Evidence & Policy

NATUROPATHS' BEHAVIOURS, ATTITUDES AND PERCEPTIONS TOWARDS THE USE OF KNOWLEDGE AND INFORMATION SOURCES

--Manuscript Draft--

Manuscript Number:	EVIDPOL-D-22-00043R2
Full Title:	NATUROPATHS' BEHAVIOURS, ATTITUDES AND PERCEPTIONS TOWARDS THE USE OF KNOWLEDGE AND INFORMATION SOURCES
Article Type:	Research Article
Keywords:	Naturopathy; Knowledge mobilisation; clinical reasoning; Evidence-based practice
Corresponding Author:	Amie Steel University of Technology Sydney - City Campus: University of Technology Sydney Ultimo, New South Wales AUSTRALIA
First Author:	Amie Steel
Order of Authors:	Amie Steel
	Vicky Ward
	Matthew Leach
	Iva Lloyd
Abstract:	Background :Primary care professions practicing traditional systems of medicine, such as naturopathy, may have an increased need to use critical thinking to integrated diverse knowledge sources in response to the complex 'messiness' of clinical practice. The degree to which the varied knowledge types used by naturopathic practitioners align with evidence-based practice principles remains unexplored. Aims and objectives :To investigate naturopathic practitioners' behaviours, perceptions and attitudes towards their use of knowledge and information sources. Methods : An online cross-sectional survey study administered in five languages to the international naturopathic profession. Descriptive statistics were prepared using Stata 16.1. Findings :Survey respondents(n=453) represented all world regions. The most common type of knowledge used to inform clinical practice was developed through clinical experience(86.2%) or during initial clinical training(81.2%). The most used information sources were scientific journals(80.4%), conferences or other professional events (78.2%), modern naturopathic clinical textbooks (74.6%), laboratory, pathology or radiology tests(74.0%), or professional journals for clinicians (73.5%). The greatest trust in knowledge acquired from information sources was attributed to information from laboratory, pathology or radiology tests. The greatest importance was place on information based on the patient's perspective of living with their health condition. Discussion and conclusions : Naturopathic practitioners do not appear to have a strong level of trust for any particular information source, despite variations in trust between sources. Further, their philosophies and principles may promote the importance naturopathic practitioners place on non-research information sources such as patient experience and add further complexity to clinical decision-making processes for naturopathic practitioners.
Order of Authors Secondary Information:	
Funding Information:	
Author Comments:	
Response to Reviewers:	Editor comment: In this final revision, I ask that you make some minor changes to the first paragraph of the limitations section. Type I error is the risk of a false positive, and is impossible to assess in non-probability samples, so I don't think it's relevant in this case. Instead, I encourage you to only focus on the risk of recall bias from self-report, and the risk of sampling and self-selection biases due to the use of a convenience sample. Of particular importance to note in the limitations, the risks associated with the use of a convenience sample mean that, although statistical tests are presented, the results only describe the sample and cannot be generalized to the broader population

	of naturopaths. Response: Thank you for supporting our publication. We have now updated the limitations section as suggested. The edited changes are underlined below: “As this study draws upon self-reported survey data and the length of the survey may have resulted in missing data due to participant drop-out. With this in mind, the results may be susceptible to participant recall bias and self-selection bias. The study also includes higher proportional representation from some countries (i.e., Canada and Australia), which may raise the risk of responder bias. The convenience sampling method may also have resulted in sampling bias. As such, the study results can only be interpreted as reflective of the study sample and not confidently generalised to the broader international naturopathic practitioner community. However, the absence of definitive lists of naturopathic practitioners in many of the countries through which recruitment was conducted precluded other sampling methods. This may explain why other international research investigating the naturopathic profession to date has been conducted using elements of convenience sampling [6, 7, 10, 24, 41, 42, 50, 51]. There may be some variations between or within countries due to regulatory models being applied differently, for example across provinces (i.e., Canada) and states (i.e., USA). Despite these limitations, this is the largest study of its type – both in number of respondents and in international representation – and provides novel insights into the global naturopathic community’s behaviours, attitudes, and perceptions regarding the use of knowledge and information in clinical practice.” We have also read through the manuscript (including the abstract and key messages) closely and made a number of small edits to grammar (e.g., reducing repetition, including or removing acronyms for consistency and in line with reporting conventions employed for this manuscript).
Additional Information:	
Question	**Response**
Conflicts of Interest Please declare any possible conflicts of interest, or state ‘The Author(s) declare(s) that there is no conflict of interest’ if there are none. Further information about conflicts of interest can be found in our Ethical Guidelines.	The authors declare that there is no conflict of interest

NATUROPATHS' BEHAVIOURS, ATTITUDES AND PERCEPTIONS TOWARDS THE USE OF KNOWLEDGE AND INFORMATION SOURCES

Amie Steel
University of Technology Sydney, Australia

Vicky Ward
University of St Andrews, Scotland

Matthew Leach
Southern Cross University, Australia

Iva Lloyd
World Naturopathic Federation, Canada

ABSTRACT

Background: Primary care professions practicing traditional systems of medicine, such as naturopathy, may have an increased need to use critical thinking to integrated diverse knowledge sources in response to the complex 'messiness' of clinical practice. The degree to which the varied knowledge types used by naturopathic practitioners align with evidence-based practice principles remains unexplored.

Aims and objectives: To investigate naturopathic practitioners' behaviours, perceptions and attitudes towards their use of knowledge and information sources.

Methods: An online cross-sectional survey study administered in five languages to the international naturopathic profession. Descriptive statistics were prepared using Stata 16.1.

Findings: Survey respondents (n=453) represented all world regions. The most common type of knowledge used to inform clinical practice was developed through clinical experience (86.2%) or during initial clinical training (81.2%). The most used information sources were scientific journals (80.4%), conferences or other professional events (78.2%), modern naturopathic clinical textbooks (74.6%), laboratory, pathology or radiology tests (74.0%), or professional journals for clinicians (73.5%). The greatest trust in knowledge acquired from information sources was attributed to information from laboratory, pathology or radiology tests. The greatest importance was place on information based on the patient's perspective of living with their health condition.

Discussion and conclusions: naturopathic practitioners do not appear to have a strong level of trust for any particular information source, despite variations in trust between sources. Further, their philosophies and principles may promote the importance naturopathic practitioners place on non-research information sources such as patient experience and add further complexity to clinical decision-making processes for naturopathic practitioners.

Key messages:

1. Naturopathic practitioners use diverse knowledge and information sources to inform practice but do not appear to have a strong level of trust for any one information source.
2. Naturopathy's focus on patient-centred care and addressing the unique needs of the patient may promote the importance naturopathic practitioners place on non-research information sources and add further complexity to their clinical decision-making.
3. Naturopathic practitioners consider knowledge or information provided by other health professionals providing care to the patient to be less important than a range of information provided by the patient, or tests and examinations.
4. Naturopathic practitioners structural isolation in the health system coupled with their underpinning philosophies and principles may drive their attitudes and perceptions regarding the knowledge and information sources they access for clinical practice.

Key words/short phrases:

Naturopathy; knowledge mobilisation; clinical reasoning; evidence-based practice

Word count:

3500

NATUROPATHS' BEHAVIOURS, ATTITUDES AND PERCEPTIONS TOWARDS THE USE OF KNOWLEDGE AND INFORMATION SOURCES

BACKGROUND

The evidence-based practice movement has presented the global community of health practitioners and policy makers with wide ranging challenges, the most notable being the core purpose of evidence-based practice: translating research evidence into practice [1]. While efforts have been made to operationalise this translation through the development of clinical practice guidelines, the complexity of patient health needs and preferences, and the tensions between clinician experiential knowledge and the best available evidence [2], have presented real and present challenges to the usefulness and applicability of clinical practice guidelines [1]. Scholars have argued that clinicians respond to the complex 'messiness' of clinical practice by using critical thinking skills to integrate diverse sources of knowledge and information in a cognitive approach described as 'mindlines'. Mindlines are described by Gabay and le May as "guidelines-in-the-head, in which evidence from a wide range of sources has been melded with tacit knowledge through experience and continual learning to become internalised as a clinician's personal guide to practising in varied contexts"[3].

