NDs

A high percentage of NDs (71%) who completed the survey identified as women, which is consistent with what has previously been reported for the profession.[14] Most NDs (76%) were aged 45 and older, which is inconsistent with surveys and reports in Canada showing that NDs are generally younger, with 59% aged 40 and under.[14,15] A much higher proportion of US respondents provided supportive cancer care compared with Canadian respondents (84% vs. 54%, respectively). Although seemingly disproportionate, this is likely because 69% of US responses came from members of the OncANP, a naturopathic oncology association with a high proportion of its members based in the United States. Thirty-three percent of respondents who provide supportive cancer care are not members of any cancer-focused organization. This may be explained by the fact that 88% of respondents in this group reported they provide supportive cancer care to only 1–25% of their patient base. Thus, respondents who see a small proportion of cancer in their practice are less likely to be members of oncology associations.

Regarding the clinical practice of both streams, there was a distinct absence of NDs in hospital settings. Almost all NDs practiced in the community, with nearly even splits between practice in multidisciplinary clinics, in clinics with multiple NDs, and as sole practitioners. Increasing in-hospital access to naturopathic care may be an important step to integrating holistic approaches with mainstream care.[16] Broadening the format of care NDs provide may also help increase patient access to naturopathic medicine. Most NDs surveyed (77%) only offer one-on-one patient visits, with only 14% providing live group programs, 10% pre-recorded programs, and 2% membership-based support. Given the expense of one-on-one naturopathic medicine,[17] lower-cost services such as group and pre-recorded programs may help remove financial barriers to supportive care and increase access to health information.

For the majority of cancer stream respondents (62%), less than half of their practice is focused on cancer care, indicating that few respondents have a clinical focus in cancer support. NDs see patients with thoracic and skin cancers far less often relative to their incidence rates.[18] This is much more pronounced for thoracic cancers; only 20% of respondents reported they "frequently"

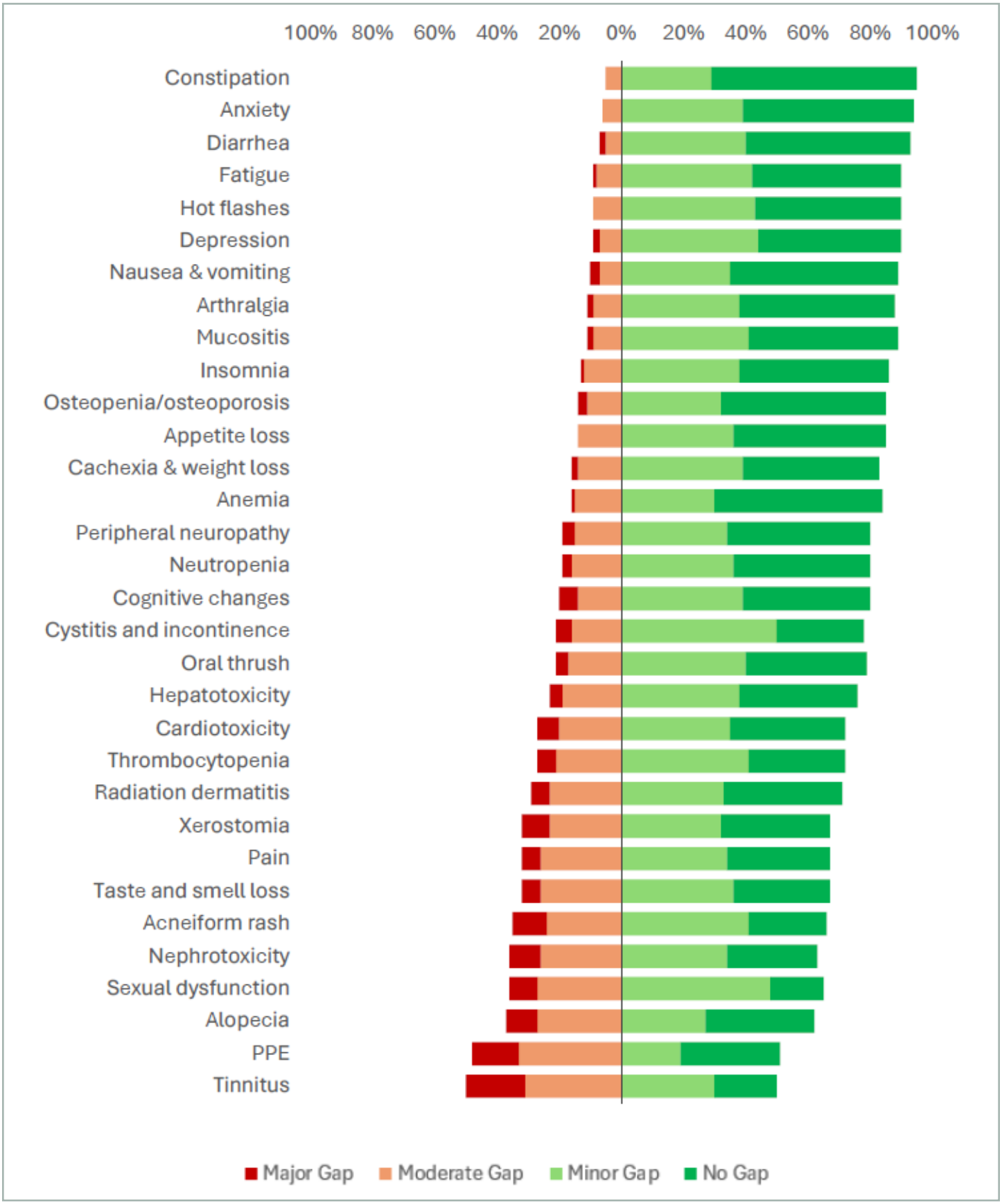

FIGURE 2 Knowledge Gaps Related to Managing Symptoms of Patients with Cancer. Percentage refers to the percentage of respondents who provided an answer. Respondents were instructed not to answer if they did not treat the condition listed. See Appendix A, Table S8, for number of respondents. PPE = palmar plantar erythrodysesthesia.

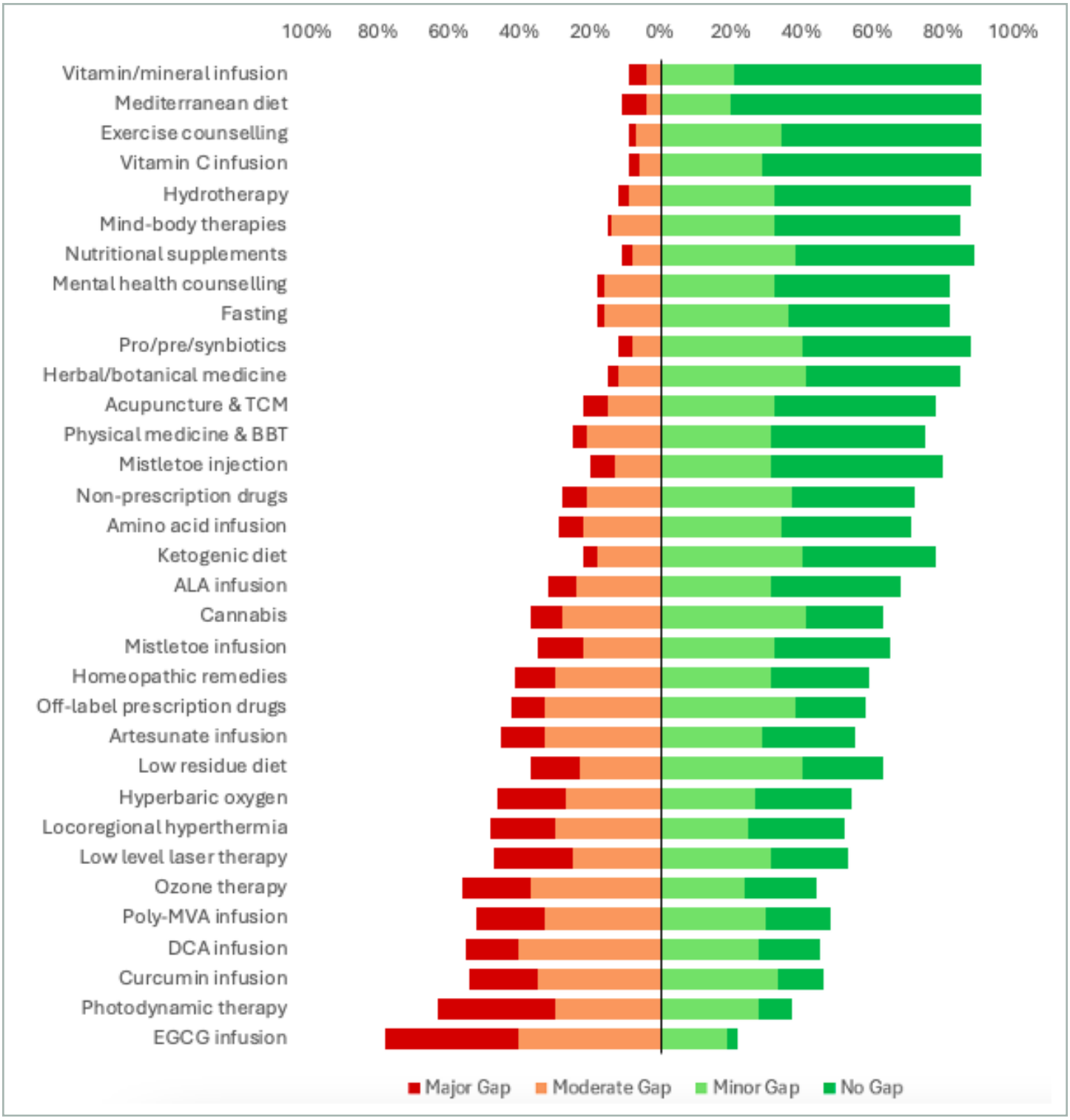

FIGURE 3 Knowledge Gaps Related to Naturopathic Interventions for Patients with Cancer. Percentage refers to the percentage of respondents who provided an answer. Participants were instructed not to answer if they did not provide the treatment listed. See Appendix A, Table S8, for number of respondents. ALA: Alpha lipoic acid; BBT: Body-based therapies; DCA: Dichloroacetate; EGCG: Epigallocatechin gallate; Poly-MVA: proprietary blend of "minerals, vitamins and amino acids"; TCM: Traditional Chinese Medicine.

provide care to people with lung cancer; however, lung cancer had the highest incidence of all cancer types in 2022.[18] Regarding the type of care provided, a much smaller proportion of NDs provide end-of-life care (48%) compared with preventive care (93%), care during conventional treatments (91%), or survivorship care (96%). A recent study in the United States reported that patients receiving hospice care often do not receive support for concerns such as anxiety, depression, and general symptom relief—concerns for which NDs reported minor to no knowledge gaps, and for which there are existing practice guidelines.[5,19] Additionally, this care was usually

provided at home by a family member, with caregivers expressing a need for hospice training.[19] This could be a gap in care that NDs are well suited to address.

Communication between NDs and conventional medical providers was not extensive and noted to occur once per month or less. This is in line with prior research showing that communication between NDs and other practitioners is lacking.[20] A collaborative interprofessional approach can help to identify and address patient needs. NDs could support this by providing consultation notes to oncologists more often, with treatment recommendations and rationale.

ND-Identified Knowledge Gaps in Supportive Cancer Care

Naturopathic doctors surveyed were generally confident in the treatments they provide and in managing symptoms and side effects. Of the 76 prompts for knowledge gaps, 46 (61%) had a mean score ≤ 1.0 out of 3.0 (minor gap or less). The lowest gaps (mean score ≤ 0.5 out of 3.0) were reported for exercise counselling, the Mediterranean diet, vitamin/mineral infusions, and IV vitamin C, as well as for managing constipation and anxiety. It is not surprising that exercise counselling and the Mediterranean diet had the lowest knowledge gaps; physical activity and clinical nutrition are two of the main therapeutic pillars that NDs are trained in addressing with patients,[21] and both have a rigorous body of evidence to support their use in cancer care.[22-27] In general, NDs had lower knowledge gaps for interventions they used frequently, such as NHPs, nutrition counselling, and exercise. One notable exception is IV therapies; IV vitamin C and vitamin/mineral infusions had some of the lowest knowledge gaps, yet IV therapies were only "frequently" recommended by 45% of NDs.

In contrast, NDs reported the highest knowledge gaps for EGCG and curcumin infusions, photodynamic therapy, ozone therapy, and low-level laser therapy. This is not surprising, as responses indicate these therapies are recommended by NDs least often. Other possible reasons for high knowledge gaps with these therapies and their low frequency of use may include a lack of access to required medical supplies, a limited scope of practice (especially since 37% of respondents were from Ontario, where photodynamic therapy and ozone therapy are outside the scope of the profession), a paucity of research on the use of these therapies in cancer care, and/or the fact that they are not a core component of naturopathic cancer courses.[28,29] In total, there were 10 items (13%) where a moderate or major gap was reported by more than 50% of respondents.

