

Article Title: No Improvement in Disclosure of Natural Health Product Use to Primary Care Medical Doctors in the Last 15 Years: A Survey of Naturopathic Patients

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Highlights

- The use of natural health products (NHPs) is common in North America, despite the potential for drug interactions.
- In 2003, we found that 42% of NHP users had not disclosed this information to their primary care medical doctors.
- We repeated our survey in 2018/2019 and found that the disclosure rate remained unchanged (at 42%) over the past 15 years.
- Almost all (99%) patients used NHPs, with 46% using NHPs concurrently with prescription medication.
- Future research should explore primary care medical doctors' hesitancy to inquire about patient NHP use.

Abstract

Background: The use of natural health products (NHPs) is common in North America. In 2003, we found that 42% of NHP users had not disclosed this information to their primary care medical doctors (MDs). We repeated our survey in 2018/2019 to explore if the rate of NHP use disclosure had improved.

Methods: From November 2018–February 2019, a 21-item survey about NHP use and disclosure was administered to adult patients who visited the Robert Schad Naturopathic Clinic in Toronto, Canada.

Results: Almost all patients surveyed were using NHPs (99%), and 46% were using NHPs and prescription medication concurrently. Consistent with our 2003 findings, 42% of respondents who used NHPs did not disclose this information to their MD.

Conclusion: Disclosure of NHP use to MDs by naturopathic patients is limited and remained unchanged over the past 15 years. Future research should explore primary care MDs' hesitancy to inquire about patient NHP use.

1. Background

Natural health products (NHPs), which include vitamins and minerals, herbal remedies, homeopathic medicines, traditional medicines, and probiotics, are used by 80% of people worldwide [1]. Individuals using NHPs often report the belief they are safe because they are natural [[2], [3], [4]]. However, NHPs used in excess or in conjunction with certain drugs have the potential to cause toxic effects or, in rare cases, death [[2], [3], [4], [5], [6], [7], [8]]. For example, usnic acid (promoted for weight loss) can cause severe acute hepatitis or liver failure [2], St. John's Wort increases the risk of stroke or heart attack when used with digoxin [9], and a third of NHP users who are on warfarin therapy are at risk for excessive bleeding [3]. It is therefore desirable for medical doctors (MDs) to be aware of their patients' NHP use.

Despite the high prevalence of NHP use, anywhere between 20%–90% of patients do not disclose use to their MD [3,[8], [9], [10], [11], [12], [13], [14]]. Lack of disclosure has been associated with patients' fear of judgement from MDs and belief that disclosure is unnecessary [3,4,[9], [10], [11], [12], [13],15]. In 2003, we surveyed 198 Canadian naturopathic patients (88% response rate) and found that while 93% of respondents used NHPs, 42% did not disclose use to their MD [15]. The single factor most strongly associated with disclosure of NHP use was whether or not the patient's primary care MD asked about NHP use. In the Province of Ontario, Canada, it should be noted that “naturopathic doctors” (i.e. NDs) and “medical doctors” (i.e. MDs) comprise two separate healthcare professions. In

this study, we repeated our study, 15 years later, at the same naturopathic college clinic to explore if patients' rate of NHP disclosure rate to their MDs had changed.

2. Methods

From November 15 to 24, 2019 and January 24 to February 2, 2019, all adult patients (18+ years) who visited the Robert Schad Naturopathic Clinic (RSNC) were given the opportunity to participate in our study. The RSNC is a naturopathic teaching clinic located at the Canadian College of Naturopathic Medicine (CCNM) in Toronto, Canada. This was the same clinic that we surveyed in 2003 [16]. A consecutive sampling technique was used, meaning that on days when the surveys were administered, members of our study team approached each patient attending the clinic. A verbal, scripted invitation was used alongside signs that advertised that a survey on NHP disclosure was being conducted. Patients who provided informed consent were given a 21-item questionnaire to complete that inquired about demographics, health care (including use of NHPs and prescription medication), and disclosure of NHP use to their primary care MD. As per the survey's instructions and informed consent, participants were allowed to skip or not answer any questions that they did not wish to or feel comfortable answering. This questionnaire is available as Supplementary File 1. Questionnaires were completed anonymously, and once completed, participants deposited their questionnaire directly into a secure box. Ethical approval for this study was provided by the CCNM Research Ethics Board.