The above challenges to evidence translation are further amplified in primary care professions practicing traditional systems of medicine, such as naturopathy. Naturopathy is a European traditional medicine system codified in the late 1800s, which draws upon early European philosophies of health and healing [4]. Naturopathic practice requires a highly patient-centred and holistic approach that prioritises preventive health and wellness, and patient education and empowerment [5]. Today, there are an estimated 110,000 naturopathic practitioners providing care to 5.5 million patients per month across the 108 countries in which they practice [6]. Accordingly, naturopathic practitioners represent a sizeable health workforce, and play a significant role in health service delivery. Naturopathic practitioners treat patients across the lifespan, largely focused on disease prevention and non-communicable diseases (NCDs) using a complex and multi-modal approach that incorporates core naturopathic therapies, modalities and practices including applied nutrition, clinical nutrition, herbal medicine, lifestyle modifications, mind-body medicine techniques, naturopathic physical medicine, hydrotherapy and other therapies [6, 7]. Naturopathic practices vary slightly across geography due to jurisdictional regulations (see Figure 1) [4, 8]. There may also be variation to naturopathic curriculum with courses commonly involving between 2500 hours and

4000 hours of study [9]. Despite naturopathic practitioners' focus on NCDs, their role in addressing health issues that substantially contribute to global burden are often overlooked [7]. The reason for this oversight may in part be due to naturopathy's philosophical and structural isolation from government policies and regulation in many of the countries that naturopathy is practiced [4, 8].

In line with naturopathic philosophies and principles, naturopathic practitioners draw upon diverse knowledge to inform clinical practice, including clinical research, traditional knowledge, and patient-provided information [10]. Naturopathic practitioners seeking to integrate the information derived from these varied knowledge types into their clinical reasoning and decision-making processes have been found to experience ontological differences in how such knowledge is generated [11-13]; although it is unclear whether these challenges are directly experienced by naturopathic practitioners or by others attempting to understand how naturopathic practitioners practice. Irrespective of viewpoint, these challenges may be accentuated by naturopathic practitioners' clinical application of the Theory of Complex Systems, in which naturopathic practitioners view an individual as an integrated whole that interacts and reacts to not only others in their surroundings, but also their environment [14]. While attempts have been made to explore the non-linear approach to clinical reasoning that characterises naturopathic approaches to clinical care [15], the degree to which the varied knowledge types used by naturopathic practitioners inform, supplement or conflict with such an approach remains unexplored.

METHODS

Design

International, cross-sectional study.

Aim

This study aimed to investigate naturopathic practitioners' behaviours, perceptions and attitudes regarding the use of varied knowledge and information sources in their clinical decision-making.

SETTING

The World Naturopathic Federation (WNF) administered an online questionnaire through their global network. The WNF is an international organisation representing over 70 naturopathic organisations (e.g., professional associations, educational institutions, regulatory bodies) from all World Health Organisation regions [16].

Participants

The study recruited a self-selected sample of naturopathic practitioners in clinical practice, defined as being in practice at any time within the previous 12 months, including the time of data collection. Individuals from any country were eligible to participate. The survey was available in five languages (English, French, Portuguese, Spanish and German); participants were excluded if they were unable to complete the survey in any of the available languages. The WNF shared a web-link to the online survey with full member organisations, which then shared the link via direct email with their naturopathic practitioner membership. Both the WNF and the WNF member organisations shared the link through their organisational social media accounts.

Sample Size

In line with sample size calculations for descriptive survey research [17], the study aimed to recruit a minimum of 385 study participants. Participation rate was defined as the number of individuals who completed the first survey items pertaining to use of knowledge and information sources to inform clinical decision-making as a proportion of the number of participants who accessed the information sheet but did not respond to any survey items [18].

Instrument

The questionnaire was administered via Qualtrics™, between 12th September 2020 and 20th November 2020. The questionnaire included 122 core items and six adaptive items repeated up to nine times. Item repetition was determined by participant responses to one survey item ("Which of the following types of information sources do you employ when providing care to patients?"). The items were categorised into seven domains: 1 – *demographic and practice characteristics* (10 items); 2 - *practice behaviours* (21 items); 3 - *use of knowledge and information sources* (4 items); 4 - *use of, and attitudes towards, specific knowledge and information sources* (6 items repeated adaptively); 5 - *perceptions about knowledge and information sources* (36 items); 6 - *perceived stakeholder influence of knowledge use* (3 items); and 7 - *barriers to use of different knowledge types* (48 items). This analysis draws on participants' responses to selected items focused on naturopathic practitioners' perceptions and use of patient knowledge and information within clinical decision-making from domains 3, 4, and 5. The items related to attitudes (Domain 4) and perception (Domain 5) of knowledge and information sources used a 5-point Likert scale for response options. Items measuring perceived importance and trust were scaled from Extremely Important (1) to Not at All Important (5), and Completely (1) to Not at All (5), respectively. Items measuring preferred frequency of use scaled from Always (1) to Never (5). The full survey is provided as a Supplementary File.

Three individuals who were reflective of the target population and were external to the research team tested the questionnaire for face validity and technical functionality. The research team made minor amendments to item structure and survey flow based on pilot test feedback. All participant documents (i.e., invitation email, information sheet, survey) were drafted in English. The Qualtrics' automated translation function was used to translate the documents into the other languages. Native language speakers were asked to cross-check the translations for accuracy and meaning. AS and IL used Google Translate to confirm any changes recommended by translators before edits were applied to the final version. A second translator was invited to provide input where applicability of the proposed changes was unclear. All translators were provided by the WNF.

Data management and analysis

Data were exported from Qualtrics and imported to Stata 16.1 (StataCorp LLC) for analysis. Items that allowed participants to select all relevant response options and included missing responses were converted to 'no' responses forming a binary variable if the respondent had selected at least one other response option in the same item. All other missing data were excluded from the analysis. Data pertaining to country of location were categorised by World Health Organization Regions, except for the Region of the Americas which was reported as North America (Canada and United States) and Latin America (e.g., Brazil, Chile, Colombia, Cuba, Ecuador, Peru, Puerto Rico, and Saint Lucia) [19]. An additional binary variable was also created for clinical practice environment through which participants that shared a clinical practice with another health professional who was not a naturopath (including hospitals) were categorised as a practicing in an 'integrative setting' and those practicing by themselves or co-located with other naturopaths only were categorised as a 'non-integrative setting'.

Descriptive statistics were prepared for all survey items (i.e., frequencies and percentages for categorical data, and means/medians and standard deviations/interquartile ranges for continuous data). Items with Likert scale response options were analysed as continuous data and reported using means, standard deviations and confidence intervals. These means were then used to categorise participant perceptions of the importance and trust of different knowledge or information sources as 'high' (≤2), 'moderate' (>2 and ≤3) or 'low' (>3).

All variables were analysed using the Student's t-test (normative continuous), Wilcoxin-ranked test (non-parametric continuous) or chi-square test (categorical) to compare differences between participants who reported practicing in an integrative setting or non-integrative setting. The alpha level was set at 0.05.

Ethical clearance

This project was approved by the Human Research Ethics Committee of [Redacted for Blinded Review]. Participants were provided with a detailed participant information sheet and required to indicate consent to participate in the study as a prelude to the survey instrument on the Qualtrics platform.

FINDINGS

Participant characteristics

The survey achieved an 89.6% participation rate (n=548), with 453 participants (82.6% of total participants) responding to items relevant to the analysis presented in this paper (see Figure 2). Participants commonly identified as female-gendered (72.6%) with a mean age of 45.9 years (min 23 years, max 81 years) (see Table 1). All world regions were represented, with participants most commonly located in North America (n=177, 39.3%), the Western Pacific (n=102, 22.6%), and Europe (n=97, 17.5%). There was some variation in the number of years since participants completed their first naturopathic qualification, with the largest proportion reporting between five and ten years (n=113, 24.9%), followed by less than five years (n=111, 24.5%) and 21 years or more (n=90, 19.9). On average, participants reported working in clinical practice part time (mean: 22.6 hours; min 1, max 60) and seeing approximately 19 patients per week (mean: 19.5; min 0, max 130). A similar proportion of participants reported their clinical practice was in a non-integrative setting (n=217, 47.6%) as those who reported practicing in an integrative setting (n=239, 52.4%).

Participant use of specific knowledge and information sources, and the methods they use to share this knowledge with their patients is also presented in Table 1. Information published in scientific journals by researchers (80.4%) and information gathered from conferences or other professional events (78.2%) were reported most frequently while the information published in traditional naturopathic textbooks was used least commonly (42.6%). The most common types of knowledge used to inform care was knowledge developed through clinical experience (86.2%) and through initial clinical training (81.2%). Knowledge developed through discussion with a mentor or expert was reported the least (55.4%). Using knowledge to produce information for the general public (e.g., social media, blogs, community talks and magazine articles; 72.6%), and for patients (e.g., information handouts and newsletters; 72.2%) were reported with the greatest frequency.

Participants who practice in an integrative clinical practice setting had a statistically significant ($p<0.05$) lower mean age than those in a non-integrative setting (43.2 years vs 48.6 years). They were also more commonly female (77.4% vs 68.7%), practicing in North America (51.9% vs 26.1%) and reported a higher mean number of patient visits per week (19.4% vs 17.8%). There was also a

difference in years since first qualification with those who first qualified between 5 and 15 years ago more commonly practicing in an integrative setting while those who first qualified 21 years or more ago practicing in a non-integrative setting. Other than information from laboratory tests, pathology or radiology tests (82.4% vs 67.8%) and knowledge developed through continuing professional education delivered by an expert clinician (85.6% vs 76.5%) being reported more frequently by participants in an integrative setting, there were no differences in the knowledge or information sources used to inform care provided to patients or the methods used to share knowledge with patients.

