



Original Article

Clinician perspectives and understanding of the adaptogenic concept: A focus group study with Naturopaths and Western Herbalists

Sophia Gerontakos ^{a,*}, David Casteleijn ^a, Jonathan Wardle ^{a,b}

^a Australian Research Centre for Complementary and Integrative Medicine, University of Technology Sydney, Sydney, Australia

^b National Centre for Naturopathic Medicine, Southern Cross University, Lismore, Australia

ARTICLE INFO

Article history:

Received 27 February 2020

Received in revised form 18 May 2020

Accepted 19 May 2020

Available online 30 May 2020

Keywords:

Adaptogens
Naturopathy
Herbal medicine
Stress adaptation
Medicinal plants

ABSTRACT

Background: Herbal adaptogens are plant medicines which have traditional associations with herbal 'tonics' and promote homeostasis and non-specifically increase resistance to stress. Current definitions of adaptogens have been derived from extensive laboratory research, however there has not been sufficient clinical data for the concept to be standardised by regulatory bodies in Europe or Australia, nor is there clarity around how adaptogens are used and understood by herbalist clinicians themselves. This study aimed to identify how Australian Naturopaths measure adaptogenic activity relative to the clinical outcomes they aim to achieve.

Methods: A qualitative methodology was implemented using focus groups and thematic analysis.

Results: Three focus groups were conducted with a total of 17 Naturopaths with a Bachelor degree or higher qualification and over five years clinical experience. Three core themes were identified: *ambiguous cultural origins with divergent perceptions on sources of knowledge about adaptogens*; *raising vitality and having a restorative effect*, and *intersystem activity*. Within these three central themes, a number of sub-themes were identified.

Conclusions: Naturopathic clinicians utilise both subjective and objective measures of vitalistic signs across multiple body systems; however, the current available research may not accurately reflect expert clinician understanding and use of adaptogens. The study opens pathways to developing novel approaches to measuring adaptogenic activity which may facilitate the process of international standardisation of the adaptogenic concept for the development of well-designed clinical studies.

© 2020 Korea Institute of Oriental Medicine. Publishing services by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

Phytoadaptogens (often referred to as 'adaptogens') are a class of herbal medicines commonly used by herbalists – in multiple traditional medical systems – to assist in reducing the negative impact that chronic stress has on health.¹ Although existing in various traditional medicine systems as a clinical concept and classification, the formalisation and scientific use of the term 'adaptogen' dates back to the late 1940's. Russian toxicologist, N. V. Lazarev codified the term in 1947 in reference to a synthetic compound (dibazol) found to "increase non-specific resistance to stress".² Shortly thereafter, adaptogen was defined more precisely and attributed to herbal medicines by Soviet Union herbalists and scientists Brekhman and Dardymov³ who noted that the concept itself

had been preceded by folk medicine of long standing. The herbalists defined adaptogens as preparations that meet the following requirements:

- 1) An adaptogen must show a non-specific activity, i.e. increase in power of resistance against physical, chemical or biological noxious agents;
- 2) An adaptogen must have a normalising influence independent of the nature of the pathological state;
- 3) An adaptogen must be innocuous and must not influence normal body functions more than required.⁴

In pharmacology and pharmacognosy adaptogens have more recently been defined as stress response modifiers that non-specifically increase an organism's resistance to various stressors (physical, chemical and biological), thereby promoting adaptation and survival.⁵ The current understanding of adaptogens derived largely from laboratory findings is that they exhibit a multi-target action associated with shared use of numerous receptor-sites.⁵

* Corresponding author at: Herbs on the Hill, Suite 15c/40 Annerley Rd, Woolloongabba, QLD, 4102, Australia.

E-mail address: s.gerontakos@gmail.com (S. Gerontakos).

The body of laboratory literature on adaptogens investigates their mode of action,⁶ molecular mechanisms associated with stress-protective effects of adaptogens,⁷ biological activity⁸ and implications in stress resistance.^{1,9} Yet there has been little examination of how this may relate to clinical practice or traditional knowledge interpretations.

A 2017 review⁵ collates this work, identifying that adaptogenic activity exhibits polyvalent effects associated with stress hormones such as cortisol and neuropeptide Y (NPY) and key mediators of the adaptive stress response including nitric oxide (NO), heat shock proteins (HSP) and the FOXO transcription factor. Further laboratory work shows at least 88 of the 3516 genes identified as being regulated by adaptogens were closely associated with adaptive stress response and adaptive stress-response signalling pathways (ASRSPs).¹⁰ Through investigations of multiple herbal medicines considered to be adaptogenic, Panossian⁵ concluded that in pharmacological terms adaptogens are an example of network pharmacology, in accordance with Hans Selye's identification of the multiple stages of the adaptive stress response,¹¹ and other laboratory research showing numerous molecular networks where receptors interact with potential adaptogens.^{12,13} To add to the laboratory evidence on adaptogens, a critical review was conducted recently of clinical trials to identify the domains which have been used to measure the effect of adaptogenic herbal medicines in humans.¹⁴ The review identified three broad categories of outcome measures namely cognitive, subjective mood and biological measures. Within those broad categories the studies utilised numerous variations of a Cognitive Drug Research (CDR) battery test, varying validated subjective mood measures and biological measures such as blood pressure, heart rate and salivary and/or serum cortisol testing.¹⁴ The review found that most clinical trials used measures too narrow to capture the inter-system activity of adaptogens holistically and in line with the understanding of adaptogens derived from the pharmacological research (i.e. most studies used domains from only one or two of the aforementioned categories or were measuring effects on an individual body system only).¹⁴

Given the modernity of the adoption of the term adaptogen in pharmacology, there is a dearth of discussion of 'adaptogens' within traditional texts using this terminology. However, herbal medicines with adaptogenic qualities have a long history of traditional use in the context of adaptogenic activity by many cultures and various parts of the world, including East Asian medicine and Western herbal medicine.⁵ For example, *Panax ginseng*—considered a classical adaptogen and referred to as a tonic in the State Pharmacopoeia of the USSR² is referred to in the oldest Chinese pharmacopoeia for its tonic activity.⁴

Herbal medicines exhibiting adaptogenic qualities – and recognised as classical adaptogens in Russian medicine (where adaptogen is considered a functional term) – were often historically listed as a sub-class within a broader definition of tonics.² Some herbal medicines considered to be classical adaptogens are also still currently listed for use as tonics in the Russian Pharmacopoeia.² Furthermore, herbalists Brekhman and Dardymov made reference to “tonic” substances within their writings about adaptogens, alluding to the adaptogenic concept being an elaboration on the well-known tonic concept.³ As such, the cross-over of herbal concepts 'tonic' and 'adaptogen' may represent the link between traditional use and modern terminology, and provide a foundation for further examination of the historical or traditional use of adaptogens.

