Review

Prevalence and predictors of herbal medicine use in adults experiencing anxiety: A critical review of the literature

Erica McIntyre [a,*], Anthony J. Saliba [a], Karl K.K. Wiener [b], Jerome Sarris [c]

[a] Charles Sturt University, School of Psychology, and National Wine and Grape Industry Centre, Australia
[b] Charles Sturt University, School of Psychology, Australia
[c] Melbourne University, Department of Psychiatry, Australia

ARTICLE INFO

ABSTRACT

Objective: Anxiety disorders are the most prevalent group of mental health disorders. Having anxiety has been found to predict the use of CAM (including herbal medicines), and anxiety has been identified as one of the most common health problems treated with CAM. This review aims to: determine the prevalence rates of herbal medicine use in adults experiencing anxiety, and to identify and critically discuss the beliefs and attitudes that predict herbal medicine use in this cohort.
Method: A critical literature review was conducted. Studies that met the inclusion criteria were identified with a comprehensive search across a range of databases.
Results: Eight studies were found across four countries reporting the prevalence of herbal medicine use in people experiencing anxiety — use ranged from 2.39% to 22%. No studies were found that explored attitudes and beliefs as predictors of herbal medicine use in adults with anxiety specifically. Therefore, the criteria were expanded to include other cohorts. Seventeen cross-sectional studies were found, with only one of the studies measuring herbal medicine use specifically, and the remaining studies measuring herbal medicine use within the umbrella of CAM. Three main categories of beliefs and attitudes were identified: belief systems/philosophies, treatment beliefs and attitudes, and control and empowerment beliefs and attitudes.
Conclusions: Herbal medicines are being used to treat anxiety symptoms to varying degrees, with people experiencing worse anxiety symptoms using more herbal medicines. Future research on herbal medicine prevalence in adults with anxiety needs to be valid and comparable using standardized definitions and measures. It is hypothesized that personal control over health, satisfaction with the medical encounter and treatment outcome may be important predictors of herbal medicine use in adults with anxiety, and may help explain why those with more severe anxiety are using more herbal medicines. This is an important area for future research.

© 2015 Elsevier Ltd. All rights reserved.

Contents

* Corresponding author. Tel.: +61 438448653.
  E-mail address: emcintyre@csu.edu.au (E. McIntyre).

What is already known about this topic?

- Adults with anxiety are using herbal medicines
- Beliefs and attitudes involved in complementary medicine use have been identified

What this paper adds?

- Identifies and critically discusses the prevalence rates of herbal medicine use in adults with anxiety
- Critically discusses the beliefs and attitudes that predict herbal medicine use
- Provides a hypothesis of herbal medicine use behavior in adults with anxiety

1. Introduction

Anxiety disorders are the most prevalent group of mental health disorders. In Western countries lifetime prevalence is high; for example, 33.7% in the United States (US) [1], and 26.3% in Australia [1,2]. In addition, it is not uncommon for people to experience problematic anxiety symptoms, without having an anxiety disorder diagnosis. Individuals not meeting diagnostic criteria for generalized anxiety disorder (GAD) are referred to as having "subthreshold anxiety" [3,4], and are not reported in prevalence rates. Despite the prevalence of anxiety, people can have dissatisfaction with, or an unwillingness to have, conventional psychological or pharmaceutical treatments [5,6]. Therefore, other treatments are needed that complement conventional treatments, or provide an alternative, such as herbal medicines.

Herbal medicine is known to be the oldest form of medicine, and use is widespread throughout the world. These medicines have a history of being used for a range of physical and mental health problems, including "nervous conditions" [7]. Modern herbal medicine has changed enormously from its traditional roots, with herbal medicines now sold as commercial products that are widely available to the public as over-the-counter supplements [8]. In Western countries the use of herbal medicines has steadily increased since the early 1990s, as products are widely available in retail outlets, and from herbal medicine practitioners. Recent lifetime prevalence rates of herbal medicine use in Western countries have been reported at approximately 31% in the UK [9], 37% in Australia [10], and 25% in the US [11]. Herbal medicines are distinguished from conventional pharmaceutical medicines by the use of whole plant parts and not their isolated constituents [12]. They are used as teas, liquid extracts, tablets, capsules, and creams. Herbal medicines are considered to be complementary and alternative medicines (CAMs) not usually part of mainstream health care in Western cultures.

While there is documented traditional evidence for the use of herbal medicines for treating anxiety symptoms, there is a lack of evidence of efficacy from modern research. A number of herbal medicines have shown promising results in both preclinical research (animal models) for relieving anxiety-like symptoms [13], and in clinical trials [14]. The herb kava (*Piper methysticum*) is the only herb to date demonstrating Level A evidence for the treatment of generalized anxiety [15]. Other herbs such as passionflower (*Passiflora incarnata)*, chamomile (*Matricaria recutita*), and *Rhodiola rosea* have demonstrated promising results in clinical trials for reducing anxiety symptoms in specific patient groups — for a comprehensive review see [14]. However, more research is needed on these and other popular herbal medicines to establish their efficacy in reducing anxiety symptoms generally, and in specific anxiety disorders. Despite the lack of evidence of efficacy people are using these medicines to treat their anxiety symptoms [8,16,17]. Having anxiety has been found to predict the use of CAM (including herbal medicines), and anxiety has been identified as one of the most common health problems treated with CAM [18].

As there is insufficient evidence for the efficacy of herbal anxiolytics, and people are using them to treat anxiety symptoms, it is important to understand what influences a person's intention to use these medicines. An understanding of the beliefs and attitudes leading to herbal medicine use in adults with anxiety is needed to inform clinical practice (e.g. guide patient education), and to guide future research (e.g. develop theoretical models of health behavior that seek to understand herbal medicine use). This is important, as herbal medicines may not be the most suitable treatment option. For example, psychological interventions or pharmaceutical treatments may be more effective than herbal medicines in treating specific anxiety disorders. In contrast, there may be situations in which herbal medicines are a suitable treatment option, for example, to avoid unwanted side-effects from pharmaceuticals (e.g. kava in generalized anxiety). Consequently, we need to ensure herbal medicines are used in an appropriate way as people may be using them incorrectly, such as: using a medicine incorrectly for its indications, choosing poor quality products, or self-medicating with possible herb-drug interactions [16,17].

By critically reviewing the literature it is possible to gain a more in-depth understanding of how adults experiencing anxiety use herbal medicines, and what beliefs and attitudes are involved in their decision-making. While there has been one review investigating beliefs and attitudes toward CAM [19], no review has discussed the beliefs and attitudes as predictors of herbal medicine use specifically in adults experiencing anxiety. This review has two primary aims: to determine the prevalence rates of herbal medicine use in adults experiencing anxiety, and to identify the beliefs and attitudes that predict herbal medicine use in this cohort. In addition, as this is a critical review it will provide a comprehensive synthesis and analysis of the identified literature, and develop a hypothesis of herbal medicine use behavior in adults with anxiety.