As participants were permitted to skip or not answer questions, missing values were present and only data that was reported were included in analyses. Frequencies were generated for all collected data. We compared respondent characteristics between the 2003 and 2019 surveys using an unpaired t-test for age and a chi-squared test for dichotomous and categorical

factors. We created univariable and multivariable logistic regression models to explore factors associated with: (1) patient disclosure of NHP use to their primary care MD and (2) MD inquiry about NHP use. Independent variables were: (1) age, (2) sex, (3) level of education, (4) length of time attending RSNC, (5) number of visits per year to RSNC, (6) patient concern regarding NHP-drug interaction and for NHP disclosure only, (7) whether or not their MD asked about NHP use. Results are presented as odds ratios (OR) with 95% confidence intervals (CI). An OR greater than 1 indicates an increased association. All analyses were two-tailed and statistical significance was defined as $p < 0.05$. All analyses were performed using IBM SPSS Statistics software, version 24.

3. Results

A total of 25% of patients approached completed the questionnaire (277 of 1112). The mean age of respondents was 40.5 years (range 16–84) and most were female (77%, 211 of 274) employed (54%, 140 of 258), white (48%, 131 of 270), and had a university degree (68%, 185 of 273) (Table 1). Compared to the 2003 survey, respondents were similar in age, sex and employment status, but less likely to be white and more likely to report higher levels of formal education (Appendix Table 1). Only 7% of respondents (19 of 273) had been referred for naturopathic care by their MD, and 54% (148 of 275) had attended the RSNC for more than one year. Forty-percent (107 of 271) visited the naturopathic clinic at least 11 times a year, whereas most (62%, 168 of 272) saw their primary care MD 0–3 times a year.

Almost all respondents (99%, 274 of 277) used NHPs, 46% (126 of 274) used NHPs and prescription drugs concurrently, and 54% (148 of 274) used NHPs alone. Patients reported use of the following NHP categories: vitamins and minerals (87%, 240 of 276), herbs (59%, 164 of 276), probiotics (51%, 141 of 276), homeopathic remedies (25%, 69 of 276),

traditional Chinese medicines (15%, 42 of 276), and medicinal cannabis (9%, 25 of 276). The most common NHPs included vitamin D (68%, 187 of 276), magnesium (55%, 151 of 276), and omega-3 fatty acids (50%, 138 of 276) (Table 2). The most commonly used prescription medication types were thyroid hormone (17%, 21 of 121), anti-hypertensive agents (16%, 19 of 121), birth control (15%, 18 of 121), and anti-depressants (13%, 16 of 121) (Table 3).

3.1. Disclosure of NHP use to medical doctors

Forty-two percent (114 of 269) of respondents did not disclose NHP use to their primary care MD. Yet, 78% (209 of 268) discussed prescription drug use with their naturopathic doctor, and only 27% (72 of 268) were concerned about potential interactions between prescription medications and NHPs. The most common reasons provided for not disclosing NHP use were: (1) MDs do not approve of complementary and alternative medicine use (21%, 27 of 131); (2) MDs would not understand (21%, 27 of 131); (3) patients were uncomfortable talking about NHP use (5%, 7 of 131); and (4) it was not relevant (5%, 6 of 131).

In the adjusted model, the only factor associated with disclosure of NHP use to MDs was whether the latter asked about NHP use (OR 5.27, 95% CI 2.57 to 10.78; $p < 0.001$) (Table 4). However, 75% (201 of 268) of respondents stated their MD did not ask about NHP use. None of the independent variables explored showed a significant association with whether primary care MDs inquire about patient's NHP use (Table 5).

4. Discussion

Our survey of naturopathic patients found that almost all reported use of NHPs, but less than half (42%) disclosed use of these products to their primary care MD. The most common reason for non-disclosure was concerns that MDs would not approve. MD inquiry about NHP

use was strongly associated with disclosure, but the majority of MDs did not instigate such discussions. Almost half of the patients we surveyed combined prescription medication with NHP use, but only a quarter were concerned about interactions.