The emergence of a global formalisation of traditional medicine (TM) concepts via the World Health Organisation (WHO) highlights the importance of standardisation of TM concepts. Currently, the formalised terminologies included in the WHO International Standard Terminologies on Traditional Medicine in the Western Pacific Region is focused on traditional Asian medicine¹⁵ with adaptogen

not included. Both the original Russian pharmacological definition and the more recent laboratory-derived definitions contain insufficient specific or measurable domains that could be used to standardise the concept by regulatory bodies as either a scientific or traditional indication. In 2008, the European Medicines Agency (EMA) reviewed the concept and concluded that clinical data was insufficient to incorporate the term into functional clinical terminology.¹⁶ Furthermore, there is little examination of the clinical use and methods used to measure adaptogenic activity by herbalists themselves, which would ordinarily serve as the basis upon which functional clinical terminology could be developed and tested. This study aims to address the gap in the literature of the translation of theory in one traditional medicine setting (Australian naturopathic practice). Naturopaths are a recognised traditional medicine system based largely on principles which include the following: supporting the healing power of nature, finding the root cause of ill health, engaging with a therapeutic hierarchy of healing, treating the whole person rather than individual disease process, prevention and doctor as teacher. Although not defined by tools of trade naturopathy in Australia (where it is the most prevalent complementary medicine profession) incorporates Western herbalism and is generally provided separate to conventional medical care in a private practice setting, although providers of conventional medicine and naturopathy may collaborate in patient care. This study aims to identify the current understanding of adaptogens by clinicians (in this case Australian naturopaths) and how these clinicians measure adaptogenic activity relative to the clinical outcomes they aim to achieve in clinical practice.

2. Methods, participants and ethics

A qualitative phenomenological methodology was employed to gain an in-depth understanding of clinician perspectives of adaptogenic herbal medicines and how they are used within a clinical setting. Qualitative methods were selected because the exploration of shared herbal medicine practitioner experience is necessary to remedy the gap between practitioner use and understanding of adaptogens, and traditional and modern evidence of adaptogens. The key strength of phenomenology lies in exploring this 'shared experience' or knowledge of a particular phenomenon.¹⁷ Qualitative methods allow the researcher to seek a deep understanding of the problem by focusing on components that cannot be quantified.¹⁸

2.1. Sampling and recruitment

Participants were drawn from purposive sampling to ensure efficient and effective saturation of categories¹⁹ and to select participants who fulfilled the following inclusion criteria:

- Held an advanced diploma of Naturopathy and/or Western Herbal Medicine (WHM) or a Bachelor of Health Science in Naturopathy and/or WHM
- Had a minimum of 5 years clinical experience practicing in Naturopathy or WHM
- Spoke fluent English
- Were able and willing to give their written consent

Anyone who did not fulfil every aspect of the inclusion criteria was excluded.

Participants were targeted through accredited education institutes nationally (in Sydney, Melbourne and Brisbane) including Endeavour College of Natural Health (ECNH), Australasian College of Natural Therapies (ACNT) and Southern School of Natural Therapies (SSNT). This purposeful sampling strategy limits the impact of

individual training organisations on views and generated a sample that is broadly representative of the views of experienced practitioners, whilst also facilitating access to a highly experienced practitioner population that are more likely to be familiar with both traditional and scientific concepts related to herbal medicine. Participants were also targeted through complementary medicine (CM) educators discussion forums and through snowball sampling²⁰ of stakeholders through these avenues identifying other relevant participants. This sampling strategy enabled a rich exploration of the experiences of the people who use adaptogenic herbal medicines without discrimination, improving trustworthiness through sampling adequacy that was evidenced by data saturation.¹⁹

2.2. Participants

We conducted three focus groups (FGs) with a total of 17 naturopaths and herbalists. Three participants were male and 14 were female. The participants all worked in private clinical practice as naturopaths with experience ranging from 5 to 20+ years. The majority were lecturers in naturopathy and/or WHM at Bachelor's degree level. Of the participants, all held a naturopathic qualification at Bachelor's degree level or higher.

2.3. Data collection

FGs were conducted after informed consent was gained from each participant.

FGs were chosen as the data collection method, as they provide the researcher the opportunity to identify existing perspectives within a subgroup, and are an effective means to gather a broad range of views to identify group norms.²¹ The key reason for selection of FGs was to benefit from the interpersonal communication style and group interaction that occur in group discussions.²² The act of participants both querying each other and explaining themselves to one another in FGs provides data on consensus and diversity amongst participants.²³

The FGs aimed to draw upon clinical experiences, perceptions and attitudes towards adaptogens, and identify where the knowledge and understanding of adaptogens has come from and how it is being taught in the WHM education system. Trustworthiness was increased with standardisation where identical questions and procedures were used in every group.²³ Although an identical run sheet was used (shown in Table 1), it was designed to facilitate flexibility giving the participants the opportunity for detailed discussion of their own perceptions and experiences with adaptogenic herbal medicines.

The number of groups was determined by previous researchers finding more than 80% of themes to be discoverable within 2–3 FGs.²⁴ Each FG aimed to run for 1–2 hours in length and comprise 5–10 participants to allow for thematic saturation where 5–8 participants has been seen to achieve this previously.²⁵ Thematic saturation was determined during data analysis phase with the absence of new themes emerging.

2.4. Data analysis

The data was recorded, transcribed verbatim by a confidential transcription service and anonymised. Data analysis consisted of thematic coding where data was categorised according to its framework and linked to relevant themes.²⁶ This was implemented by grouping words and sentences together that convey similar meanings and labelling each group with codes.²⁷ Codes were allocated to exhaustive categories creating groups of content that share a commonality.²⁷ One researcher (SG) coded all transcripts and then met with two other researchers (JW and DC) to discuss emerging

themes and establish consensus. Coding allowed for segments of text to be interpreted in new ways²⁸ and developed 'clusters' of meaning²⁶ that represent the perceptions, beliefs and attitudes that practitioners have about adaptogens. The researcher (SG) removed any possible identifying information from the transcripts. Participants are identified by pseudonym initials to maintain confidentiality.