2. Method

2.1. Literature search strategy

A search of published peer-reviewed articles was conducted by the first author, with two aims: (1) to determine the prevalence of herbal medicine use in adults experiencing anxiety, and (2) to identify the beliefs and attitudes that predict intentions to use herbal medicines, or herbal medicine use behavior in adults with anxiety.

For the first aim the search was limited to between 2000 and April 2015. Reporting more recent prevalence rates is necessary, as general herbal medicine use has been steadily increasing in

Western countries making earlier studies irrelevant for the purpose of this article. Search terms used for the first aim were anxiety and herb* medicine* or botanical medicine* or plant medicine* or phytotherapy or complementary medicine* or alternative medicine* and prevalence. The same terms were used for the second aim with the addition of belief* or attitude*, and elimination of prevalence. For the second aim the date range of the search was expanded to between 1990 and April 2015. Databases used for both searches were Medline, ESCOhost, ProQuest, Sciencedirect and Google Scholar. Article titles and abstracts were read to determine relevance to the criteria, and if lacking information the full text was retrieved. Reference lists of all articles meeting the criteria were hand searched to ensure all relevant material was included (see Supplement 1 for the inclusion and exclusion criteria). See Fig. 1 for flow diagram.

For the second aim no studies were found that explored the attitudes and beliefs of adults with anxiety as predictors of herbal medicine use. Therefore, the criteria were expanded to include the general population and other patient groups. Examining other cohorts will provide guidance to inform future research into beliefs and attitudes to herbal medicine use in adults experiencing anxiety. Only one study was found that focused on the beliefs and attitudes of herbal medicine use specifically. Therefore, the inclusion criteria were broadened to include CAM use if herbal medicine use was measured. See Supplement 2 for inclusion and exclusion criteria for the second aim. Seventeen cross-sectional studies met the modified inclusion criteria for aim two. See Fig. 2 for flow diagram.

Illness beliefs were excluded from this review, as the majority of studies were focused on illness beliefs for specific health conditions such as cancer and HIV, and unlikely to be relevant to those experiencing anxiety. As this was not a review of efficacy studies expert judgment (by the first author) was used to assess eligible criteria. The beliefs and attitudes identified were organized into three main thematic categories, which were informed by the literature.

3. Results

3.1. Prevalence of herbal medicine use in adults with anxiety

Eight studies were found that met the criteria for the first aim (see Table 1). Of these only two Australian studies were found that reported prevalence rates of herbal medicine use in adults with anxiety. The Australian National Health Survey 2007/2008 reported that of those individuals using either vitamins, minerals or herbal medicines (n = 3769) 70.8% reported having a mental
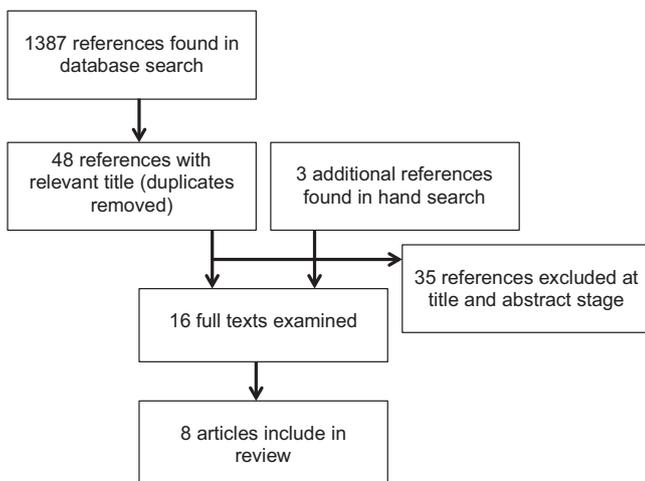

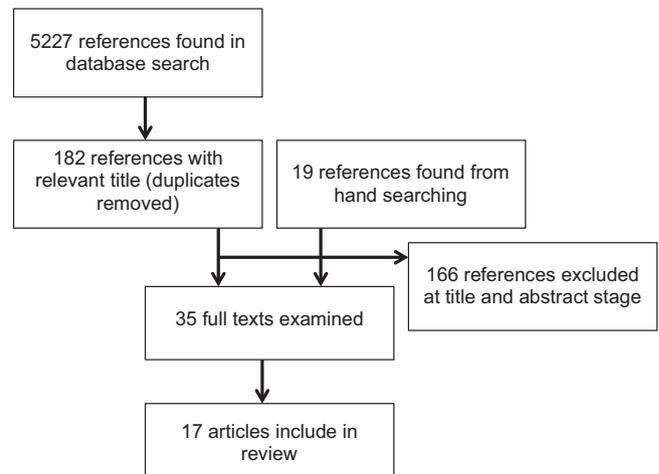
Fig. 1. Flow diagram of studies included in aim one.

Fig. 2. Flow diagram of studies included in aim two.

health condition, which was found to be a significant predictor of CAM use [20]. However, the type of mental health condition was not identified, making it impossible to determine the prevalence of herbal medicine use of adults with anxiety. In addition, as this study combined herbal medicines with vitamins and minerals into one category, accurate rates of herbal medicine use cannot be determined. Another Australian study explored herbal medicine use in adults (N = 7485), and investigated associations between using CAM treatments and mental health [21]. The study found that 2.39% reported taking CAMs for their anxiety symptoms in the previous month. Herbal medicine use may be underreported in this study as participants chose from a predetermined list of medicines for use in the previous month. Herbal medicines were included within the umbrella term of CAM in both these studies (a common problem in herbal medicine use research) making it difficult to determine accurate herbal medicine use prevalence.

A large study on psychiatric outpatients (N = 1027) in Turkey found that 18.7% of those with an anxiety disorder diagnosis used CAMs (included herbal medicines) [22]. Sixty four percent of CAM users used herbal medicines, which was the most frequently used CAM. Those with a GAD diagnosis had the highest CAM usage compared to those with panic disorder, obsessive-compulsive disorder, and post-traumatic stress disorder. In addition, a Finish study (N = 5987) found 49.9% of those with a GAD diagnosis (n = 75) used a CAM in the previous 12 months, which was a higher usage rate than any other anxiety disorder [25]. Of those with an anxiety disorder (n = 127) 21.8% currently used a biologically based therapy. In this study herbal medicines were included as a biologically based CAM therapy. Neither of these two studies reported the prevalence of herbal medicine use specifically for each disorder diagnosis.

One large US population study (N = 9271) [16] focused on the use of herbal medicines. This study found 3.72% of the sample reported using herbal medicines for their emotions or nerves in the previous 12 months. Those diagnosed with an anxiety disorder (n = 2198) were significantly more likely to use herbal medicines for their anxiety symptoms than those not meeting the criteria for a disorder (n = 7073), with 8.54% reporting using herbal medicines for anxiety symptoms compared to 2.24% of those without a diagnosis. Individuals with a GAD diagnosis had the highest usage rates, with 12.72% (n = 393) using herbal medicines, which was significantly more than those without a GAD diagnosis (3.36%, n = 8878). Those with a diagnosis of panic attack, panic disorder, social phobia, or specific phobia also had significantly higher herbal medicine use than those without an anxiety disorder diagnosis.