Importance of, and Trust in, knowledge and information sources when making decisions about patient care

The importance participants reported placing on different knowledge and information sources is presented in Table 2. The sources of knowledge or information categorised as having a 'high' level of importance is the patient's perspective of living with their health condition (Mean [M] 1.6) and the patient's personal health history (M 1.8). 'Moderate' importance was attributed to the patient's family health history, medical examinations or tests, general internet sources, and other health professionals providing care to the patient, and functional examinations or tests. The remaining knowledge or information sources – encompassing government agencies, broadcast media and informal sources – were considered 'low' importance. No difference in the mean level of importance was found for participants in integrative settings compared with those in non-integrative settings.

Table 3 presents practitioner self-reported trust of knowledge and information sources. The sources attributed a high level of trust were patient's health history and patient's perspective of living with their health condition. Sources that were moderately trusted included family health history, published journal articles, functional and medical examinations or tests and other health professionals. Among the least trusted were broadcast media, general internet sources and government agencies. The trust of general internet sources was significantly lower among participants practicing in integrative clinical settings compared with those practicing in non-integrative settings (4.1 vs 3.8).

The overall categorisation participants' perceptions of the importance of, and trust in, different knowledge and information sources are displayed in Figure 3.

PREFERRED FREQUENCY AND TRUST OF KNOWLEDGE ACQUIRED FROM DIFFERENT SOURCES AMONG USERS OF THOSE SOURCES

Table 4 presents the preferred frequency of use for each knowledge and information source among those who reported using each source. Users of information provided by the patient reported the highest mean preferred frequency of use for this information source (M 1.4). Participants who reported using information from laboratory tests, pathology or radiology tests also preferred using this information source frequently (M 2.0). Participants who used information provided by product companies preferred to use this information less frequently (M 3.4). The level of trust of knowledge acquired from information sources was also scored by participants that used each source. Information from laboratory tests, pathology or radiology tests were scored a high level of trust among users (M 2.0) while users of information provided by product companies attributed such information form these companies a lower level of trust (M 2.9). Comparison across participants according to their clinical practice environments found users of information published in scientific journals by researchers in integrative settings preferred to use this information with a greater degree of frequency than users in non-integrative settings (M 1.9 vs 2.4). Participants' trust of information from laboratory tests, pathology or radiology tests was also greater among users of this type of information who practiced in an integrative setting (M 1.9) compared to those in a non-integrative setting (M 2.1). Trust of information provided by product companies was significantly lower among users of that information who practiced in an integrative setting (M 3.1) compared to a non-integrative setting (M 2.7).

DISCUSSION AND CONCLUSIONS

A number of findings have emerged from this study that furthers our understanding of how naturopathic practitioners use and perceive knowledge and information within the context of clinical care and wider community health. One such finding is the mean level of trust reported by naturopathic practitioners ranges between 'a lot' and 'a little', with trust varying between sources and complete trust for any one information source rarely reported. As a result, naturopathic practitioners likely require complex critical thinking skills to meaningfully engage with the information derived from these different information sources and make patient-centred clinical decisions. Such challenges are reportedly shared by other health professionals seeking to resolve similar tensions within the context of their own professions' norms and practices [20]. Such complexity may, however, be amplified for practitioners of traditional medicine systems like naturopathy as they in part rely, by definition, on traditional knowledge sources [21, 22]. Australian research has described the challenges naturopathic practitioners face in navigating disparities between various information sources while providing naturopathic care [11, 13]. Our study builds on

and extends this previous research by providing quantitative and internationally relevant data. The varied trust naturopathic practitioners in our study express for the information sources they use may reflect the manifestation of complex dynamics between the core tenets of naturopathy as a traditional medicine system and the philosophies and principles of evidence-based practice as the prevailing paradigm in health. Studies exploring naturopathic practitioners' clinical reasoning and case management have highlighted the degree to which naturopathic practitioners engage with complexity within their clinical practice [15, 23, 24]. The skills developed through such application may be applied to appropriately using information sources which may not be deemed entirely trustworthy. Ultimately, further research is needed to better understand the cognitive and practical methods used by naturopathic practitioners to integrate knowledge from such diverse information sources, particularly where the naturopathic practitioner identifies gaps in the trustworthiness of the information the source provides.

This study found naturopathic practitioners' perceptions of importance and trust towards information sources changed based on proximity to the patient. Specifically, patient-related knowledge or information *provided by the patient* was rated with greater importance and trust than other patient-related information *provided by external sources* (e.g., medical examinations or tests, family history, information from other health professionals providing care to the same patient). The reason for naturopathic practitioners' low level of trust in information provided by external yet commonly respected information sources such as other health professionals involved in a patient's care is unclear. It may be that perceived differences in how health is viewed and managed in conventional medicine compared with naturopathic medicine may cause some uncertainty among naturopathic practitioners regarding the interpretation, diagnosis or clinical management decisions made by conventional health professionals whereby naturopathic practitioners may rely on accessing test results and drawing their own diagnostic conclusions [25-27]. Accordingly, some naturopathic practitioners may feel a need to undertake their own investigations rather than relying on the information gathered and shared by other clinicians. In fact, in some jurisdictions naturopathic practitioners may be legally bound to verify any diagnosis they are treating. For example, in Canada naturopathic practitioners are primary care doctors and as such can rely on laboratory tests and medical reports, but not a patient's report of a diagnosis. This does not, however, explain why the level of trust afforded medical examinations and tests was lower compared with patient provided information about their health and their lived experience of illness, as identified in our study. This comparatively lower importance and trust assigned to patient-specific information generated from non-patient sources (e.g., test results, family history) may also reflect the importance naturopaths place on interpreting health information within the context of

naturopathic philosophies and principles. For example, applying an integrative understanding of human biochemistry and physiology [28] due to naturopathic principles-based emphasis on identifying causal factors of ill health [24, 29]. These features of naturopathy may drive naturopathic practitioners to examine a patient's signs and symptoms through a lens different to the biomedical perspective and, in doing so, develop nuanced diagnostic interpretations of information derived from pathology tests and other external information directly informed by the patients' report of the health complaint as it occurs for and to the patient [28].

Naturopathy's focus on patient-centred care and addressing the unique needs of each individual patient – as reflected in the naturopathic philosophies and principles [22, 29] - may to some extent explain the importance naturopathic practitioners place on the breadth of information sources considered to have 'high' or 'moderate' importance. It is unclear what impact the perception of low trust of information from external information such as that provided by other health professionals, relative to patient-provided information, may have on the quality of patient care [30]. Individuals accessing naturopathic care commonly have complex and chronic health conditions, and such individuals often report unsatisfactory health service experiences when their care is poorly coordinated between health professionals [31, 32]. Interprofessional collaboration opportunities may be an important solution to this issue, as they have been found to improve multidisciplinary teamwork and patient outcomes for other health professions [33]. Despite health professionals agreeing that interprofessional care is a valuable feature of effective and patient-centred health care [34, 35], their behaviours may not actually support achieving interprofessional collaboration [35]. Ultimately, true patient-centred care requires a balance between prioritising and valuing patient needs while also facilitating and optimising coordinated interdisciplinary care. Individuals accessing naturopathy have reported high levels of patient-centred care from their naturopathic practitioner, even greater than experienced by their general practitioner [36], and international survey research has found a high degree of support for interprofessional collaboration among traditional and complementary medicine professions [37]. However, preliminary research has identified several barriers to achieving truly integrated care between naturopathic practitioners and other health professionals [26, 38-40]. Follow up research needs to consider policy and practice solutions to overcome such barriers for improved patient care.

This study also found naturopaths place a low importance on and trust in established institutions such as government agencies. Such a finding may reflect the structurally isolated position of naturopathic practitioners in many health care systems [8, 41] where collaboration and engagement with government agencies is often limited or restricted. However, it also presents a significant challenge to government agencies seeking to ensure the public have access to appropriate care, and

the government priorities for population health are enacted in community-based primary care. For example, international research highlights the significant value and priority naturopaths place on educating the community – both the general public and their patients – about health and wellness [42]. Appropriate engagement with and support from the government agencies tasked with coordinating health promotion activities would ensure a more cohesive and consistent message to the population. The lower importance that naturopaths place on government agencies also further emphasises previously raised concerns that existing, prevailing models of implementation science that focus on top-down knowledge transfer may not be relevant or appropriate for the naturopathic profession [43, 44]. These previous concerns are further supported by the low importance that naturopaths also attribute to research organisations and published literature while indicating a moderate level of trust for each. While this result reinforces previous findings that suggest naturopaths may find gaps in transferability between published research and real-world naturopathic practice [12, 45, 46], solutions to this gap have also been proposed through application of pragmatic trials involving complex interventions that are codesigned with or informed by naturopaths in clinical practice [47].