Another area to highlight is that surveyed NDs who see patients with cancer the least often reported the highest degree of knowledge gaps, the most common reason being a lack of formal training. This was evident in all categories but was most pronounced for interactions between naturopathic and conventional treatments. NHPs have the potential to interfere with the safety and efficacy of conventional cancer treatments. Higher knowledge gaps regarding naturopathic treatments, their use, and their interaction potential could increase patient safety concerns and risk providing less effective care, especially if the ND does not recognize their lack of knowledge. This may be especially applicable to NDs who provide care for patients with cancer but do not necessarily focus their training or practice on cancer care. Although oncology specializations are not uniformly recognized, providing cancer support that is safe and evidence-informed requires additional training and a dedication to continuing education.

Creating Educational Tools and Clinical Resources

When asked to identify reasons for their knowledge gaps, the two most common responses were a lack of time to find and examine new data (68%) and a lack of formal training (47%). A lack of time may suggest that succinct and specific clinical resources could help address some of these knowledge gaps; however, follow-up questions are required. Additional follow-up may also clarify whether a lack of formal training pertains to training in naturopathic medical schools, integrative oncology elective courses, residencies, or whether NDs perceive a paucity of data on certain topics, which creates an obstacle to developing formal training.

Given there was no clear preference in the way NDs would like to receive clinical resources related to cancer care, future research should focus on addressing knowledge gaps and consider providing a variety of resources to accommodate different learning styles and preferences.

Strengths

This survey is the first to focus on the practice of integrative cancer care provided by NDs across North America. Using naturopathic social media platforms and professional associations to administer the survey allowed for a large, targeted reach, which resulted in a sample size that adequately addressed the study's research objectives. Despite taking an average of 12.5 minutes to complete and having only one mandatory question, response rates for each question were high. To minimize assessor bias, we included a broad range of items to address knowledge gaps, without overloading respondents. In question design, we used language which acknowledges the varying regulations across North America, for example, we used the term "integrative cancer care" rather than "integrative oncology," which is not accepted by some governing bodies. Additionally, we included "not applicable" response options to accommodate the diverse treatment preferences and scopes of practice. Lastly, the inclusion of a "general stream" provided insights into the demographic differences between NDs who offer cancer support and those who do not. This approach also helped identify barriers preventing the general stream from offering cancer support and potential ways to overcome these challenges.

Limitations

Despite the wide reach of this survey, the generalizability of survey findings is limited. A large portion of respondents graduated from CCNM's Toronto campus and practice in Ontario or British Columbia. Overall response rate was low, which could be due to the impersonal way the survey was distributed and/or the length of the survey. In most instances where NDs chose an option based on a Likert scale, the options required a subjective interpretation.

Because of this, we cannot say whether we accurately quantified knowledge gaps, given that what respondents felt was a minor or major gap could have differed. Furthermore, some prompts were specific and targeted, whereas others addressed broad treatment domains. For example, a curcumin infusion was a specific treatment, whereas the domain of NHP use spans a diverse range of products. It was not feasible to provide specificity across these larger domains. Additionally, it is not clear whether respondents interpreted knowledge gaps solely as gaps in their own personal knowledge, or if gaps in available literature were also considered. Finally, although it was not an objective of this study, we did not ask practitioners about their knowledge or experience in supporting historically marginalized groups, such as Indigenous Peoples, people of colour, people with disabilities, or LGBTQ+ persons. Future research should assess the knowledge gaps NDs may have in supporting these populations, with goals of creating resources and training to address healthcare disparities.

CONCLUSION

This survey described the type and extent of cancer care provided by NDs and identified knowledge gaps among respondents. Our results indicate that NDs are generally confident in their scope of practice, particularly with commonly used therapies. However, gaps exist which could be addressed through clinical resources. These include resources on interactions between naturopathic interventions and conventional treatments, managing certain side effects, information on treatment modalities, and sample templates for communications with conventional medical providers. It is unclear which items would be best suited as clinical tools and resources. Future work may involve follow-up with respondents to determine which resources would most benefit clinical practice. Furthermore, discussion with the Oncology Association for Naturopathic Physicians, the Society for Integrative Oncology, and oncologists may be helpful to enhance inter-provider collaboration and resource dissemination. Ultimately, clinical resource and guideline development could advance naturopathic cancer care, enhance integrative oncology and improve patient care.

Access to Data

Datasets utilized in this study are available by request only. Please contact Patterson Institute's executive director, Dugald Seely at dseely@thechi.ca, to request access to data not included in this manuscript.

AUTHOR AFFILIATIONS

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CONFLICTS OF INTEREST DISCLOSURE

We have read and understood the CAND Journal's policy on conflicts of interest disclosure and declare the following interests: Dr. Dugald Seely, ND, is the executive director of the Patterson Institute for Integrative Oncology Research and a contributing member to Vitazan Professional's "Naturopathic Doctor Medical Advancement Panel Solutions" (NDMAPS) team, who provided $100 to the Patterson Institute for Integrative Oncology Research at CCNM for each survey response. While this amount is managed by CCNM, the funding supports the compensation of the team at the Patterson Institute for Integrative Oncology Research. Thus, while indirect, this may constitute a significant financial interest (SFI) for Dr. Seely, ND, and other members of the team, given the number of survey respondents. Vitazan had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

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Advancing Naturopathic Cancer Care: A Survey of Naturopathic Doctors to Identify Practice Patterns and Knowledge Gaps

APPENDIX A: SUPPLEMENTARY MATERIALS

Part 1: Survey Questions

Part A: Getting to know you

1. How old are you?

2. Which gender do you most identify with?

3. Which school did you graduate from?

4. Which country do you primarily practice in?

5. In which province, territory, or state do you primarily practice?

6. Other than your naturopathic degree, do you have any other qualifications? Select all that apply.
    - Bachelor's degree
    - Master's degree
    - Doctor of Philosophy (PhD)
    - Doctor of Chiropractic (DC)
    - Doctor of Medicine (MD)
    - Doctor of Osteopathic Medicine (DO)
    - Diplomate of the Homeopathic Academy of Naturopathic Physicians (DHANP) Licensed
    - Acupuncturist (L.Ac.)
    - Nurse Practitioner (NP)
    - Physician Assistant (PA)
    - Registered Dietician (RD)
    - Registered Nurse (RN)
    - Other (please specify)
    - None of the above

7. How many years have you been practicing naturopathic medicine?

8. In which ways do you interact with patients and provide naturopathic care? Select all that apply.
    - One-on-one visits (virtual or in-person)
    - Live group programming (virtual or in-person)
    - Pre-recorded courses/educational sessions
    - Membership programs
    - Other (please specify)

9. If you conduct one-on-one visits, how do you conduct them?
    - In-person only
    - Virtual only
    - In-person and virtual
    - I don't conduct one-on-one visits
    - Other (please specify)

10. Approximately how many hours do you spend in patient visits/interactions each week? (Note: this includes in-person and virtual visits, but excludes administrative tasks, charting, and research)

11. Approximately how many hours per week do you spend on continuing education activities? (e.g., reading articles, attending webinars, etc.)

12. Which best describes the nature of your naturopathic practice setting(s)? Select all that apply.
    - Community (private practice) – sole practitioner
    - Community (private practice) – multi-ND practice
    - Community (private practice) – multidisciplinary practice
    - Hospital
    - Other (please specify)

Part B: Knowledge translation and resources

13. Regarding sources of information related to supporting your clinical care and decision-making, indicate how often you use the following.
    - Directly accessing medical literature through journals (e.g., CANDJ, Natural Medicine Journal, JAMA Oncology, Integrative Cancer Therapies) or publication databases (e.g., PubMed, Google Scholar, EMBASE, Cochrane Library)
    - Professional resources and databases (e.g., Up-To-Date, Clinical Key, Natural Medicine Database, MSKCC About Herbs, professional monographs, Medscape, Examine.com.)
    - KNOWIntegrativeOncology.org textbooks (including e-texts)
    - Conferences, webinars, and/or seminars
    - Discussion with colleagues
    - Lay resources (e.g., magazines, books, blogs, Wikipedia, etc.)

14. Of the resources listed below, please indicate your degree of preference for each item, from "I love this resource" to "I do not like this resource."
    - Clinical decision aid (a tool that helps the clinician and/or patient understand their treatment options to make informed decisions based on best available evidence, includes information on available therapies, risks, benefits, etc.)
    - Clinical practice guideline (statements that include expected clinical standards intended to optimize patient care based on best available evidence)
    - Conference presentations
    - Courses or fellowship programs
    - Professional monographs (detailed summary of interventions, not always published in peer-review format)
    - Webinars

15. Would you support the development of clinical practice guidelines or clinical decision-making tools for naturopathic therapies in cancer care?

16. Do you consider yourself a naturopathic doctor (ND) who provides cancer care (including supportive cancer care)?

Part C: Getting to know your clinical practice

17. Are you a Fellow of the American Board of Naturopathic Oncology?

18. Are you a member of any oncology-specific organizations? Select all that apply.
    - American Society of Clinical Oncology (ASCO)
    - Oncology Association of Naturopathic Physicians (OncANP)
    - Society for Integrative Oncology (SIO)
    - The Multinational Association of Supportive Care in Cancer (MASCC)
    - Other (please specify)

19. What percentage of your clinical practice is providing care related to cancer?

20. Where along the cancer care continuum do you provide care? Select all that apply.
    - Primary prevention (i.e., never had cancer)
    - Secondary prevention (i.e., previous history of cancer)
    - During active conventional treatment
    - After completion of conventional treatment (i.e., survivorship or aftercare)
    - Having declined conventional treatments
    - End-of-life care
    - Other (please specify)

21. Of patients who present for cancer care, how often do you provide care for the following age ranges?
    - Children (<12)
    - Adolescents (12–17)
    - Young adults (18–39)
    - Adults (40–64)
    - Older adults (>64)

22. Of patients who present for cancer care, how often do you provide care for the following types?
    - Brain and CNS (central nervous system)
    - Breast
    - Gastrointestinal (e.g., colorectal, esophageal, liver, gastric, pancreatic, hepatobiliary)
    - Gynecological (e.g., cervical, endometrial, ovarian, vaginal, vulvar)
    - Head and neck (e.g., oropharyngeal, laryngeal)
    - Hematological (e.g., lymphomas, leukemias and multiple myeloma)
    - Sarcomas
    - Skin (melanoma, basal cell carcinoma, squamous cell carcinoma)
    - Thoracic (e.g., lung, thymic, mediastinal)
    - Urogenital (e.g., prostate, bladder, kidney, testicular)

23. Which of the following acts are you qualified and able to perform? Select all that apply.
    - Prescribe certain pharmaceutical medications
    - Perform acupuncture
    - Perform intravenous infusion therapy (IVIT)
    - Perform injections (subcutaneous and/or intramuscular)
    - None of the above

24. Considering the following interventions, regardless of whether or not they are in your scope, please indicate how frequently you recommend them or refer out for patients with cancer.
    - Acupuncture and/or Traditional Chinese Medicine
    - Body-based therapies (e.g., spinal manipulations, manual lymphatic techniques, massage)
    - Cannabis (oil, dry products, edibles, etc.)
    - Exercise counselling
    - Herbal/botanical medicine (tinctures, extracts, tea, etc.)
    - Homeopathic remedies
    - Hydrotherapy and thermal therapy (e.g., constitutional hydrotherapy, saunas, cold- immersions, sitz baths)
    - Hyperbaric oxygen
    - Hyperthermia – locoregional
    - Hyperthermia – whole body
    - IVIT
    - Low level laser therapy (LLT)
    - Mental health counselling
    - Mind-body therapies (e.g., meditation, yoga, tai chi, Qigong, breathwork)
    - Non-IV injection therapy (e.g., intramuscular, subcutaneous, etc.)
    - Non-prescription/over-the-counter medication
    - Nutritional counselling – general
    - Nutritional counselling – specific diets

- Nutritional supplements (e.g., vitamins, minerals, fatty acids)
- Ozone
- Photodynamic therapy
- Prescription medications (off-label use)
- Probiotics/prebiotics/synbiotics
- Other (if there are other interventions not previously listed, please note them and how frequently you recommend/refer out for them)

25. How often do you communicate with conventional oncology medical doctors such as surgeons, medical oncologists, or radiation oncologists? (e.g., letters, faxes, phone, email)

26. How often do you communicate with allied healthcare providers such as other NDs, RMTs (registered massage therapists), NPs (nurse practitioners), holistic nutritionists, physiotherapists, functional medicine–oriented MDs, etc.? (e.g., letters, faxes, phone, email)

Part D: Identifying gaps in knowledge and training

27. Regarding interactions between naturopathic interventions and the following conventional cancer treatments, please indicate to what extent you feel there is a gap in your knowledge. If you do not work with patients receiving a certain treatment, please select "not applicable."
    - Chemotherapy
    - Hormonal therapy (e.g., androgen deprivation therapy, anti-estrogen therapies)
    - Monoclonal antibodies (e.g., PD1 inhibitors, trastuzumab)
    - Oral targeted therapy (e.g., tyrosine kinase inhibitors, CDK4/6 inhibitors)
    - Photodynamic therapy
    - Radiation therapy
    - Stem cell transplant
    - Surgery