Table 1
Studies reporting the prevalence of herbal medicine use in adults with anxiety disorders or anxiety symptoms.

Author/date	Country	Sample	Measure of herbal medicine use	Measure of anxiety
Bahceci et al., 2013 [22]	TUR	$N = 1027$ (patients with mental disorders)	Current CAM use. Herbal medicines included as a biologically based therapy	Anxiety disorder diagnosis
Bystritsky et al., 2012 [23]	US	$N = 1004$ (primary care patients with anxiety disorder)	Non-prescription medications or herbal remedies used in previous 6 months to help with your mood or energy	Type of anxiety disorder (method of measurement not reported)
Gardiner, Graham, and Legedza, 2007 [24]	US	$N = 31,044$ (general population)	Herbal medicines used in previous 12 months	Not reported
Parslow and Jorm, 2004 [21]	AUS	$N = 7485$ (general population)	CAM use in the previous month (from a predetermined list including herbal medicines)	Anxiety symptoms in previous month (method of measurement not reported)
Ravven, Zimmerman, and Schultz, 2011 [16]	US	$N = 9271$ (general population)	Herbal medicines used for emotions or nerves or mental health or use of alcohol or drugs in the previous 12 months. Predetermined list of herbal medicines. Those who used herbal medicines were able to add additional herbs they had used in the last 12 months	Anxiety disorder diagnosis. World Mental Health Survey Initiative version of the World Mental Health Composite International Diagnostic Interview
Roy-Byrne et al., 2005 [17]	US	$N = 682$ (primary care patients with anxiety disorder)	Herbal medicines used in previous 3 months	Anxiety disorder diagnosis. World Health Organization's 12-Month Composite International Diagnostic Interview
Spinks and Hollingsworth, 2012 [20]	AUS	$N = 15,779$ (general population)	CAM (a vitamin, mineral or herbal supplement) use in previous 12 months	Mental health condition (self report)
Wahlström, Sihvo and Haukkala, 2008 [25]	FIN	$N = 5987$ (general population, adults over 30 years)	CAM (from a predetermined list of therapists) use in previous 12 months, and current use of biologically based therapies (included herbal medicine, natural or homoeopathic remedies)	Anxiety disorder diagnosis

Note. AUS = Australia, US = United States of America, FIN = Finland, TUR = Turkey, CAM = complementary and alternative medicine.

Another US study of primary care patients with anxiety disorders ($N = 1004$) found 21% to use non-prescription or herbal medicines in the previous 6 months [23]. This study also found adults diagnosed with GAD to use more herbal medicines than those with other anxiety disorder diagnoses [23]. There is often higher use of health services in people with GAD [26], which may be a factor in the increased use of herbal medicines in this clinical population. Although, the reasons for the higher up-take of herbal medicines was not explored in the above mentioned studies, it could be speculated that individuals with an anxiety disorder diagnosis may be motivated to look for alternate treatments that complement conventional therapies, as they experience more severe symptoms, and consequently seek additional relief if conventional therapies are not satisfying their treatment needs.

Another US study explored herbal medicine use in a cohort of primary care patients with anxiety ($n = 682$). The authors found that 11% ($n = 75$) of primary care patients with anxiety had used herbal medicines in the last 3 months, with 64% of these herbal medicine users having a DSM-IV diagnosed anxiety disorder [17]. While there was higher herbal medicine use in those with an anxiety disorder diagnosis, they found depression and not anxiety to be a significant predictor of using herbal medicines. It is impossible to draw conclusions about herbal medicine use from this study as the participants could only choose from a predetermined list of six herbal medicines (ginseng, *Ginkgo biloba*, kava kava, St John's wort, valerian, and melatonin) presented as a multiple response question, and may have been using other herbs in addition to these. Consequently, it is likely that this study did not capture all the herbal medicines participants were using to treat their anxiety. In addition, 8% of the 75 herbal medicine users reported using melatonin. This is problematic as melatonin is a hormonal supplement and not a herbal medicine [27]. Including melatonin in this study reflects a common problem in herbal medicine research, in which people conducting the studies often have limited knowledge of the medicines, or how they should be

used. Therefore, the reported results are not an accurate reflection of herbal medicine use in adults with anxiety.

A large ($N = 31,044$) US population study [24] found that 18.6% of participants had previously used herbal medicines. Of those people who used herbal medicines to treat a specific health condition in the previous 12 months ($n = 3315$), 5.5% did so to treat anxiety or depression, which were the fourth most common conditions for which herbal medicines were used. However, herbal medicine use may be underestimated in this study as it was measured using a predetermined list of 29 herbs, and only six of the herbs listed (ginseng, *Ginkgo biloba*, St John's wort, chamomile, kava kava, and valerian) are commonly used to treat anxiety.

When considering the aforementioned studies, there is a large variation in the prevalence of herbal medicine use in adults experiencing anxiety. This is likely to occur due to inconsistencies with type of cohort, measurement of herbal medicine use, and measurement of anxiety (See Table 1 for details of these studies).

3.2. Beliefs and attitudes toward herbal medicines

Research on beliefs and attitudes toward herbal medicines began in the late 1990s as the use of CAMs began to increase. Most studies have focused on the beliefs and attitudes toward herbal medicines or herbal practitioners under the umbrella of CAM [e.g. [18,28], with few studies exploring the beliefs and attitudes toward herbal medicines specifically [29]. There is a need to differentiate between CAM modalities, as differences in the users of various types of CAM have been demonstrated to have different beliefs about CAM [30].

There is inconsistency in the literature around what defines a belief or attitude, for example some studies have included behaviors (e.g. informing a doctor they take herbs) in the category of beliefs [31]. This review will define beliefs as "the subjective probability of a relation between the object of the belief, and some other object, value, concept, or attribute" [32] (p. 131). Attitudes

will be defined as "a person's general feeling of favorableness or unfavorableness toward some stimulus object" [32] (p. 216). In addition, beliefs can be confused with attitudes, for example, Sirois and colleagues [33] discuss dissatisfaction with doctors as being a belief, however this is an attitude that is formed by beliefs. An example of a belief related to this attitude would be 'doctors don't empower people'. Behaviors and experiences (i.e. previous herbal medicine use) are antecedents to the development of beliefs, and as beliefs are formed about an object (i.e. herbal medicines are effective), an attitude (i.e. toward herbal medicine use) is simultaneously formed. A number of beliefs are involved in the formation of an attitude and it is the combination of these beliefs that will determine whether an attitude is positive or negative toward a behavior (i.e. using herbal medicine) [32].

Seventeen cross-sectional studies were found that explored beliefs and attitudes as predictors of herbal medicine use using multivariate statistics − see Table 2. All studies defined and operationalized the dependent variables differently (i.e. CAM use, attitudes to CAM, and intention to use herbal medicines). Only one of the studies measured herbal medicine use specifically [29], while the remaining studies measured herbal medicine use within the umbrella of CAM. Three main categories of beliefs and attitudes related to CAM use were identified: belief systems/philosophies, treatment beliefs and attitudes, and control and empowerment beliefs and attitudes.