Overall, this study highlights another aspect of complexity which may be faced by all clinical professions but is potentially amplified in naturopathy due to the philosophical, historical and structural features of modern naturopathic practice. Educators have recognised the need to strengthen health professionals' critical thinking [45], a cognitive approach that draws on the pillars of meta-cognition, motivation and creativity [48], and this equally applies to naturopathy. Critical thinking enables clinicians to engage with the complex 'messiness' of clinical practice [12] and navigate potentially divergent information sources to integrate the knowledge derived from various sources in a manner that is applicable to the unique needs of the patient [49]. The resultant cognitive approach, or 'mindlines'[3], have been juxtaposed against the primary decision-making tool of the evidence-based practice movement - clinical practice guidelines. Mindlines are argued to be a potential asset when applied well, but perpetuating poor practice when not scaffolded by clinician skills in critical appraisal and self-reflection [3]. Our study results indicate naturopathic practitioners use and (mostly) trust a wide range of knowledge and information. This suggests naturopathic practitioners use 'mindlines' in their day-to-day practice to integrate such knowledge and information to inform their clinical decisions. While preliminary research has begun to explore naturopaths' clinical reasoning and cognitive process [15], much more research is needed to explore the degree to which mindlines are a feature of their practice, and whether there are any differences in the development and application of mindlines by naturopathic practitioners relative to other health professions. Future research needs to interrogate the relationship between the importance

and trust of knowledge and information sources as experienced by naturopathic practitioners and to understand how their mindlines are constructed including the potential relationship between naturopathic practitioners' mindlines and complexity. Research comparing mindline construction of naturopathic practitioners with other health professionals would also provide valuable insights.

Limitations

As this study draws upon self-reported survey data and the length of the survey may have resulted in missing data due to participant drop-out. With this in mind, the results may be susceptible to participant recall bias and self-selection bias. The study also includes higher proportional representation from some countries (i.e., Canada and Australia), which may raise the risk of responder bias. The convenience sampling method may also have resulted in sampling bias. As such, the study results can only be interpreted as reflective of the study sample and not confidently generalised to the broader international naturopathic practitioner community. However, the absence of definitive lists of naturopathic practitioners in many of the countries through which recruitment was conducted precluded other sampling methods. This may explain why other international research investigating the naturopathic profession to date has been conducted using elements of convenience sampling [6, 7, 10, 24, 41, 42, 50, 51]. There may be some variations between or within countries due to regulatory models being applied differently, for example across provinces (i.e., Canada) and states (i.e., USA). Despite these limitations, this is the largest study of its type – both in number of respondents and in international representation – and provides novel insights into the global naturopathic community's behaviours, attitudes, and perceptions regarding the use of knowledge and information in clinical practice.

Conclusions

Clinical practice presents clinicians with complex challenges that requires them to draw upon diverse knowledge types to inform their clinical reasoning and decision-making. These challenges may be amplified in traditional medicine systems such as naturopathy, in which practitioners report a complex engagement with varied information sources when providing care to their patients. Health policy and practice researchers are attempting to solve the challenges arising from this diversity and complexity. Naturopathy may offer an opportunity to better integrate various forms of knowledge and information, and these approaches could be adapted and applied to other health professions. While evidence-based practice is accepted as an important advancement in providing quality clinical care, the dynamics surrounding the use of knowledge and information identified through our study highlights the importance of accommodating the use of non-research information sources to foster the provision of patient-centred care, and to help overcome the complex problems seen in real-world clinical care.

FUNDING

No funding was used for this study.

CONTRIBUTOR STATEMENT

[Author 1] and [Author 4] developed the concept for this study. [Author 1] designed the survey with input from [Authors 2-4]. The statistical analysis was conducted by [Author 1] with input from [Author 3]. Interpretation of the findings was undertaken by all authors. All authors contributed to drafting, reviewing and approving the final manuscript.

CONFLICT OF INTEREST STATEMENT

The authors have no conflicts of interest to declare

ACKNOWLEDGEMENTS

We thank the World Naturopathic Federation member organisation representatives who assisted with instrument translation. We also thank Asher Steel for assistance in preparing Figure 3 which presents the hierarchy of importance and trust.

REFERENCES

1. Beauchemin, M., E. Cohn, and R.C. Shelton, *Implementation of Clinical Practice Guidelines in the Health Care Setting: A Concept Analysis.* ANS. Advances in nursing science, 2019. **42**(4): p. 307-324.
2. Correa, V.C., et al., *Individual, health system, and contextual barriers and facilitators for the implementation of clinical practice guidelines: a systematic metareview.* Health Research Policy and Systems, 2020. **18**(1): p. 74.
3. Gabbay, J. and A. le May, *Mindlines: making sense of evidence in practice.* British Journal of General Practice, 2016. **66**(649): p. 402-403.
4. Lloyd, I. and T. Hausser, *Landscape of Naturopathy by WHO region*, in *Naturopathy: Practice, Effectiveness, Economics and Safety*, I. Lloyd, A. Steel, and J. Wardle, Editors. 2021, World Naturopathic Federation: Toronto, Canada. p. 21-28.
5. Lloyd, I., T. Hausser, and S. Myers, *Naturopathic Philosophies and Principles*, in *Naturopathy: Practice, Effectiveness, Economics and Safety*, I. Lloyd, A. Steel, and J. Wardle, Editors. 2021, World Naturopathic Federation: Toronto, Canada. p. 8-14.
6. Lloyd, I., A. Steel, and J. Wardle, eds. *Naturopathy: Practice, Effectiveness, Costs, Safety*. 2021, World Naturopathic Federation: Toronto, Ontario.
7. Steel, A., et al., *Overview of international naturopathic practice and patient characteristics: results from a cross-sectional study in 14 countries.* BMC Complementary Medicine and Therapies, 2020. **20**(1): p. 59.
8. Lloyd, I., J. Dunn, and J. Wardle, *Regulation of the Naturopathic Workforce*, in *Naturopathy: Practice, Effectiveness, Economics, Safety*, I. Lloyd, A. Steel, and J. Wardle, Editors. 2021, World Naturopathic Federation: Toronto, Canada. p. 28-57.
9. World Naturopathic Federation, *WNF Educational Program Guide*. 2021, World Naturopathic Federation: Toronto, Ontario.
10. Steel, A., et al., *Naturopaths' mobilisation of knowledge and information in clinical practice: an international cross-sectional survey.* BMC Complementary Medicine and Therapies, 2021. **21**(1): p. 205.
11. Steel, A. and J. Adams, *The interface between tradition and science: naturopath's persepctive of modern practice.* J Altern Complement Med, 2011. **17**(10): p. 967-72.
12. Steel, A. and J. Adams, *Approaches to clinical decision-making: A qualitative study of naturopaths.* Complementary Therapies in Clinical Practice, 2011. **17**: p. 81-84.
13. Steel, A. and J. Adams, *The application and value of information sources in clinical practice: an examination of the perspective of naturopaths.* Health Information & Libraries Journal, 2011. **28**(2): p. 110-118.
14. Myers, S., I. Lloyd, and T. Hausser, *Naturopathic Theories*, in *Naturopathy: Practice, Effectiveness, Economics and Safety*, I. Lloyd, A. Steel, and J. Wardle, Editors. 2021, World Naturopathic Federation: Toronto, Canada. p. 15-18.
15. Graham, K.D., A. Steel, and J. Wardle, *Primary health care case management through the lens of complexity: an exploratory study of naturopathic practice using complexity science principles.* BMC Complementary Medicine and Therapies, 2022. **22**(1): p. 107.
16. World Naturopathic Federation. *About WNF*. 2023 [cited 2023 31 Jan]; Available from: http://worldnaturopathicfederation.org/about-wnf/.
17. Jekel, J.F., et al., *Epidemiology, biostatistics, and preventive medicine*. 2007, Philadelphia: Saunders Elsevier.
18. Eysenbach, G., *Improving the quality of Web surveys: the Checklist for Reporting Results of Internet E-Surveys (CHERRIES).* Journal of medical Internet research, 2004. **6**(3): p. e34.
19. World Health Organisation. *Countries*. 2021 [cited 2021 4 February]; Available from: https://www.who.int/countries/.
20. Greenhalgh, T., J. Howick, and N. Maskrey, *Evidence based medicine: a movement in crisis?* BMJ : British Medical Journal, 2014. **348**: p. g3725.