28. Regarding naturopathic management of side effects and symptoms associated with cancer and/or cancer treatments, please indicate to what extent you feel there is a gap in your knowledge and your ability to treat or prevent this condition. If you do not work with a certain side effect or symptom, please select "not applicable."
    - Anxiety
    - Acneiform rash
    - Alopecia
    - Anemia
    - Appetite loss (anorexia)
    - Arthralgia
    - Cachexia and weight loss
    - Cardiotoxicity
    - Cognitive changes
    - Constipation
    - Cystitis and incontinence
    - Depression
    - Diarrhea
    - Edema and lymphedema
    - Fatigue
    - Hepatotoxicity
    - Hot flashes
    - Insomnia
    - Mucositis
    - Nausea and vomiting
    - Neutropenia
    - Nephrotoxicity

- Oral thrush
- Osteopenia/osteoporosis
- Pain
- Palmar plantar erythrodysesthesia (PPE or hand-foot syndrome)
- Peripheral neuropathy
- Radiation dermatitis
- Sexual dysfunction
- Taste and smell loss
- Thrombocytopenia
- Tinnitus
- Xerostomia

29. Regarding the use of Natural Health Products (NHPs) for supporting patients with cancer, please indicate to what extent you feel there is a gap in your knowledge. If you do not use a certain type of NHP, please select "not applicable."
    - Herbal/botanical medicine (tinctures, extracts, tea, etc.)
    - Homeopathic remedies
    - Nutritional supplements (e.g., vitamins, minerals, fatty acids)
    - Probiotics, prebiotics, synbiotics

30. Regarding specific diets for patients with cancer, please indicate to what extent you feel there is a gap in your knowledge. If you do not use or recommend a specific diet, please select "not applicable."
    - Fasting (e.g., intermittent fasting, short-term fasting around chemo, longer fasts)
    - Ketogenic diet
    - Low residue diet
    - Mediterranean diet
    - Other (If there is a gap in your knowledge about other specific diets, please note the diet and the degree of your knowledge gap(s) here)

31. Regarding injectable therapies for patients with cancer, please indicate to what extent you feel there is a gap in your knowledge. If you do not use or recommend a certain therapy, please select "not applicable."
    - Alpha-Lipoic Acid (ALA) (infusion)
    - Amino acid (infusion)
    - Artesunate (infusion)
    - Ascorbic acid (vitamin C) (infusion)
    - Curcumin (infusion)
    - Dichloroacetate (Infusion)
    - EGCG (infusion)
    - Mistletoe (infusion)
    - Mistletoe (subcutaneous injection)
    - Poly-MVA (infusion)
    - Vitamin/mineral mix (e.g., Myers infusion)
    - Other (If there is a gap in your knowledge about other injectable therapies, please note them and the degree of your knowledge gap(s) here)

32. Regarding the modalities listed below for patients with cancer, please indicate to what extent you feel there is a gap in your knowledge. If you do not use or recommend this intervention, please select "not applicable."
    - Acupuncture, acupressure, and Traditional Chinese Medicine
    - Cannabis (oil, dry products, edibles, etc.)
    - Exercise counselling
    - Hydrotherapy
    - Hyperbaric oxygen
    - Locoregional hyperthermia
    - Low level laser therapy (LLLT)
    - Mental health counselling
    - Mind-body therapies

- Non-prescription drugs/over-the-counter
- Off-label prescription medications for cancer control
- Ozone therapy
- Photodynamic therapy
- Physical medicine and body-based therapies
- Prescription medications (off-label for cancer control)
- Other (If there is a gap in your knowledge about other modalities, please note them and the degree of your knowledge gap(s) here)

33. Part of medical practice is remaining up to date on new information and emerging therapies. Regarding finding, appraising, and implementing new evidence related to naturopathic oncology, please indicate to what extent you feel there is a gap in your knowledge.

34. Thinking in general about gaps in your knowledge, please indicate reasons for these gaps. Select all that apply.
    - Lack of formal training (e.g., in school, through continuing education, through residency/fellowship programs)
    - Lack of time to find resources and do continuing education
    - Unsure of how to find available data and resources
    - Unsure of how to critically appraise (assess or interpret) available data
    - Lack of resources (e.g., access to professional resources and clinical research)
    - Other (If you think there are other reasons for gaps in your knowledge, please list them)

Interest in providing cancer care

35. Are you interested in developing your skills in order to support people with cancer?

36. Regarding why you don't currently work with cancer populations, please indicate which of the following barriers/reasons are relevant to you. Select all that apply.
    - There is no demand or need in my community
    - I don't have the knowledge or training to do so
    - I am concerned about legal/liability issues and/or regulatory restrictions
    - I am concerned about the emotional burden
    - Other (If there are other barriers/reasons why you don't currently work with cancer populations, please note them)

37. Would the availability of better training and resources for naturopathic oncology increase your likelihood of working with this population?

Follow-up and additional information

38. If researchers at The Patterson Institute have follow-up questions, are you open to being contacted by email?

39. Is there anything else you would like to add?

40. Please input your email address below to access Vitazan's promotion; if you would like to skip the offer, please leave this blank.

Part 2: Supplementary Tables

TABLE S1: Other academic and professional qualifications

Type of Qualification	General Stream *n* (%)	Cancer Stream *n* (%)	Total *n* (%)
Bachelor's Degree	47 (94)	78 (79)	125 (84)
Master's Degree	2 (4)	23 (23)	25 (17)
Doctor of Philosophy (PhD)	0	4 (4)	4 (3)
Registered or Licensed Acupuncturist (RAc/LAc)	1 (2)	8 (8)	9 (6)
Doctor of Medicine (MD)	1 (2)	8 (8)	9 (6)
Doctor of Osteopathic Medicine (DO)	1 (2)	0	1 (1)
Physician Assistant (PA)	0	1 (1)	1 (1)
Registered Nurse (RN)	0	1 (1)	1 (1)
DHANP	0	1 (1)	1 (1)
Registered Herbalist (RH)	0	2 (2)	2 (1)
Registered Massage Therapist (RMT)	0	1 (1)	1 (1)

General *n* = 50; Cancer *n* = 99; Total *N* = 149. Multiple selections were permitted. DHANP = diploma from the Homeopathic Academy of Naturopathic Physicians.

TABLE S2: State or Province of Practice

State/Province	General Stream *n* (%)	Cancer Stream *n* (%)	Total *n* (%)
Canada			
Alberta	0	2 (2)	2 (1)
British Columbia	10 (20)	13 (14)	23 (16)
Manitoba	0	3 (3)	3 (2)
Nova Scotia	6 (12)	3 (3)	9 (6)
Ontario	25 (50)	29 (30)	54 (37)
Quebec	1 (2)	0	1 (1)
USA			
Arizona	1 (2)	2 (2)	3 (2)
California	2 (4)	2 (2)	4 (3)
Colorado	3 (6)	2 (2)	5 (3)
Connecticut	0	3 (3)	3 (2)
Hawaii	0	2 (2)	2 (1)
Illinois	0	1 (1)	1 (1)
Indiana	0	1 (1)	1 (1)
Maine	0	2 (2)	2 (1)
Michigan	1 (2)	1 (1)	2 (1)
Missouri	0	2 (2)	2 (1)
Montana	0	2 (2)	2 (1)
New York	0	1 (1)	1 (1)
Oregon	0	8 (8)	8 (5)
Pennsylvania	0	1 (1)	1 (1)
Texas	0	1 (1)	1 (1)
Washington	0	8 (8)	8 (5)
Washington DC	0	2 (2)	2 (1)
Wisconsin	1 (2)	0	1 (1)
Outside of Canada/USA	0	5 (5)	5 (3)

General *n* = 50; Cancer *n* = 96; Total *N* = 146. Three respondents in the cancer stream did not provide a response.

TABLE S3: Type of visit conducted

Type of Visit	General Stream *n* (%)	CancerStream *n* (%)	Total *n* (%)
In-person and virtual	42 (84)	89 (90)	131 (88)
In-person only	4 (8)	6 (6)	10 (7)
Virtual only	4 (8)	4 (4)	8 (5)

General *n* = 50; Cancer *n* = 99; Total *N* = 149.

TABLE S4: Membership in oncology-specific organizations

Organization	*n* (%)
Oncology Association of Naturopathic Physicians	61 (64)
Society for Integrative Oncology	10 (10)
American Society of Clinical Oncology	6 (6)
Multinational Association of Supportive Care in Cancer	2 (2)
Other	7 (7)
Not a member of any organizations	32 (33)

N = 96 respondents from the cancer stream. Three respondents did not provide a response. Multiple selections were permitted.

TABLE S5: How often naturopathic doctors communicate with other practitioners

Frequency	*n* (%)
Conventional medical providers	
Frequently (at least once per week)	27 (27)
Occasionally (at least once per month)	27 (27)
Rarely (less than once per month)	35 (35)
Never	10 (10)
Allied healthcare providers	
Frequently (at least once per week)	40 (40)
Occasionally (at least once per month)	40 (40)
Rarely (less than once per month)	18 (18)
Never	1 (1)

N = 99 respondents from the cancer stream.

TABLE S6: How often naturopathic doctors provide cancer care for the following age ranges

Age Range (years)	Frequently (3)	Occasionally (2)	Rarely (1)	Never (0)	Mean Score (/3)	N (responses)
< 12	2 (2%)	5 (5%)	27 (30%)	57 (63%)	0.5	91
From 12 to 17	3 (3%)	7 (8%)	36 (40%)	45 (49%)	0.6	91
From 18 to 39	15 (16%)	46 (49%)	24 (26%)	9 (10%)	1.7	94
From 40 to 64	75 (76%)	17 (17%)	7 (7%)	0	2.7	99
> 64	68 (69%)	24 (24%)	6 (6%)	1 (1%)	2.6	99

Responses provided by the cancer stream only. Number of responses differs as some participants did not respond to each prompt.

TABLE S7: How often naturopathic doctors provide care for the following cancer types

Cancer Type	Frequently (3)	Occasionally (2)	Rarely (1)	Never (0)	Mean score (/3)	N (responses)
Breast	80 (82%)	13 (13%)	4 (4%)	0	2.8	97
Gastrointestinal	60 (61%)	24 (25%)	13 (13%)	2 (2%)	2.4	99
Gynecological	48 (48%)	37 (38%)	11 (11%)	2 (2%)	2.3	98
Urogenital	42 (42%)	35 (35%)	17 (18%)	5 (5%)	2.1	99
Hematological	29 (29%)	40 (40%)	23 (23%)	7 (7%)	1.9	99
Thoracic	19 (20%)	31 (32%)	31 (32%)	16 (16%)	1.5	97
Brain & CNS	12 (12%)	40 (41%)	33 (34%)	13 (13%)	1.5	98
Head/Neck	11 (11%)	38 (39%)	33 (34%)	15 (15%)	1.5	97
Skin	4 (4%)	46 (47%)	43 (44%)	5 (5%)	1.5	98
Sarcoma	4 (4%)	31 (32%)	40 (42%)	21 (22%)	1.2	96

Responses provided by the cancer stream only. Number of responses differs as some participants did not respond to every prompt. CNS: Central nervous system