3.3. Belief systems/philosophies

Belief systems comprise interrelated beliefs that people use to make sense of the world. In CAM and herbal medicine research these have been considered in the context of both worldview [18], and views specifically related to health [28]. The belief systems found to predict positive attitudes toward CAM, or CAM use include cultural creative [18], post-modern values [28], philosophical congruence with CAM [37], holism [18], spirituality [45], and anti-technology [41]. See Table 3 for belief systems found to predict CAM use or positive attitudes to CAM.

Postmodern values incorporate modern beliefs about nature, science and technology, health, authority, individual responsibility, and consumerism [41]. In two separate studies Siahpush [28,41] explored this belief system in relation to CAM, and found that having postmodern values predicted positive attitudes toward CAM use. A third study [38] used the postmodern beliefs scale developed by Siahpush [28], and while they found having postmodern values to predict both positive attitudes toward CAM, and use of CAM, not all the subscales (i.e. individual responsibility and holism) individually predicted CAM use − this will be discussed separately. In all three studies exploring postmodern values, the only subscale to consistently predict attitudes to CAM was faith in natural remedies.

Holism is a philosophy related to health that includes beliefs about the benefits in treating the whole person (body, mind, spirit), and that the use of the whole plant part is more beneficial than its isolated constituents; these beliefs are a core principle of herbal medicine [46]. Therefore, it is logical to suggest that a belief in holism is likely to predict herbal medicine use, however the findings in the literature are inconsistent. The majority of studies found holistic beliefs to predict either CAM use [18,30,37,44], or positive attitudes to CAM [28], in nonclinical populations. Conversely, two studies have found that holistic beliefs did not predict positive attitudes to CAM in nonclinical cohorts [38,41]. However, one study of adults with a health complaint [30] found positive beliefs about holistic health to be a significant independent predictor of current use of biologically based CAM therapies. A similar belief system, *philosophical congruence with CAM* (includes beliefs related to empowerment,

individual responsibility for health, and the body's ability to heal itself, the efficacy of CAM, and valuing holism) was found to predict past and future, but not current CAM use in an adult nonclinical population [37].

A *cultural creative* is described as being someone who is unorthodox and at the "leading edge of change and innovation"; they ascribe to beliefs about environmentalism, feminism, spirituality (esoteric), personal growth and self-expression, and enjoy the foreign and exotic [18] (pp. 1549–1550). Astin [18] found that having the beliefs of a cultural creative predicted CAM use. Consistent with this finding, *spirituality* has also been found to predict both intention to use CAM [45] and actual CAM use [44]. In contrast, religious beliefs did not predict intentions to use CAM [45]. Spiritual beliefs are considered to be more unconventional and less formal than religious beliefs [47], which may help explain this finding.

Anti-technology beliefs have been found to predict CAM use [41], while anti-science sentiments did not. If people who are more likely to use CAM have cultural creative beliefs, and are adopters of innovation, it would seem logical that they would support technology. Reasons for this contradictory finding are unclear. However, each of these studies used different types of measures in different cohorts, which may provide some explanation for the inconsistent findings.

3.4. Treatment beliefs and attitudes

Treatment beliefs and attitudes relate to convictions or apprehensions people have about specific health care treatments. Dissatisfaction with the medical encounter [39], dissatisfaction with the treatment outcome [39], faith in natural treatments [38], and attitude about treatment choice [28], have all been found to predict positive attitudes toward CAM, or the use of CAM. In addition, positive attitudes toward herbal medicines have been found to predict intention to use herbal medicines [29]. See Table 4 for treatment beliefs and attitudes predicting CAM use, positive attitudes to CAM, or intention to use herbal medicines.

Faith in natural treatments reflects the belief that natural treatments are preferable to pharmaceutical treatments, as they are more effective and safer (e.g. less side-effects) [28]. Four studies explored faith in natural treatments, three of which found it predicted positive attitudes to CAM [28,38,41], and CAM use [38]. This suggests that those who have faith in natural medicines are more likely to use herbal medicines. Conversely, one study did not find faith in natural treatments to predict use of biologically based CAM therapies [30]. In addition, another study found the belief that treatments need to be safe (a belief related to natural treatments) did not predict past CAM use [34]. Choice is important for people who prefer natural treatments, which is reflected in a study finding that having a consumerist attitude (i.e. *treatment choice* in health is good) predicted positive attitudes toward CAM [28,41].

Being dissatisfied with conventional medicine is proposed to push people toward CAM use. It is suggested that there are two dimensions to this attitude: dissatisfaction with the medical encounter, and dissatisfaction with the treatment outcome [28]. *Dissatisfaction with the medical encounter* is an attitude that relates to the experience of the relationship between the doctor (or other health care professional) and the patient; this compares to *dissatisfaction with the treatment outcome*, which is an attitude formed about the result of their treatment. In a general population study Siahpush [41] discovered that once controlling for postmodern values, dissatisfaction with the treatment outcome was not a significant predictor of attitudes to CAM, but dissatisfaction with the medical encounter was, however, it explained only 1% of the variance, suggesting that it is not an important predictor. In a

Table 2
Cross-sectional surveys on beliefs and attitudes as predictors of positive attitude toward herbal medicine, and herbal medicine or herbal practitioner use.

