Naturopathic patient care during different life stages: an international observational study of naturopathic practitioners and their patients

Amie Steel*

Abstract

Background: An individual’s health status varies with age, with most health problems increasing through different life stages. Yet, a key feature of the majority of conditions contributing burden to society globally, irrespective of life stage, is the predominance of chronic, non-communicable diseases (NCDs). An important response to this growing burden is the increasing recognition of addressing NCD prevention through a life-course perspective through primary care and public health. Naturopathy is a traditional medicine system originating from Europe, and its practitioners commonly provide primary care and focus on prevention and wellness. However, little is known about naturopathic practitioners (NPs) contribution to health care across different life stages.

Methods: This secondary analysis of a cross-sectional study aimed to describe the approach to the care of NPs based on the life stage of their patients. The primary study recruited NPs from 14 regions or countries, who were invited to complete a short survey about 20 consecutive patients. The multilingual survey included the following domains: patient demographics, reason for visit, prescribed or recommended treatments, and naturopathic interpretation of the health conditions. Descriptive statistics were tabulated as frequencies and percentages and chi square tests were used to test associations and compare groups. Effect size was determined by Cramer’s V.

Results: Participant NPs (n = 56) provided consultation details for 854 patients encounters. There were differences in the patient’s primary reason for visiting, the additional physiological systems the NP considered important in the management of the patient’s health, and the treatments prescribed across all life stages. However, diet (45.1–70.0%) and lifestyle (14.3–60.0%) prescription were the most common categories of treatments across all patient groups.

Conclusion: NPs provide care to patients across all life stages, and diverse conditions pertinent to those life stages while also demonstrating a holistic approach that considers broader health concerns and long term treatment practices. While there may be emerging evidence supporting and informing NP clinical outcomes, the breadth and diversity of health conditions, populations and treatments within the scope of naturopathic practice underscores a need for urgent and widescale research investigating naturopathic care across the life course.

Keywords: Life course perspective, Naturopathy, Preventive medicine, Healthy lifestyle, Primary health care

*Correspondence: amie.steel@uts.edu.au

Australian Research Centre in Complementary and Integrative Medicine, School of Public Health, Faculty of Health, University of Technology Sydney, Ultimo 2006, Australia

Introduction

An individual’s health status varies with age, with most health problems increasing through different life stages [1]. For example, the burden of disease among children is more commonly attributed to conditions such as asthma and infectious disease, while adolescents experience...
burden from asthma but also from other conditions ranging from acne to suicide and injury [2]. Among adults, cardiometabolic and neoplastic conditions represent some of the greatest disease burdens and while these conditions continue to contribute burden in older adulthood, the elderly are also impacted by cognitive decline and musculoskeletal conditions such as osteoarthritis [2]. A key feature of the majority of conditions contributing burden, irrespective of life stage, is the predominance of chronic, non-communicable diseases (NCDs).

In response to the growing burden associated with NCDs, the focus of public health and primary care has shifted in the last 30 years to respond to the importance of an individual's health throughout their life-course [3]. This life-course approach recognises that health develops dynamically through a process that begins before conception and continues through the lifespan [3]. The key stages of the life-course employed in this framework are preconception and prenatal care, infancy, childhood, adolescence, adulthood and older people [4]. The life-course approach originated from the study of biological programming and health inequalities using birth cohort research [5]. The cumulative outcomes of decades of life-course epidemiological investigations is now being applied to prevention and control strategies, interventions and frameworks to reduce the burden of NCDs during key life stages [4–6]. While both public health and primary care are named as central to impacting life-course health for the community, there are a number of global challenges to successfully implementing life-course perspectives in primary care, including making efficient use of the primary care workforce [7].

Ideally, primary care is characterised by integrated health services aimed at meeting people's health needs through comprehensive care throughout the life-course and encompasses preventive, curative, rehabilitative, and palliative (including end-of-life) care [7]. However, manifesting this ideal has presented challenges to health policy makers globally, particularly in the context of integrating healthy lifestyle promotion into primary care encounters [8]. Yet, this is a challenge that primary care must overcome if it is to meaningfully address the global burden of NCDs, particularly given diet and lifestyle behaviours such as nutrition and physical activity are recognised as protective factors for individuals across most life stages with alcohol and smoking also contributing significant risk in adulthood [1, 9]. As such, the primary care workforce - all occupations engaged in the continuum of promotion, prevention, treatment, rehabilitation and palliative care [7] – must be fully utilised to achieve optimal health outcomes for the population across their life-course. A facet of the global primary care workforce that is recognised by the World Health Organisation as consistently overlooked by governments internationally is Traditional, Complementary and Integrative Medicine [10].

Naturopathy is one such traditional medicine system that originates from Europe and is practiced by more than 100,000 practitioners in over 100 countries [11]. The practice of naturopathy is defined by philosophies (e.g., holism and vitalism) and principles (e.g. *first do no harm, doctor as teacher, treat the cause, treat the person, prevention*) rather than by specific treatments [12, 13]. However, there are a number of therapies and treatments that are used more consistently than others among the global naturopathic profession, namely: (1) applied nutrition or dietary prescription, (2) lifestyle modification, (3) herbal medicine, and (4) nutritional medicine or the use of therapeutic products (e.g., tablets, powders, and liquids) of vitamins, minerals and food-based extracts for targeted clinical outcomes [14, 15]. Previous research has found individuals consult with a naturopathic practitioner (NP) for assistance with a diverse range of conditions, including illnesses contributing significant disease burden globally [15]. Research has also found NPs approach management of these conditions in a manner which aligns with their philosophies and principles by being holistic [16], patient-centred [17], and committed to patient education [18]. There is also evidence that NPs provide care to individuals at different life stages including childhood [19], pregnancy [20] and older adulthood [21]. However, this prior research has been conducted within single countries and focuses on specific life stages so does not provide a global view of the naturopathic profession within the context of life-course health. More research is needed to provide an international perspective for government about if and how they can effectively make use of NPs within the milieu of the broader primary care workforce, particularly in the context of NCD prevention and the growing recognition of a life-course approach. In response, this study presents an exploratory analysis of international data describing NPs patient profile and practice behaviours across key life stages.

**Methods**

**Aim and study design**

This secondary analysis of a cross-sectional study aimed to describe the approach to the care of NPs based on the life stage of their patients. Results from the primary analysis of this data have been published previously [15, 16].

**Recruitment**

Naturopathic clinics in 14 regions or countries were involved in this study including those in Portugal, United Kingdom, Switzerland, Spain, Canada, United States, Chile, Brazil, Hong Kong, Australia, New Zealand,
and South Africa. The World Naturopathic Federation (WNF) invited the recognised naturopathic professional associations in these countries to share an invitation pack (including an invitation email, online information sheet, online consent form, and online screening instrument) with their members. Once relevant NPs who were interested in participating in this study were confirmed that they had met the inclusion criteria for the study via the online screening instrument, an automated email was sent to the WNF. The research team then emailed the online patient-focused survey instrument link to participants.