TABLE S8 (Part 1 of 2): Tabular breakdown of knowledge gaps

Item	No Gap (0)	Minor Gap (1)	Moderate Gap (2)	Major Gap (3)	Mean Score (/3)	Not Applicable[a]
Interactions between integrative treatments and conventional treatments						
Photodynamic therapy	5 (8%)	14 (22%)	19 (29%)	27 (42%)	2.0	34
Stem cell transplant	11 (12%)	18 (20%)	33 (37%)	28 (31%)	1.9	9
Oral targeted therapies	16 (17%)	30 (31%)	31 (32%)	19 (20%)	1.6	3
Monoclonal antibodies	18 (18%)	32 (33%)	27 (28%)	21 (21%)	1.5	1
Radiation therapy	23 (23%)	47 (47%)	21 (21%)	8 (8%)	1.1	0
Chemotherapy	22 (22%)	48 (49%)	21 (21%)	7 (7%)	1.1	1
Hormonal therapy	30 (30%)	44 (44%)	21 (21%)	4 (4%)	1.0	0
Surgery	40 (40%)	40 (40%)	14 (14%)	5 (5%)	0.8	0
Management of symptoms and side effects associated with cancer and/or cancer treatments						
Tinnitus	19 (20%)	30 (31%)	30 (31%)	18 (19%)	1.5	2
Sexual and reproductive issues	17 (17%)	47 (48%)	25 (27%)	9 (9%)	1.3	1
PPE	30 (32%)	18 (19%)	31 (33%)	14 (15%)	1.3	6
Acneiform rash	23 (25%)	38 (41%)	22 (24%)	10 (11%)	1.2	6
Nephrotoxicity	29 (29%)	34 (34%)	26 (26%)	10 (10%)	1.2	0
Taste and smell loss	31 (31%)	36 (36%)	26 (26%)	6 (6%)	1.1	0
Pain	32 (33%)	33 (34%)	26 (27%)	6 (6%)	1.1	2
Alopecia	34 (35%)	26 (27%)	26 (27%)	10 (10%)	1.1	3
Xerostomia	35 (36%)	31 (32%)	22 (23%)	9 (9%)	1.1	2
Cystitis and incontinence	28 (29%)	49 (50%)	16 (16%)	5 (5%)	1.0	1
Thrombocytopenia	31 (31%)	41 (41%)	21 (21%)	6 (6%)	1.0	0
Cardiotoxicity	37 (37%)	35 (35%)	20 (20%)	7 (7%)	1.0	0
Radiation dermatitis	37 (38%)	32 (33%)	22 (23%)	6 (6%)	1.0	2
Hepatotoxicity	38 (38%)	38 (38%)	19 (19%)	4 (4%)	0.9	0
Oral thrush	38 (39%)	39 (40%)	17 (17%)	4 (4%)	0.9	1
Cognitive changes	40 (41%)	38 (39%)	14 (14%)	6 (6%)	0.9	1
Neutropenia	44 (44%)	36 (36%)	16 (16%)	3 (3%)	0.8	0
Peripheral neuropathy	46 (46%)	34 (34%)	15 (15%)	4 (4%)	0.8	0
Cachexia and weight loss	44 (44%)	39 (39%)	14 (14%)	2 (2%)	0.7	0
Mucositis	47 (48%)	40 (41%)	9 (9%)	2 (2%)	0.7	1
Insomnia	48 (48%)	38 (38%)	12 (12%)	1 (1%)	0.7	0
Depression	46 (46%)	44 (44%)	7 (7%)	2 (2%)	0.6	0
Hot flashes	47 (47%)	43 (43%)	9 (9%)	0	0.6	0
Fatigue	48 (48%)	42 (42%)	8 (8%)	1 (1%)	0.6	0
Appetite loss	49 (49%)	36 (36%)	14 (14%)	0	0.6	0
Arthralgia	50 (50%)	38 (38%)	9 (9%)	2 (2%)	0.6	0
Diarrhea	52 (53%)	40 (40%)	5 (5%)	2 (2%)	0.6	0
Osteopenia/osteoporosis	53 (54%)	32 (32%)	11 (11%)	3 (3%)	0.6	0
Nausea and vomiting	54 (55%)	35 (35%)	7 (7%)	3 (3%)	0.6	0
Anemia	54 (55%)	30 (30%)	14 (14%)	1 (1%)	0.6	0
Anxiety	54 (55%)	39 (39%)	6 (6%)	0	0.5	0
Constipation	65 (66%)	29 (29%)	5 (5%)	0	0.4	0
Natural health products for patients with cancer						
Homeopathic remedies	21 (28%)	23 (31%)	22 (30%)	8 (11%)	1.2	25
Herbal/botanical medicine	43 (43%)	41 (41%)	12 (12%)	3 (3%)	0.7	0
Pro-/pre-/synbiotics	46 (48%)	38 (40%)	8 (8%)	4 (4%)	0.7	3
Nutritional supplements	50 (50%)	38 (38%)	8 (8%)	3 (3%)	0.6	0

TABLE S8 (Part 2 of 2): Tabular breakdown of knowledge gaps

Item	No Gap (0)	Minor Gap (1)	Moderate Gap (2)	Major Gap (3)	Mean Score (/3)	Not Applicable[a]
Specific diets for patients with cancer (missing n = 1)						
Low residue diet	19 (23%)	35 (40%)	20 (23%)	12 (14%)	1.3	12
Ketogenic diet	37 (39%)	38 (40%)	17 (18%)	4 (4%)	0.9	2
Fasting	44 (46%)	35 (36%)	15 (16%)	2 (2%)	0.7	2
Mediterranean diet	69 (70%)	20 (20%)	4 (4%)	5 (5%)	0.4	0
Injectable therapies for patients with cancer						
EGCG infusion	1 (2%)	8 (19%)	17 (40%)	16 (38%)	2.1	57
Curcumin infusion	6 (13%)	16 (33%)	17 (35%)	9 (19%)	1.6	51
DCA infusion	8 (17%)	13 (28%)	19 (40%)	7 (15%)	1.5	52
Poly-MVA infusion	8 (19%)	13 (30%)	14 (33%)	8 (19%)	1.5	56
Artesunate infusion	14 (27%)	15 (29%)	17 (33%)	6 (12%)	1.3	47
Mistletoe infusion	22 (32%)	22 (32%)	15 (22%)	9 (13%)	1.2	31
ALA infusion	22 (37%)	18 (31%)	14 (24%)	5 (8%)	1.0	40
Amino acid infusion	22 (38%)	20 (34%)	13 (22%)	3 (5%)	0.9	41
Mistletoe injection	40 (48%)	26 (31%)	11 (13%)	6 (7%)	0.8	16
Vitamin C infusion	49 (62%)	23 (29%)	5 (6%)	2 (3%)	0.5	20
Vitamin/mineral infusion	54 (70%)	16 (21%)	3 (4%)	4 (5%)	0.4	22
Modalities for patients with cancer						
Photodynamic therapy	4 (10%)	11 (28%)	12 (30%)	13 (33%)	1.8	59
Ozone therapy	11 (20%)	13 (24%)	20 (37%)	10 (19%)	1.5	45
LLLT	14 (22%)	20 (31%)	16 (25%)	14 (22%)	1.5	35
LRHT	16 (27%)	15 (25%)	18 (30%)	11 (18%)	1.4	39
Hyperbaric oxygen	18 (28%)	17 (27%)	17 (27%)	12 (19%)	1.4	35
Off-label prescription drugs	15 (20%)	29 (38%)	25 (33%)	7 (9%)	1.3	23
Cannabis	18 (23%)	33 (41%)	22 (28%)	7 (9%)	1.2	19
Non-prescription drugs	31 (37%)	31 (37%)	18 (21%)	4 (5%)	0.9	15
Physical medicine and BBT	37 (44%)	26 (31%)	18 (21%)	3 (4%)	0.8	14
Acupuncture and TCM	39 (46%)	27 (32%)	13 (15%)	6 (7%)	0.8	14
Mental health counselling	46 (50%)	29 (32%)	15 (16%)	2 (2%)	0.7	7
Mind–body therapies	47 (53%)	28 (32%)	12 (14%)	1 (1%)	0.6	11
Hydrotherapy	49 (56%)	28 (32%)	8 (9%)	3 (3%)	0.6	11
Exercise counselling	56 (57%)	33 (34%)	7 (7%)	2 (2%)	0.5	1
Finding, appraising, and implementing new evidence						
Searching for new info	32 (32%)	38 (38%)	17 (17%)	12 (12%)	1.1	0
Critically appraising new info	28 (28%)	45 (45%)	21 (21%)	5 (5%)	1.0	0
Applying new info in practice	29 (29%)	45 (45%)	18 (18%)	7 (7%)	1.0	0

N = 99 respondents from the cancer stream. ALA: Alpha lipoic acid; BBT: Body-based therapies; DCA: Dichloroacetate; EGCG: Epigallocatechin gallate; LLLT: Low level laser therapy; LRHT: Locoregional hyperthermia; PPE: Palmar plantar erythrodysesthesia; Poly-MVA: proprietary blend of "minerals, vitamins and amino acids"; TCM: Traditional Chinese medicine.

[a] Respondents were asked to select "not applicable" if they do not work with patients receiving a particular conventional treatment, if the naturopathic therapies were not within their scope of practice, or if they do not use a given naturopathic therapy in their practice.

TABLE S9 (Part 1 of 2): Knowledge gap comparison based on percent of practice related to cancer

Item	≤ 25% of Practice Cancer-Focused		> 25% of Practice Cancer-Focused		*P* value
	No Gap + Minor Gap	Moderate + Major Gap	No Gap + Minor Gap	Moderate + Major Gap	
Interactions between integrative treatments and conventional treatments					
Photodynamic therapy	4 (14%)	24 (86%)	15 (41%)	22 (59%)	0.02
Stem cell transplant	7 (19%)	29 (81%)	22 (41%)	32 (59%)	0.03
Oral targeted therapies	9 (23%)	30 (77%)	37 (65%)	20 (35%)	< 0.001
Monoclonal antibodies	14 (34%)	27 (66%)	36 (63%)	21 (37%)	0.005
Radiation therapy	26 (62%)	16 (38%)	44 (77%)	13 (23%)	0.10
Chemotherapy	19 (46%)	22 (54%)	51 (89%)	6 (11%)	< 0.001
Hormonal therapy	27 (64%)	15 (36%)	47 (82%)	10 (18%)	0.04
Total for category	**106 (39%)**	**163 (61%)**	**252 (67%)**	**124 (33%)**	**< 0.001**
Management of symptoms and side effects associated with cancer and/or cancer treatments					
Tinnitus	17 (41%)	24 (59%)	32 (57%)	24 (43%)	0.13
Sexual and reproductive issues	24 (57%)	18 (43%)	40 (71%)	16 (29%)	0.14
PPE	9 (24%)	29 (76%)	39 (71%)	16 (29%)	< 0.001
Acneiform rash	24 (63%)	14 (37%)	37 (67%)	18 (33%)	0.68
Nephrotoxicity	21 (50%)	21 (50%)	42 (74%)	15 (26%)	0.02
Taste and smell loss	24 (57%)	18 (43%)	43 (75%)	14 (25%)	0.54
Pain	29 (69%)	13 (31%)	36 (65%)	19 (35%)	0.71
Alopecia	23 (56%)	18 (44%)	37 (67%)	18 (33%)	0.26
Xerostomia	25 (60%)	17 (40%)	41 (75%)	14 (25%)	0.12
Cystitis and incontinence	33 (79%)	9 (21%)	44 (79%)	12 (21%)	> 0.99
Thrombocytopenia	25 (60%)	17 (40%)	47 (82%)	10 (18%)	0.01
Cardiotoxicity	23 (55%)	19 (45%)	49 (86%)	8 (14%)	0.001
Radiation dermatitis	21 (53%)	19 (48%)	48 (84%)	9 (16%)	0.001
Hepatotoxicity	30 (71%)	12 (29%)	46 (81%)	11 (19%)	0.28
Oral thrush	33 (79%)	9 (21%)	44 (79%)	12 (21%)	> 0.99
Cognitive changes	29 (71%)	12 (29%)	49 (86%)	8 (14%)	0.06
Total for category	**390 (59%)**	**269 (41%)**	**674 (75%)**	**224 (25%)**	**< 0.001**
Specific diets for patients with cancer					
Low residue diet	18 (51%)	17 (49%)	36 (71%)	15 (29%)	0.07
Ketogenic diet	28 (68%)	13 (32%)	47 (85%)	8 (15%)	0.04
Total for category	**46 (61%)**	**30 (39%)**	**83 (78%)**	**23 (22%)**	**0.009**
Injectable therapies for patients with cancer					
EGCG infusion	2 (11%)	16 (89%)	7 (29%)	17 (71%)	0.16
Curcumin infusion	6 (30%)	14 (70%)	16 (57%)	12 (43%)	0.06
DCA infusion	6 (30%)	14 (70%)	15 (56%)	12 (44%)	0.08
Poly-MVA infusion	8 (44%)	10 (56%)	13 (52%)	12 (48%)	0.62
Artesunate infusion	9 (45%)	11 (55%)	20 (63%)	12 (38%)	0.22
Mistletoe infusion	13 (52%)	12 (48%)	31 (72%)	12 (28%)	0.09
ALA infusion	13 (54%)	11 (46%)	27 (77%)	8 (23%)	0.06
Amino acid infusion	14 (58%)	10 (42%)	28 (82%)	6 (18%)	0.04
Mistletoe injection	19 (66%)	10 (34%)	47 (87%)	7 (13%)	0.02
Total for category	**90 (45%)**	**108 (55%)**	**204 (68%)**	**98 (32%)**	**< 0.001**

TABLE S9 (Part 2 of 2): Knowledge gap comparison based on percent of practice related to cancer

Item	≤ 25% of Practice Cancer-Focused		> 25% of Practice Cancer-Focused		*P* value
	No Gap + Minor Gap	Moderate + Major Gap	No Gap + Minor Gap	Moderate + Major Gap	
Modalities for patients with cancer					
Photodynamic therapy	3 (20%)	12 (80%)	12 (48%)	13 (52%)	0.08
Ozone therapy	7 (33%)	14 (67%)	17 (52%)	16 (48%)	0.19
LLLT	13 (54%)	11 (46%)	21 (53%)	19 (48%)	0.90
LRHT	8 (33%)	16 (67%)	23 (64%)	13 (36%)	0.02
Hyperbaric oxygen	15 (58%)	11 (42%)	20 (53%)	18 (47%)	0.69
Off-label prescription drugs	10 (37%)	17 (63%)	34 (69%)	15 (31%)	0.006
Cannabis	16 (47%)	18 (53%)	35 (76%)	11 (24%)	0.008
Non-prescription drugs	21 (62%)	13 (38%)	41 (82%)	9 (18%)	0.04
Physical medicine & BBT	29 (83%)	6 (17%)	34 (69%)	15 (31%)	0.16
Acupuncture and TCM	27 (75%)	9 (25%)	39 (80%)	10 (20%)	0.62
Total for category	**149 (54%)**	**127 (46%)**	**276 (67%)**	**139 (33%)**	**0.001**

P value calculated using Chi-square test. Total for each category counts each patient multiple times. ALA: Alpha lipoic acid; BBT: Body-based therapies; DCA: Dichloroacetate; EGCG: Epigallocatechin gallate; LLLT: Low level laser therapy; LRHT: Locoregional hyperthermia; PPE: Palmar plantar erythrodysesthesia; Poly-MVA: proprietary blend of "minerals, vitamins and amino acids"; TCM: Traditional Chinese medicine.