Author/date	Country	Sample characteristics	Scales used to measure beliefs or attitudes	Dependent variable: measure of CAM or HM use	Significant predictors	Other beliefs and attitudes (not found to be significant predictors)
Astin, 1998 [18]	US	N = 1035, adults representative of US population. 31% experienced anxiety	Questionnaire developed by Ray (1997) — unable to access	Alternative health care use (treatments)	Predicted CAM use: • Holistic philosophy • Cultural creative beliefs	Did not predict CAM use: • Negative attitudes to conventional medicine • Need for control over one's health
Bishop, Yardley, and Lewith, 2008 [30]	UK	N = 247, adults general population who reported a current health problem	The CAM Beliefs Inventory. Attitudes to GPs scale. Beliefs about medicines questionnaire. Revised Illness Perceptions Questionnaire	Current CAM use, from five different categories of CAM therapies. Herbal medicine included as a biologically-based therapy	Predicted current CAM (biologically-based) use: • Holistic health	Did not predict CAM (biologically-based) use: • Participation in treatment • Natural treatments • Attitudes to GP
Furnham, 2000 [34]	UK	N = 159 General population (17–81 years of age)	Ways of predicting the future questionnaire. Complementary medicine questionnaire. Attitudes to medicine questionnaire	Ever tried CAM therapies (practitioner/medicine not specified)		Did not predict having tried CAM: • Need for research in medicine • Psychological factors influence health • Skepticism about conventional medicine • Safety of treatments (they need to be rigorously tested)
Gupchup et al., 2006 [29]	US	N = 251, adults (65 years and older)	59-item herbal medicine questionnaire (previously developed and validated)	Intentions to use herbal medicines in the 6 months	Predicted intention to use herbal medicines: • Attitudes toward herbal medicines	Did not predict intention to use herbal medicines: • Subjective norms • Perceived behavioral control
Hildreth and Elman, 2007 [35]	US	N = 1672, adults (31–65 years)	Likert-type questions for beliefs about health control, spirituality and religiosity	Any CAM services use in the previous 12 months (included herbal medicine)	Predicted CAM use: • Spiritual beliefs	Did not predict CAM use: • Religious beliefs • Belief in personal control over health
London, Foote-Ardah, Fleishman, and Shapiro, 2003 [36]	US	N = 2745, adults, HIV-infected	Previously unvalidated questionnaire to measure beliefs and attitudes variables	CAM practitioner use in previous 6 months	Predicted CAM use: • Greater desire for information • Greater desire for involvement in health care decisions	Did not predict CAM use: • Trust in conventional medical providers
McFadden, Hernández, and Ito, 2010 [37]	US	N = 65, graduate psychology students	Complementary, Alternative, and Conventional Medicine Attitudes Scale (3 subscales: philosophical congruence with CAM, holistic balance, dissatisfaction with conventional medicine). Multidimensional Health Locus of Control scale (MHLC)	Past, current and future CAM use (practitioner)	Predicted past CAM use: • Philosophical congruence with CAM • Predicted current CAM use • Holistic balance • Predicted future CAM use • Philosophical congruence with CAM Provider control over health	Did not predict CAM use at any stage: • Dissatisfaction with conventional medicine

Table 2 (*Continued*)

44

Author/date	Country	Sample characteristics	Scales used to measure beliefs or attitudes	Dependent variable: measure of CAM or HM use	Significant predictors	Other beliefs and attitudes (not found to be significant predictors)
O'Callaghan and Jordan, 2003 [38]	AUS	N = 171, adults (included first year psychology students)	Post-modern beliefs questionnaire [28]. Attitudes toward CAM questionnaire	How often they visited a CAM practitioner, included naturopathy* Attitudes toward CAM. *This study was included as prescription of herbal medicines is a core treatment of naturopathy in Australia	Predicted positive attitudes toward CAM, and CAM use: • Post-modern beliefs (full scale) • Rejection of authority (sub scale) • Natural remedies (sub scale)	Did not predict CAM use, or attitudes to CAM: • Individual responsibility (sub scale) • Holism (sub scale)
Paltiel et al., 2001 [39]	Israel	N = 1027, adults, diagnosed with cancer	Defined CAM as any therapy not included in the orthodox biomedical framework for the treatment of cancer	Ever used CAM (practitioner/ medicine not specified) since cancer diagnosis, and recent CAM use (last 3 months). Did not report regressions forever used CAM. *This study was included as prescription of herbal medicines is a core treatment of naturopathy in Israel	Predicted recent CAM use: • Feeling of helplessness • Conventional medical care does not meet needs • Lack of trust in medical doctor	
Shumay et al., 2002 [40]	Hawaii	N = 143, adults, cancer patients	Likert scale items measuring satisfaction with health care providers and treatments, and sources of information	Degree of CAM use	Predicted higher degree of CAM use: • Lower satisfaction with doctors • Lower health care satisfaction • Lower satisfaction with information	
Siahpush, 1998 [41]	AUS	N = 209, adults, regional areas	Post-modern beliefs scale (developed by author). Dissatisfaction with the medical encounter, and medical outcome, Likert scale items	Attitude to CAM, therapists and therapies	Predicted positive attitudes toward CAM: • Post modern beliefs (full scale) • Faith in natural remedies (sub scale) • Consumerist attitudes to health care (sub scale) • Anti-technology (sub scale) • Dissatisfaction with the medical encounter	Did not predict positive attitudes to CAM: • Need for individual responsibility (sub scale) • Rejection of authority (sub scale) • Dissatisfaction with the medical outcome • Holistic view of health (sub scale)
Siahpush, 1999 [28]	AUS	N = 787, adults, general population	Post-modern beliefs scale	Attitudes toward CAM (medicines and practitioners)	Predicted positive attitudes toward CAM: • Post modern beliefs (full scale) • Faith in natural remedies (sub scale) • Holistic view of health (sub scale) • Consumerist attitudes to health care (sub scale) • Need for individual responsibility (sub scale)	Did not predict positive attitudes to CAM: • Anti-science sentiments (sub scale) • Rejection of authority (sub scale) • Dissatisfaction with the medical outcome • Dissatisfaction with the medical encounter

Study	Country	Sample	Measures	Dependent variable	Predicted	Did not predict
Sirois and Gick, 2002 [33]	Canada	N = 199, adults visiting conventional and CAM health clinics	MHLC scale Doctor satisfaction questionnaire	Use of CAM therapies (practitioners) in the past year	Predicted CAM use: • Dissatisfaction with medical doctors (both treatment efficacy, and relationship with doctor)	Did not predict CAM use: • Health locus of control
Sirois, 2008 [42]	Multinational	N = 365, people with chronic illness (16 years and older)	Control Beliefs Inventory	Consultations with a CAM practitioner in the past 6 months	Predicted CAM use • Greater perceived health control	Did not predict CAM use • Chance health control
Steginga et al., 2004 [43]	AUS	N = 111, adult men with prostate cancer	MHLC scale	CAM use — current, 2 months following treatment, 12 months following treatment		Did not predict CAM use: • Health locus of control
Testerman, 2004 [44]	US	N = 230, outpatients from a family practice clinic (40–60 years of age, with osteoarthritis, depression or healthy)	MHLC scale Holistic beliefs (5-items, developed by Astin) Spirituality (5-items, Daily Spiritual Experiences subscale) Physician care satisfaction (10-items)	CAM use in the past two years. Included herbal medicine in the Food/Supplement category	Predicted CAM use: Holistic beliefs Spiritual beliefs	Did not predict CAM use: • Health locus of control Physician care satisfaction
Thomson et al., 2014 [45]	AUS	N = 1256, adults, general population	Questions developed in previous studies	Intention to use CAM (medicines and practitioners) before conventional medicine in the last 12 months	Predicted intention to use CAM: • Belief in personal control over health • Belief in spiritual experiences	Did not predict intention to use CAM: • Belief in religion

Note. AUS = Australia, US = United States of America, UK = United Kingdom, CAM = complementary and alternative medicine.

follow-up study Siahpush [28] found that neither dissatisfaction with the medical encounter, or dissatisfaction with the treatment outcome to predict attitudes to CAM once controlling for postmodern values. In addition, dissatisfaction with the medical encounter did not predict CAM use in a cohort of family clinic outpatients [44]. Similarly, attitudes toward doctors were not found to predict use of biologically based CAM therapies in adults with a self-reported health condition [30], and degree of trust in health provider was not found to predict CAM use in HIV patients [36]. Both negative attitudes [18], and skepticism toward conventional medicine did not predict CAM use in general population samples [18,34].