21. World Naturopathic Federation, *A comprehensive listing of books written by naturopaths/naturopathic doctors*. 2020, World Naturopathic Federation: Toronto, Ontario.
22. World Naturopathic Federation Roots Committee, *WNF - Naturopathic Roots Report*. 2016, World Naturopathic Federation,: Toronto, Canada.
23. Graham, K.D., A. Steel, and J. Wardle, *The converging paradigms of holism and complexity: An exploration of naturopathic clinical case management using complexity science principles.* Journal of Evaluation in Clinical Practice, 2022.
24. Steel, A., et al., *Integrative physiology and traditional naturopathic practice: Results of an international observational study.* Integrative Medicine Research, 2020. **9**(4): p. 100424.
25. Wardle, J.L., J. Adams, and C.-W. Lui, *A qualitative study of naturopathy in rural practice: A focus upon naturopaths' experiences and perceptions of rural patients and demands for their services.* BMC health services research, 2010. **10**(1): p. 1-8.
26. Wardle, J., et al., *Collaborating with medicine? Perceptions of Australian naturopaths on integrating within the conventional medical system.* Journal of interprofessional care, 2017. **31**(6): p. 734-743.
27. Nguyen, J., et al., *Conventional and Complementary Medicine Health Care Practitioners' Perspectives on Interprofessional Communication: A Qualitative Rapid Review.* Medicina, 2019. **55**(10): p. 650.
28. Roytas, D. and N. Schoendorfer, *Naturopathic diagnostic techniques*, in *Clinical Naturopathy: an evidence-based guide to practice*, J. Sarris and J. Wardle, Editors. 2014, Elsevier: Chatswood, Australia. p. 19-52.
29. World Naturopathic Roots Committee, *WNF White Paper: Naturopathic Philosophies, Principles and Theories*. 2017, World Naturopathic Federation: Canada.
30. Foronda, C., B. MacWilliams, and E. McArthur, *Interprofessional communication in healthcare: An integrative review.* Nurse Education in Practice, 2016. **19**: p. 36-40.
31. Powell Davies, G., et al., *Coordination of care within primary health care and with other sectors: a systematic review.* 2017.
32. Fox, S. and C. Chesla, *Living with chronic illness: A phenomenological study of the health effects of the patient–provider relationship.* Journal of the American Academy of Nurse Practitioners, 2008. **20**(3): p. 109-117.
33. Supper, I., et al., *Interprofessional collaboration in primary health care: a review of facilitators and barriers perceived by involved actors.* Journal of Public Health, 2015. **37**(4): p. 716-727.
34. Ulrich, G., et al., *Attitudes towards interprofessional collaboration in young healthcare professionals.* J Interprof Care, 2019. **33**(6): p. 768-773.
35. Ansa, B.E., et al., *Attitudes and Behavior towards Interprofessional Collaboration among Healthcare Professionals in a Large Academic Medical Center.* Healthcare (Basel), 2020. **8**(3).
36. Foley, H., A. Steel, and J. Adams, *Perceptions of Person-Centred Care Amongst Individuals with Chronic Conditions who Consult Complementary Medicine Practitioners.* Complementary Therapies in Medicine, 2020: p. 102518.
37. Lloyd, I., et al., *Attitudes Towards Professional Collaboration: An International Survey.* Advances in Integrative Medicine, 2019. **6**: p. S132.
38. Diezel, H., et al., *Patterns and influences of interprofessional communication between midwives and CAM practitioners: a preliminary examination of the perceptions of midwives.* Aust J Herbal Med, 2013. **25**(1): p. 4-10.
39. Steel, A., et al., *Providing maternity care from outside the system: perspectives of complementary medicine practitioners.* Journal of Interprofessional Care, 2020: p. 1-9.
40. Gaboury, I., et al., *Interprofessional collaboration within Canadian integrative healthcare clinics: Key components.* Social Science & Medicine, 2009. **69**(5): p. 707-715.

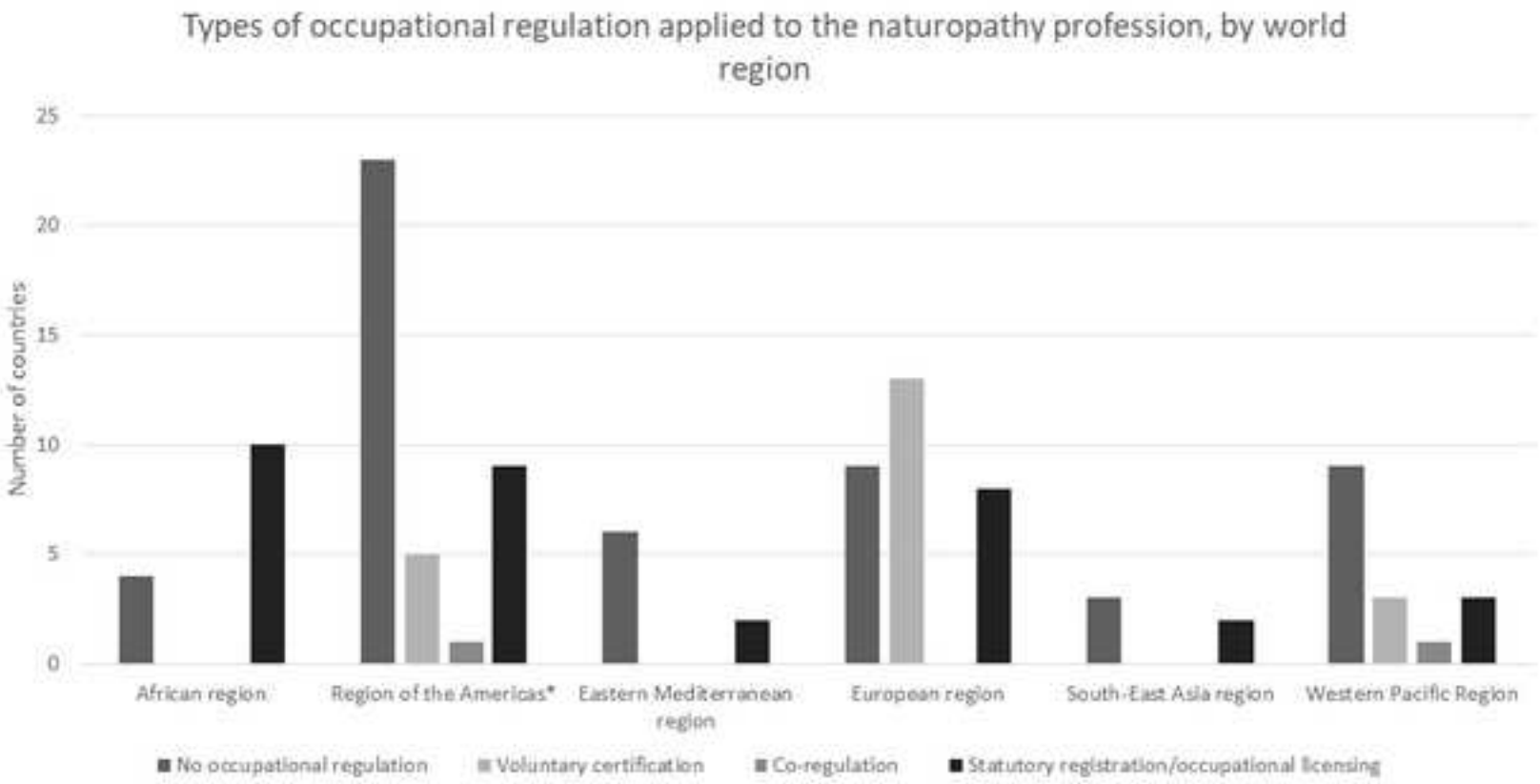
41. Dunn, J., et al., *Characteristics of global naturopathic education, regulation, and practice frameworks: results from an international survey.* BMC complementary medicine and therapies, 2021. **21**(1): p. 1-19.
42. Steel, A. and I. Lloyd, *Community education and health promotion activities of naturopathic practitioners: results of an international cross-sectional survey.* BMC Complementary Medicine and Therapies, 2021. **In press**(Text available on request).
43. Adams, J., A. Steel, and R. Reid, *A holistic approach to implementation science (IS): Broadening the IS gaze to traditional, complementary and integrative medicine*, in *Public Health and Health Services Research in Traditional, Complementary and Integrative Health Care: International Perspectives*, A. J, et al., Editors. 2019, World Scientific: London.
44. Steel, A., F. Rapport, and J. Adams, *Towards an implementation science of complementary health care: some initial considerations for guiding safe, effective clinical decision-making.* Advances in Integrative Medicine, 2018. **5**(1): p. 5-8.
45. Steel, A., et al., *The Role and Influence of Traditional and Scientific Knowledge in Naturopathic Education: A Qualitative Study.* 2019. **25**(2).
46. Leach, M.J., *Implementation science in New Zealand naturopathic practice: a cross-sectional study.* Journal of Complementary and Integrative Medicine, 2022.
47. Schloss, J., et al., *Lessons from outside and within: Exploring advancements in methodology for naturopathic medicine clinical research.* The Journal of Alternative and Complementary Medicine, 2019. **25**(2): p. 135-140.
48. Van de Kamp, M.T., et al., *Enhancing divergent thinking in visual arts education: Effects of explicit instruction of meta-cognition.* British Journal of Educational Psychology, 2015. **85**(1): p. 47-58.
49. Weaver, R.R., *Reconciling evidence-based medicine and patient-centred care: defining evidence-based inputs to patient-centred decisions.* Journal of Evaluation in Clinical Practice, 2015. **21**(6): p. 1076-1080.
50. Steel, A., et al., *Knowledge dissemination by the naturopathic profession: a bibliometric analysis of naturopath-authored, peer-reviewed publications.* The Journal of Alternative & Complementary Medicine, 2021. **27**(8): p. 630-640.
51. World Naturopathic Federation, *World Naturopathic Federation Report*. 2015, World Naturopathic Federation: Ontario, Canada.