4.1. Similarities and differences to survey administered 15 years ago

The characteristics of survey respondents were relatively similar to that of the survey administered 15 years ago. The mean age was slightly higher (40.5 ± 17.2 vs. 37.3 ± 14.7), and comprised of a higher majority of females (77.0% vs. 71.8%). Participants in the recent survey were more multi-ethnic than 15 years ago, though still predominantly White (48.3% vs. 71.8%). Education level was relatively similar across both surveys. A lesser proportion of participants were employed in the recent survey (54.3% vs. 66.5%). Generally speaking, more participants in the recent survey attended the CCNM clinic for a longer period of time. Number of visits to the CCNM clinic per year as well as number of visits to primary care family doctor were relatively similar across both surveys.

While we added a number of additional NHPs to the recent survey, in terms of those listed in both surveys, we found that vitamins, garlic, Echinacea, chamomile, and licorice remained one of the most commonly taken NHPs. A considerably larger proportion of patients in the recent survey reported using omega-3 fatty acids (50.0% vs. 1.9%), probiotics (44.2% vs. 2.5%; though only written as *Lactobacillus acidophilus* in the 2005 version), and iron supplements (24.3% vs. 1.2%), compared to the survey 15 years ago. Worryingly, a number of participants in the recent survey, roughly equal to that of the first survey, reported taking kava kava (2.9% vs. 3.1%) and St. John's Wort (5.8% vs. 5.0%), despite the fact that Health Canada has issued advisories on both regarding safe use and potential for drug-herb

interactions. In a scenario of optimal safe consumption, disclosure rates ought to mirror use of NHPs that have more significant safety considerations.

In regards to medication use reported by survey respondents, medications used for thyroid disease (17.4% vs. 11%), hypertension (15.7% vs. 6%), birth control (14.9% vs. 20%), depression (13.2% vs. 13%), and hyper-cholesterol (12.4% vs. 4%) remained as the six most common categories of prescription medications across both surveys.

4.2. Implications and importance of the current survey

Prior studies have reported NHP nondisclosure rates ranging from 15% to 74%, with the reasons for nondisclosure being lack of inquiry from MDs, lack of time, belief that their MDs would not know about NHPs, patients' fear of being judged, and patients perceiving disclosure as irrelevant because NHPs are safe [3,11,[17], [18], [19], [20]]. Yet, patients' failure to disclose NHP use to a healthcare provider makes it difficult to recognize or report drug-herb interactions or adverse events, which occurs with increasing likelihood with long-term use and polypharmacy [21]. This study allowed us to evaluate a unique population that almost entirely uses NHPs of some sort (i.e. 99%), which is considerably higher than other populations that have been studied in the literature including the 2010 Health Canada survey which found that 73% of Canadians used NHPs.

The 42% NHP nondisclosure rate we found is identical to results at the same naturopathic clinic 15 years earlier [16]. Among the general population, a recent study found that most respondents would prefer to take an NHP versus a prescription drug and that half of respondents believe that NHPs are safer [21], despite the literature finding otherwise whereby in some cases even serious harm can arise from taking NHPs, such as hepatotoxicity or heavy

metal poisoning [22,23]. Considering misleading health claims and lack of information about NHP-prescription drug interactions, there is merit in patients involving their MD in decisions to initiate or continue NHP use [4,24,25]. For instance, one study of 1118 patients found that 59% concurrently used NHPs and prescription drugs, which increased their risk 6.4 times for experiencing severe bruising, cardiac arrest, seizures, and shallow breathing [26]. Some NHPs can increase perioperative patient risk of bleeding (i.e. garlic), hypertension (i.e. ginseng, ephedra), or prolongation of anaesthetic effects (i.e. kava kava, ginseng) [27]. NHP use is common among cancer patients where there is a potential risk of adverse events [28]. Aside from providing such information, MDs who are aware of their patients' NHP use can report adverse events to Health Canada to help inform removal of unsafe products or modifications to safety information [24].