Prior to conducting the study, the researchers conducted a literature review to identify the domains used to measure adaptogenic activity in clinical trials which is described elsewhere.¹⁴ Two additional key articles were identified during the literature review phase which outline the laboratory findings (i.e. molecular targets) on adaptogens.^{5,10} The findings of this study were collated with those existing reviews in the form of a narrative synthesis informing the findings and discussion points.

2.5. Ethics

The project was approved by the Human Research Ethics Committee (HREC) through ECNH (approval number 20181217-SG-1), and was conducted according to the principles outlined in the National Statement on Ethical Conduct in Human Research 2007.²⁹

3. Results

Three FGs were conducted in Brisbane, Melbourne and Sydney. The groups contained between 4 and 7 people (17 total), lasting between 60 and 120 min. Three core themes were developed from the qualitative data, relating to practitioner understanding and use of adaptogenic herbal medicines. These themes were: *ambiguous cultural origins with divergent perceptions on sources of knowledge about adaptogens; raising vitality and having a restorative effect, and intersystem activity*. Within these three central themes a number of sub-themes are discussed.

3.1. Ambiguous cultural origins with divergent perceptions on sources of knowledge of adaptogens

Although the majority of participants commented on the alignment of adaptogens with naturopathic and Western herbal medicine practice philosophy, and several viewed it as being analogous with historical tonic concepts in WHM, most viewed the concept as having been imported from other cultures or traditions. Ayurveda, Chinese medicine and Russian herbal medicine were listed as likely sources, or more modern concepts such as the General Adaptation Syndrome (developed by Hans Selye). As the quotes below illustrate, when the participants were questioned on where the knowledge of adaptogens has come from there was a consensus that – while adaptogens were now an intrinsic part of herbal medicine practice – they had originally come from cultural systems of medicine outside of Western herbal medicine:

"I think the concept is kind of like, I guess you could say Chinese or Ayurveda kind of concept but when you think about it there's lots of Western herbal medicines that are also Adaptogens." (MB)

"The traditional Ayurveda and TCM." (AP)

'I always think about the military that were in the middle of the desert in Siberia so I kind of think of that historical concept in terms of how it came to be in use.' (LD)

"It started with the Russians actually." (VM)

There was little consensus of adaptogen's traditional origins beyond the fact it originated in other cultures and that the herbs they most commonly referred to as adaptogens were herbs drawn from TCM and Ayurvedic traditions. Cited sources

Table 1
Focus group theme list.

Theme	Questions
Definition and understanding of adaptogens	<ul style="list-style-type: none"> • What is your definition of adaptogen? ○ Why do you define them this way? ○ What are the key aspects? ○ How did you come to this definition? ○ Do you think this is the same as your peers? Why is it the same/different? • What is your understanding of adaptogens? ○ How did you come to this understanding? ○ What have been your main sources of information for learning about and understanding adaptogens? What information has been influential/non-influential? Why do you prefer these sources over others?
Clinical Use	<ul style="list-style-type: none"> • How do you use adaptogens in clinical practice? ○ How do you know if they are having an effect? What signs/observations to you watch out for? Why do you focus on these? ○ What tools or clinical signs do you use to measure the effect? ○ Why do you use these tools or clinical signs? What tools or clinical signs have <i>not</i> been useful in measuring the effect?
Education	<ul style="list-style-type: none"> • How do you teach adaptogens to students? ○ What resources do you use? What sources do you rely on? Why do you prefer these sources? ○ What are your preferred methods for describing adaptogenic activity? ○ Why do you believe this is the best way of teaching them? What other ways are you aware of? ○ What are the advantages/disadvantages of these different methods?

for knowledge however, were diverse, and included non-specific references to 'tradition' or 'traditional applications', textbooks, word of mouth, expert opinion, research, Google and 'knowledge passed down', with little consensus. Some participants reported they believed research understandings of adaptogens differed significantly from traditional practice understandings. Experimentation and trial and error were repeatedly raised by the majority of participants as informing their understanding and clinical use of adaptogens, as illustrated in the following quotes:

"I think I've taken pretty much all of them myself and watched how they've worked with me." (AP)

"Just through research and reading people's stuff and experimenting, that's the big one experimenting on yourself and your patients absolutely that's why they call it practice." (RL)

The most common source of knowledge and learning of adaptogens amongst participants was reported to be observation of clinical experience and personal experience. In addition to this reliance on empirical observation and clinical experience, intuition was also mentioned by some participants as an important tool for using and learning about adaptogens.

"Our intuition helps us select what we know from often what we don't know." (DB)

"Part of the holistic learning of naturopathy is you get a feel for a herb." (VM)

"I happen to think its intuition. There's this subliminal thing that's been passed on from ages and ages." (PC)

Although participants agreed that experiential learning was a key source of knowledge, they explained that they had observed significant differences in the understanding and use of adaptogens amongst herbal medicine practitioners more widely. Many participants believed that the educational institution where practitioners have trained is an influential factor on use and understanding as it relates to adaptogens and some participants associated the differences to the influence of 'industry' on the way practitioners' practice.

"It depends which college they went to and how many conferences that they do." (RL)

"I have patients come in that have seen someone else and they're on a product and they've got herbs in it that I wouldn't have used ever for that patient." (AM)

"I think part of it is also the incredible influence of industry now on our profession, like the pure billions of dollars of incredible marketing ploys that manipulate Practitioners that maybe aren't feeling super confident in prescribing their own formulas." (AP)

Other participants believed that the changes to education and curriculum over decades contributed to the differences in understanding and use of adaptogens, where older graduates noted the differences in their education to the modern graduates.

"It depends I think what year they came out of college." (VR)

"I think Practitioners these days don't have the traditional knowledge a lot of Practitioners have had from decades gone by. And they don't have true understandings of the individual herbs way back from we were taught." (PC)

"Also I think that the nature of education and curriculum developing now and education certainly since I went through it, it's all about speed... I feel there's less chance to immerse yourself in the finer points during your education of each of the herbal medicines." (TK)

Similarly to the participants observation of differences in understanding and use of adaptogens, there was little consensus on how they believed the concept should be taught to students. Many participants identified research as an important resource for studying the adaptogenic concept. However, as the following quote demonstrates, some participants believed that the holistic nature of the concept was not easily captured by the reductionist nature of modern scientific approaches.

"We've lost our Western traditions a lot as well because I think now science which is very reductionist has kind of been a dominant concept, and I guess that a lot of our traditions have been kind of lost or buried because science has been so prominent. I think there's more of a general interest in more holistic approaches nowadays but you can't get that from a real scientific approach because it is very reductionist just by nature." (MB)

3.2. Improving vitality and having a restorative effect

Despite lack of consensus on origins or sources of knowledge, there was consensus around the concept itself and how it perfectly sits within holistic naturopathic and Western herbalism philosoph-

ical frameworks and principles such as raising a patient's 'vital force' and promoting homeostasis.