Survey instrument
The online survey was administered via SurveyGizmo (https://www.surveygizmo.com/). Five domains were included in this survey: patient sociodemographics, reason for visit, interprofessional care, prescribed or recommended treatments, and naturopathic interpretation of the health condition. The whole invitation pack and the online survey were both initially drafted in English and were translated into another three languages by native language speakers including French, Spanish, and Portuguese. The translated documents were subsequently cross-translated back to English by a second native speaker of these three languages. The research team of the World Naturopathic Federation checked the translations for accuracy with the original English documents. Surveys in different languages were all uploaded to the online platform.

Participants
All NPs who were a member of naturopathic associations recognised by the WNF were invited to participate in this study. The inclusion criteria are (1) 5-years or more clinical practice experience; (2) preferably more than 10 patients per week; (3) having a computer terminal at the clinic. NPs were excluded if they were practising only within one specialised field or target population. The participants were asked to complete this online survey for 20 consecutive patient cases. In addition, participants were reminded, at the beginning of the second to 20th survey, whether they had missed completing a survey about the previous patient. If yes, participants were asked to provide the reason for the missed patient case.

Survey domains
Patient sociodemographics
Participating NPs were asked to provide information about patients’ age groups and gender (male, female, non-binary).

Reason for visit
Participating NPs were asked to identify the primary presenting condition of the patient including the condition category (e.g. gastrointestinal, respiratory, and cardiovascular) and the specific condition. Based on a naturopathic clinical textbook, a total of 17 condition categories and corresponding specific conditions were provided for participants to select [22]. For each condition category, an ‘other’ option was also provided so that participants can manually enter a condition that was not included in the category list. In addition, reasons for the patient visit were included in this survey, including the visit type (initial visit, follow up) and the chronicity of the complaint (chronic, acute, unsure).

Interprofessional care
Participating NPs were asked, where applicable, to identify any other health professionals (general practitioner, specialist doctor, allied health professional, complementary medicine practitioner, other health professionals) known by the NP to be providing care to the patient for the presenting complaint.

Prescribed or recommended treatments
Based on the most common therapies reported in the Naturopathic Roots Report [23], a list of prescribed or recommended treatments to patients was also included in the survey, such as herbal medicines, dietary changes, acupuncture, and lifestyle recommendations.

Naturopathic interpretation of the health condition
Participating NPs were asked to indicate any other physiological systems relevant or important to the treatment of the patient’s presenting disorder. The list of physiological systems is the same as the baseline categories used to identify the reason for visit domain. Participants were able to select as many physiological system options as necessary.

Data analysis
Survey responses were exported from SurveyGizmo so there were four separate Microsoft Excel spreadsheets (each spreadsheet for one language). All non-English responses were translated into English based on the translation developed at the beginning of the study, and all data were merged into one spreadsheet. With regards to the open text responses, all non-English answers were firstly translated using Google Translate and then cross-checked by the research team of the World Naturopathic Federation. All data were coded and imported into Stata 14.2 for analysis.
Once imported, patient age groups were recategorized to represent life stage categories: young child (0–4 years), older child (5–12 years), adolescent (13–17 years), working adult (18–65 years) and older adult (65 years or more). An additional life stage category, ‘Pregnancy and fertility’, was generated for all patients who visited the naturopath for assistance with fertility, pregnancy or postnatal health concerns. Treatment categories were collapsed into grouped variables for the following: lifestyle and behavioural changes (lifestyle, exercise, meditation, mind-body and rehabilitation exercise); manual therapies (massage, bodywork, acupuncture); invasive treatments (intravenous therapy, injection therapy, colonics, mesotherapy, chelation therapy, surgery); other energetic medicines (flower essences, tissue salts); other traditional medicine systems (traditional Chinese medicine, Ayurveda, humoral therapy, Unani medicine). Cumulative variables were generated for the total number of treatment categories prescribed and the total number of other health systems considered by the naturopath to be relevant or important to the patient’s primary complaint. Descriptive statistics were tabulated as frequencies and percentages and chi square tests were used to test associations and compare groups. Effect size was determined by Cramer’s V and classified according to Rea and Parker (1992) [24]: negligible association (.00 and under .10); weak association (.10 and under .20); moderate association (.20 and under .40); relatively strong association (.40 and under .60); strong association (.60 and under .80) and very strong association (.80 and under 1.00). Student’s t test analysis was used to compare the difference between life stages and both the number of physiological systems considered important in the management of the patient’s health, and the number of treatment categories prescribed.

Ethical clearance
This project was approved by the Human Research Ethics Committee of the Endeavour College of Natural Health (#20181017).

Results
The characteristics of participants are described in Table 1. Naturopaths from 14 countries participated. Most participants were female (62.5%), commonly aged 36–45 years (37.5%) and had been in practice between 5 and 10 years (44.6%). Participants contributed a mean of 15.1 responses.

Table 1 presents the characteristics of patients compared with their life stage. Most of the total patients were female (72.6%). This figure was slightly higher among working adults (75.0%, V = .0918, p = .007) but lower for other groups particularly young children (42.9%, V = .1062, p = .002) and children (45.0%, V = .0961, p = .005). Most patients in the total group were visiting the naturopath for a follow up consultation (67.0%) and this figure was higher in the elderly population (79.8%, V = .1014, p = .003) and lower among children (38.1%, V = .0978, p = .004). The majority of patients presented with a chronic health conditions (75.0%), and this rate

| Characteristic | n (%) |
|---------------|-------|
| Country       |       |
| Australia     | 6 (10.7) |
| Brazil        | 4 (7.1) |
| Canada        | 6 (10.7) |
| Chile         | 4 (7.1) |
| Hong Kong     | 3 (5.4) |
| India         | 7 (12.5) |
| Nepal         | 2 (3.6) |
| New Zealand   | 3 (5.4) |
| Portugal      | 4 (7.1) |
| South Africa  | 2 (3.6) |
| Spain         | 4 (7.1) |
| Switzerland   | 2 (3.6) |
| United Kingdom| 3 (5.4) |
| United States | 6 (10.7) |

| Gender*       |       |
|---------------|-------|
| Female        | 35 (62.5) |
| Male          | 21 (37.5) |

| Age           |       |
|---------------|-------|
| 26–35 years   | 11 (19.6) |
| 36–45 years   | 21 (37.5) |
| 46–55 years   | 11 (19.6) |
| 56–65 years   | 11 (19.6) |
| 66 years or more | 2 (3.6) |

| Years in clinical practice |       |
|----------------------------|-------|
| 5–10 years                 | 25 (44.6) |
| 11–15 years                | 14 (25.0) |
| 16–20 years                | 5 (8.9) |
| 21–25 years                | 6 (10.7) |
| 26 years                   | 6 (10.7) |

| Average number of patients per week |       |
|-------------------------------------|-------|
| Less than 10                        | 9 (16.1) |
| 11–20                               | 20 (35.7) |
| 21–30                               | 12 (21.4) |
| 31–40                               | 8 (14.3) |
| 41–50                               | 4 (7.1) |
| 51 or more                          | 3 (5.4) |