TABLE S10: Ways naturopathic doctors obtain information

Item	Frequently (3)	Occasionally (2)	Rarely (1)	Never (0)	Mean Score (/3)	N (responses)
Direct access to literature through journals	103 (69%)	40 (27%)	5 (3%)	1 (1%)	2.6	149
Professional resources and databases	87 (58%)	47 (32%)	12 (8%)	3 (2%)	2.5	149
Discussion with colleagues	63 (43%)	68 (46%)	15 (10%)	2 (1%)	2.3	148
Conferences, webinars, or seminars	62 (42%)	71 (48%)	15 (10%)	0	2.3	148
Textbooks	30 (20%)	56 (38%)	51 (34%)	11 (7%)	1.7	148
KNOW website	21 (22%)	23 (24%)	21 (22%)	31 (32%)	1.3	96[a]
Lay (non-scientific) resources	21 (14%)	28 (19%)	77 (52%)	23 (15%)	1.3	149

Number of responses differs as some participants did not respond to each prompt. Only includes respondents from the cancer stream.
KNOW: Knowledge in Integrative Oncology.

TABLE S11: Degree of preference for various resources

Item	I Love This Resource (3)	I Like This Resource (2)	I Somewhat Lke This Resource (1)	I Do Not Like This Resource (0)	Mean Score (/3)	N (responses)
Clinical decision aid	85 (59%)	35 (24%)	22 (15%)	3 (2%)	2.4	145
Conference presentations	67 (46%)	58 (39%)	20 (14%)	2 (1%)	2.3	147
Professional monographs	68 (46%)	56 (38%)	22 (15%)	3 (2%)	2.3	149
Webinars	66 (45%)	65 (44%)	15 (10%)	2 (1%)	2.3	148
Clinical practice guideline	65 (45%)	48 (33%)	27 (19%)	4 (3%)	2.2	144
Courses or fellowship programs	56 (39%)	60 (42%)	23 (16%)	5 (3%)	2.2	144

Number of responses differs as some participants did not respond to each prompt.

TABLE S12: Interest in providing cancer care

Question	*n* (%)
Are you interested in developing your skills in order to support people with cancer?	
Yes	23 (46)
No	11 (22)
Unsure	16 (32)
Regarding why you don't currently work with cancer populations, please indicate which of the following barriers/reasons are relevant to you. (Multiple selections permitted. Those who selected "No" above, n = 11, excluded)	
There is no demand or need in my community	4 (10)
I don't have the knowledge or training to do so	31 (79)
I am concerned about legal/liability issues and/or regulatory restrictions	12 (31)
I am concerned about the emotional burden	14 (36)
Other	6 (15)
Would the availability of better training and resources for naturopathic oncology increase your likelihood of working with this population?	
Yes	29 (74)
No	0
Unsure	10 (26)

N = 50 respondents from the general stream.

TABLE S13: Time spent on continuing education

Hours Per Week	General Stream *n* (%)	Cancer Stream *n* (%)	Total *n* (%)
≤ 1 hour	9 (18)	16 (16)	25 (17)
2 hours	20 (40)	42 (42)	62 (42)
3 hours	8 (16)	15 (15)	23 (15)
≥ 4 hours	13 (26)	26 (26)	39 (26)

General *n* = 50; Cancer *n* = 99; Total N = 149.

TABLE S14: Would you support the development of clinical practice guidelines or decision-making tools for naturopathic therapies in cancer care?

Degree of Support	General Stream *n* (%)	Cancer Stream *n* (%)	Total *n* (%)
Yes, strongly	37 (74)	74 (75)	112 (74)
Yes, somewhat	10 (20)	16 (16)	26 (17)
Unsure	2 (4)	6 (6)	8 (5)
No	1 (2)	3 (3)	4 (3)

General *n* = 50; Cancer *n* = 99; Total *N* = 149.

Step-Up Regenerative Injection Therapy for Severe Chronic Low Back Pain Utilizing Epidural Dextrose Solution (Prolotherapy), Local Platelet-Rich Plasma, and Epidural Platelet-Rich Plasma: A Case Report and Suggested Protocol

Jessica Hobson,[1,2*] ND, and **Andrew Vargo,**[3] MD

ABSTRACT

Chronic low back pain (CLBP) is a prevalent problem that rarely resolves completely and frequently has a negative impact on mood, activity, and mobility. Conservative pharmacologic and non-pharmacologic therapies have limited efficacy, and there is an unmet therapeutic need for these patients. The authors report a case of a 38-year-old male patient with a 6-year history of moderate to severe back pain, significantly impaired mobility and neurologic deficits that were resistant to a wide range of conservative therapies. Physical exam and magnetic resonance imaging (MRI) revealed evidence of radiculopathy, with impaired sensation and strength that was consistent with a right L5 nerve root impingement. Repeated caudal epidural injection of dextrose solution caused rapid, though not durable, improvement in symptoms and mobility, with some effect on neurologic findings. Stepping up to caudal epidural platelet-rich plasma (PRP) injection combined with articular PRP injections at the sacroiliac joint and lumbar facet joints resulted in almost complete resolution of pain, marked improvements in mobility and resumption of physical activity. Also, after caudal epidural PRP injection the patient regained sensation and function over the right L5 distribution for the first time in 6 years. The injections were well tolerated, and the patient was very pleased with the therapy. The case report also includes a brief review of and suggested approach to injection therapy for the naturopathic physician treating resistant CLBP.

Key Words PRP, degenerative disc disease, disc herniation, discogenic back pain, caudal epidural, facet arthropathy, lumbar radiculopathy

INTRODUCTION

Chronic low back pain (CLBP) is a prevalent problem in North America. A recent survey found that as many as 8% of those in the general US population report CLBP that is severe and the majority experience limitations in mobility and ability to work.[1] Meta-analysis has shown that both acute and subacute low back pain have a favourable prognosis in terms of resolution of pain and disability. However, mean pain and disability scores in non-interventional cohort trials that evaluate the course of CLBP (defined as pain that is present for longer than 12 weeks) show limited improvement over time.[2] The Cochrane Database of Systematic Reviews includes meta-analyses that conclude that exercise therapies,[3] yoga,[4] and a multi-disciplinary biopsychosocial approach to CLBP[5] show mild to modest improvements in pain and disability. A Cochrane meta-analysis found that pharmacologic therapies other than opioids are either mildly effective or not effective.[6] There was good evidence for a modest reduction in pain with opioids, but the potential for dependence and the adverse effect profile of opioids, including dependence and hyperalgesia, are well-known, which necessitates close patient monitoring.[7]

A wide range of pathologic entities can be responsible for CLBP, including lumbar radiculopathy, neuropathic pain, spinal stenosis, post-surgical pain, and non-specific CLBP.[8] Controlled trials demonstrate that a wide range of injections are effective for CLBP, regardless of the cause. More evidence is accumulating to

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support the efficacy of what are termed "regenerative injections"; two examples of regenerative injectants include dextrose solutions (either isotonic or hypertonic, known as prolotherapy) and platelet-rich plasma (PRP).[9,10,11] A wide range of structures can be injected, including facet joints, intervertebral discs, and the epidural space. Caudal epidural injections of dextrose solution or PRP are intriguing because studies seem to indicate that they are efficacious in CLBP associated with multiple etiologies and the procedure is relatively simple, technically speaking, compared with facet joint or intradiscal injections.[9]

This paper describes a patient with refractory CLBP who experienced significant and prolonged improvements in pain, disability, and neurological complications associated with lumbar radiculopathy after 4 dextrose solution and 2 PRP caudal epidural injections. This case report was prepared following the CARE guidelines.[12]

CASE DESCRIPTION

The patient is a 38-year-old Caucasian man with a history of intermittent back pain for more than 10 years. His CLBP was exacerbated by a chiropractic manipulation in 2018, and since then he has experienced loss of mobility, limitation of work activities, and hypoesthesia over his right great toe. He is a construction labourer by trade and does not smoke, drink, or use any illicit substances. Prior to his back pain his recreational physical activity included weightlifting, which he had to modify or discontinue due to pain and mobility limitations. He slipped and fell on ice in February 2024, and since then, his CLBP was exacerbated to the point where he had to miss work and could only engage in swimming as a recreational activity. On the date of the first visit with the author (18 May 2024) his chief complaint was severe left-sided lower back pain (reported as 7–8/10 in severity), difficulty mobilizing, difficulty sleeping due to pain, and numbness in the right big toe. The patient's therapies at that time included pregabalin, massage therapy, acupuncture, and disc decompression as well as therapeutic exercise from a physiotherapist. The patient reported mild benefits which were not long-lasting after physiotherapy and no significant benefit from the other treatments.

On the first visit, the patient was obviously uncomfortable, and he had significant difficulty walking and standing from a seated position. On physical exam, posterior pelvic tilt and spasm in the erector spinae and gluteus complex were noted, without muscle atrophy. Gait was antalgic with notably reduced push-off strength on the left side. Diffuse tenderness and increased muscle tone were noted on palpation of the lower lumbar erector spinae and gluteus muscles, as well as tenderness over the lumbar spinal processes, sacro-iliac (SI) joint, and facet joints—the area of greatest pain was between L5 and S1. Neurological exam revealed weakness in right great toe dorsiflexion (L5) and decreased sensation to light touch and sharp stimuli over the dorsum of the right foot and great toe (L5). The Achilles reflex was diminished on the right side. Straight-leg raise was positive on the right side, with radicular pain radiating into the great toe. Slump test was positive. FABER test and Gaenslen's test were negative, and there was no report of saddle anesthesia or bowel/bladder complaints.

Magnetic resonance imaging (MRI) performed on 18 April 2024 reported the following:

- L3–L4 disc desiccation and mild diffuse disc bulge that flattens the thecal sac as well as a 6-mm left foraminal disc protrusion with an extruded component that migrated superiorly 10 mm, causing left foraminal narrowing with compression of the L3 nerve roots. Mild right foraminal narrowing and facet arthropathy were also noted.
- L4–L5 disc desiccation and mild diffuse disc bulge is present with a posterior annular tear and 2-mm disc protrusion. No spinal stenosis, but mild facet arthropathy and mild foraminal narrowing were noted.
- L5–S1 disc desiccation and mild diffuse disc bulge as well as a right paracentral tear and disc protrusion that measures 4 mm and indents the right side of the thecal sac. The protrusion compresses nerve roots posteriorly on the right side.

Based on the history, physical exam findings, and imaging the patient and author agreed on caudal epidural dextrose injections (prolotherapy). The injectant was 20 mL of 5% dextrose in water (D5W) which was administered using ultrasound guidance. The injection was repeated 3 times for a total of 4 dextrose solution injections (each one 20 mL); the injections were given at 1-week intervals, and the concentration of dextrose was increased by 5% each week (last injection was 20 mL of D20W). The patient reported a very good pain response to the injections each time, with a drop in pain levels early on (after 4 hours) such that the pain was reported as mild (1–2/10). Four to five days post-epidural dextrose solution, pain came back to a moderate level (4/10) in a consistent fashion. During this period, the patient reported more restful sleep.

After the fourth dextrose solution injection, the patient wished to step up to epidural PRP combined with PRP injections into the facet joints that were most likely contributing to his symptoms based on imaging (L4/L5 and L3/L4 facets). Two weeks after the last dextrose solution epidural (June 25, 2024), 10 mL of 5% hematocrit PRP was injected into the epidural space and 0.5 mL of 2% hematocrit PRP was injected into the facet joints under ultrasound guidance. Additional 2% hematocrit PRP (0.5 mL each site) was injected into the left base of the sacro-iliac joint and the left gluteus maximus insertion point. Platelet-poor plasma was injected into multiple trigger points (0.5 mL each) on the left side. The patient reported that 4 days after the first PRP injections his back pain had almost completely resolved, and he regained sensation in his right great toe—he had not had sensation in that toe for the last 6 years. His ambulation and mobility had greatly improved, and he was able to engage in bodyweight strength training with minimal discomfort. The patient requested an additional PRP epidural on July 10, even though his CLBP symptoms had not returned since the last epidural. 10 mL of 7% hematocrit PRP was injected caudally into the epidural space and the same facet and sacro-iliac joint sites as his first PRP treatment. Since the last PRP treatment the patient has not needed any further injection therapy. As of January

2025, he has returned to full duties at work, he feels no limitations in activity, and he ranks his back pain at less than 1/10 (more than 6 months later). Table 1 outlines additional details of the injectant composition and preparation for the dextrose solutions and PRP.

The patient improved objectively in a steady fashion throughout the course of therapy. Assessment at the appointment for the second PRP epidural showed that his gait was no longer antalgic and he mobilized on the table easily. His posture was more upright with minimal pelvic tilt or lumbar flattening. His strength had normalized, and his plantar reflexes became symmetrical. He was very satisfied with the results—it would not be an exaggeration to say that he seemed elated. To quote from a written testimonial sent to the author, he was "…shouting from the mountaintops that the pain dropped to a manageable level" after the first D5W epidural, and "Sleep actually started to become a time of repair, as [he woke] up feeling better than the day before" after the third dextrose solution (D15W) epidural. After the first PRP epidural he described, "…concentration starting to go back up… Tuesday was the first day where I could focus on something else instead of just the pain." The patient noticed no adverse effects with any of the injection therapies outside of transient stiffness and mild discomfort for 2 to 3 days after PRP injections, and he gave signed consent for his case to be published. Figure 1 illustrates the injection schedule, the injectant used, and the clinical findings at selected timepoints.