"For me a clear aspect of an adaptogen is it has to have an effect on a lot of different body systems, and normalise the activity of those body systems." (TK)

"If a herb is purely stimulating it's not an adaptogen it needs to work on homeostasis, that's my understanding of adaptogens, creating a balance." (RL)

"With that balancing action that brings us back towards homeostasis more easily." (DB)

Improving vitality and resilience was described by participants as a core feature of adaptogenic herbs. Almost all participant descriptions regarding the mechanism of action and understanding of the concept included references to concepts such as restoration of homeostasis, balance, harmony, vitality, and of having a restorative effect more generally:

"I would say resilience and vitality improvement they would be key aspects of how I would see adaptogen above and beyond other specific areas of focus that the core is this resilience aspect." (TK)

"Adaptogens are often thought of as raising the vitality, their capacity to bounce back from disease states." (AP)

However, while there was agreement amongst participants as to the consistency of action of adaptogenic herbs participants also noted that there was some specificity, and that there were individual adaptogenic herbal medicines that have different actions and effects on various body systems. Participants based their selection of which adaptogen to prescribe on both their bioscientific understanding (i.e. that stress affects multiple body systems) as well as naturopathic understanding that disease and illness manifests differently in each individual. Therefore, adaptogens were prescribed by participants in accordance with how stress manifests in the individual person.

"I guess there are an awful lot of stressors. It wouldn't just be mental stressors it would also be physical stressors. I would consider so many of them have immunological aspect to them, so immune regulating as well as to physical stressors." (AP)

"The adaptogenic herbs are also complex they have more than just the adaptogenic actions. There are no herbs that I know of that are purely adaptogenic, there is no such thing, they are always doing something else." (DB)

"Adaptogens are very much about improving resilience to any kind of environmental, psychological, social stressors. I would say it's a little bit broader than just that adrenal nervous system aspect, and it's a number of different problem systems, neurological etcetera. And obviously depending on the particular herbal medicine some focus more on certain systems than others." (TK)

"I think of it like you'd have a big umbrella with all the Adaptogens underneath it some work on this system, some work on that system, some work on both systems, some have other effects. So, there's an umbrella with all these Adaptogens underneath it and you choose based upon the person, the most appropriate for the individual." (MB)

Despite participant agreement on the adaptogenic concept, there were some identified associations with other traditional concepts relating to traditional understandings of 'vitality', most notably 'tonics'. There was disagreement as to whether these concepts were the same (i.e. tonics were a previous term for adaptogens) or different (i.e. adaptogens were clinically and/or pharmacologically distinct from tonics). Many participants either compare these two concepts as similar or use them interchangeably:

"The first thing that pops into my head [when describing adaptogens] is tonic" (KG)

"I know the American herbalists have a strict definition of what is a tonic and what is an adaptogen, but I feel there is often an overlap with tonics and adaptogens." (RL)

"A tonic would be a traditional term of adaptogen – which is a modern term." (DK)

While many participants considered the two concepts to be similar, others posited that there is a clear differentiation between tonic and adaptogen.

"I think tonifying is more energising maybe, toning an organ say so that it's more resilient whereas adaptogen I think helps you to deal with the detriment of whatever stress it was on an organ." (PC)

"I think tonifying for me is when I think of a weakened system or in that convalescence aspect I guess a little bit as well, but with adaptogenic I tend to think of it as both the physiological and the mental stressors." (SJ)

The idea of adaptogens as a tool to raise vitality was further developed in participant explanations as to how they measured the effect of adaptogens in clinical practice. Most participants described the effects of adaptogenic herbs as varying from person to person. The range of clinical signs and measurement tools reported by participants varied but usually correlated with participant methods of measuring patient vitality.

"Their energy improves, their mood improves at the same time quite often I find a little bit more dramatically than their fatigue does." (TK)

"I guess I think of it in terms of their vitality so signs of: increased vitality, skin improves, hair improves, physiological signs of improved vitality, capacity to respond rather than react to stress." (AP)

"Quality of life indicators like the quality of rest and the quality of how energised they are." (NF)

Participants reported a diverse range of clinical presentations that changed with successful clinical use of adaptogens including sleep quality, menstrual cycle regularity, improved sense of smell, skin colour and improved bowel motions, as well as patients being more active in making positive lifestyle changes. This diversity was also reflected in the assorted range of ways participants measured the impact of adaptogenic activity in their patients, including Patient Reported Outcome Measures (PROMS), Scale ratings (such as energy levels) and by patient feedback ("telling you they work").

Facilitator: "When you do prescribe them how do you know if they are working?"

"They tell you." (MB)

"Absolutely people come and they'll say 'I feel amazing', and they'll come back." (RL)

"There are ways that you can rate these things with your patient feedback. So, you can say to a person, 'How's your stress levels now out of ten? How are energy levels out of ten?' and you can get a baseline and then you can rate them back against their own baseline assessment of themselves." (BB)

'Trial and error' was a recurrent theme during discussions around methods of measuring vitality and prescribing adaptogens by participants. Almost all participants explained that the effects of adaptogens vary from person to person and that only clinical experience could guide you to what effects were most likely. Although participants believe that the adaptogenic concept itself is not discordant, they explained that in herbal medicine there are occasionally anomalies where a herbal treatment has a different effect in a patient to what it is expected to have.

“There’s a certain amount of trial and error with different people you know what is the right way to dose them.” (LD)

“You don’t really know until you do it.” (DB)

“Sometimes it was mentioned that they’ve had the sort of opposite effect on occasion we’ve had to be really careful and start with one Adaptogenic at a low dose in a formulation, or not go straight for adaptogens but calm down the nervous system first.” (SJ)

3.3. Inter-system activity

Although participants were unclear or divided on the traditional origins of adaptogens, there was consensus as to acknowledgement of the intersystem activity of adaptogens, and that the concept itself is consistent (though it was noted that the effects, herbs and usage were individualised). All participants expressed iterations of an intersystem action – where adaptogens have an effect on multiple body systems to improve resilience and restore balance and homeostasis – which participants noted as aligning with traditional naturopathic principles.