* No respondents identified as a non-binary person

Mean (SD; Min, Max)
Number of responses per participant 15.1 (7.6; 1, 20)
Table 2  Characteristics of patients visiting a naturopath compared with their life stage (n = 854)

| Characteristics                              | All (n = 854) | Young child (n = 21) | Older child (n = 21) | Adolescent (n = 10) | Pregnancy and fertility (n = 42) | Working adult (n = 638) | Older adult (n = 105) |
|----------------------------------------------|---------------|----------------------|----------------------|---------------------|-------------------------------|------------------------|----------------------|
|                                              | N (%)         | n (%)                | V        | p       | N (%)         | V        | p       | N (%)         | V        | p       | N (%)         | V        | p       |
| Sex (n = 851)                                |               |                      |          |        |               |          |        |               |          |        |               |          |        |
| Female                                       | 618 (72.6)    | 9 (42.9)             | .1062    | .002   | 9 (45.0)      | .0961    | .005   | 5 (50.0)      | .0553    | .107   | 36 (87.8)     | .0766    | .025   | 477 (75.0)    | .0918    | .007   |
| Male                                         | 233 (27.4)    | 12 (57.1)            | 11 (55.0)| .0113  | 5 (50.0)      | 5 (12.2) | .0501  | 159 (25.0)    | 35 (33.3)|        |               |          |        |               |          |        |
| Visit (n = 852)                              |               |                      |          |        |               |          |        |               |          |        |               |          |        |
| First                                        | 281 (33.0)    | 9 (42.9)             | −0.0334  | .330   | 13 (61.9)     | .0978    | .004   | 4 (40.0)      | −0.163   | .635   | 10 (23.8)     | .0444    | .195   | 214 (33.7)    | .0262    | .445   |
| Follow-up                                    | 571 (67.0)    | 12 (57.1)            | 8 (38.1) | .0001  | 6 (60.0)      | 32 (76.2)| .0002  | 421 (66.3)    | 83 (79.8)|        |               |          |        |               |          |        |
| Chronicity (n = 844)                         |               |                      |          |        |               |          |        |               |          |        |               |          |        |
| Acute                                        | 165 (19.6)    | 3 (14.3)             | .0338    | .617   | 7 (33.3)      | .0555    | .272   | 5 (50.0)      | .857     | .045   | 6 (15.8)      | .0508    | .337   | 131 (20.8)    | .0572    | .251   |
| Chronic                                     | 633 (75.0)    | 16 (76.2)            | 13 (61.9)| .0009  | 5 (50.0)      | 28 (73.7)| .0004  | 468 (74.2)    | 92 (89.3)|        |               |          |        |               |          |        |
| Unsure                                       | 46 (5.5)      | 2 (9.5)              | 1 (4.8)  | .0000  | 0 (0.0)       | 4 (105)  | .0000  | 32 (5.1)      | 1 (1.0)  |        |               |          |        |               |          |        |
| Other health professionals providing care to the same patient |               |                      |          |        |               |          |        |               |          |        |               |          |        |
| GP (n = 854)                                 | 369 (43.2)    | 10 (47.6)            | .0141    | .68    | 7 (33.3)      | .0317    | .355   | 4 (40.0)      | .0001   | .837   | 16 (38.1)     | .0235    | .493   | 284 (44.7)    | .0521    | .128   |
| Specialist doctor (n = 854)                  | 237 (27.8)    | 4 (19.1)             | 0.0309   | .367   | 7 (33.3)      | .0198    | .563   | 3 (30.0)      | .0055   | .873   | 16 (45.2)     | .0888    | .009   | 159 (25.0)    | .1031    | .003   |
| Allied health practitioner (n = 854)         | 106 (12.4)    | 0 (0.0)              | 0.0598   | .08    | 2 (9.5)       | .0139    | .684   | 2 (20.0)      | .0250   | .464   | 11 (26.2)     | .0950    | .005   | 76 (12.0)     | .0299    | .503   |
| Other complementary medicine practitioner (n = 854) | 93 (10.9)  | 4 (19.1)             | .0416    | .224   | 1 (4.8)       | .0312    | .361   | 2 (20.0)      | .0318   | .352   | 4 (9.5)       | .01     | .771   | 66 (10.4)     | .0271    | .428   |
| No other health professionals (n = 854)      | 282 (33.0)    | 7 (33.3)             | .0110    | .975   | 6 (28.6)      | .015     | .661   | 3 (30.0)      | .007    | .838   | 11 (26.2)     | .0334    | .334   | 216 (34.0)    | .036    | .293   |
| Any conventional health professional (n = 854) | 527 (61.4)  | 11 (52.4)            | .0292    | .393   | 13 (61.9)     | .0018    | .958   | 6 (60.0)      | .0030   | .930   | 31 (73.8)     | .058    | .089   | 391 (61.3)    | .0023    | .947   | 68 (64.8)     | .0261    | .444   |
of chronicity was even higher among elderly patients (79.8%, \(V = .1014, p = .001\)) but lower among adolescents (50.0%, \(V = .857, p = .045\)). More patients from the pregnancy and fertility (45.2%, \(V = .0888, p = .009\)) and elderly (36.2%, \(V = .0706, p = .039\)) groups were consulting with a specialist doctor compared with the total patient population (27.8%). Patients visiting a naturopath for assistance with pregnancy and fertility were more likely to be consulting with an allied health professional (26.2%, \(V = .0950, p = .005\)) compared to all other patients (12.4%).

The patient’s primary reason for visiting the naturopath compared with the patient’s life stage is presented in Table 3. Young children less commonly (0.0%, \(V = .0752, p = .028\)) presented for a musculoskeletal condition compared to the total population of patients (18.4%) while elderly patients did so more commonly (33.3%, \(V = .1439, p < .001\)). The frequency with which all patients presented with a gastrointestinal condition (12.1%) was less than the rate of gastrointestinal presentations in both adolescents (40.0%, \(V = .0928, p = .007\)) and working age patients (13.5%, \(V = .0715, p = .036\)). General wellness and prevention was identified as the primary reason for the patient visit in young children (23.8%, \(V = .1092, p = .001\)) more common than other patients (6.6%). Skin complaints were reported more frequently for patients who were young children (19.1%, \(V = .100, p = .003\)) and adolescents (30.0%, \(V = .1225, p < .001\)) compared to the total patient population (5.1%). Older children (5–12 years) were presenting with a respiratory condition (47.6%, \(V = .3093, p < .001\)) significantly more frequently than all other patient categories (5.0%). Elderly patients presented with cardiovascular conditions (14.3%, \(V = .1880, p < .001\)) more often than the total population of patients (4.2%).

The participants indicated additional physiological systems that they considered important in the management of their patient’s health (see Table 4). Compared with the frequency with which the musculoskeletal system was considered important for the total patient population (17.7%), the rate was higher in elderly patients (29.5%, \(V = .1162, p = .001\)). Patients who were presenting for pregnancy- or fertility-related health were more frequently identified by participants as requiring support with female reproductive (40.5%, \(V = .1550, p < .001\)), maternal health (33.3%, \(V = .3759, p < .001\)) and endocrine function (47.6%, \(V = .1274, p < .001\)) compared to all other patients (female reproductive: 15.7%, maternal health: 3.4%, endocrine: 23.8%). Weight management was identified more frequently for working adults (19.5%, \(V = .1044, p = .002\)) than for the full sample of patients (17.2%). The cardiovascular system (22.9%, \(V = .115, p = .001\)) but not female reproductive system (1.0%, \(V = .1517, p < .001\)) was indicated as important for elderly patients compared with the total patient population. The mean total number of systems considered important for the patients was 2.4 (SD 1.9) and this figure was significantly lower for young children (Mean 1.5, SD 1.1, \(p = .013\)) and children (Mean 1.3, SD 0.85, \(p = .003\)).