FIGURE 1: TYPES OF OCCUPATIONAL REGULATION APPLIED TO NATUROPATHY, BY WORLD REGION

FIGURE 2: SURVEY PARTICIPATION FLOWCHART

FIGURE 3: HIERARCHY OF PARTICIPANTS' PERCEPTIONS OF IMPORTANCE AND TRUST REGARDING KNOWLEDGE AND INFORMATION SOURCES

Figure 1



*Voluntary certification regimens are present in some provinces (Canada) and States (USA) where occupational licensing or statutory registration is absent
Source: Lloyd, I., J. Dunn, and J. Wardle, *Regulation of the Naturopathic Workforce*, in *Naturopathy: Practice, Effectiveness, Economics, Safety*, I. Lloyd, A. Steel, and J. Wardle, Editors. 2021, World Naturopathic Federation: Toronto, Canada. p. 28-57. [8]

Figure 2

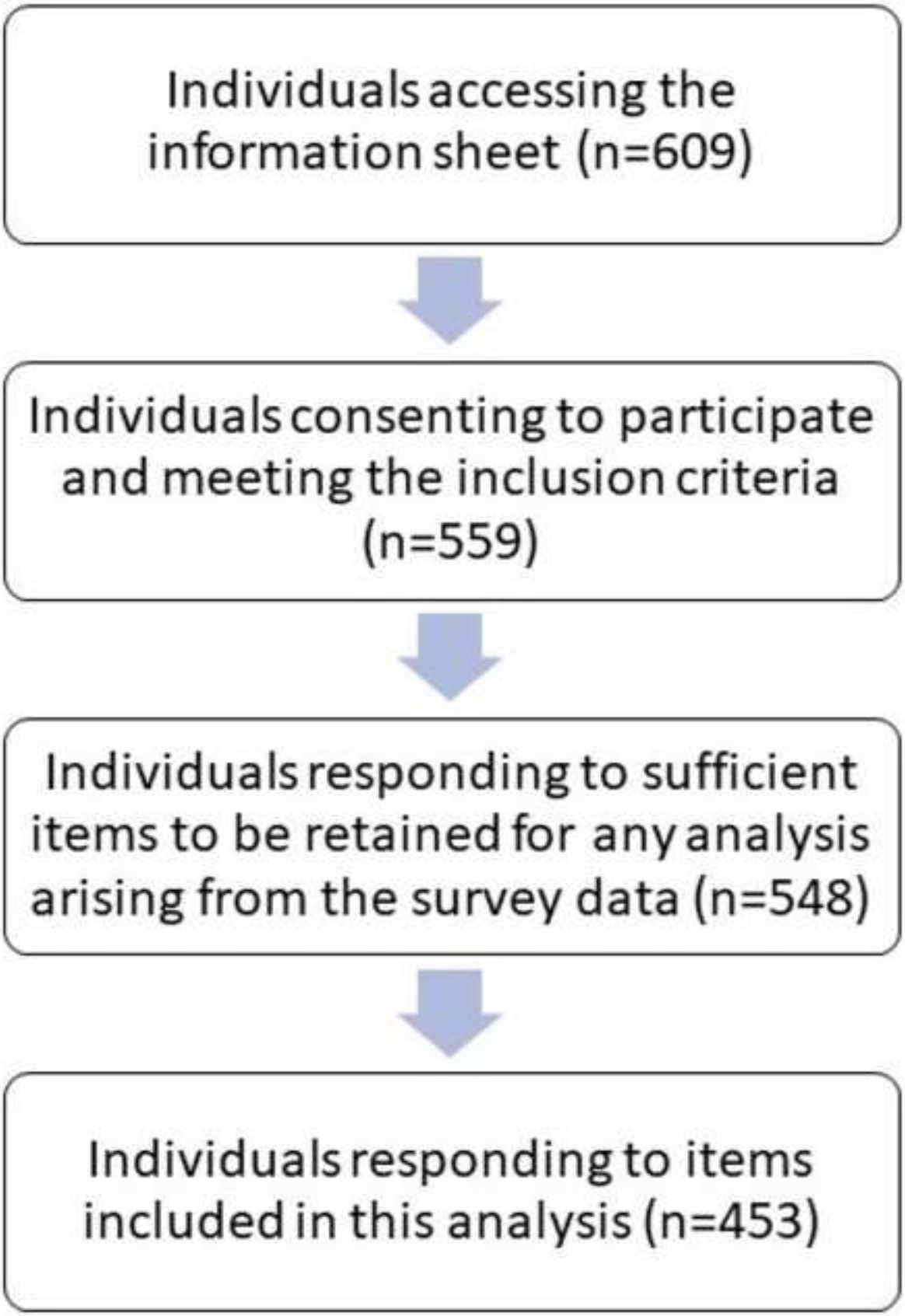

Individuals accessing the information sheet (n=609)
Individuals consenting to participate and meeting the inclusion criteria (n=559)
Individuals responding to sufficient items to be retained for any analysis arising from the survey data (n=548)
Individuals responding to items included in this analysis (n=453)