Particular to this study, certain adverse effects and drug interactions are known among NHPs commonly taken by our patient population. More than half of all patients took one or more vitamin supplements in our study. In recent years, the consumption of multivitamins has increased globally and the common assumption among patients is that they are generally safe, even if not necessarily effective [29]. Patients taking high dosages of vitamin C can experience osmotic diarrhea and gastrointestinal upset [30] while overdosing on vitamin A can result in hypervitaminosis and hepatotoxicity [31,32], as examples. Nearly 30% of patients surveyed took turmeric which can cause gastrointestinal issues [[33], [34], [35]]. Green tea was also another commonly taken NHP, and while generally safe, in large quantities can lead to hepatotoxicity [36]. It is also known that green tea contains compounds that have the potential to alter absorption and metabolism of other substances which may result in adverse drug-catechin interactions [37]. Concerns also exist surrounding NHPs that have been associated with serious health risks identified by Health Canada; notably, we asked

survey participants to report whether they took St. John's Wort (*Hypericum perforatum*) and kava kava (*Piper methysticum*), to which approximately 6% and 3% responded “yes” respectively. Advisory regarding both have been issued by Health Canada in the past (St. John's Wort in 2000, kava kava in 2002). In the advisories, it was warned that St. John's Wort may interfere with medications taken for HIV infection, heart conditions, blood clots, asthma, depression and migraines [38] and kava kava was banned in August 2002 over concerns of hepatotoxicity [39], as well as uncertainty of how to extrapolate evidence from various populations and forms of consumption (e.g. as a tea, standardized extract, traditional preparations) [40]. Ultimately, the ban on kava kava was lifted in Canada and in other jurisdictions, with the provision of label warnings regarding the potential for drug-herb interactions, and directions to consult a health care provider if pregnant, lactating, or suffering from liver disease or epilepsy.

Standards associated with NHP manufacturing, packaging, labelling, licensing and regulation continue to develop and evolve in recognition of gaps and opportunities for improvement [41]. For example, there is ongoing debate regarding how to manage competing types of evidence from both scientific and traditional sources with respect to health claims [42]. Uncertainty arises stemming from issues in the global NHP market regarding product quality including findings of inconsistency in ingredients (presence of fillers, adulterants, contamination or inaccurate undeclared constituents) or inaccurate labels based on contents or claims [[43], [44], [45]]. Although these issues, and others, are not necessarily unique to NHPs, there is some convergence with the regulation, and regulatory issues, of pharmaceutical products while acknowledging the differences in accessing these products [[47], [48], [49]]. Patients who disclose their NHP use, may be able to receive help from their

healthcare provider in navigating these complexities and make an informed decision, as well as access quality products they can trust.

Patients often rely on family, friends, or the internet for information regarding NHPs, rather than their MD(s) or other healthcare providers [[49], [50], [51], [52]]. As our study found, patients more frequently disclose NHP use to their naturopathic doctor in comparison to their MD. As these patients have all actively sought out naturopathic care, however, it could be inferred that they have greater trust in naturopathic doctors in comparison to the general public. The majority of MDs, pharmacists, and nurses have minimal, if any, training in complementary medicines, including NHPs [53]. Providing MDs with a live tutorial can significantly improve their knowledge of complementary medicine [54] although the viability of this approach remains uncertain amidst existing resources and expertise in alternate providers. Future research should explore healthcare practitioners' reasons for not inquiring about patients' NHP use, identify strategies to encourage inquiry, and facilitate decision-making with patients.

4.3. Strengths and limitations

Use of a previously validated survey strengthens our findings, as does the use of a consecutive sampling technique to reduce sampling bias. There were a number of limitations to our study, including a modest response rate of 25%, reliance on self-report for NHP use, and restriction of our sample to a single naturopathic teaching clinic. Thus, our results may not be generalizable to other patient populations using NHPs.

5. Conclusions

The use of NHPs is common among patients in North America, and these products can interact with prescription medications and cause adverse effects. Disclosure of NHP use provides MDs with the opportunity to educate patients on NHP-drug interactions. It is therefore important for MDs to be aware of patient NHP use. Almost all naturopathic patients in our survey used NHPs, but less than half disclosed this information to their primary care MD. The low rate of disclosure in the population we surveyed has remained constant over the past 15 years. Patient disclosure is strongly associated with MD inquiry; however, most do not ask. Future research should explore strategies to encourage MD inquiry regarding NHP use and how best to ensure productive discussions following disclosure by patients.