The treatments prescribed to patients across life stage categories is presented in Table 5. Young children were prescribed lifestyle changes (14.3%, \(V = .1367, p < .001\)) or acupuncture (0.0%, \(V = .0970, p = .005\)) less frequently, but the rate of homeopathic medicine prescription was higher (47.6%, \(V = .0981, p = .004\)) than all other patients. A similar pattern of lower prescription of lifestyle changes (28.6%, \(V = .0909, p = .008\)) and higher of homeopathic medicines (42.9%, \(V = .0799, p = .02\)) was seen in the older children although there was no difference in the rate of acupuncture treatment compared with other patients. Patients presenting for assistance with pregnancy or fertility health concerns were prescribed acupuncture treatment at a significantly higher rate (47.6%, \(V = .1046, p = .002\)) than the rest of the patient population (27.2%). Homeopathic medicines (4.8%, \(V = .0947, p = .006\)) and other energetic treatments (4.8%, \(V = .0699, p = .041\)) were recommended much less frequently in the pregnancy and fertility group. Working adults had statistically greater incidence of being recommended lifestyle changes (60.0%, \(V = 1.063, p = .002\)) compared with the total population. Elderly patients were prescribed dietary changes less frequently (45.7%, \(V = .1136, p = .001\)) but acupuncture more frequently (41.0%, \(V = .1160, p = .001\)) than all other patients. The mean total number of treatment categories prescribed to the patients was 4.0 (SD 1.8) and this figure was lower in the younger children (Mean 3.1, SD 1.7, \(p = .022\)).

**Discussion**

This first international study of NPs’ therapeutic approach to patients at different life stages reveals a number of interesting findings. Firstly, this analysis suggests NPs treat patients across all life stages. This finding is increasingly relevant in the context of the increased attention directed towards life course perspectives in preventive health [3, 25]. General wellness and prevention were considered by NPs when managing the health of approximately one third of patients. This was reported most commonly for patients who were working or older adults, but also frequently identified for pregnancy and fertility and young child patient groups. This attention to general wellness and prevention aligns with the life-course approach which extends from preconception through to the final years of life, and emphasises the importance of prevention and wellness in earlier life stages on an individual’s health.
| Primary Reason for visit | All (N = 835) | Young child (n = 21) | Older child (n = 21) | Adolescent (n = 10) | Working adult (n = 638) | Older adults (n = 105) |
|-------------------------|--------------|---------------------|---------------------|---------------------|------------------------|-----------------------|
|                         | n (%)        | n (%)               | V       | p       | n (%)        | V       | p       | n (%)        | V       | p       | n (%)        | V       | p       | n (%)        | V       | p       |
| Musculoskeletal condition | 158 (18.4)   | 0 (0.0)             | .0752   | .028   | 1 (4.8)     | .5577   | .103   | 1 (10.0)    | .0235   | .491   | 118 (18.5)   | .0045   | .896   | 35 (33.3)    | .1439   | <.001 |
| Gastrointestinal condition | 104 (12.1)   | 4 (19.1)            | .0337   | .324   | 2 (9.5)     | .0125   | .713   | 4 (40.0)    | .0928   | .007   | 86 (13.5)    | .0715   | .036   | 7 (6.7)      | .0622   | .068 |
| Mental health condition | 93 (10.8)    | 3 (14.3)            | .0176   | .605   | 5 (23.8)    | .0661   | .053   | 0 (0.0)     | .0378   | .268   | 77 (12.1)    | .0679   | .046   | 6 (5.7)      | .0614   | .072 |
| General wellness and prevention | 57 (6.6)     | 5 (23.8)            | 1.092   | .001   | 1 (4.8)     | .0119   | .727   | 1 (10.0)    | .0147   | .667   | 45 (7.1)     | .0285   | .403   | 4 (3.8)      | .0424   | .214 |
| Female reproductive condition | 51 (5.9)     | 0 (0.0)             | .0398   | .244   | 0 (0.0)     | .0398   | .244   | 0 (0.0)     | .0273   | .424   | 48 (7.5)     | .1141   | .001   | 1 (1.0)      | .0787   | .021 |
| Skin/Integumentary condition | 44 (5.1)     | 4 (19.1)            | 1.000   | .003   | 0 (0.0)     | .0368   | .281   | 3 (30.0)    | .1225   | <.001  | 34 (5.3)     | .0159   | .640   | 3 (2.9)      | .0383   | .261 |
| Respiratory condition    | 43 (5.0)     | 2 (9.5)             | .0328   | .336   | 10 (47.6)   | .3093   | <.001  | 0 (0.0)     | .0249   | .465   | 25 (3.9)     | .1847   | .013   | 6 (5.7)      | .0121   | .722 |
| Neurological condition   | 43 (5.0)     | 2 (9.5)             | .0328   | .336   | 1 (4.8)     | .0018   | .959   | 1 (10.0)    | .0249   | .466   | 31 (4.9)     | .0114   | .737   | 6 (5.7)      | .0121   | .722 |
| Endocrine condition      | 40 (4.7)     | 0 (0.0)             | .035    | .305   | 1 (4.8)     | .0008   | .981   | 0 (0.0)     | .0240   | .482   | 36 (5.6)     | .0795   | .020   | 3 (2.9)      | .0319   | .35  |
| Cancer condition         | 39 (4.5)     | 0 (0.0)             | .0345   | .312   | 0 (0.0)     | .0345   | .312   | 0 (0.0)     | .0234   | .488   | 32 (5.0)     | .0388   | .255   | 6 (5.7)      | .021    | 537  |
| Cardiovascular condition | 36 (4.2)     | 0 (0.0)             | .0331   | .332   | 0 (0.0)     | .0331   | .332   | 0 (0.0)     | .0227   | .506   | 19 (3.0)     | .1028   | .003   | 15 (14.3)    | .1880   | <.001 |
| Weight management        | 34 (4.0)     | 0 (0.0)             | .0321   | .346   | 0 (0.0)     | .0321   | .346   | 0 (0.0)     | .0220   | .518   | 32 (5.0)     | .0679   | .046   | 0 (0.0)      | .0758   | 0.026 |
| Autoimmune condition     | 31 (3.6)     | 1 (4.8)             | .0098   | .774   | 0 (0.0)     | .0306   | .369   | 0 (0.0)     | .2100   | .533   | 27 (4.2)     | .0568   | .096   | 3 (2.9)      | .015    | 659  |
| Urogenital condition     | 21 (2.4)     | 0 (0.0)             | .0251   | .463   | 0 (0.0)     | .0251   | .463   | 0 (0.0)     | .0172   | .615   | 15 (2.4)     | .0103   | .763   | 3 (2.9)      | .0100   | .770 |
| Ageing and cognition     | 10 (1.2)     | 0 (0.0)             | .0172   | .615   | 0 (0.0)     | .0172   | .615   | 0 (0.0)     | .0118   | .73   | 4 (0.6)      | .0851   | .013   | 5 (4.8)      | .1252   | <.001 |
| Infectious disease       | 9 (0.8)      | 0 (0.0)             | .0143   | .674   | 0 (0.0)     | .0143   | .674   | 0 (0.0)     | .0098   | .773   | 5 (0.8)      | .0059   | .863   | 2 (1.9)      | .0452   | 1.85 |
Table 4 Additional physiological systems considered by the naturopath to be important when managing the individual patient’s health, compared to each life stage by condition category (n = 854)