“Adaptogens are very much about improving resilience to any kind of environmental, psychological social stressors” (TK)

“Adaptogen I think helps you to deal with the detriment of whatever stress it was on an organ.” (PC)

“They do have amazing restorative effects on multiple systems of the body.” (BB)

“I was taught that Adaptogen was a herb that helped you to adapt to any type of stress whether it’s physical, emotional, environmental all of those things. And all of those things affect the body in different ways and organs.” (PC)

Participants posited that adaptogens worked across multiple body systems and for this reason are a unique multi-purpose treatment. There was a consensus amongst participants that adaptogens are used to treat all types of stress: physical, emotional, social or environmental. However, participants also described other clinical presentations besides stress where they used adaptogens, which in their views aligned with the individualised clinical focus each naturopath takes in their own practice. These presentations included cardiovascular disease, pain, blood sugar regulation, as a fertility treatment, in exhaustion, convalescence, inflammation and to improve mood. However, the use of adaptogens was not specifically for these conditions or symptoms, but to support the body’s reaction and adaptation to stressors that may have resulted in those conditions or symptoms, highlighting the inter-system activity of adaptogens.

“A lot of my patient load is cardiovascular predominately, chronic inflammatory problems secondary to that, so my use of Adaptogens is often supportive of those kinds of situations.” (TK)

“People who are overweight and blood sugar pre-diabetic I like them then.” (MB)

“I’ve had patients come to me for fertility and I haven’t given them any hormonal herbs, I’ve worked on the adrenal axis because they’re just so stressed. So, I’ve used adaptogens just to help with fertility cases.” (VM)

“One of the indirect effects of herbal medicine generally speaking is that you can improve their mood and energy so that then they are more likely to participate in a healthy lifestyle and Adaptogens would promote that.” (LD)

The intersystem activity of adaptogens – commonly described by participants – linked back to concepts of individualised medicine and naturopathic theory and philosophy. When questioned on topics of usage, dosage and appropriate prescription of adaptogens,

participants often suggested “it depends on the individual”, linking with the concepts of experiential learning and intersystem activity. The perception of the multi-system and multi-purpose action of adaptogens, the effects on vitality and homeostasis and the alignment of adaptogenic activity with naturopathic principles of practice were echoed across participants and groups. However, a minority of participants explained that they do not use adaptogens if the patient is too exhausted or “pushed”, a contradictory idea to the general consensus that adaptogens are an efficacious and appropriate treatment for all types of stress.

The array of methods of measurement previously described further indicated the multi-system activity that participants understand adaptogens to exhibit and most participants agreed that the more narrow measures such as scale rating methods were unreliable for measuring this activity.

“It’s very subjective.” (RL) (In reference to the scale rating method)

“There’s a fatigue severity scale and it’s just really bio-nominal like you fall into one category or the other basically. One category is that your fatigue doesn’t need further investigation and the other is that you’re fatigue needs further investigation. So, that’s not really useful in our clinical setting because people have much more complex needs around treatment for fatigue.” (MB)

“It’s very variable because something like self-reported fatigue outcome there’s so many factors that could influence that day-to-day outside of your treatment.” (TK) (In reference to the scale rating method)

Participant consensus that narrow measures are unreliable for measuring adaptogenic activity aligned with discussions around research and the difficulties of capturing a holistic concept with modern reductionist scientific approaches.

“I think there’s more of a general interest in more holistic approaches nowadays but you can’t get that from a real scientific approach because it is very reductionist just by nature.” (MB)

3.4. Comparison of clinician experience with literature review findings of researcher and laboratory evidence

Table 2 shows the areas of overlap and variance in identifying features of adaptogens, with an x indicating which features were identified in the aforementioned review of clinical trials,¹⁴ laboratory evidence^{5,10} or through clinician understanding derived from the present FG study.

4. Discussion

To examine the clinician perspective on what constitutes adaptogenic activity, a FG study was conducted to explore Australian naturopaths’ (the major providers of WHM in Australia) understanding and clinical use of adaptogens from a WHM perspective, as well as to identify sources of knowledge on adaptogens influential to practice. To our knowledge, this is the first study examining clinical use and expert clinician understanding of adaptogens. This data adds a new, previously unexamined layer to the existing body of evidence on adaptogens, which has had predominant focus on pharmacological perspectives.

An analysis of the data highlights the adaptogenic concept is understood by Australian naturopaths to have been imported into that practice from cultures or traditions outside the Western herbal medicine tradition. However, the traditional origins of the adaptogenic concept appear to be either lost or unknown to clinicians. Though clinicians identified adaptogens coming from ‘other’ herbal

Table 2
Areas of overlap and variance between laboratory evidence and clinician use.

	Identifying features of adaptogens	Clinical trials ¹⁴	Laboratory evidence ^{5,10}	Clinician understanding
Measures	Cognitive function	x	x	
	Physical endurance	x	x	
	Subjective mood measurements	x		x
	Heart rate	x	x	
	Blood pressure	x	x	
	Cortisol/corticosterone	x	x	
	Neuropeptide Y (NPY)		x	
	Heat shock proteins (e.g. HSP70)		x	
	FOXO transcription factor		x	
	Nitric Oxide		x	
	HPA axis regulation	x	x	
	Regulation of innate anti-oxidant system		x	
	Regulation of neuroendocrine-immune complex		x	
	Regulation of gene expression		x	
	Trial and Error			x
	Clinical signs of "increased vitality" (subjective and objective)			x
Patient reporting			x	
Other investigative results	Individualised plant medicines			x
	Inter-system activity		x	x
	Network pharmacology		x	
	Alignment with Naturopathic principles "Vitalistic" and "Holistic" concept			x
Clinical uses	Chronic inflammation		x	x
	Mental diseases		x	x
	Cognitive impairment	x	x	x
	Stress-induced fatigue	x	x	x
	Increase physical endurance	x	x	x
	Cardiovascular health			x
	Fertility			x
	Metabolic health			x

cultures of practice, there was no detail (known or mentioned) in relation to the use of adaptogens by other cultures. Rather, clinicians stated it was simply known that many of those particular herbs (that Western herbalists commonly refer to as adaptogens) come from other cultures such as China, India and Russia. Nevertheless, participants suggested the adaptogenic concept aligns with naturopathic principles and philosophy, and as such greater emphasis was placed on the philosophical alignment with traditional knowledge and practice than on the cultural origins of that traditional knowledge.