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Ethics approval and consent to participate

Approval for our survey was granted by the CCNM Ethics Review Board. All participants were provided with a letter of consent to participate prior to completing their survey.

Consent for publication

All authors consent to this manuscript's publication.

Availability of data and materials

All relevant data are included in this manuscript.

CRedit authorship contribution statement

Jeremy Y. Ng: Data curation, Formal analysis, Investigation, Methodology, Writing - original draft, Writing - review & editing. Anna Garber: Data curation, Investigation, Writing - review & editing. Michelle Luong: Data curation, Investigation, Writing - review & editing. Kieran Cooley: Data curation, Investigation, Resources, Writing - review & editing. Jason W. Busse: Conceptualization, Formal analysis, Methodology, Resources, Software, Supervision, Writing - review & editing.

Declaration of competing interest

The authors declare that they have no competing interests.

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List of abbreviations

CAM: complementary and alternative medicine

CCNM: Canadian College of Naturopathic Medicine

CI: confidence interval

MD: medical doctor

NHP: natural health product

OR: odds ratio

RSNC: Robert Schad Naturopathic Clinic

Supplementary data

Supplementary File 1: 21-Item Patient Survey

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Tables

Table 1: Characteristics Of Survey Respondents^a

Mean \pm SD Age (range) (y) (n = 267)	40.5 \pm 17.2 (range = 16 to 84)
Female Sex (n = 274)	211 (77.0%)
Ethnicity (n = 270)	
White	131 (48.3%)
Asian	29 (10.7%)
Mixed	26 (9.6%)
Jewish	17 (6.3%)
Southeast Asian	15 (5.5%)
Other ^b	52 (19.1%)
Education (n = 273)	
Did Not Graduate High School	12 (4.4%)
Graduated High School	28 (10.3%)
Graduated College	48 (17.6%)
Graduated University	185 (67.8%)
Employed (n = 258)	140 (54.3%)
Referral Source (n = 273)	
Medical Doctor	19 (7.0%)
Self	157 (57.5%)
Other	97 (35.5%)
Time Attending the CCNM Clinic (n = 275)	
First Visit	26 (9.5%)
<1 Month	27 (9.8%)
1–3 Months	35 (12.7%)
3–6 Months	21 (7.6%)
6–12 Months	18 (6.5%)
1–2 Years	48 (17.5%)
2–3 Years	33 (12.0%)
>3 Years	67 (24.4%)
No. of Visits to the CCNM Clinic per Year (n = 271)	
First vVisit	32 (11.8%)

1-3	40 (14.8%)
4-6	38 (14.0%)
7-10	54 (19.9%)
11-15	31 (11.4%)
16-20	27 (10.0%)
>20	49 (18.1%)
No. of Visits to Primary Care MD per Year (n = 272) ^ε	
0-3	168 (61.8%)
4-6	48 (17.6%)
7-10	26 (9.6%)
11-15	9 (3.3%)
16-20	3 (1.1%)
>20	4 (1.5%)
<p>^aNot all respondents answered every question. Data are number (percentage) of respondents unless indicated otherwise. CCNM = Canadian College of Naturopathic Medicine.</p> <p>^bIncludes African American (n = 12, 4.4%), Middle Eastern (n = 10, 3.7%), Latin American (n = 9, 3.3%), Native North American (n = 2, 0.7%), and “other” (n = 20, 7.4%).</p> <p>^cFourteen respondents (5.1%) reported that they did not have a primary care MD.</p>	