|                              | All (n = 854) | Young child (n = 21) | Older child (n = 21) | Adolescent (n = 10) | Pregnancy and fertility (n = 42) | Working adult (n = 638) | Older adult (n = 105) |
|------------------------------|---------------|----------------------|----------------------|---------------------|---------------------------------|------------------------|----------------------|
|                              | N (%)         | n (%)                | V                    | p                   | N (%)                          | V                      | p                    |
| Gastrointestinal             | 348 (40.8)    | 10 (47.6)            | 0.022                | 0.517               | 0.086                          | 0.802                  | 0.046                |
| General wellness and prevention | 245 (28.7)    | 4 (19.1)             | -0.0338              | 0.323               | 0.067                          | 0.049                  | 0.045                |
| Endocrine                    | 203 (23.8)    | 2 (9.5)              | 0.0531               | 0.12                | 0.0709                         | 0.038                  | 0.0096               |
| Musclekeletal                | 151 (17.7)    | 4 (19.1)             | 0.0057               | 0.868               | 0.0736                         | 0.032                  | 0.0219               |
| Weight management            | 147 (17.2)    | 0 (0.0)              | 0.0724               | 0.034               | 0.0524                         | 0.126                  | 0.0208               |
| Female reproductive          | 134 (15.7)    | 0 (0.0)              | 0.0685               | 0.045               | 0.0685                         | 0.045                  | 0.0129               |
| Mental illness               | 132 (15.5)    | 4 (19.1)             | 0.0158               | 0.045               | 0.0621                         | 0.046                  | 0.0164               |
| Cardiovascular               | 132 (15.5)    | 0 (0.0)              | 0.0604               | 0.077               | 0.0604                         | 0.077                  | 0.0087               |
| Skin/Integumentary           | 79 (9.3)      | 1 (4.8)              | 0.025                | 0.472               | 0.0246                         | 0.472                  | 0.0028               |
| Autoimmune                   | 74 (8.7)      | 0 (0.0)              | 0.0489               | 0.153               | 0.022                          | 0.52                   | 0.0335               |
| Respiratory                  | 71 (8.3)      | 2 (9.5)              | 0.007                | 0.839               | 0.0343                         | 0.316                  | 0.0328               |
| Ageing and cognition         | 69 (8.1)      | 0 (0.0)              | 0.0471               | 0.169               | 0.0471                         | 0.169                  | 0.0323               |
| Neurological                 | 67 (7.9)      | 4 (14.8)             | 0.0182               | 0.595               | 0.0463                         | 0.176                  | 0.0897               |
| Urogenital                   | 41 (4.8)      | 0 (0.0)              | 0.0357               | 0.297               | 0.0357                         | 0.297                  | 0.0244               |
| Maternal health              | 29 (3.4)      | 0 (0.0)              | 0.0298               | 0.384               | 0.0298                         | 0.384                  | 0.0204               |
| Cancer                       | 29 (3.4)      | 0 (0.0)              | 0.0298               | 0.384               | 0.012                          | 0.726                  | 0.0204               |
| Infectious disease           | 27 (3.2)      | 0 (0.0)              | 0.0287               | 0.402               | 0.0145                         | 0.671                  | 0.0425               |
|                              | Mean (SD)     | Mean (SD)            | p                    | Mean (SD)           | p                               | Mean (SD)              | p                     |
| Total number of systems      | 2.4 (1.9)     | 1.5 (1.1)            | .013                 | 1.3 (0.85)          | .003                           | 1.9 (1.4)              | .358                  |
|                              |               |                      |                      |                     |                                |                        |                      | Mean (SD)            | p                    |
|                              |               |                      |                      |                     |                                |                        |                      | 2.6 (1.5)            | .391                 |
|                              |               |                      |                      |                     |                                |                        |                      | 2.4 (1.7)            | .475                 |
|                              |               |                      |                      |                     |                                |                        |                      | 2.6 (1.7)            | .323                 |
| Treatment                              | All (n = 854) | Young child (n = 21) | Older child (n = 21) | Adolescent (n = 10) | Pregnancy and fertility (n = 42) | Working adult (n = 638) | Older adult (n = 105) |
|---------------------------------------|---------------|----------------------|----------------------|---------------------|--------------------------------|------------------------|----------------------|
|                                       | N (%)         | n (%)                | V  p                 | n (%)               | V  p                           | n (%)                   | V  p                 |
| Dietary changes                       | 517 (60.5)    | 14 (66.7)            | .0199 .561           | 14 (66.7)           | .0199 .561                      | 7 (70.0)               | .0211 .538           |
| Lifestyle changes                     | 486 (56.9)    | 3 (14.3)             | .1367 <.001          | 6 (28.6)            | .0099 .008                      | 5 (50.0)               | .0152 .657           |
| Nutritional medicines                 | 463 (54.2)    | 11 (52.4)            | .0009 98             | 13 (61.9)           | .0311 .363                      | 8 (800)                | .0608 .076           |
| Herbal medicines                      | 445 (52.1)    | 9 (42.9)             | .0362 29             | 8 (38.1)            | .0514 .133                      | 7 (700)                | .0345 .314           |
| Acupuncture                           | 233 (27.2)    | 0 (0.0)              | .0970 .005           | 3 (14.3)            | .046 .179                       | 1 (100)                | .0420 .220           |
| Manual therapy                        | 189 (22.1)    | 2 (9.5)              | .0482 159            | 3 (14.3)            | .030 .381                       | 0 (0)                  | .058 .09             |
| Homeopathic medicines                 | 188 (22.0)    | 10 (47.6)            | .0981 004            | 9 (42.9)            | .0799 .02                        | 4 (400)                | .0473 .167           |
| Counselling and psychotherapy         | 160 (18.7)    | 3 (14.3)             | .0181 597            | 3 (14.3)            | .0181 597                       | 3 (300)                | .0314 .358           |
| Other energetic treatments            | 137 (16.0)    | 6 (28.6)             | .0542 .113           | 3 (14.3)            | .0076 .824                      | 1 (100)                | .0179 .600           |
| Testing and investigations            | 117 (13.7)    | 0 (0.0)              | .0633 064            | 6 (28.6)            | .0687 .045                      | 1 (100)                | .0117 .732           |
| Hydrotherapy                          | 115 (13.5)    | 2 (9.5)              | .0183 592            | 1 (4.8)             | .0405 .237                      | 2 (200)                | .0208 .543           |
| Other Traditional Medicine Systems    | 110 (12.9)    | 0 (0.0)              | .0611 .074           | 2 (9.5)             | .0159 642                       | 1 (100)                | .0094 .784           |
| Invasive treatments                   | 58 (6.8)      | 0 (0.0)              | .0429 .210           | 0 (0.0)             | .0429 .210                      | 1 (100)                | .0139 .685           |
| Other treatments                      | 222 (26.0)    | 5 (23.8)             | .0078 .817           | 2 (9.5)             | .0596 .081                      | 3 (300)                | .0099 .771           |
| Mean (SD)                             | 4.0 (1.8)     | 3.1 (1.7)            | .022 .35 (1.6)       | .184 4.4 (2.0)       | .498 3.9 (1.7)                  | .654 4.1 (1.8)         | .159 4.1 (1.9)       |
outcomes as they age [4, 25]. However, it is important to note that the degree to which consideration of general wellness and prevention influences NPs practice decisions and prescriptions or recommendations, and the extent to which such approaches and behaviors influence a patient’s health across the life-course remains unclear. In light of this gap, and considering the acknowledged challenges of integrating prevention into primary care [7, 26] and the recent global call for such challenges to be addressed [27], further research is needed.