The general reliance on empirical observation, clinical experience and intuition amongst participants suggests the clinical use of adaptogens may have 'evolved' into WHM practice through a combination of experimentation, clinical experience, the emergence of research and the intuitive synthesis of these components with limited traditional knowledge; rather than an adaptation of other traditional medicine practices into WHM practice. Intuition was identified as an important component of participants decision-making process. Intuition can be a contentious topic in complementary medicine commentary, where it has been associated with pseudoscience.³⁰ However, the clinical intuition as described by participants in this study is complex and nuanced, reflecting clinical intuition based on unconscious application of experience commonly held to play a key role in other health professions such as nursing and conventional medicine.^{31,32} In these contexts, the ability of a medical professional to have an intuitive grasp of a situation is held as a sign of experience, deep understanding and a skill to be harnessed.³³ Although clinical intuition has been identified amongst naturopaths previously,³⁴ there has been little examination of the role it plays in complementary therapies and where attention has been placed it has a tendency to be misconstrued in a negative light despite evidence placing clinical intuition as an esteemed quality of experienced clinicians. However, our study suggests that examination of the clinical knowledge drawn from intuition may help to provide more clarity, standardisation and perhaps even codification of core clinical concepts commonly

employed by CM clinicians, but not readily described in biomedical or scientific literature.

Similarly to ambiguous responses regarding cultural origins of adaptogens, there was no consensus knowledge of sources identified and a wide variety of sources were reported, often with non-specific answers such as 'traditional sources' and 'research' with no elaboration. Many of the participants reported that they rely heavily on research to inform their use of adaptogenic herbal medicines and appear to trust modern evidence more than traditional sources, noting that these two sources often don't align. Therefore, the naturopathic use of adaptogens may be less based on absorption of traditional knowledge but rather may represent adaptogens having 'evolved' into WHM practice as more scientific and experiential evidence supports their use.

One example of this could be the evolution of a more nuanced understanding of historical broader clinical concepts. The majority of participants associated adaptogen with the traditional concept of 'tonic', however whether participants noted the overlap of the two concepts or identified clear differences between the two traditional actions was unclear. The consensus was that the general association of adaptogens and tonics in modern practice may represent a link between WHM traditions (which largely described tonics) and the more recently codified concept of adaptogens, and may also more accurately reflect the nuances in a category such as 'tonic' that may have been too broad or too vague originally. Participants in this study saw value in developing more nuanced understanding of traditional clinical concepts based on application of external information, even to the extent they may evolve into newly defined concepts entirely. This finding has significant implications for archival and historical examination of herbal practice, as historical descriptions of herbal medicines may be unnecessarily broad, and may warrant more nuanced and detailed assessment in order to ascertain their true value to modern clinical practice.

The adaptogenic concept appears to have filled a gap within the vernacular of naturopathic practice, becoming a treatment that aligns with the fundamental tenets of naturopathic practice; – rais-

ing vitality, restoring harmony and 'treating the whole person'.³⁵ The naturopathic principle 'treat the whole person' refers to the concept of individualised medicine, taking into account the complexity of the human being, recognising that disease and illness manifests uniquely in each individual, as well as acknowledging the links between body systems in treatment.³⁶ Adaptogens were perceived by participants to be medicines that appear to perfectly align with this principle, having a holistic action of restoring homeostasis throughout multiple body systems where the practitioner selects the adaptogen according to the individual presentation. The perceived holistic activity of adaptogens was considered relatively consistent (within the scope of individualised medicine) despite the vastly differing clinical presentations they are prescribed in, and the differing actions that each adaptogenic herb has in addition to its adaptogenic activity. Adaptogens appear to be used by herbalists for presentations beyond stress adaptation – the use for which laboratory and clinical research is focused – and were considered a treatment applicable to a broad range of conditions and presentations including fertility and cardiovascular health. In practical terms the holistic nature of adaptogens was most commonly referred to as 'improved resilience', 'raising vitality' and 'having a broad activity across multiple body systems'. However, given the lack of formal examination of adaptogenic use and the multiple traditional medicine systems that purport to use adaptogenic medicines, further examination of clinical perspectives are required to gain a global understanding of the adaptogenic concept.

One area that participants identified as being largely unique to adaptogens in clinical settings was 'consistency'. The idea of 'consistency' amongst medicinal substances (adaptogens) that are used in a multitude of clinical presentations appears to be a paradoxical concept unique to adaptogenic herbal medicines, where they improve resilience regardless of the body system impacted by stress. The effects of adaptogens are understood to vary from person to person yet consistently correlate (in practice) with signs of increased vitality and resilience. Therefore, there appears to be consistency in clinical outcomes of adaptogenic prescriptions, but inconsistency in the clinical reasons for use and the mechanisms driving the clinical outcomes. In the context of common pharmacological actions this non-specific effect appears to be paradoxical, while being considered the 'norm' for adaptogens by herbal medicine clinicians. The complexity and anomaly of the adaptogenic concept is reflected in the common testimonies of experiential learning and the repetition of 'trial and error' in reference to clinical use. The same complexity could be seen as the very essence of 'individualised medicine' that is the trademark of naturopathic practice, matching the complexity of the human being; providing one possible explanation for the wholehearted embrace of the adaptogenic concept by naturopaths. It appears tools to capture this complexity in a rigorous way that remains true to practice may be a missing link between practice and evidence.

Naturopaths may have been particularly attuned to this unique action. The concept of raising a patient's vitality to deal with health issues is interwoven with the practice of individualised medicine in naturopathic practice,³⁶ and participants' use of adaptogens according to individual presentations was often focused on improving an individual patient's vitality. Aspects of the existing definitions of adaptogens where they are considered to increase resistance to stress³ and promote adaptation and survival⁵ may align with vitalistic concepts – that are fundamental parts of naturopathic philosophy (and which relate to the body's innate capacity to heal).³⁷ Vitality is a salient subjective state, whilst also being associated with objective health outcomes and is defined as having optimal mental and physical energy.³⁸ Vitality has been defined as a "sense of enthusiasm and aliveness" and is conceptually related to organismic wellness,³⁹ and associated with improved coping mechanisms, resilience to a range of stressors and less vulnerability

to illness³⁸ – terms mirrored in statements from participants. This may provide rationale for the varied methods reported by participants for measuring the efficacy of adaptogenic treatments which all included measures (subjective and objective) which could be associated with vitality and wellness on an individual level – ranging from improved skin condition and energy levels to menstrual cycle regularity, elevated mood and bowel motion regularity. However, our findings show that just as traditional therapeutic concepts such as adaptogens require further examination and codification, their incorporation and value in clinical practice cannot be fully ascertained until traditional medicine concepts that underpin their use – such as vitality in the naturopathic context – are better understood and codified.