Figure 3

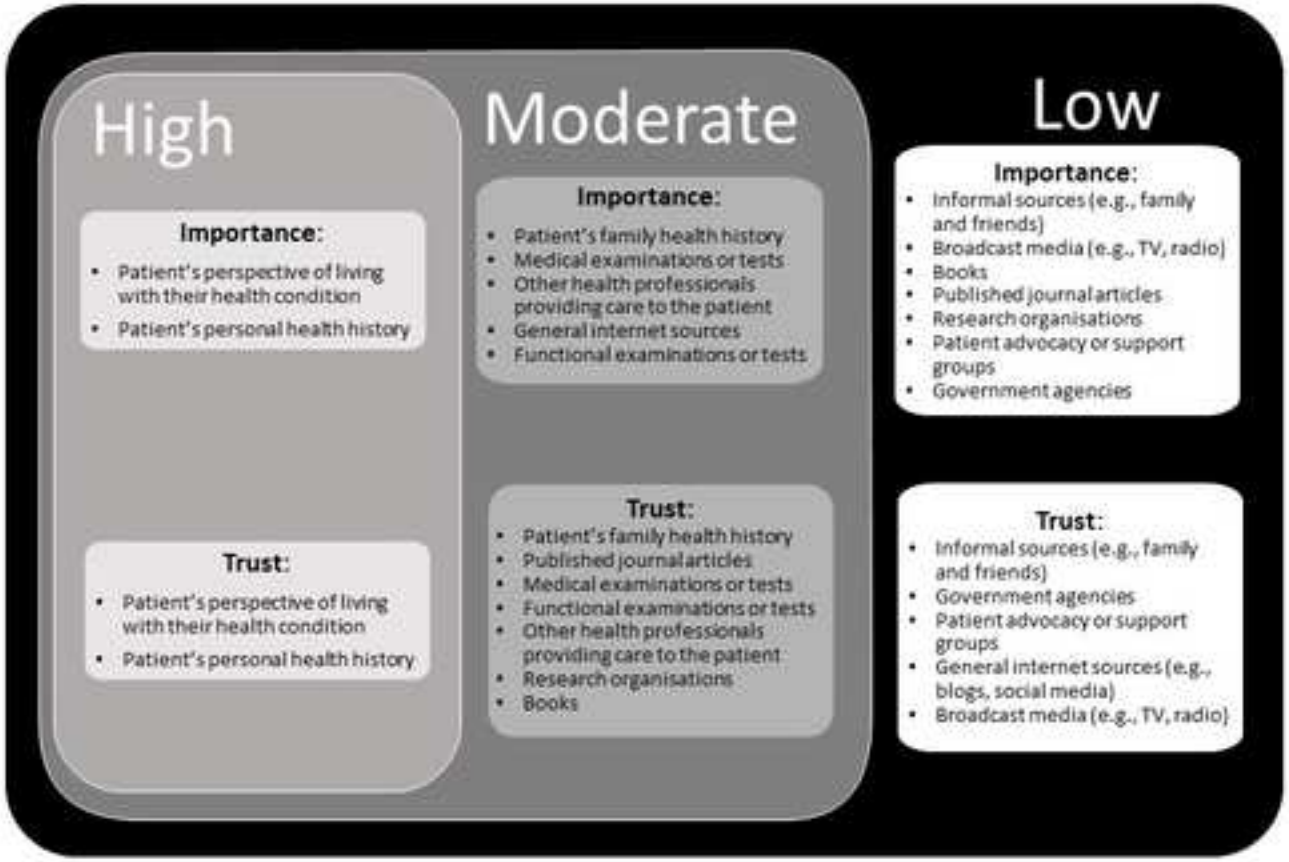

High
Importance:
Patient's perspective of living with their health condition
Patient's personal health history
Trust:
Patient's perspective of living with their health condition
Patient's personal health history
Moderate
Importance:
Patient's family health history
Medical examinations or tests
Other health professionals providing care to the patient
General internet sources
Functional examinations or tests
Trust:
Patient's family health history
Published journal articles
Medical examinations or tests
Functional examinations or tests
Other health professionals providing care to the patient
Research organisations
Books
Low
Importance:
Informal sources (e.g., family and friends)
Broadcast media (e.g., TV, radio)
Books
Published journal articles
Research organisations
Patient advocacy or support groups
Government agencies
Trust:
Informal sources (e.g., family and friends)
Government agencies
Patient advocacy or support groups
General internet sources (e.g., blogs, social media)
Broadcast media (e.g., TV, radio)

TABLE 1: PARTICIPANT DEMOGRAPHIC, PRACTICE AND INFORMATION USE CHARACTERISTICS, COMPARED BY CLINICAL PRACTICE SETTING (N=453)

Participant characteristic	All participants	Non-integrative setting (n=217)	Integrative setting (n=239)	*p*
	Mean (SD)			
Age (n=446)	45.9 (12.6)	48.6 (12.9; 46.9-50.3)	43.2 (11.5; 41.8-44.7)	<0.001
Gender (n=453)	***N (%)***			
Male	124 (27.4)	68 (31.3)	54 (22.6)	0.04
Female	329 (72.6)	149 (68.7)	185 (77.4)	
World Health Region (n=451)				
North America	177 (39.3)	56 (26.1)	124 (51.9)	<0.001
Latin America	46 (10.2)	23 (10.7)	23 (9.6)	
Europe	79 (17.5)	53 (24.7)	27 (11.3)	
Western Pacific	102 (22.6)	61 (28.4)	42 (17.6)	
Africa/Southeast Asia/Eastern Mediterranean	47 (10.4)	22 (10.2)	23 (9.6)	
Years since first qualification (n=453)				
Less than 5 years	111 (24.5)	53 (24.4)	58 (24.3)	0.03
Between 5 and 10 years	113 (24.9)	46 (21.2)	66 (27.6)	
Between 11 and 15 years	73 (16.1)	30 (13.8)	44 (18.4)	
Between 16 and 20 years	66 (14.6)	30 (13.8)	35 (14.6)	
21 years or more	90 (19.9)	58 (26.7)	36 (15.1)	
	Mean (SD)			
Clinical practice hours per week (n=446)	22.6 (12.9)	22.2 (13.2; 20.4-24.0)	23.1 (12.9; 21.5-23.9)	0.4
Patient visits per week (n=450)	19.5 (18.0)	17.8 (16.5; 15.6-20.0)	19.4 (16.9; 17.8-20.9)	<0.001
Information source used to inform care provided to patients*	***N (%)***			
Information published in scientific journals by researchers	364 (80.4)	156 (77.2)	189 (83.3)	0.1
Information gathered from conferences or other professional events	354 (78.2)	156 (77.2)	181 (79.7)	0.5
Information published in modern naturopathic clinical textbooks (published in the last 10 years)	338 (74.6)	148 (73.3)	172 (75.8)	0.5
Information from laboratory tests, pathology or radiology tests	335 (74.0)	137 (67.8)	187 (82.4)	<0.001
Information published in professional journals for clinicians	333 (73.5)	143 (70.8)	175 (77.1)	0.1
Information provided by the patient	309 (68.2)	142 (70.3)	155 (68.3)	0.6
Information published in general clinical textbooks	296 (65.3)	131 (64.9)	152 (67.0)	0.6
Information from clinical guidelines	248 (54.8)	110 (54.5)	127 (56.0)	0.8
Information provided by product companies	230 (50.8)	104 (51.5)	115 (50.7)	0.9

Information published in traditional naturopathic textbooks (published more than 50 years ago)	193 (42.6)	91 (45.0)	93 (41.0)	0.4
Knowledge used to inform care provided to patients*				
Knowledge developed through clinical experience	412 (86.2)	185 (86.9)	207 (87.7)	0.8
Knowledge developed through initial clinical training	388 (81.2)	174 (81.7)	196 (83.1)	0.7
Knowledge developed through continuing professional education delivered by an expert clinician	382 (79.9)	163 (76.5)	202 (85.6)	0.01
Knowledge developed through consideration of the patient's unique needs	376 (78.7)	190 (80.5)	167 (78.4)	0.6
Knowledge developed through discussion with professional peers	362 (75.7)	184 (78.0)	160 (75.1)	0.5
Knowledge developed through continuing professional education delivered by a researcher	286 (59.8)	126 (59.2)	145 (61.4)	0.3
Knowledge developed through discussions with a mentor or expert	265 (55.4)	129 (54.7)	120 (56.3)	0.7
Methods used to share knowledge with patients*				
Producing information for the general public (e.g., social media, blogs, community talks, magazine articles)	318 (72.6)	140 (73.3)	157 (70.7)	0.6
Producing information for patients (e.g., information handouts, newsletters)	316 (72.2)	136 (71.2)	163 (73.4)	0.6
Producing information delivered through clinical training for naturopathic students	142 (32.4)	66 (34.6)	67 (30.2)	0.3
Producing information delivered through continuing professional education events for other clinicians	123 (28.1)	52 (27.2)	63 (28.4)	0.8
Producing information to be published in scientific journal articles	80 (18.3)	31 (16.2)	42 (18.9)	0.5
Producing information to be published in naturopathic clinical journal articles	79 (18.0)	36 (18.9)	39 (17.6)	0.7
Producing information to be published in modern naturopathic text books	50 (11.4)	24 (12.6)	22 (9.9)	0.4
Producing information to be published in general clinical text books	39 (8.9)	17 (8.9)	19 (8.6)	0.9
Producing information for product companies	39 (8.9)	14 (7.3)	21 (9.5)	0.4

*participants able to select more than one response

TABLE 2: IMPORTANCE OF DIFFERENT KNOWLEDGE OR INFORMATION SOURCES WHEN MAKING DECISIONS ABOUT PATIENT CARE

Source of knowledge or information	All participants	Non-integrative setting	Integrative setting	*p*
	MEAN (SD; 95%CI)	MEAN (SD; 95%CI)	MEAN (SD; 95%CI)	
Patient's perspective of living with their health condition (n=365)	1.6 (0.7; 1.6 – 1.7)	1.7 (0.7; 1.5 – 1.8)	1.6 (0.7; 1.5 – 1.7)	0.5
Patient's personal health history (n=364)	1.8 (0.9; 1.7 – 1.9)	1.9 (1.0; 1.7 – 2.0)	1.8 (0.9; 1.7 – 1.9)	0.3
Patient's family health history (n=365)	2.2 (1.0; 2.1 – 2.3)	2.2 (1.0; 2.0 – 2.4)	2.2 (1.0; 2.1 – 2.4)	0.9
Medical examinations or tests (n=365)	2.3 (1.0; 2.2 – 2.4)	2.3 (1.0; 2.1 – 2.4)	2.4 (0.9; 2.2 – 2.5)	0.3
General internet sources (e.g., blogs, social media) (n=365)	2.6 (1.0; 2.5 – 2.7)	2.7 (1.0; 2.5 – 2.8)	2.6 (0.9; 2.4 – 2.7)	0.3
Other health professionals providing care to the patient (n=365)	2.9 (0.9; 2.8 – 3.0)	3.0 (1.0; 2.9 – 3.2)	2.9 (0.9; 2.7 – 3.0)	0.06
Functional examinations or tests (e.g., urine/salivary hormone tests, hair mineral analysis, stool analysis) (n=365)	3.0 (1.1; 2.9 – 3.1)	3.0 (1.1; 2.8 – 3.1)	3.1 (1.1; 2.9 – 3.2)	0.4
Informal sources (e.g., family and friends) (n=365)	3.1 (1.0; 3.0 – 3.2)	3.1 (1.0; 3.0 – 3.3)	3.1 (1.0; 3.0 – 3.3)	0.9
Books (n=364)	3.5 (0.8; 3.4 – 3.6)	3.5 (0.8; 3.4 – 3.6)	3.6 (0.8; 3.4 – 3.7)	0.4
Broadcast media (e.g., TV, radio) (n=365)	3.5 (1.0; 3.4 – 3.6)	3.5 (1.0; 3.3 – 3.6)	3.5 (1.0; 3.4 – 3.7)	0.3
Patient advocacy or support groups (n=363)	4.1 (0.8; 4.0 – 4.2)	4.1 (0.8; 3.9 – 4.2)	4.1 (0.7; 4.0 – 4.2)	0.8
Published journal articles (n=365)	4.2 (0.7; 4.1 – 4.3)	4.2 (0.7; 4.0 – 4.3)	4.2 (0.7; 4.1 – 4.3)	0.5
Government agencies (n=365)	4.2 (0.7; 4.1 – 4.3)	4.2 (0.7; 4.1 – 4.3)	4.2 (0.7; 4.1 – 4.3)	0.6
Research organisations (n=364)	4.3 (0.7; 4.2-4.3)	4.3 (0.7; 4.2 – 4.4)	4.2 (0.8; 4.1 – 4.3)	0.3