Diet and lifestyle changes were commonly prescribed to patients across the various life stages; two thirds of all patient groups except elderly (45.7%) were prescribed dietary changes, and lifestyle changes were recommended to at least half of patients from adolescents onwards and approximately one in three children but not young children. When viewed through the lens of the life-course paradigm, the inclusion of lifestyle prescription has significant potential to benefit the population, particularly if the prescriptions are tailored to respond to changing physical, social and emotional demands in a patient’s life [6]. However, there is well-established evidence that diet and lifestyle prescription is one of the most challenging therapeutic categories to use for beneficial patient outcomes [28], which may explain why it is less evident in other primary care professions [8, 29]. However, when employed effectively, diet and lifestyle prescription can produce highly impactful long term benefits for patients [30]. Certainly existing research has found patients receiving naturopathic care are more likely to make and sustain diet and lifestyle changes compared to patients receiving conventional primary care [31]. However, this previous research was focused on adult populations and as such the transferability of such outcomes to pediatric populations is not clear given the challenges associated with school, family and other infrastructure on a child’s locus of control in achieving diet and lifestyle change [32]. While parents, extended families, schools or society may have some influence over a child’s health behaviors, the power imbalances impacting the child means that overcoming the cumulative barriers to health behaviour change in pediatric populations requires coordinated effort from all sectors and as such the transferability of existing naturopathic evidence from adult populations may be limited. Overall, there were notable variations in the categories of treatments prescribed or recommended to patient groups based on their life stage, suggesting that NPs are tailoring their treatment plans to the unique needs and preferences of the patient, as has been previously reported for pediatric populations [19]. The rationale underpinning such differential treatment decisions remains underexamined and requires closer researcher attention.

The analysis found a strong association between pediatric patients - inclusive of young children, older children and adolescents – and specific health conditions such as skin and respiratory conditions. Previous research has found almost two thirds of Canadian NPs provide care to one more more pediatric patients per month, and a similar number reported receiving training in pediatric care for between one semester and one year for their clinical studies [19]. More than three quarters of Canadian NPs reported a high comfort level treating pediatric patients [19]. The reasons for pediatric patients accessing naturopathic care have not received the same research attention but may be explained by the much greater incidence of conditions such as atopic dermatitis, acne, and asthma in younger populations [33–35], coupled with patient and carer dissatisfaction with available conventional treatments for these conditions. For example, steroid treatments are commonly prescribed as a first line of treatment for inflammatory skin conditions and asthma [36, 37], and some parents hold concerns regarding the safety of steroid medications in children despite their documented effectiveness [38]. Similarly, published adverse events of other medications such as increased risk of suicide associated with the acne medication isotretinoin [39] as well as global concerns with over-prescription of antibiotics [40] may ‘push’ patients and their parents to seek other treatment options for conditions such as acne and respiratory infections [41]. In contrast, naturopathic care for these conditions embrace principles of complexity and holism [12, 13] by treating related physiological systems that may directly and indirectly impact on the presentation of a skin or respiratory condition such as the gastrointestinal system as was identified in our study and is described in naturopathic clinical texts and other practice-based research [16, 22]. Such traditional naturopathic approaches to managing these conditions are supported by emerging research which reports a clinically significant link between microbiome and allergic disease inclusive of atopic dermatitis and asthma [42]. Similarly, other naturopathic treatments have been reported to reduce symptoms in acne vulgaris, and psoriasis [43]. Likewise, there is preliminary evidence of naturopathic treatments having potential benefit in acute respiratory infections through direct immune support or symptom management [44]. Despite this evidence, there is limited research directly examining naturopathic care in the management of health conditions in pediatric populations and as such the real clinical value of such care requires investigation.

Despite the variety of categories of health conditions more commonly identified as the primary reason for
working adults visiting a NP, one of the most common physiological systems or issues NPs reported considering when managing the health of their patients in this group was weight. The specific focus on weight management may be explained by the substantial international prevalence of overweight and obesity in adults [45] coupled with the recognised links between increased BMI and the onset or severity of a range of globally significant health conditions (e.g., cardiovascular disease [46], some cancers [47], mental health [48], osteoarthritis [49], etc). Despite these links, government agencies are challenged by the siloed approach to health practiced in conventional health services, driving new strategies and plans [50, 51] intended to more effectively address overweight and obesity in the future. One feature of these existing plans is a need for increased emphasis on lifestyle interventions for weight management in primary care encounters. This need may explain why lifestyle changes were recommended to a greater proportion of working adults than any other patient group in this study. While this study does not provide evidence that the various biopsychosocial factors relevant to obesity management were successfully addressed in these patients, research conducted by naturopathic researchers have explored lifestyle interventions on populations with obesity. For example, a randomised-controlled trial (RCT) from Germany investigated a 12-week yoga practice for females with abdominal obesity and found it resulted in reduced body weight, body mass index, body fat and waist-hip ratio while it increased quality of life and self-esteem compared with a wait-list control [52]. A secondary analysis of this study found the outcomes of this study was not only due to the physical activity of yoga but also due to changed dietary patterns, i.e., increased daily fruit and vegetable intake [53]. Given the global burden associated with overweight and obesity additional research investigating naturopathic treatments for this condition is needed.

In contrast to the other patient populations included in this analysis, elderly patients visiting a NP more commonly sought care for musculoskeletal conditions and were prescribed acupuncture and other invasive treatments such as prolotherapy. In addition to the breadth of evidence produced by the wider health research community with regards to non-pharmacological treatments for musculoskeletal conditions [54], naturopathic researchers have investigated a range of treatments for musculoskeletal conditions such as chronic neck pain, low back pain, fibromyalgia, and osteoarthritis among others and report a positive primary or secondary outcome in 89.3% of studies [55]. The degree to which this clinical evidence is driving patient behaviour or reflects the treatment practices used by NPs in this study, however, can not be assumed. It was also more common for NPs to consider an elderly patient’s cardiovascular health compared to other patient groups, yet the prevalence of NPs prescribing dietary changes was lowest for patients in the ‘elderly’ life stage. This practice behaviour is noted despite the strong documented association between dietary patterns and cardiovascular health [56]. While this may be explained by the primary presenting complaint being a non-cardiovascular health condition, other previous research has found that NPs considered and addressed cardiovascular conditions or risk factors if it was identified by the NP even if it was not the presenting complaint [57]. For this reason, the decreased frequency of dietary prescription in this patient population may be explained by existing evidence that elderly patients may be reluctant to change their diet due to issues associated with personal resources, psychosocial influences, and other age-related changes to their physical health [58].