Other research demonstrates the multi-systemic effects caused by chronic stress,⁴⁰ suggesting that detrimental impacts of stress could manifest in different body systems in each individual, and that relationships *between* body systems may be impacted. The multi-systemic effects caused by stress alongside the perceived multi-system action of adaptogens and naturopathic concepts of 'treat the whole person' and individualised medicine could provide further rationale for a diverse array of measures to assess treatment efficacy.

Relating to the laboratory evidence, differing measures are being used by naturopaths to measure adaptogenic activity in clinical practice to those measures identified in experimental studies. Overall, participants agreed that narrow outcome measures limited to clinical, pharmacological or disease-based domains are not particularly useful for measuring adaptogenic activity. As such, herbal medicines exhibiting complex inter-systems activity may require more diverse methods of measurement – perhaps more functional than biological – that are capable of capturing organism-wide multiple-symptom, energy and global well-being patterns, aligning with clinician reports of signs of improved vitality.

A complex systems and network theory-driven model for whole systems study for complementary medicine traditions such as naturopathy has been proposed previously.⁴¹ Novel whole-systems healing models target inherent adaptogenic responses across multiple pathways in contrast to curative biomedical models which assume linear pathways and direct links to disease.⁴² Complex systems models recognise that using narrow domains measuring end-point change cannot capture the holistic patterns of non-linear change that a complex activity such as that of adaptogens would be expected to achieve.⁴¹ Complexity in methods of measurement of efficacy appears to align with the adaptogenic concept, naturopathic principles and with the multi-systemic negative effects that may result from chronic stress. The concept of network pharmacology aligns with proposed complex systems models for holistic complementary medicine traditions to capture the non-linear, dynamic changes that holistic medicines such as adaptogens are expected to exhibit⁴¹ and these complex system models may be worthy of further examination in future research pertaining to measuring adaptogenic activity in humans.

The study has some limitations. The sample of naturopaths participating in this study were taken from three major cities in Australia and like all FG studies, the findings may not be generalisable (and are not intended to be). It is unclear whether the findings of this study would apply to naturopaths from other regions or countries regardless that the theme lists were consistent across groups. However, the naturopathic philosophies of "vitalism" and "holism" are central to naturopathic philosophies globally, and the foundational naturopathic practices are consistent globally.³⁷ Further, purposeful sampling was used in the study to select the most appropriate sample to answer the research question.²⁰ As such the study provides valuable preliminary insight into the perceptions, understanding and clinical use of adaptogens by naturopaths

and herbal medicine practitioners, laying necessary foundations for further research in this area.

Another drawback to qualitative research is the limitation to the researchers' interpretations, where the knowledge and personal experience of the researcher can influence the observations, interpretations and conclusions⁴³ introducing researcher bias. A phenomenological framework was selected with the intention of minimising researcher bias as much as feasibly possible, as this framework implements the use of bracketing to omit the researchers own views from the research.⁴⁴

Limitation to the researchers' interpretations were further addressed by using triangulation where a second researcher analysed transcriptions and coded themes⁴⁵ and discrepancies were assessed and reported on, maintaining transparency. Researcher bias was also reduced and reliability increased with the use of a reflexive journal and memo-ing throughout the research process,⁴⁵ as well as ensuring methodological coherence (by triangulation) and sampling sufficiency.¹⁹

In conclusion, clinicians are measuring adaptogenic effects predominantly through signs relating to vitality and through patient reporting. Given the importance clinicians in this study placed on intuition and the contentious meaning the term often has when describing its use in complementary medicine, a further nuanced yet critical examination of the role of clinical intuition, experiential learning and unconscious understandings is warranted.

Further, it appears that although the complex inter-systems activity is agreed upon in both laboratory research and by clinicians, the complexity of the activity hasn't yet been translated from the laboratory data into clinical practice. It appears there is a bi-directional lack of translation between modern evidence and clinical practice.

This study may inform future research by providing a basis for novel approaches to pharmacological research, and a basis for researchers to design clinical studies capturing individualised plant medicines. Furthermore, the synthesis of this data provides foundations for further investigations into the development of domains-based criteria to measure effect and efficacy of adaptogens by both clinicians and researchers. The development of such criteria may lay the groundwork for defining adaptogens in a way which can be standardised by regulatory bodies, potentially leading to more integration of traditional medicine into healthcare in the future.

While the complexity of adaptogens is warmly embraced by herbalists as the essence of individualised plant medicine, adaptogens remain a conundrum to scientists who have attempted to capture the activity with conventional methods. Adaptogens are holistic and vitalistic medicines, being used within a Naturopathic framework of individualised prescription. As is common in Naturopathic medicine, those adaptogenic prescriptions are often driven by matching the "essence of the plant" to the person presenting. This distinct insight may prove useful as a foundation for novel approaches to capturing adaptogenic activity within a complex systems model style to embody the essence of the individualised style of medicine they are, and the holistic framework they are used within.

Acknowledgements

This research was conducted as part of an Honours program at Endeavour College of Natural Health (ECNH). We are grateful to ECNH for the financial support granted to Sophia Gerontakos to conduct this research. We would also like to acknowledge the ECNH Office of Research for their administrative support in facilitating this project.

Author Contributions

SG: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Writing original draft, Writing - review and editing.

DC: Conceptualization, Supervision, Formal analysis, Writing - review and editing.

Conceptualization, Supervision, Project administration, Data curation, Methodology, Formal analysis, Writing: review and editing.

Conflict of interest

The authors declare no conflicts of interest.

Funding

This research was funded by Endeavour College of Natural Health (ECNH).

Ethical statement

ECNH Human Research Ethics Committee approved this project (Approval no: 20181217-SG-1).

Data availability

The data will be made available upon reasonable request.