However, other studies demonstrate dissatisfaction with the medical encounter does predict CAM use [33,39,40], or attitudes to CAM [41]. In addition, three of these studies found dissatisfaction with the treatment outcome to predict positive attitudes to CAM [33,39,40]. However, these three studies involved clinical cohorts, such as cancer patients [39,40], and adults visiting health clinics [33]. This is an important consideration, as people are likely to have different treatment experiences depending on their health condition; for example, cancer treatments are often unpleasant (e.g. drug side effects, slow recovery). Therefore, it is understandable that people with cancer may seek out alternatives, or treatments that help manage the negative effects of cancer treatments. Based on these studies it appears that dissatisfaction with the medical encounter may be a more important predictor of CAM use than the treatment outcome in clinical groups, however the findings are inconclusive.

One study used a theoretical model of health behavior (Theory of Planned Behaviour) to identify beliefs and attitudes as predictors of intention to use herbal medicines [29]. In their study attitudes were formed from: behavioral beliefs (herbal medicine treatment outcome), control beliefs (perceive control over taking herbal medicines), and normative beliefs (salient beliefs about significant others). This study found that a positive *attitude to herbal medicine* was the only significant predictor of intention to use herbal medicines.

3.5. Control and empowerment beliefs and attitudes

Control and empowerment beliefs relate to the perceived control people have over their health care and medical treatments, and their need for involvement in decisions about health. Helplessness, personal control over health, rejection of authority, and desire for treatment information have been shown to predict either attitude toward CAM, intention to use CAM, or actual CAM use. It is suggested that CAM treatments allow a person to have greater control over their health because they promote empowerment of the individual [28]. This is the case if using herbal medicines, as they are widely available to the public either as products sold in retail or clinical environments, and information on how to use them is widely available. However, the research in this area has contradictory findings. See Table 5 for control and empowerment beliefs and attitudes found to predict positive attitudes toward CAM, intention to use CAM and actual CAM use.

Herbal medicine and other CAM philosophies encourage empowerment of the individual, and give a person greater involvement in their health care. Therefore, it is often hypothesized that users of CAM will have greater individual control over their health. *Personal control over heath* relates to a person's beliefs about control over their heath, such as health care provider control, internal control, and control over health outcomes [33]. Research in general population samples has found that people with a greater desire for control over their health [37,45], who believe in individual responsibility for health [28], intend to, and are more likely to use CAM [36,42]. This is a logical finding as it relates to the

Table 3
Belief systems predicting attitudes toward, or use of CAM.

Belief system	Dependent variable	Sample	Study
Postmodern philosophy	Attitudes toward CAM	Adults, general population (AUS)	[28,38,41]
Holism	CAM use	Adults, general population (US)	[18]
		Adults, 40–60 years of age (US)	[44]
	CAM use (future)	Adults, graduate psychology students (US)	[37]
	Attitudes toward CAM	Adults, general population (AUS)	[28]
	CAM use (current)	Adults, general population with current health problem (International, predominately UK and US)	[30]
Cultural creative	CAM use	Adults, general population (US)	[18]
Philosophical congruence with CAM	CAM use (past and future)	Adults, graduate psychology students (US)	[37]
Spirituality	Intention to use CAM (before conventional medicine)	Adults, general population (AUS)	[45]
	CAM use	Adults, 40–60 years of age (US)	[44]
Anti-technology	Attitudes toward CAM	Adults, general population (AUS)	[41]

Table 4
Treatment beliefs and attitudes predicting positive attitudes toward CAM, intention to use CAM, or CAM use.

Treatment belief or attitude	Dependent variable	Sample	Study
Faith in natural treatments	Attitudes toward CAM	Adults, general population (AUS)	[28,38,41]
	CAM use		[38]
Dissatisfaction with medical encounter	CAM use	Adult, health clinic patients (Canada)	[33]
	CAM use (higher degree of)	Adult cancer patients (Hawaii)	[40]
	CAM use (recent)	Adults, cancer patients (Israel)	[39]
	Attitudes toward CAM	Adults, general population (AUS)	[41]
Dissatisfaction with treatment outcome	CAM use (recent)	Adults, cancer patients (Israel)	[39]
	CAM use (degree off)	Adults, cancer patients (Hawaii)	[40]
	CAM use (past 12 months)	Adult, health clinic patients (Canada)	[33]
Treatment choice	Attitudes toward CAM	Adults, general population (AUS)	[28,41]
Attitudes toward herbal medicines	Intention to use herbal medicines	Older adults (65 years and older) (US)	[29]

aforementioned philosophy of CAMs (e.g. personal empowerment). However, the majority of studies have found that neither perceived control over health, chance control over health, need for control over health, or belief in the importance of health treatment participation predicted intention to use herbal medicines [29], or the use of CAMs [18,30,33,42–44]. These studies involved a range of different cohorts. While there is no obvious reason these findings are inconsistent with the empowerment philosophy of CAM, a possible contributing factor is that some people do not have herbal medicine or other CAMs as a treatment option for their specific condition.

Dissatisfaction with information about health care and treatment options has been shown to predict CAM practitioner use [36], and a greater amount of CAM use compared to those who are satisfied with information [40]. This finding may relate to being dissatisfied with the medical encounter – health practitioners may not be providing patients with enough information about their health care. Only one study was identified that explored the role of *helplessness*, and found that the belief that a person's health situation is helpless predicted CAM use in cancer patients [39], which suggests a need to feel more empowered about their health care. In addition, the same study found that optimistic beliefs about the future did not predict CAM use. These two beliefs were not explored in other cohorts, therefore, this may be due to the unique situation of cancer patients and may not be found in those experiencing anxiety.

Rejection of authority is a belief related to post-modern values, in which people reject the health practitioner as being the authority over their health care, and having a desire for greater involvement in decision-making about their health [28]. This belief has been explored in three studies; two found rejection of authority to predict positive attitudes to CAM [28,38], while the other did not [41]. In addition, one study found rejection of authority to predict actual CAM use [38]. Rejection of authority is a belief related to empowerment as people are seeking to be part of their health care decision-making process. Therefore, it is unsurprising that those with positive attitudes to CAM want more involvement in their health care.

Table 5
Control and empowerment beliefs and attitudes predicting positive attitudes toward, intention to use, or actual use of CAM.