Limitations

The results of this study must be considered within the context of its limitations. While this study draws from an international sample, the diversity of naturopathic practice in specific geographical areas is likely to be impacted by cultural, social and regulatory influences. For this reason the study results should be considered within the context of these national and regional settings and may not be generalisable to the aggregate international naturopathic profession. Additional bias may also have been introduced by the self-reported nature of the survey data, as the accuracy of this data was not independently confirmed by the researchers. The target population was limited to members of professional associations that are members organisations within the WNF. This sampling frame may introduce biases in countries were regulatory mechanisms ensuring consistency in training and practice are absent. While a smaller representation of NPs from a greater number of countries was used for this exploratory study, they afforded a level of representativeness attributed to practice-based research conducted in a minimum of five locations and with at least 15 participating clinicians [59]. It should also be noted that the life stage categories used in this analysis do not reflect recommended age boundaries for life stages used in wider life-course health literature. Small sample sizes for the child and adolescent categories also limit the overall generalisability of the study findings for pediatric populations. However, as this study presents secondary analysis of data collected for other purposes it was not possible to regroup the data to more recognised life stage categories. This should be addressed through future research focussed specifically on this topic.
Conclusions

NPs provide care to patients across all life stages, and diverse conditions pertinent to those life stages while also demonstrating a multimodal approach that may consider broader health concerns and long-term treatment practices. The specific treatments employed by NPs also varies based on the patient’s life stage. While there may be emerging evidence supporting and informing NP clinical outcomes, the breadth and diversity of health conditions, populations, and treatments within the scope of naturopathic practice underscores a need for urgent and wide-scale research investigating naturopathic care across the life course.

Abbreviations
NCDs: Non-communicable diseases; NPs: Naturopathic practitioners; WNF: World Naturopathic Federation.

Acknowledgements
Thank you to Iva Lloyd, Tom Greenfield, Tina Hausser and colleagues of the World Naturopathic Federation for face validity testing and translation of all documents. Thank you to the WNF Member Organisations for their assistance with participant recruitment.

Author’s contributions
A3 was responsible for framing the research question, collecting the data, undertaking the analysis and drafting this manuscript. The author(s) read and approved the final manuscript.

Funding
This project was funded by the World Naturopathic Federation (WNF). Representatives of the WNF were involved in preliminary stages of study design and analysis.

Availability of data and materials
The datasets generated and analysed during the current study are not publicly available due to intellectual property agreements but are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate
This project was carried out in accordance with the National Health and Medical Research Council’s National Statement on Ethical Conduct in Human Research and was approved by the Human Research Ethics Committee of the Endeavour College of Natural Health (#20181017). All participants were provided with a Participant Information Sheet and were required to provide written informed consent before they were included in the study.

Consent for publication
Not applicable.

Competing interests
The authors have no competing interests to declare.

Received: 16 February 2022 Accepted: 15 July 2022 Published online: 26 July 2022

References
1. Australian Institute of Health and Welfare. Health across the life stages. Canberra: Australian Institute of Health and Welfare; 2008.
2. Benzier CP, Roth GA, Moran AE. The global burden of disease study and the preventable burden of NCD. Glob Heart. 2016;1(4):393–7.
3. Hafloon N, Larson K, Lu M, Tullis E, Russ S. Life course health development: past, present and future. Matern Child Health J. 2014;18(2):344–65.
4. Mikkelsen B, Williams J, Rakovac I, Wickramasinghe K, Hennis A, Shin H-R, et al. Life course approach to prevention and control of non-communicable diseases. BMJ. 2019;364:1257.
5. Blane D, Ntoumanis G, Stone J. The development of life course epidemiology. Rev Epidemiol Sante Publique. 2007;55(1):31–8.
6. Yingwattanakul P, Moschis GP. Life course perspectives on the onset and continuity of preventive healthcare behaviors. J Prim Prev. 2017;38(5):537–50.
7. World Health Organisation, United Nations Children’s Fund (UNICEF). Operational framework for primary health care: transforming vision into action. Geneva: World Health Organisation and United Nations Children’s Fund (UNICEF); 2020.
8. Grandes G, Sanchez A, Cortada JM, Balague L, Calderon C, Arrazola A, et al. Is integration of healthy lifestyle promotion into primary care feasible? Discussion and consensus sessions between clinicians and researchers. BMC Health Serv Res. 2008;8(1):1–12.
9. World Health Organisation. Health through life stages. Geneva: World Health Organisation; 2022. [Available from: https://www.euro.who.int/en/ health-topics/Life-stages/pages/life-course]
10. World Health Organisation. WHO global report on traditional and complementary medicine 2019. Geneva: World Health Organisation; 2019. [Available from: https://bit.ly/3Ev6yFq]
11. Lloyd I, Hauser T. Landscape of naturopathy by WHO region. In: Lloyd I, Steel A, Wardle J, editors. Naturopathy: practice, effectiveness, economics and safety. Toronto: World Naturopathic Federation, 2022. p. 21–7.
12. Myers S, Lloyd I, Hauser T. Naturopathic theories. In: Lloyd I, Steel A, Wardle J, editors. Naturopathy: practice, effectiveness, economics and safety. Toronto: World Naturopathic Federation, 2021. p. 15–8.
13. Lloyd I, Hauser T, Myers S. Naturopathic philosophies and principles. In: Lloyd I, Steel A, Wardle J, editors. Naturopathy: practice, effectiveness, economics and safety. Toronto: World Naturopathic Federation, 2021. p. 8–14.
14. Lloyd I, Hauser T. Naturopathic practice. In: Lloyd I, Steel A, Wardle J, editors. Naturopathy: practice, effectiveness, economics and safety. Toronto: World Naturopathic Federation, 2022; 3–7.
15. Steel A, Foley H, Bradley R, Van De Venter C, Lloyd I, Schloss J, et al. Overview of international naturopathic practice and patient characteristics: results from a cross-sectional study in 14 countries. BMC Complement Med Ther. 2020;20(1):59.
16. Steel A, Goldenberg JZ, Hawrelak JA, Foley H, Gerontakos S, Hamett JE, et al. Integrative physiology and traditional naturopathic practice: results of an international observational study. Integr Med Res. 2020;9(4):100424.
17. Foley H, Steel A, Adams J. Perceptions of person-centred care amongst individuals with chronic conditions who consult complementary medicine practitioners. Complement Ther Med. 2020;52:102518.
18. Steel A, Lloyd I. Community education and health promotion activities of naturopathic practitioners: results of an international cross-sectional survey. BMC Complement Med Ther. 2021;21(In press) [Text available on request].
19. Porcino A, Solomonian L, Zylich S, Gluvic B, Doucet C, Vohra S. Pediatric training and practice of Canadian chiropractic and naturopathic doctors: a 2004–2014 comparative study. BMC Complement Altern Med. 2017;17(1):512.
20. Steel A, Adams J, Sibbritt D, Broom A, Gallus C, Frawley J. Utilisation of complementary and alternative medicine (CAM) practitioners within maternity care provision: results from a nationally representative cohort study of 1,835 pregnant women. BMC Pregnancy Childbirth. 2012;12:146.
21. Patel A, Wesseling K, Carnuthers R, Hill W. Older adults’ utilisation of a student naturopathic clinic in Auckland, New Zealand. Adv Integr Med. 2022;9(2):115–8.
22. Sarris J, Wardle J, editors. Clinical naturopathy: an evidence-based guide to practice. 3rd ed. Chatswood: Elsevier Health Sciences; 2019.
23. World Naturopathic Federation Roots Committee. WNF – naturopathic roots report. Toronto: World Naturopathic Federation; 2016.
24. Rea LM, Parker RA. Designing and conducting survey research: a comprehensive guide. United States of America: Wiley; 2014.
25. Baird J, Jacob C, Barker M, Fall CH, Hanson M, Harvey NC, et al. Developmental origins of health and disease: a life course approach to the prevention of non-communicable diseases. Healthcare. 2017;5(1):14.