DISCUSSION

Regenerative injection therapy using dextrose solution or PRP has been used for years, and clinical trial data is accumulating to support its efficacy and safety. Caudal epidural injections using these injectants are a newer approach, with few clinical studies. A double-blind, randomized placebo-controlled trial conducted in 2016 using caudal epidural D5W injections for patients with CLBP showed a 70% decrease in pain scores hours after the injection, with gradual (days) re-emergence of low back pain; 2 weeks after the epidural, there was a 30% reduction in pain scores compared with baseline.[9] An open-label extension of this trial showed that with 12 months of follow-up, between 5 and 6 injections on average were needed for patients to maintain a statistically and clinically significant long-term reduction in pain and disability scores of 52% and 42%, respectively.[13] Two small recent trials, both randomized and controlled, found that a single epidural injection of PRP was effective at improving disability and CLBP.[14,15] Both studies used an active control (triamcinolone) and both showed that epidural PRP was superior to epidural glucocorticoid for pain and disability improvement after 24 weeks. Injected glucocorticoid is the only other epidural therapy for CLBP that the authors are aware of that lasts longer than a few days. A Cochrane meta-analysis found low- to moderate-quality evidence that epidural corticosteroid injections are somewhat effective for lumbosacral radicular pain in the short term, so epidural D5W and/or PRP injections could plausibly become an important part of non-surgical care.[16] The biological mechanism of action for epidural D5W has not been clearly defined, though the authors of the randomized controlled trial (RCT) cited above suggest a few theories based on animal studies.[13] Among them are modulation of transient receptor potential vanilloid 1 (TRPV-1) cation channels or other channels, such as the acid-sensing ion channel (ASIC); animal studies have found that dextrose solutions impact the activity of these channels, which are implicated in models of chronic pain.[17] Human studies have shown that multiple spine-associated structures, notably intervertebral discs and facet joints, experience increased nociceptive fibre sprouting in response to damage—these fibres could be impacted by local dextrose solution and its modulation of TRPV-1 and ASIC channel activity. Reduced pain sensation could also lead to improved function of spinal stabilizers such as the multifidus and erector spinae, which can be inhibited by spinal pain sensation.[8] It remains to be proven whether this or other mechanisms are responsible for the benefit of dextrose solution caudal epidurals, since no mechanistic studies have been conducted to date in animal or human models. The impact of PRP on CLBP may be due to increased disc resorption and reduced inflammation through the release of platelet-derived growth factors and anti-inflammatory cytokines, respectively. It could also be due to improved resorption of herniated disc components, as seen in animal models.[10,11] Although trials have established the efficacy of PRP in CLBP, the mechanism has not been clearly proven in human subjects, and changes on imaging are modest if present at all.[10,15]

TABLE 1 Injectant and Procedure Description

Injectant	Preparation	Cellular Composition	Volumes
Sterile dextrose in water: 5–20 g/100 mL of water	Stock D5W solution or dilution of D50W	N/A	20 mL in epidural space
Epidural PRP #1 (25 June 2024)	180 mL whole blood starting volume, final PRP volume 8 mL	5% hematocrit 2.09 × 10^6 platelets/uL 2.30 × 10^4 leukocytes/uL	10 mL in epidural space
Epidural PRP #2 (10 July 2024)	180 mL whole blood starting volume, final PRP volume 10 mL	7% hematocrit 1.88 × 10^6 platelets/uL 2.35 × 10^4 leukocytes/uL	10 mL in epidural space
PRP for facets and SIJ	180 mL whole blood starting volume, final PRP volume 6 mL	2% hematocrit 1.76 × 10^6 platelets/uL 6.88 × 10^3 leukocytes/uL	0.5 mL peri- and intraarticular

PRP = platelet-rich plasma; SIJ = sacro-iliac joint.

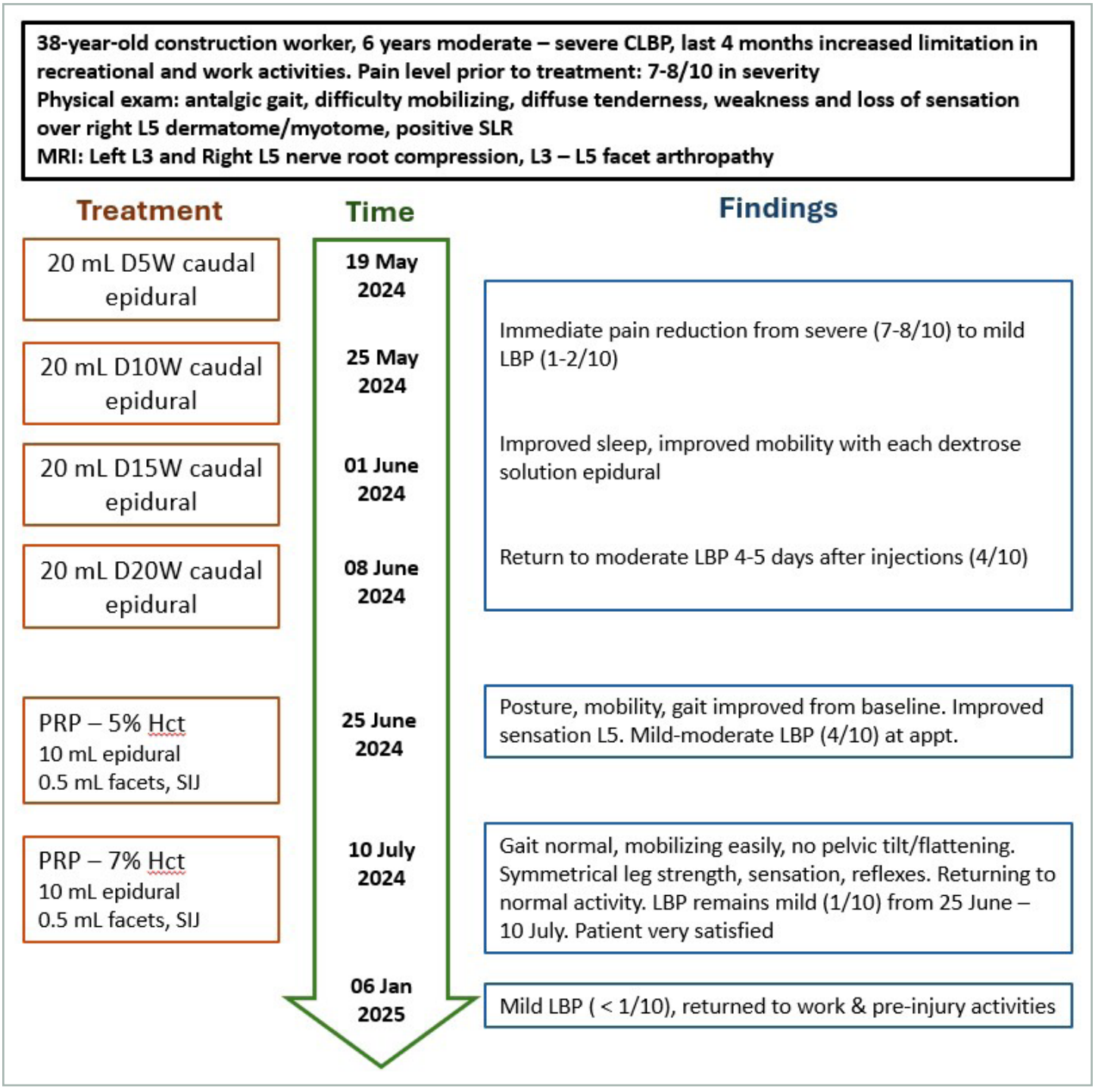

FIGURE 1 Timeline of Interventions and Salient Clinical Findings
CLPB = chronic low back pain; SLR = straight leg raise; MRI = magnetic resonance imaging; D#W = g of dextrose/100 mL of water; PRP = platelet-rich plasma; LBP = low back pain; Hct = hematocrit; SIJ = sacro-iliac joint.

One of the strengths of this regimen was its step-up nature. When the cheaper, more frequently administered therapy—epidural dextrose solution—showed good but not optimal results, the patient chose PRP injections in multiple sites—epidural, facet joints, and the sacro-iliac joint. This responsive approach may have resulted in more robust clinical outcomes. It was guided by both imaging and clinical findings and likely reflects clinical practice better than a RCT. A limitation of this case report is that one cannot be sure what aspect of the intervention was most responsible for the patient's improvement, since all of the injection strategies have evidence of efficacy.[10] There is no way of knowing whether the epidural dextrose solution would have had the same results as PRP if further injections had been conducted. There is also no way of knowing if the improvement in the patients' symptoms after PRP injections was due to the caudal epidural or the facet joint injections. However, the authors think that epidural PRP was

responsible for the bulk of the improvement, as it is unlikely that the facet joint injections would have had an impact on radicular symptoms. Another weakness of this case report is the relatively short follow-up—the last check-in with this patient was in January 2025 (just over 6 months after the last PRP injections). However, the patient was very pleased with the treatment, his CLBP has almost completely resolved, his objective neurologic findings have resolved, and he has been able to return to work. These are durable and highly clinically significant outcomes. Unfortunately, the author did not use a validated disability scale such as the Oswestry Disability Index (ODI) to quantify improvements; future case reports would benefit from incorporation of validated indices of treatment response.[18]

Finally, as with all uncontrolled studies, it is impossible to know for certain if the patient's symptoms resolved on their own independently of injection therapy or if the placebo effect was responsible. The clear temporal association between therapy and improvement of symptoms in the setting of CLBP that had been moderate to severe for years argues against spontaneous resolution of symptoms. Objective findings such as reflexes, sensation, and muscle strength showed an excellent response to therapy, in addition to reported pain. A number of trials, including a meta-analysis and a randomized trial of open label placebo injections, found evidence that placebo medications and sham procedures show clear benefit for pain and disability scores in CLBP. These trials did not report any benefit for objective neurological findings.[19,20] Undoubtedly the placebo effect provided some benefit, but the authors feel it is unlikely that it was solely responsible. To support this, placebo-controlled RCTs for both dextrose solution[9,13] and PRP caudal epidural injection[14,15] have demonstrated efficacy in CLBP.

This case report uses a similar approach, in terms of injectant and technique, to the one controlled study on epidural therapy using dextrose solution for CLBP. The patient opted to increase the concentration of dextrose for each subsequent injection, even though there is no good evidence to suggest concentrations greater than 5% dextrose are necessary. In contrast, there are many different approaches to epidural therapy using PRP. The injectant in trials differs in preparation method, injection technique, and concentration of erythrocytes, leukocytes, and platelets.[14,15] It is therefore difficult to hypothesize an optimal protocol for epidural PRP in CLBP when few trials have been done.

The system the primary author uses for PRP is the Arthrex™ system,[21] which is a self-contained, sterile system that offers modifiable and reproducible cell counts. Other advantages of systems such as this include ease of use and no need for a fume hood. The studies supporting the efficacy of epidural PRP used higher cell counts of both platelets and leukocytes. Intra- or periarticular joint injections typically involve lower cell counts of erythrocytes and leukocytes but high platelet counts, as seen in Table 1. Caudal epidural injections are technically straightforward, and practitioners can become competent at this procedure with a modest amount of training.[22] In contrast, injection of facet joints or structures associated with transverse processes are more technically difficult; the corresponding author recommends pursuing these therapies only after training with an experienced injector and while using ultrasound guidance with a device that can image these structures well. Table 2 lists commonly used injection therapies in naturopathic practice (given that regional regulations designate them as within scope), their most rational indications, a brief description of technical difficulty, and their most common adverse effects.

It is unlikely that there is any "one size fits all" protocol for non-surgical approaches to CLBP given the uncertainty of the pathogenesis, the developing nature of the literature, and individual patient variability. A number of excellent resources exist for diagnosing likely causes of CLBP and ruling out red flags,[23,24] as well as administering trigger point therapy.[25] Recent reviews for PRP[10] and dextrose injections[26] provide additional guidance regarding solution preparation and injection targets. A rational approach to CLBP begins with a thorough history and physical exam to rule out red flags or autoimmune causes. During the history and physical exam the likely cause of the pain can be determined—most causes of CLBP do not require imaging to guide treatment, though it can be helpful if one is aware of the high frequency of radiologic "findings" in the spine and adjacent structures in asymptomatic

TABLE 2 Injection Therapy Options for CLBP

Injection	Indications (based on evidence, experience)	Technical Difficulty/Cost	Notable Adverse Effects
Trigger point (saline ± anaesthetic)	Non-specific LBP, myofascial pain	Low/$	None beyond those for any IM or subcutaneous injection
Dextrose solution D5W (epidural)	Refractory CLBP, neuropathic/radicular pain up to L3	Low–medium (ultrasound guidance not necessary but useful)/$$	None beyond those for any epidural injection
Leukocyte-rich PRP (LrPRP) (epidural)	Refractory CLBP, neuropathic/radicular pain up to L3	Low–medium (ultrasound guidance not necessary but useful)/$$$$$ PRP kits range between CA$350 and CA$500	PRP injections are often significantly more painful than dextrose injections for several days after the procedure
Dextrose solution D15/D20W (specific sites or joints)	Refractory CLBP, physical exam/imaging suggests discrete structures (TVPs, facet joints) contribute to pain	Challenging; recommend ultrasound guidance/$$$	Increased risk of intrathecal injection (facets) or intraperitoneal injection (TVPs)
Low-Hct, lower leukocyte PRP (specific sites or joints)	Refractory CLBP, physical exam/imaging suggests discrete structures (TVPs, facet joints) contribute to pain	Challenging; recommend ultrasound guidance/$$$$$ PRP kits range between CA$350 and CA$500	Increased risk of intrathecal injection (facets) or intraperitoneal injection (TVPs) Increased pain with PRP injections (vs. dextrose)

LBP = low back pain; IM = intramuscular; D#W = g of dextrose/100 mL of water; CLPB = chronic low back pain; PRP = platelet-rich plasma; TVP = transverse processes; Hct = hematocrit.

patients.[23] If physiotherapy, exercise therapy, weight loss, and other conservative approaches do not bring a satisfactory result, then it is logical to pursue trigger point or other superficial local injection procedures. If CLBP is thought to be radicular/neuropathic and related to structures at L3 or lower, then epidural injections are a logical next step. The few studies that have evaluated caudal epidural injection of D5W seem to yield impressive results with few side effects. Since the cost of this procedure is low and it entails a modest level of training, it may be a logical next step prior to injection therapies that cost more (epidural PRP) and may be more uncomfortable. Finally, if imaging or physical exam suggest deeper pathology associated with the lumbar spine then higher concentration dextrose solutions or lower hematocrit, leukocyte-poor PRP may be added to the regimen.