(1 = Always; 5 = Never)

TABLE 3: PRACTITIONER SELF-REPORTED TRUST OF KNOWLEDGE AND INFORMATION SOURCES (N=362)

	All participants	Non-integrative setting	Integrative setting	*p*
	MEAN* (SD; 95%CI)	MEAN * (SD; 95%CI)	MEAN* (SD; 95%CI)	
Patient's health history	1.9 (0.6; 1.9-2.0)	2.0 (0.7; 0.8 – 2.1)	1.9 (0.6; 1.9 – 2.0)	0.8
Patient's perspective of living with their condition	2.0 (0.7; 2.0-2.1)	2.1 (0.7; 2.0-2.2)	2.0 (0.6; 1.9 – 2.1)	0.1
Family health history	2.2 (0.7; 2.1 – 2.2)	2.2 (0.7; 2.0 – 2.3)	2.2 (0.7; 2.1 – 2.3)	1.0
Published journal articles	2.3 (0.7; 2.3 – 2.4)	2.4 (0.7; 2.3 – 2.5)	2.3 (0.6; 2.2 – 2.4)	0.2
Medical examinations or tests	2.3 (0.8; 2.2 – 2.4)	2.3 (0.8; 2.2 – 2.4)	2.3 (0.7; 2.2 – 2.4)	0.8
Functional examinations or tests (e.g., urine/salivary hormone tests, hair mineral analysis, stool analysis)	2.3 (0.8; 2.2 – 2.4)	2.3 (0.8; 2.2 – 2.4)	2.3 (0.7; 2.2 – 2.4)	0.8
Other health professionals providing care to the patient	2.4 (0.6; 2.4 – 2.5)	2.4 (0.7; 2.3 – 2.6)	2.4 (0.6; 2.3 – 2.5)	0.4
Research organisations	2.4 (0.7; 2.3 – 2.5)	2.4 (0.8; 2.3 – 2.6)	2.4 (0.7; 2.3 – 2.5)	0.7
Books	2.5 (0.7; 2.4 – 2.6)	2.5 (0.7; 2.4 – 2.6)	2.5 (0.7; 2.4 – 2.6)	0.4
Government agencies	3.1 (0.9; 30-3.2)	3.2 (0.9; 3.0 – 3.3)	3.0 (0.8; 2.9 – 3.1)	0.1
Patient advocacy or support groups	3.2 (0.8; 3.1 – 3.3)	3.2 (3.1 – 3.4)	3.2 (0.8; 3.1 – 3.3)	0.7
Informal sources (e.g., family and friends)	3.6 (0.8; 3.5 – 3.7)	3.5 (0.9; 3.4 – 3.6)	3.6 (0.8; 3.5 – 3.8)	0.2
General internet sources (e.g., blogs, social media)	4.0 (0.8; 3.9 – 4.0)	3.8 (0.8; 3.7 – 4.0)	4.1 (0.8; 4.0 – 4.2)	0.002
Broadcast media (e.g., TV, radio)	4.3 (0.7; 4.2 – 4.4)	4.2 (0.7; 4.1 – 4.3)	4.3 (0.7; 4.2 – 4.4)	0.2

*Likert scale: Trust: 1= Completely, 5 = Not at all

TABLE 4: PREFERRED FREQUENCY AND TRUST OF KNOWLEDGE ACQUIRED FROM SOURCES AMONG USERS (N=453)

Information source	PREFERRED FREQUENCY OF USE*				LEVEL OF PRACTITIONER TRUST OF KNOWLEDGE ACQUIRED FROM INFORMATION SOURCE*			
	ALL PARTICIPANTS	NON-INTEGRATIVE SETTING	INTEGRATIVE SETTING	P	ALL PARTICIPANTS	NON-INTEGRATIVE SETTING	INTEGRATIVE SETTING	*P*
	MEAN* (SD; 95%CI)	MEAN* (SD; 95%CI)	MEAN* (SD; 95%CI)		MEAN* (SD; 95%CI)	MEAN* (SD; 95%CI)	MEAN* (SD; 95%CI)	
Information provided by the patient	1.4 (0.8; 1.3 – 1.5)	1.5 (0.8; 1.3 – 1.6)	1.3 (0.7; 1.1-1.4)	0.06	2.3 (0.7; 2.2 – 2.4)	2.4 (0.7; 2.2 – 2.5)	2.3 (0.7; 2.2 – 2.4)	**0.4**
Information from laboratory tests, pathology or radiology tests	2.0 (1.0; 1.9 – 2.2)	2.1 (1.1; 1.9 – 2.3)	1.9 (0.9; 1.8-2.1)	0.3	2.0 (0.6; 1.9 – 2.1)	2.1 (0.6; 2.0 – 2.2)	1.9 (0.5; 1.9 -2.0)	**0.04**
Information published in scientific journals by researchers	2.2 (0.9; 2.1-2.3)	2.4 (1.1; 2.3 – 2.6)	1.9 (0.8; 2.1 – 2.3)	<0.001	2.5 (0.6; 2.4 – 2.5)	2.5 (0.6; 2.4 – 2.6)	2.4 (0.6; 2.3 – 2.5)	**0.3**
Information published in professional journals for clinicians	2.4 (1.0; 2.3-2.5)	2.5 (1.0; 2.3-2.6)	2.3 (0.9; 2.2-2.4)	0.1	2.5 (0.6; 2.4 – 2.5)	2.5 (0.6; 2.4 – 2.6)	2.4 (0.6; 2.3 – 2.5)	**0.3**
Information from clinical guidelines	2.4 (1.0; 2.3 – 2.6)	2.5 (1.1; 2.3 – 2.8)	2.4 (0.9; 2.2 – 2.6)	0.4	2.5 (0.7; 2.4 – 2.5)	2.5 (0.7; 2.3 – 2.6)	2.4 (0.6; 2.3 – 2.5)	**0.5**
Information published in modern naturopathic clinical textbooks (published in the last 10 years)	2.7 (1.0; 2.6-2.8)	2.6 (1.0; 2.4 – 2.8)	2.7 (1.0; 2.6 – 2.9)	0.2	2.3 (0.6; 2.2 – 2.3)	2.3 (0.6; 2.2 – 2.4)	2.3 (0.6; 2.2 – 2.3)	**0.7**
Information gathered from conferences or other professional events	2.8 (0.9; 2.7 – 2.9)	2.8 (0.9; 2.6 – 3.0)	2.7 (0.9; 2.7 – 2.9)	0.6	2.5 (0.6; 2.4 – 2.5)	2.4 (0.6; 2.3 – 2.5)	2.5 (0.6; 2.4 – 2.6)	**0.6**
Information published in general clinical textbooks	2.8 (1.0; 2.7-3.0)	2.8 (1.0; 2.6-2.9)	2.9 (1.0; 2.8 – 3.1)	0.2	2.3 (0.7; 2.3 – 2.4)	2.3 (0.6; 2.2 – 2.4)	2.4 (0.7; 2.2 – 2.5)	**0.6**
Information published in traditional naturopathic textbooks (published more than 50 years ago)	3.2 (1.0; 3.0-3.3)	3.1 (1.1; 2.8 – 3.3)	3.2 (0.9; 3.0-3.4)	0.4	2.6 (0.7; 2.5 – 2.7)	2.6 (0.8; 2.4 – 2.8)	2.6 (0.7; 2.5 – 2.8)	**0.8**
Information provided by product companies	3.4 (0.9; 3.2 – 3.5)	3.3 (0.9; 3.1 – 3.5)	3.5 (0.9; 3.3 – 3.6)	0.1	2.9 (0.7; 2.8 – 3.0)	2.7 (0.6; 2.6 – 2.9)	3.1 (0.7; 2.8 – 3.0)	**<0.001**

*Likert scales: Trust: 1 = Completely, 5 = None at all; Prefer: 1 = Always, 5 = Never