Table 2. Specific Natural Health Products Used By Survey Respondents

Natural Product	Frequency, No. (%) (n = 276)
Vitamins	240 (87.0%)
Vitamin D	187 (67.8%)
Vitamin B(s)	128 (46.4%)
Vitamin C	105 (38.0%)
Multivitamin	77 (27.9%)
Herbs	164 (59.4%)
Tumeric	81 (29.3%)
Green Tea (or extract)	76 (27.5%)
Garlic	66 (23.9%)
Chamomile	62 (22.5%)
Echinacea	56 (20.3%)
Licorice	47 (17.0%)
Astragalus	26 (9.4%)
Milk Thistle	20 (7.2%)
St. John's Wort	8 (2.9%)
Gingko Biloba	14 (5.1%)
Valarian	10 (3.6%)
Kava Kava	8 (2.9%)
Other CAM Products	
Magnesium	151 (54.7%)
Omega-3 fatty acids	138 (50.0%)
Probiotics	122 (44.2%)
Iron Supplement	67 (24.3%)
Topical (applied to skin) Natural Health Products	48 (17.4%)
Melatonin	47 (17.0%)
Calcium	44 (5.9%)
Other ^a	126 (45.7%)
Medical Cannabis	25 (9.1%)
CAM = complementary and alternative medicine. ^a This category includes alpha lipoic acid, creatine, fibre, flaxseed oil, IPG gold, mushroom	

Natural Product	Frequency, No. (%) (n = 276)
extracts, powder supplements, protein powder, royal jelly, sports supplements, tinctures, traditional medicines such as traditional Chinese medicines.	

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Table 3. Medication Use Reported By Survey Respondents

Type of Medication or Target Condition	Medications Listed ^a	Frequency, No. (%) (n = 121)
Thyroid Disease	Levothyroxine, Dessicated thyroid hormone	21 (17.4%)
Hypertension	Amlodipine Besylate, Atenolol, Bisoprolol, Candesartan, Furosemide, Hydrochlorothiazide, Irbesartan, losartan, Perindopril, Trandolapril	19 (15.7%)
Birth Control	Desogestrel - Ethinyl Estradiol, Levonorgestrel-Ethinyl Estrad, Levonorgestrel	18 (14.9%)
Depression	Bupropion HCL, Citalopram, Fluoxetine, Paroxetine HCL, Sertraline, Duloxetine, Amitriptyline, Escitalopram, Nortriptyline, Fluvoxamine	16 (13.2%)
Hyper-cholesterol	Atorvastatin, Rosuvastatin, Simvastatin	15 (12.4%)
Epilepsy	Carbamazepine, Clonazepam, Gabapentin, Lacosamide, Lamotrigine, Oxazepam, Pregabalin	11 (9.1%)
Asthma	Fluticasone, Albuterol, Formoterol – Mometasone, Beclomethasone Dipropionate, Albuterol, Glycopyrronium	9 (7.4%)
Diabetes	Insulin, Metformin	7 (5.8%)
Nonsteroidal Anti-inflammatory Drugs	Acetylsalicylic Acid, Celecoxib	7 (5.8%)
Ulcer	Dexlansoprazole, Esomeprazole, Omeprazole, Pantoprazole, Rabeprazole	6 (5.0%)
Attention Deficit Hyperactivity Disorder	Dextroamphetamine-Amphetamine, Lisdexamfetamine	5 (4.1%)
Pain	Hydromorphone, Oxycodone-Acetaminophen, Tramadol	4 (3.3%)
Menopause	Estrogen, Natural Progesterone, Progesterone, Bioidentical Progesterone, Estradiol	4 (3.3%)
Psychosis	Aripiprazole, Lurasidone, Risperidone, Quetiapine Fumarate	3 (2.5%)
Other ^b	Other	27 (22.3%)

^aSome respondents reported their medication by name, and others by the condition targeted by their medication. Some respondents reported use of more than one medication. The reported frequency represents an aggregate of these data. Whenever possible, generic names are provided for reported medications.

^bThe following medications taken for their respective disease/conditions were also reported, however, each only by less than 2% of all participants reporting to take medications: alcohol

Type of Medication or Target Condition	Medications Listed ^a	Frequency, No. (%) (n = 121)
	<p>abuse (Naltrexone), allergy (Diphenhydramine, Mometasone) anxiety (Lorazepam), erectile dysfunction (Tadalafil), immunosuppressant (Azathioprine, Leflunomide, Methotrexate), unspecified hormonal therapy (Testosterone, Dehydroepiandrosterone), acne (Tretinoin), breast cancer (Trastuzumab), chest pain (Diltiazem), coagulant (Rivaroxaban), gout (Allopurinol), infection (Antibiotics), infertility (Clomiphene citrate), male pattern baldness (Minoxidil), muscle spasms, (Cyclobenzapine), osteoporosis (Alendronate), ovarian cancer (Lynparza), Parkinson's disease (Pramipexole), probiotic (Lactobacillus helveticus R0052, Bifidobacterium longum R0175), sleep disorder (Zopiclone), and urinary leakage (Fesoterodine).</p>	