In conclusion, this case report describes a patient with severe CLBP refractory to non-surgical treatment who was experiencing significant disability due to his pain. He responded very well to 4 caudal epidural dextrose solution injections and chose to step up to caudal epidural PRP as well as PRP injections for facet joints and his sacro-iliac joint. More than 6 months after PRP injections, the patient experienced a durable reduction in pain and improvement in mobility and activity. Given the prevalence of CLBP, this type of step-up regimen may be valuable option for many patients.

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CONFLICTS OF INTEREST DISCLOSURE

Dr. Hobson is a trainer for West Coast Injection Training (https://www.westcoastinjectiontraining.com/); Dr. Vargo has no conflicts to declare.

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Treatment of Rumination Syndrome with Constitutional Homeopathy in a 6-Year-Old Child: A Case Report

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ABSTRACT

Introduction: Rumination syndrome, characterized by repeated regurgitation of ingested food, is an underdiagnosed condition with no consensus on treatment. Homeopathic management has not been suggested or reported. This case report details successful treatment using constitutional homeopathy.

Case Description: A 6-year-old Caribbean-Canadian female experienced food regurgitation after most meals for 8 months triggered by emotional stress. Symptoms persisted despite previous treatments, including lansoprazole, digestive enzymes, probiotics, gluten and dairy elimination, and abdominal castor oil application. Abdominal ultrasound and endoscopy showed no abnormalities. A constitutional homeopathic intake suggested a mental-emotional component, leading to the prescription of Phosphorus 200CH at one pellet once a day for 3 days. Initial dosing reduced regurgitation frequency, with significant improvement after re-dosing at one pellet twice a day for 5 days. Anxiety and stress-provoking events retriggered regurgitation episodes, but re-dosing Phosphorus at one pellet twice a day for 5 days significantly reduced regurgitation.

Conclusion: Constitutional homeopathy significantly reduced regurgitation frequency in a 6-year-old with rumination syndrome triggered by anxiety and stress. This case suggests that mental-emotional factors may underlie rumination syndrome and supports the potential efficacy of constitutional homeopathy. Future studies should explore these processes and assess homeopathy's efficacy through small trials.

Key Words Vomiting, regurgitation, pediatrics, functional gastrointestinal disorders, pediatric gastroenterology, phosphorus

INTRODUCTION

Rumination syndrome (RS) is characterized by repeated regurgitation of ingested food or fluid during or soon after eating, followed by either re-swallowing or expelling.[1] Most commonly, regurgitation occurs 10 to 15 minutes after a meal, but it can occur and last up to 2 hours afterwards.[2] In a recent systematic review and meta-analysis, the pooled prevalence of RS in children of all ages was 0.4–2.1%.[3]

A 2018 expert review and clinical practice update for the diagnosis and treatment of RS recommends clinicians diagnose the condition primarily based on the Rome IV criteria after an appropriate medical work-up.[2] According to the criteria, RS in children and adolescents is classified as a functional gastrointestinal disorder and diagnosed if all of the following are present for at least 2 months:

1. Repeated regurgitation and rechewing or expulsion of food that begins soon after ingestion of a meal and does not occur during sleep.

2. Not preceded by retching.

3. After appropriate evaluation, the symptoms cannot be fully explained by another medical condition. An eating disorder must be ruled out.[4]

Patients with RS may also present with halitosis, dental erosions, frequent caries, or weight loss.[2] Gastrointestinal symptoms of nausea, heartburn, abdominal discomfort or pain, bloating, diarrhea, or belching are uncommonly seen, yet the presence of these symptoms does not rule out a diagnosis.[2]

The pathophysiology of RS involves the reversal of the normal pressure gradient between the esophagus and stomach, with increased intragastric pressure exceeding lower esophageal sphincter (LES) pressure, allowing gastric contents to flow upward.[5] This pressure increase, often due to involuntary contractions of abdominal muscles combined with LES relaxation, leads to regurgitation.[5] The exact trigger for this behaviour is unclear, but it may develop unconsciously in response to upper gastrointestinal discomfort.[5]

Due to a lack of awareness of this condition, children often consult multiple practitioners and undergo repeated and unnecessary testing.[2] This often delays diagnosis, which, unfortunately, is associated with a lower likelihood of symptom resolution after

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treatment.[6] However, awareness of the condition appears to be improving. In a 2003 study, the average length of time between symptom onset and diagnosis in children was 2.2 years compared with a median of 1 year in a more recent 2024 study.[6,7]

An objective test that can confirm the diagnosis of RS is postprandial high-resolution impedance or esophageal manometry (HRIM/HREM).[2,5,8] This test measures gastric and LES pressures for 30 minutes after a meal is consumed.[5] Postprandial HRIM/HREM characteristically shows increased gastric pressure, decreased LES pressure, and bolus movement into the esophagus in patients with RS.[5] Although this test is not necessary to make a diagnosis, it may be used to support and convince families of the diagnosis.[2] However, limitations of HRIM/HREM are a lack of standardized protocols for testing as well as some children not being able to tolerate the test due to discomfort.[2,9]

The current recommendation for first-line treatment that is the most effective is postprandial diaphragmatic breathing, which lowers intragastric pressure and increases pressure in the LES, stopping the retrograde movement of stomach contents.[1,2,5,10] Biofeedback or cognitive behavioural therapy in conjunction with diaphragmatic breathing may result in further improvements.[5,11] For refractory patients, the addition of the pharmaceutical baclofen, which increases postprandial LES pressure, is recommended.[2,5,10] Other therapies that have been studied but are currently not recommended as treatment options are the antipsychotic medication levosulpiride,[12] low-dose tricyclic antidepressants,[13] psychotherapy,[12] chewing gum,[14,15] fundoplication surgery,[5,16] and subtotal gastrectomy surgery.[17]

Further research is needed to explore other treatment options, particularly in children. Homeopathic management of RS has not previously been suggested or reported. Homeopathy is an inexpensive and safe complementary and alternative medicine therapy that is particularly effective in children. This case report details the successful management of RS using constitutional homeopathy in a 6-year-old female. Informed consent was obtained from the patient's mother to publish the details of the case.

CASE DESCRIPTION

Presenting Concern

ES is a 6-year-old Caribbean-Canadian female who has experienced food regurgitation after every meal for the past 8 months. Symptoms began in December 2019 as regurgitation after dinner only but increased in frequency to after every meal by January 2020. Regurgitation occurred primarily within 1 hour of finishing a meal but occasionally occurred before the completion of a meal and occurred regardless of the type of food consumed. The vomitus was watery with pieces of food, which was expelled or occasionally re-swallowed. Abdominal pain that lasted a few minutes occurred after regurgitation episodes. No weight loss or personality changes were noted.

ES separately trialled a digestive enzyme supplement before meals and a probiotic supplement once daily. The former decreased regurgitation frequency slightly, but no changes were noted with the latter. She was prescribed lansoprazole 15 mg daily by her family physician, which she began in June 2020. A decrease in regurgitation frequency was noted; however, episodes continued to occur daily. At the time of the initial appointment, ES continued to take lansoprazole daily.

Psychosocial History

ES is an only child and lives with both parents, with whom she has very close relationships. She is very social, loves interacting with other children, and prefers the company of her friends to being alone. She is artistic and loves to sing, draw, and write in cursive. Her mother described her as sensitive and feeling all emotions strongly.

In December 2019, ES was told she would be held back in the Casa Montessori program because her reading skills were not at an appropriate level to graduate. She was switched to a new class in January 2020, which she described as difficult because she did not have any friends in the new class and was often playing alone. In March 2020, ES began online education at home due to the COVID-19 lockdown, which was a difficult transition for her, and regurgitation episodes increased in frequency. In July 2020, she began a homeschooling program at a neighbouring house with other children her age. Over time, she came to really enjoy this environment, made new friendships, and bonded with the teacher. Her parents decided not to return her to the Montessori program, and ES continued with the homeschooling program into 2021.

Physical Examination

No abnormalities were noted on abdominal physical exam. She was bright, cheerful, talkative, and engaging in the visit.

Past Medical History

ES had a dairy sensitivity approximately 1 to 2 years prior, experiencing increased nasal and pharyngeal mucus after consumption, but no longer experiences any reactions. She uses salbutamol and fluticasone puffers together approximately twice a year for lingering cough post upper respiratory tract infections. She has no prior history of gastrointestinal symptoms, major illnesses, hospitalizations, or other diagnoses.

Diagnostic Assessment

Abdominal ultrasound and endoscopy showed no abnormal findings. Differential diagnoses that were considered and ruled out were cyclical vomiting syndrome, food allergy/sensitivity, gastroesophageal reflux disease, eosinophilic esophagitis, achalasia, gastroparesis, gastroenteritis or other infections, bowel obstruction, volvulus, and intussusception. A working diagnosis of RS was suggested as all conditions of the Rome IV criteria were met.

Therapeutic Intervention

ES was first prescribed abdominal castor oil application nightly before bed and a trial of dairy and gluten elimination. Castor oil was chosen to aid in decreasing suspected inflammation in the gastrointestinal tract, and dairy and gluten elimination was chosen due to suspected food sensitivities.

Constitutional homeopathy was then proposed due to the suspicion that ES's symptoms were largely due to mental-emotional factors. A constitutional homeopathic intake was taken, and the following key symptoms were used to select a remedy:

- Open, sociable, and impressionable personality
- Desire for company
- Artistic
- Sympathetic and empathetic
- Fear of the dark
- Desire for cold drinks and salty food
- Restless sleep
- Epistaxis
- Hot body temperature
- Vomiting in children

The single homeopathic remedy Phosphorus was selected after consulting three resources: (1) *The Homeopathic Treatment of Children: Pediatric Constitutional Types*, by Dr. Paul Herscu, ND;[18] (2) *Homeopathic Clinical Repertory*, 3rd edition, by Dr. Robin Murphy, ND;[19] and (3) Complete Dynamics homeopathy software.[20] Three resources were used because repertorization was done by a fourth-year naturopathic student who was becoming familiar with different homeopathy resources. The key symptoms, noted above, were used with all three resources.

The posology chosen was one 200CH pellet once a day for 3 days, and ES was instructed to place the pellet under her tongue and allow it to dissolve. The remedy strength of 200CH was selected due to the intensity and chronic nature of symptoms. The restricted diet was maintained when Phosphorus was initiated, but the castor oil abdominal application was discontinued. To re-dose Phosphorus, the posology was increased to one 200CH pellet twice a day for 5 days. A second re-dosing was prescribed at the latter posology.

Follow-up and Outcomes

A timeline detailing treatment outcomes is presented in Table 1.

Prior to starting naturopathic recommendations, lansoprazole was discontinued. Nightly abdominal castor oil application with dairy and gluten elimination resulted in only a slight decrease in regurgitation frequency over 3 weeks.

Phosphorus resulted in a decrease in regurgitation frequency over 1 week. Parents also noted a positive change in ES's personality/disposition. To evaluate whether regurgitation frequency could be further reduced, Phosphorus was re-dosed at a stronger posology. Re-dosing resulted in further decreases in regurgitation frequency, with only one regurgitation episode occurring over 2 weeks. Parents also noticed great improvements in ES's academics, social interactions, and enthusiasm for learning.

ES experienced an increase in regurgitation frequency in October and November 2020, totalling 20 episodes, likely due to stress and anxiety surrounding various medical appointments. Phosphorus was re-dosed, which resulted in only three regurgitation episodes in the following 7 1/2 weeks.

At the last appointment in January 2021, parents stated that they believed Phosphorus was the only treatment that has worked for ES in decreasing regurgitation frequency.