References

- Panossian A. Adaptogens: Tonic herbs for fatigue and stress. *Altern Complement Ther* 2003;9:327–31.
- Shikov A, Pozharitskaya O, Makarov V, Wagner H, Verpoorte R, Heinrich M. Medicinal plants of the Russian Pharmacopoeia; their history and applications. *J Ethnopharmacol* 2014;154:481–536.
- Brekhman II, Dardymov IV. New substances of plant origin which increase nonspecific resistance. *Annu Rev Pharmacol* 1969;9:419–30.
- Wagner H, Nörr H, Winterhoff H. Plant adaptogens. *Phytomedicine* 1994;1:63–76.
- Panossian A. Understanding adaptogenic activity: Specificity of the pharmacological action of adaptogens and other phytochemicals. *Ann N Y Acad Sci* 2017;1401:49–64.
- Panossian A, Wikman G, Wagner H. Plant adaptogens III. Earlier and more recent aspects and concepts on their mode of action. *Phytomedicine* 1999;6:287–300.
- Panossian A, Wikman G. Effects of adaptogens on the central nervous system and the molecular mechanisms associated with their stress-Protective activity. *Pharmaceuticals* 2010;3:188–224.
- Panossian A, Wagner H. Adaptogens. *HerbalGram* 2011:52–63.
- Panossian A, Wikman G, Kaur P, Asea A. Adaptogens exert a stress-protective effect by modulation of expression of molecular chaperones. *Phytomedicine* 2009;16:617–22.
- Panossian A, Seo E-J, Efferth T. Novel molecular mechanisms for the adaptogenic effects of herbal extracts on isolated brain cells using systems biology. *Phytomedicine* 2018;50:257–84.
- Selye H. Forty years of stress research: Principal remaining problems and misconceptions. *Can Med Assoc J* 1976;115:53–6.
- Panossian A, Seo E-J, Wikman G, Efferth T. Synergy assessment of fixed combinations of Herba Andrographidis and Radix eleutherococci extracts by transcriptome-wide microarray profiling. *Phytomedicine* 2015;22:981–92.
- Panossian A, Hamm R, Wikman G, Efferth T. Mechanism of action of Rhodiola, salidroside, tyrosol and triandrin in isolated neuroglial cells: An interactive pathway analysis of the downstream effects using RNA microarray data. *Phytomedicine* 2014;21:1325–49.
- Gerontakos S, Casteleijn D, Shikov A, Wardle J. A critical review to identify the domains used to measure the effect and outcome of adaptogenic herbal medicines. *Yale J Biol Med* 2020. Article accepted in press.
- World Health Organization. WHO international standard terminologies on traditional medicine in the Western Pacific Region. <https://apps.who.int/iris/handle/10665/206952>. Published 2007. Accessed 14 April 2020.
- European Medicines Agency. In: Agency EM, editor. *Reflection paper on the adaptogenic concept*. London: European Medicines Agency; 2008.
- Al-Busaidi ZQ. Qualitative research and its uses in health care. *Sultan Qaboos Univ Med J* 2008;8:11–9.
- Queirós A, Faria D, Almeida F. Strengths and limitations of qualitative and quantitative research methods. *European J Educ Stud* 2017;3:369–87.

19. Morse JM, Barrett M, Mayan M, Olson K, Spiers J. Verification strategies for establishing reliability and validity in qualitative research. *Int J Qual Methods* 2002;1:13–22.
20. Marshall MN. Sampling for qualitative research. *Fam prac* 1996;13:522–6.
21. Mack N, Woodson C, MacWueen K, Guest G, Namey E. *Qualitative research methods: A data collector's field guide*. North Carolina, USA: Family Health International; 2005.
22. Pope C, Mays N. *Qualitative research in health care*. London, UK: BMJ books; 1999.
23. Morgan DL. Focus groups. *Annu Rev Sociol* 1996;22:129–52.
24. Guest G, Namey E, McKenna K. How many focus groups are enough? Building an evidence base for nonprobability sample Sizes. *Field methods* 2017;29:3–22.
25. Hancock ME, Amankwaa L, Revell MA, Mueller D. Focus group data saturation: A new approach to data analysis. *Qual Report* 2016;21:2124–30.
26. Starks H, Trinidad SB. Choose your method: A comparison of phenomenology, discourse analysis, and grounded theory. *Qual Health Res* 2007;17:1372–80.
27. Graneheim UH, Lundman B. Qualitative content analysis in nursing research: Concepts, procedures and measures to achieve trustworthiness. *Nurse Educ Today* 2004;24:105–12.
28. Belotto MJ. Data analysis methods for qualitative research: Managing the challenges of coding, interrater reliability, and thematic analysis. *Qual Report* 2018;23:2622–33.
29. National Health and Medical Research Council. *National statement on ethical conduct in human research*; 2007, - Updated 2018. <https://nhmrc.gov.au/about-us/publications/national-statement-ethical-conduct-human-research-2007-updated-2018>. Published 2018. Accessed 2 October 2018.
30. Quackery Mehlman M. *Am J Law Med* 2005;31:349–63.
31. Melin-Johansson C, Palmqvist R, Rönnberg L. Clinical intuition in the nursing process and decision-making-A mixed-studies review. *J Clin Nurs* 2017;26:3936–49.
32. Woolley A, Kostopoulou O. Clinical intuition in family medicine: More than first impressions. *Ann Fam Med* 2013;11:60–6.
33. Greenhalgh T. Intuition and evidence—uneasy bedfellows? *Br J Gen Pract* 2002;52:395–400.
34. Steel A, Adams J. Approaches to clinical decision-making: A qualitative study of naturopaths. *Complement Ther Clin Pract* 2011;17:81–4.
35. World Naturopathic Federation. The World Naturopathic Federation Roots Report - Findings from the Naturopathic Roots Committee Survey. <http://worldnaturopathicfederation.org/wnf-publications/>. Published 2016. Accessed 18th January 2020.
36. Hechtman L. In: Chatswood NSW, editor. *Clinical naturopathic medicine. Vol rev. Ed.*. Churchill Livingstone; 2012.
37. World Naturopathic Federation, Canada September 2017 *White paper on naturopathic philosophies, principles and theories*; 2017.
38. Ryan R, Deci E. From ego depletion to vitality: Theory and findings concerning the facilitation of energy available to the self. *Soc Personal Psychol Compass* 2008;2:702–17.
39. Ryan R, Frederick C. On energy, personality, and health: Subjective vitality as a dynamic reflection of well-being. *J Pers* 1997;65:529–65.
40. Mariotti A. The effects of chronic stress on health: New insights into the molecular mechanisms of brain-body communication. *Future Sci OA* 2015;1.
41. Bell IR, Koithan M. Models for the study of whole systems. *Integr Cancer Ther* 2006;5:293.
42. Jonas WB, Beckner W, Coulter I. Proposal for an integrated evaluation model for the study of whole systems health care in cancer. *Integr Cancer Ther* 2006;5:315.
43. Choy LT. The strengths and weaknesses of research methodology: Comparison and complimentary between qualitative and quantitative approaches. *IOSR J Hum Soc Sci* 2014;19:99–104.
44. Qutoshi SB. Phenomenology: A philosophy and method of inquiry. *J Educ Devel* 2018;5:215–22.
45. Carter N, Bryant-Lukosius D, DiCenso A, Blythe J, Neville AJ. The use of triangulation in qualitative research. *Oncol Nurs Forum* 2014;41:545–7.