Treatment belief	Dependent variable	Sample	Study
Helplessness	CAM use (recent)	Adults, cancer patients (Israel)	[39]
Rejection of authority	Attitudes toward CAM	Adults, general population (AUS)	[28,38]
	CAM use		[38]
Dissatisfaction with information	Higher degree of CAM use	Adult cancer patients (Hawaii)	[40]
	CAM use (previous 6 months)	Adults, HIV patients (US)	[36]
Personal control over health	Attitudes toward CAM	Adults, general population (AUS)	[28]
	CAM use (previous 6 months)	Adults, HIV patients (US)	[36]
	CAM use	People with chronic illness 16 years and older (Multinational)	[42]
	Intention to use CAM	Adults, general population (AUS)	[45]
	CAM use (future)	Adults, graduate psychology students (US)	[37]

4. Discussion

This review found that the prevalence of herbal medicine use in people experiencing anxiety ranged from 2.39% (CAM use including herbal medicine in general population) to 22% (adults with an anxiety disorder) across four countries (Australia, Finland, Turkey, and the US). The wide variation in prevalence is likely to be related to differences between countries, type and size of cohort, and the way in which herbal medicine use and anxiety were measured. In these studies herbal medicine use was self-reported using different time frames (i.e. current use, 1, 3, 6 and 12 months), which is difficult to compare between studies. In most studies higher prevalence of use was found in people with anxiety disorders compared to those without a diagnosis [23]. Of those with an anxiety disorder diagnosis, people with GAD had the highest rates of herbal medicine use [16,23]. This may be due to people with GAD often having comorbid conditions with poorer physical and mental health, and being high users of health services [26].

A number of beliefs and attitudes were found to predict attitudes to and use of CAM and herbal medicines. However, the explained variance accounted for by the predictors was generally small, which indicates there are other important factors involved in predicting herbal medicine use behavior. Some studies found demographic variables such as having a higher level of education [18,28], and being female [42] explained some of the additional variance, but other factors involved remain to be determined. The predictors identified suggest that herbal medicine users are more likely to have a post-modern philosophy with beliefs in holism, have faith in natural treatments, be dissatisfied with their medical encounter, and believe in having greater control over their health. These attributes are not surprising given that the philosophy of herbal medicine includes an emphasis on holism and empowerment [46]. Stronger conclusions could be drawn from this body of research if there was more consistent use of assessment tools, in particular the measure of anxiety and herbal medicine use. Many studies reported using unvalidated self-report measures, such that one substantial but simple improvement could be the adoption of validated measures.

One factor driving the use of herbal medicine may be that patients with anxiety disorders have been shown to have barriers to professional treatment (e.g. cost and lack of time) [48]. Herbal medicines are more affordable, easily accessed and self-prescribed. It could be that anxious people with a high desire for control over their health perceive they have a greater sense of control when taking herbal medicines as they can self-prescribe, and the perception of having control reduces their anxiety. Alternatively, they may perceive they have less control taking prescribed pharmaceuticals, for example, selective serotonin reuptake inhibitors may worsen anxiety symptoms (i.e. anxiogenic reaction) in the initial treatment phase, and benzodiazepines may have unwanted side-effects, such as difficulty concentrating and memory impairment [49]. Hence, if these people are dissatisfied with the medical encounter (as they come away perceiving to have less control), or the treatment outcome, they seek out ways to regain the control they desire [50], which may be achieved through using herbal medicines. In addition, when anxiety symptoms are more severe there is a reduced sense of control [50] and people with anxiety may seek treatments that are easily accessed to regain control and reduce their symptoms. Therefore, personal control over health, satisfaction with the medical encounter and treatment outcome may be important predictors of herbal medicine use in adults with anxiety, and may help explain why those with more severe anxiety are using more herbal medicines. This is an important area for future research.

It is important to note that the majority of studies reviewed in this article measured herbal medicine use within the umbrella of CAM. Future research on beliefs and attitudes needs to focus on herbal medicine use in its own right, as CAM is too broad a term that includes a range of different modalities that have varying types of application (e.g. manual, energetic, and biological), and levels of evidence. Herbal medicine is a biological therapy with a growing body of research evidence, a long history of traditional use, and high usage rates, which contrasts with other CAM modalities such as reiki that have little research evidence, and much lower usage rates [51]. It is likely that that beliefs and attitudes to specific CAM treatments will differ [19].

Future research should determine whether or not people experiencing anxiety are benefiting from herbal medicines, and whether or not they are using them safely. This is particularly important in people with anxiety disorders, as they are more at risk of having adverse reactions due to herb-drug interactions, or not receiving effective treatment. Clinicians need to be aware of this and counsel patients on the importance of discussing their herbal medicine use with health care providers in order to receive safe and effective treatment for their anxiety. In addition, there needs to be an understanding of the beliefs and attitudes that predict herbal medicine use so health practitioners can discuss treatment options and help guide people to make the best decisions for treatment of their anxiety. Therefore, we can use the information presented to guide future research so we can better understand how and why people are making the choice to use these medicines.

5. Conclusion

This is the first known study to: review the prevalence of herbal medicine use in adults experiencing anxiety, identify the beliefs and attitudes found to predict their intention to use herbal medicines, and provide a critical analysis and synthesis of this research. Up to 22% of adults with an anxiety disorder have been found to use herbal medicines, and those with a GAD diagnosis are higher users than those without this diagnosis. It is hypothesized that personal control over health, satisfaction with the medical encounter and treatment outcome may be important predictors of herbal medicine use in adults with anxiety, and may help explain why those with more severe anxiety are using more herbal medicines. This is an important area for future research. While the findings indicate that herbal medicines are being used to treat anxiety symptoms, more research is needed. Future research on herbal medicine prevalence in adults with anxiety needs to be valid and comparable using standardized definitions and measures [52], such as the International CAM Questionnaire (I-CAM-Q). However, the I-CAM-Q is designed to measure CAM use and not herbal medicine use specifically. Similar questionnaires that specifically measure herbal medicine use are needed. The studies discussed that explored predictors of herbal medicine use focused on a range of cohorts other than adults with anxiety. However, these findings can be used to inform future research in order to understand the unique beliefs and attitudes to herbal medicine use in adults experiencing anxiety.

Conflict of interest statement

The authors have no conflict of interest related to this article.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at doi:10.1016/j.aimed.2015.04.002.

References

[1] Kessler RC, Petukhova M, Sampson NA, Zaslavsky AM, Wittchen H-U. Twelve-month and lifetime prevalence and lifetime morbid risk of anxiety and mood disorders in the United States. Int J Methods Psychiatr Res 2012;21(September (3)):169–84.

[2] Slade T, Johnston A, Oakley Browne MA, Andrews G, Whiteford H. 2007 National Survey of Mental Health and Wellbeing: methods and key findings. Aust N Z J Psychiatry 2009;43(July (7)):594–605.

[3] Grenier S, Préville M, Boyer R, O'Connor K, Béland S-G, Potvin O, et al. The impact of DSM-IV symptom and clinical significance criteria on the prevalence estimates of subthreshold and threshold anxiety in the older adult population. Am J Geriatr Psychiatry 2011;19(April (4)):316–26.

[4] Kessler RC, Wittchen H-U. Patterns and correlates of generalized anxiety disorder in community samples. J Clin Psychiatry 2002;63:4–10.

[5] Baldwin DS, Waldman S, Allgulander C. Evidence-based pharmacological treatment of generalized anxiety disorder. Int J Neuropsychopharmacol 2011;14(June (5)):697–710.