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Table 4. Predictors of Medical Doctor-Patient Discussion of Natural Product Use

Variable	Univariable Analysis OR (95% CI)	p- value	Multivariable Analysis OR (95% CI)	p- value
Older Age	1.02 (1.01–1.03)	0.01	1.02 (1.00–1.04)	0.08
Female Gender	0.96 (0.55–1.66)	0.87	1.26 (0.64–2.45)	0.51
Level of Education	0.93 (0.70–1.23)	0.60	0.91 (0.65–1.29)	0.60
Duration of Time Attending the CCNM Clinic	1.17 (1.06–1.30)	0.002	1.11 (0.97–1.27)	0.13
Number of Visits per Year to the CCNM Clinic	1.15 (1.06–1.30)	0.03	1.09 (0.92–1.29)	0.32
Number of Visits per Year to One's Primary Care MD	1.13 (0.90–1.42)	0.28	0.96 (0.73–1.27)	0.77
Patient Concern over Interactions between Prescription Medication and Natural Products	2.10 (1.19–3.68)	0.01	1.81 (0.96–3.42)	0.07
Primary Care MD Asks about Natural Product Use	5.89 (2.97–11.66)	<0.001	5.27 (2.57–10.78)	<0.001
CCNM = Canadian College of Naturopathic Medicine; OR = odds ratio; 95% CI = 95% confidence interval.				

Table 5. Predictors of Whether a Primary Care Medical Doctor Asks About Natural Product Use

VARIABLE	Univariable Analysis OR, 95% CI	p-value	Multivariable Analysis OR, 95% CI	p-value
Older Age	1.01 (0.99–1.03)	0.32	1.01 (0.99–1.03)	0.32
Female Sex	0.95 (0.49–1.81)	0.87	0.96 (0.47–2.00)	0.92
Level of Education	1.15 (0.81–1.62)	0.44	1.21 (0.82–1.79)	0.34
Duration of Time Attending the CCNM Clinic	1.11 (0.99–1.25)	0.08	1.09 (0.94–1.27)	0.23
Number of Visits per Year to the CCNM Clinic	1.12 (0.97–1.30)	0.11	1.07 (0.90–1.28)	0.45
Number of Visits per Year to Primary Care MD	1.16 (0.91–1.48)	0.24	1.10 (0.83–1.46)	0.50
Use of Prescription Medication	1.25 (0.72–2.17)	0.44	1.20 (0.63–2.28)	0.58
Patient Concern of Interactions between Prescription Medication and Natural Products	1.32 (0.71–2.44)	0.38	1.16 (0.60–2.24)	0.66
OR = odds ratio; 95% CI = 95% Confidence Interval; N/S = p-values for all ethnic groups were greater than 0.05; CCNM = Canadian College of Naturopathic Medicine; and ND = naturopathic doctor.				

Appendix Table 1. Demographic Characteristics of Respondents from the 2003 and 2019 Surveys

	2003 Survey	2019 Survey	
Mean \pm SD age (y)	37.7 \pm 14.6 (n = 156)	40.5 \pm 17.2 (n = 262)	p = 0.09
Female Sex (n, %)	112 (72%) (n = 156)	211 (77%) (n = 274)	p = 0.16
White Ethnicity (n, %)	111 (71%) (n = 156)	131 (47%) (n = 278)	p < 0.001
Education	(n = 156)	(n = 273)	p = 0.01
Did not Graduate High School	9 (6%)	12 (4%)	
Graduated High School	31 (20%)	28 (10%)	
Graduated College	33 (21%)	48 (18%)	
Graduated University	83 (53%)	185 (68%)	
Employed (n, %)	102 (66%) (n = 155)	140 (54%) (n = 260)	p = 0.09