2024 Update

As of October 2024, ES is 11 years old and has recovered from RS. While it took a few months after her final appointment in January 2021 for the regurgitation episodes to subside completely, they eventually resolved. Phosphorus was not re-dosed after her final appointment. Since then, ES has experienced occasional

TABLE 1 Timeline of Appointments, Prescribed Treatments, and Outcomes

Date	Type of visit	Purpose of Visit	Prescribed Treatment	Treatment Outcome[a]
Aug 14, 2020	Video telemedicine	Initial intake	Abdominal application of castor oil nightly before bed.	Slight decrease in vomitus volume.
Aug 21, 2020	In-office	Constitutional homeopathic intake and physical examination	Continue with nightly abdominal application of castor oil. Dairy- and gluten-free diet. Parents chose to discontinue lansoprazole at this time.	Slight decrease in regurgitation frequency Aug 21–Sept 11. Two consecutive days where no regurgitation occurred after dinner.
Sept 11, 2020	Video telemedicine	Follow-up	Phosphorus 200CH: 1 pellet QD for 3 days, administered Sept 11–13. Continue with dairy- and gluten-free diet.	Decrease in regurgitation frequency Sept 11–18. Positive change in personality/disposition.
Sept 18, 2020	Video telemedicine	Follow-up	Phosphorus 200CH: 1 pellet BID for 5 days, administered Sept 18–22. Continue with dairy- and gluten-free diet.	One regurgitation episode Sept 18–Oct 2. Improvements in academics, social interactions, and enthusiasm for learning.
Oct 2, 2020	Video telemedicine	Follow-up	Gluten reintroduction.	Twenty regurgitation episodes Oct 2–Nov 29.
Nov 30, 2020	Email correspondence		Phosphorus 200CH: 1 pellet BID for 5 days, administered Dec 3–7.	Decrease in regurgitation frequency Dec 3–7. Three regurgitation episodes Dec 8–Jan 29.
Dec 11, 2020	Phone telemedicine	Follow-up	Re-dosing recommendation: 1 pellet Phosphorus 200CH before a stressful event.	
Jan 29, 2021	Video telemedicine	Follow-up	None	

[a] Evaluated at a subsequent appointment
BID=twice a day; QD=once a day.

instances of vomiting, but none as severe as during her experience with RS. ES's mother cannot recall if these occasional instances of vomiting were triggered by anything. In May 2024, ES's father passed away due to an ongoing health condition, which has been a challenging time for her. Despite this, she is doing well overall, and her regurgitation episodes have not returned since his passing.

DISCUSSION

Anxiety and stress surrounding ES being held back in school and starting a new class likely was the trigger for her RS. The return of regurgitation episodes following a variety of anxiety and stress-provoking medical appointments confirmed this trigger. A decrease in regurgitation frequency was noted after initial Phosphorus dosing, but a greater and significant decrease resulted after re-dosing the remedy at a longer and more frequent posology than the initial prescription. The longer and more frequent dosing of Phosphorus also significantly reduced regurgitation frequency after ES experienced a return of regurgitation episodes following the anxiety- and stress-provoking medical appointments.

Although the pathophysiology of RS involves increased intragastric pressure and relaxation of the LES, the etiology is still not well understood.[5] This case report provides evidence that mental-emotional processes may be underlying factors in the etiology of RS. It also provides evidence that mental health can affect physical health, and that mental-emotional processes may be factors to consider in other physiological conditions. Future studies should explore mental-emotional factors in patients diagnosed with RS as a potential cause of regurgitation episodes.

The successful use of constitutional homeopathy in the management of RS in ES provides evidence for a potential new treatment option for this condition. Homeopathy is a safe and cost-effective naturopathic modality that is particularly useful when there is a strong mental-emotional component in a patient's case. The reason for this is that psychological symptoms are regarded as the most important symptoms in correctly selecting a homeopathic remedy for a particular case.[21] Homeopathy is an energetic medicine that aids in shifting the imbalanced energy in a diseased state to a balanced energy state.[22] The selection of the correct homeopathic remedy that matches a patient's totality of symptoms is particularly important as it will show the greatest energetic efficacy.[22] Phosphorus was correctly selected as ES's constitutional remedy, and it had the profound effect of bringing her back into a state of balanced energy. Of particular interest, her parents noted a change in her personality/disposition and stated that she acted "more like herself" after taking the remedy, an observation that supports the understanding of the mechanisms of homeopathic medicine.

CONCLUSION

This case highlights the potential link between anxiety, stress, and the onset of regurgitation episodes in children diagnosed with RS. The successful management of RS using the homeopathic remedy Phosphorus suggests that homeopathy may be a safe, cost-effective treatment option, especially when mental-emotional factors are present. The value of selecting a homeopathic remedy based on a patient's totality of symptoms is also demonstrated. Additional studies should explore the relationship between emotional stressors and RS and the role of homeopathy in the management of this condition.

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Advocacy in Ontario: NDs and the Health Human Resources Crisis

Kevin Draper[1]

The Ontario Association of Naturopathic Doctors (OAND) represents more than 1100 NDs in Canada's largest province. One of the association's core functions is undertaking robust and ongoing advocacy to position the profession as a solution to the human resources crisis in the healthcare sector. The association is initiating and supporting regulatory change to allow NDs to practice to the full extent of their knowledge, skill and judgment. The health system partners engaged to advance this work include the Ministry of Health, elected officials (Members of Provincial Parliament), cabinet ministers and the profession's regulator, the College of Naturopaths of Ontario (CoNO).

A key focus of the past year has been to increase NDs' authority to prescribe drugs and substances and to order laboratory tests. The association has made a formal request, for example, to add oral progesterone to the list of substances that NDs can prescribe, the gold standard for a hormone replacement therapy treatment. Currently, NDs in the province can access this treatment through topical and vaginal routes of administration. The Ministry of Health has been engaged early on in discussions around ND access to oral progesterone, and the first step in the process, which is a formal request to CoNO, has been undertaken.

Another recent project was a submission that seeks to expand the number of laboratory tests that NDs are permitted to requisition. This includes approximately 20 updates or amendments, in instances where test names or formats have changed, and 40 net new tests that will better allow NDs to support their patients. The tests span several important areas, including advanced immunological testing, chronic disease management, fertility and sexual health and environmental health assessment and management.

The association also prioritizes its role as a voice for the profession in consultations initiated by CoNO. The past year was particularly intense in this area of work, with five consultations and preliminary consultations that touched on areas of importance such as currency requirements, prescription reporting and the definition of naturopathic therapies.

While association staff do the day-to-day work of the OAND's advocacy, volunteers are the lifeblood of these efforts. Committees, working groups and ad hoc teams of volunteers work on projects big and small, including taking on the significant workload that goes into the responses to the CoNO consultations described above.

The association's annual spring Lobby Day also relies heavily on volunteers. Its success depends entirely on the dozens of NDs who come to Queen's Park to meet with their local representative and help to tell the story of naturopathic health care in communities across the province. This in turn helps to make our regulatory "asks" more tangible to decision-makers. Furthermore, it is volunteers who secure meetings with decision-makers throughout the year, ensuring that momentum from milestone events such as Lobby Day is not lost. Engagement with elected officials and key officials at both the regulator and the Ministry level is one of the most important ways that the association keeps its advocacy requests moving forward.

The association is encouraged by a regulatory and political landscape that has seen the provincial government show openness to innovative solutions to the healthcare human resource crisis. We applaud the significant scope-of-practice gains made by professions such as pharmacists, midwives, and nurse practitioners. We remain convinced that Ontario NDs have a larger role to play. The association is committed to working with the regulator, the Ministry and other health system partners to bring regulations more closely in line with the knowledge, skills and judgment that Ontario's ND workforce possesses.

Kevin Draper is the OAND's Manager of Government Relations and Communications; Kevin welcomes comments and questions and can be reached at governmentrelations@oand.org.

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Healing Internalized Racism to Succeed in Practice

Samantha Dass,[1] ND

Practicing as a naturopathic doctor (ND) who is a person of colour comes with some unique challenges. This is a topic that I've spoken about with other BIPOC (Black, Indigenous, and people of colour) NDs over the past couple of years. For many of us, we were minorities in our class at the Canadian College of Naturopathic Medicine and that feeling of being a visible minority continued as we started to practice. Being one of the few people of colour in the room can be an uncomfortable experience that can impact your confidence in many ways.

You may feel, in this situation, the need to prove that you're just as relatable, likable and capable as everyone else. Feeling "different" has a strong effect on the mind and can lead to anxiety about one's ability to succeed in many areas of life—career included. When I started my practice, I worked in a town that, at the time, was not particularly diverse. I remember wondering whether patients would be less likely to book with me because I didn't have a western last name. Would patients prefer to work with someone who shares the same ethnicity? Should I downplay my culture to try to blend in more? Are these concerns warranted based on facts or are they just in my head?

After having many conversations with other BIPOC healthcare providers, I learned that I was not alone in having these concerns. These small moments of solidarity with my colleagues inspired me to write about this issue candidly. I hope that I can be a source of comfort for other NDs who have experienced some of these challenges and that I can make others feel less isolated.

When I started my practice, in 2017, I always had a little stage fright before seeing patients, but I never knew why. Then one day, the reason became clear to me. I had been invited to give a talk, something I normally dread and get very nervous about. The talk was to be held at a dance studio that, as I soon discovered, put a strong emphasis on multiculturalism. I walked in, full of my usual public speaking nervousness, but as I walked through the doors and saw that most of the members were people of colour, my anxiety melted away. For the first time, I did not feel nervous talking about naturopathic medicine in front of a crowd. It was a pivotal moment for me that made me realize that my anxiety around practicing as a naturopathic doctor in various settings may have something to do with being a visible minority.

From that moment, I began a journey of learning about the ways race, racism, and intergenerational trauma shape the mind and the lens through which we see the world. I sought out professional help from a therapist to work through these issues and the results were life-changing.

The sad reality is that it's a common experience for people of colour to feel out of place, even if they were born and raised in that same place. Nobody ever explicitly told me that they think I'm less capable or likable because of my race. But what I learned from my work with a professional is that there is such a thing as internalized racism and this can take a huge toll on your self-perception.

Physician and epidemiologist Camara Phyllis Jones[1] put forth a moving definition of internalized racism as "acceptance by members of the stigmatized races of negative messages about their own abilities and intrinsic worth…. It involves accepting limitations to one's own full humanity, including one's spectrum of dreams, one's right to self-determination, and one's range of allowable self-expression." Research has demonstrated a link between internalized racism, anxiety, and career aspirations.[2] Learning about internalized racism helped me put my anxiety around practicing into context.

The stories of explicit racism experienced by my parents that they passed on to me made me fear that I had less value than people from the dominant culture. It didn't help that during my formative years in the 1990s and early 2000s, my people and other people of colour were rarely the smart, cool, main characters in the media. We were often the butt of jokes or an unimportant supporting character added for diversity points. I felt like my last name, my Indian appearance, and my unique cultural background were genuinely inferior. That inferiority complex impacted my confidence in all areas of my life, including my career. Internalized racism undermined my confidence in my ability to build a strong practice because I worried that others would see me as "less than."

As Jones points out, internalized racism is linked to explicit and systemic racism, both of which need to be rooted out for internalized racism to truly dissipate.[1] Working on changing peoples' racial biases is fundamental. There has been a growing focus on anti-racism efforts that tackle this. However, it's important for

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BIPOC individuals to remember that we can work on broader systemic issues while also working on healing the internal damage that has already been done. It does not have to be "either, or."

Over time, with help and through extensive self-work, I began to accept that I deserve to take up space in this profession. I learned to celebrate my heritage more openly rather than hide it. I began to internalize a new reality—that successful NDs can come from many different backgrounds. I began to follow others in the health and wellness space who are people of colour and who are thriving in their work to remind myself of this fact. The pool to draw inspiration from is smaller in the naturopathic profession because the profession is not as diverse as it could be, but that is changing. I now approach my practice with much more confidence, and I see that reflected back, with a busier practice and stronger connections with my patients. Most of the time, I feel that confidence regardless of who is in the room with me. The inferiority complex I had has been healed dramatically and is not holding me back in my career the way it used to.

If anyone reading this article suspects that they are dealing with internalized racism, it's helpful to learn more about the topic and how it can impact your mindset and confidence. Knowledge is power, and learning more about internalized racism can help you recognize it and address it. It may even be worth getting professional help if you feel that issues around race and internalized racism are holding you back from reaching your full potential in practice.

It's also helpful to surround yourself with others who can relate to your experiences and provide support. Research has shown that such safe spaces play an important role in healing internalized racism.[3,4] This is the main reason why some colleagues and I formed a group of BIPOC NDs who meet virtually, every month, to talk about these issues. We provide support and encouragement as well as a safe space to discuss our experiences. Our group is called Gather and Ground and is a subgroup within a larger group called Naturopathic Doctors Dismantling Racism.

I hope this article makes anyone who has experienced or is experiencing internalized racism feel less alone. I hope to make BIPOC NDs aware that there is a network of colleagues whom you can lean on. I also encourage anyone who recognizes and relates to what was shared here to reflect on how racism and internalized racism may be influencing your confidence in yourself and your ability to succeed in practice. Learn more about this topic and seek help so that you can take steps towards building a thriving practice and career that you're proud of. My hope is that any BIPOC ND who is struggling with internalized racism can heal enough to feel that they deserve to take up space in this profession and reach for the stars.

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