26. Dineen-Griffin S, Garcia-Cardenas V, Williams K, Benning J. Helping patients help themselves: a systematic review of self-management support strategies in primary health care practice. PLoS One. 2019;14(8):e022116.

27. WHO, editor. Declaration of Astana (global conference on primary health care) 2018: Kazakhstan: Declaration of Astana (Global Conference on Primary Health Care), 2018.

28. Pagoto S. The current state of lifestyle intervention implementation research: where do we go next? Transl Behav Med. 2011;1(3):401–5.

29. Hébert ET, Caughy MO, Shuval K. Primary care providers’ perceptions of physical activity counselling in a clinical setting: a systematic review. Br J Sports Med. 2012;46(9):625–31.

30. Artinian NT, Fletcher GF, Mozaffarian D, Kris-Etherton P, Van Horn L, Lichtenstein AH, et al. Interventions to promote physical activity and dietary lifestyle changes for cardiovascular risk factor reduction in adults: a scientific statement from the American heart Association. Circulation. 2010;122(4):406–41.

31. Bradley R, Sherman KJ, Catz S, Calabrese C, Oberg EB, Jordan L, et al. Adjunctive naturopathic care for type 2 diabetes: patient-reported and clinical outcomes after one year. BMC Complement Altern Med. 2012;12(3):44.

32. Kelishadi R, Azizi-Soleiman F. Controlling childhood obesity: a systematic review on strategies and challenges. J Res Med Sci. 2014;19(10):993.

33. Nutten S. Atopic dermatitis: global epidemiology and risk factors. Ann Nutr Metab. 2015;66(Suppl. 1):8–16.

34. Tan JK, Bhate K. A global perspective on the epidemiology of acne. Br J Dermatol. 2015;172:3–12.

35. Trivedi M, Denton E. Asthma in children and adults—what are the differences and what can they tell us about asthma? Front Pediatr. 2019;7:256.

36. Frazier WT, Bhardwaj N. Atopic dermatitis: diagnosis and treatment. Am Fam Physician. 2020;101(10):590–8.

37. Bush A, Fleming L. Diagnosis and management of asthma in children. BMJ. 2015;350:h996.

38. Contento M, Cline A, Russo M. Steroid phobia: a review of prevalence, risk factors, and interventions. Am J Clin Dermatol. 2021;22(6):837–51.

39. Crijs I. Isotretinoin: communication for preventing birth defects and alerting of an uncertain risk of suicide. In: Communicating about risks and safe use of medicines. Singapore: Springer; 2020. p. 147–62.

40. Romandini A, Pani A, Schenardi PA, Pattarino GAC, Di Giacomo C, Scaglione F. Antibiotic resistance in pediatric infections: global emerging threats, predicting the near future. Antibiotics. 2021;10(4):393.

41. Bel Z, Enders C, Tschöpe C, Wenderoth N, Weiland S, Wulf H, et al. The microbiome in allergic disease: current understanding and future opportunities—2017 PRACTALL document of the American Academy of Allergy, Asthma & Immunology and the European Academy of Allergy and Clinical Immunology. J Allergy Clin Immunol. 2017;139(4):1099–110.

42. Lloyd I, Steel A. Skin conditions. In: Lloyd I, Steel A, Wardle J, editors. Naturopathy: practice, effectiveness, economics and safety. Toronto: World Naturopathic Federation; 2022. p. 278–312.

43. Williams C, Lovegrove J, Griffith B. Dietary patterns and cardiovascular disease. Proc Nutr Soc. 2013;72(4):407–11.

44. Steel A, Rickwood C, Bradley R, Foley H, Harnett JE. Australian Naturopaths’ approach to caring for people with cardiovascular disease and associated risk factors: a qualitative study of the Providers’ perspective. J Altern Complement Med. 2020;26(10):902–10.

45. Hitzler-McArdle T, McManus A, Keating K, Charlton K. Factors influencing food choice for independently living older people—a systematic literature review. J Nutr Gerontol Geriatr. 2020;39(3):1–23.

46. Anheyer D, Koch AK, Thoms MS, Dobos G, Kramer H. Yoga in women with abdominal obesity—a randomized controlled trial. Dtsch Arztebl Int. 2016;113(39):645–653.

47. Jiang L, Tian W, Wang Y, Rong J, Bao C, Liu Y, et al. Body mass index and susceptibility to knee osteoarthritis: a systematic review and meta-analysis. Joint Bone Spine. 2012;79(3):291–7.

48. Department of Health. National Obesity Prevention Strategy 2022–2032. Canberra: Australian Government; 2021.

49. Department of Health and Social Care. Tackling obesity: empowering adults and children to live healthier lives. London: UK Government; 2020.

50. Kramer H, Thoms MS, Anheyer D, Lauche R, Dobos G, Yoga in women with abdominal obesity—do lifestyle factors mediate the effect? Secondary analysis of a RCT. Complement Ther Med. 2021;60:102741.

51. Department of Health and Social Care. Tackling obesity: empowering adults and children to live healthier lives. London: UK Government; 2020.

52. Department of Health and Social Care. Tackling obesity: empowering adults and children to live healthier lives. London: UK Government; 2020.

53. Anheyer D, Koch AK, Thoms MS, Dobos G, Kramer H. Yoga in women with abdominal obesity—do lifestyle factors mediate the effect? Secondary analysis of a RCT. Complement Ther Med. 2021;60:102741.

54. Hitzler-McArdle T, McManus A, Keating K, Charlton K. Factors influencing food choice for independently living older people—a systematic literature review. J Nutr Gerontol Geriatr. 2020;39(3):1–23.

55. Department of Health and Social Care. Tackling obesity: empowering adults and children to live healthier lives. London: UK Government; 2020.

56. Williams C, Lovegrove J, Griffith B. Dietary patterns and cardiovascular disease. Proc Nutr Soc. 2013;72(4):407–11.

57. Steel A, Rickwood C, Bradley R, Foley H, Harnett JE. Australian Naturopaths’ approach to caring for people with cardiovascular disease and associated risk factors: a qualitative study of the Providers’ perspective. J Altern Complement Med. 2020;26(10):902–10.

58. Host A, McMahon A-T, Walton K, Charlton K. Factors influencing food choice for independently living older people—a systematic literature review. J Nutr Gerontol Geriatr. 2020;39(3):1–23.

59. Agency for Health Care Research and Quality. Practice-based research networks: research in everyday practice. Washington DC: U.S. Department of Health & Human Services; 2017. Available from: https://pbrn.ahrq.gov/.

Publisher’s Note
Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.