[6] Mitte K. Meta-analysis of cognitive-behavioral treatments for generalized anxiety disorder: a comparison with pharmacotherapy. Psychol Bull 2005;131(September (5)):785–95.

[7] Halberstein RA. Medicinal plants: historical and cross-cultural usage patterns. Ann Epidemiol 2005;15(October (9)):686–99.

[8] Zhang AL, Story DF, Lin V, Vitetta L, Xue CC. A population survey on the use of 24 common medicinal herbs in Australia. Pharmacoepidemiol Drug Saf 2008;17(October (10)):1006–13.

[9] Posadzki P, Watson LK, Alotaibi A, Ernst E. Prevalence of herbal medicine use by UK patients/consumers: a systematic review of surveys. Focus Altern Complement Ther 2013;18(1):19–26.

[10] Thompson P, Jones J, Evans J, Leslie SJ. Factors influencing the use of complementary and alternative medicine and whether patients inform their primary care physician. Complement Ther Med 2012;20:45–53.

[11] Wu C-H, Wang C-C, Kennedy J. Changes in herb and dietary supplement use in the U.S. adult population: a comparison of the 2002 and 2007 National Health Interview Surveys. Clin Ther 2011;33(November (11)):1749–58.

[12] Williamson EM. Synergy and other interactions in phytomedicines. Phytomedicine 2001;8(September (5)):401–9.

[13] Sarris J, McIntyre E, Camfield DA. Plant-based medicines for anxiety disorders, part 1: a review of preclinical studies. CNS Drugs 2013;27(March (3)):207–19.

[14] Sarris J, McIntyre E, Camfield DA. Plant-based medicines for anxiety disorders, part 2: a review of clinical studies with supporting preclinical evidence. CNS Drugs 2013;27(April (4)):301–19.

[15] Sarris J, Panossian A, Schweitzer I, Stough C, Scholey A. Herbal medicine for depression, anxiety and insomnia: a review of psychopharmacology and clinical evidence. Eur Neuropsychopharmacol 2011;21(12):841–60.

[16] Ravven SE, Zimmerman MB, Schultz SK, Wallace RB. 12-month herbal medicine use for mental health from the National Comorbidity Survey Replication (NCS-R). Ann Clin Psychiatry 2011;23(2):83–94.

[17] Roy-Byrne PP, Bystritsky A, Russo J, Craske MG, Sherbourne CD, Stein MB. Use of herbal medicine in primary care patients with mood and anxiety disorders. Psychosomatics 2005;46(March (2)):117–22.

[18] Astin JA. Why patients use alternative medicine: results of a national study. JAMA. Am Med Assoc 1998;279(May (19)):1548–53.

[19] Bishop FL, Yardley L, Lewith GT. A systematic review of beliefs involved in the use of complementary and alternative medicine. J Health Psychol 2007;12(November (6)):851–67.

[20] Spinks J, Hollingsworth B. Policy implications of complementary and alternative medicine use in Australia: data from the National Health Survey. J Altern Complement Med 2012;18(April (4)):371–8.

[21] Parslow RA, Jorm AF. Use of prescription medications and complementary and alternative medicines to treat depressive and anxiety symptoms: results from a community sample. J Affect Disord 2004;82(1):77–84.

[22] Bahceci B, Bagcioglu E, Öztürk A, Bulbul F, Sahiner IV, Tuncer BE, et al. Complementary and alternative medicine use in patients with mental disorders in Turkey. Complement Ther Clin Pract 2013;19(November (4)):221–6.

[23] Bystritsky A, Hovav S, Sherbourne C, Stein MB, Rose RD, Campbell-Sills L, et al. Use of complementary and alternative medicine in a large sample of anxiety patients. Psychosomatics 2012;53(May (3)):266–72.

[24] Gardiner P, Graham R, Legedza ATR, Ahn AC, Eisenberg DM, Phillips RS. Factors associated with herbal therapy use by adults in the United States. Altern Ther Health Med 2007;13(March (2)):22–9.

[25] Wahlström M, Sihvo S, Haukkala A. Use of mental health services and complementary and alternative medicine in persons with common mental disorders. Acta Psychiatr Scand 2008;118(1):73–80.

[26] Hunt C, Slade T, Andrews G. Generalized anxiety disorder and major depressive disorder comorbidity in the National Survey of Mental Health and Well-Being. Depress Anxiety. Wiley Online Library 2004;20(1):23–31.

[27] Caumo W, Levandovski R, Hidalgo MPL. Preoperative anxiolytic effect of melatonin and clonidine on postoperative pain and morphine consumption in patients undergoing abdominal hysterectomy: a double-blind, randomized, placebo-controlled study. J Pain 2009;10(January (1)):100–8.

[28] Siahpush M. Why do people favour alternative medicine? Aust N Z J Public Health 1999;23(June (3)):266–71.

[29] Gupchup GV, Abhyankar UL, Worley MM, Raisch DW, Marfatia AA, Namdar R. Relationships between Hispanic ethnicity and attitudes and beliefs toward herbal medicine use among older adults. Res Soc Adm Pharmacy 2006;2(June (2)):266–79.

[30] Bishop FL, Yardley L, Lewith GT. Why do people use different forms of complementary medicine? Multivariate associations between treatment and illness beliefs and complementary medicine use. Psychol Health Routledge 2006;21(February (5)):683–98.

[31] Zeilmann CA, Dole EJ, Skipper BJ, McCabe M, Dog TL, Rhyne RL. Use of herbal medicine by elderly Hispanic and non-Hispanic white patients. Pharmacotherapy 2003;23(4):526–32.

[32] Fishbein M, Ajzen I. In: Fishbein M, Ajzen I, editors. Belief, attitude, intention and behavior: an introduction to theory and research. 1st ed., Reading, MA: Addison-Wesley Publishing Company; 1975.

[33] Sirois FM, Gick ML. An investigation of the health beliefs and motivations of complementary medicine clients. Soc Sci Med 2002;55(6):1025–37.

[34] Furnham A. Does experience of the occult predict use of complementary medicine? Experience of, and beliefs about, both complementary medicine and ways of telling the future. Complement Ther Med 2000;8(December (4)):266–75.

[35] Hildreth KD, Elman C. Alternative worldviews and the utilization of conventional and complementary medicine. Sociol Inq 2007;77(January (1)):76–103.

[36] London AS, Foote-Ardah CE, Fleishman JA, Shapiro MF. Use of alternative therapists among people in care for HIV in the United States. Am J Public Health 2003;93(June (6)):980–7.

[37] McFadden KL, Hernández TD, Ito TA. Attitudes toward complementary and alternative medicine influence its use. Explore 2010;6(November (6)):380–8.

[38] O'Callaghan FV, Jordan N. Postmodern values, attitudes and the use of complementary medicine. Complement Ther Med 2003;11:28–32.

[39] Paltiel O, Avitzour M, Peretz T, Cherny N, Kaduri L, Pfeffer RM, et al. Determinants of the use of complementary therapies by patients with cancer. J Clin Oncol 2001;19(May (9)):2439–48.

[40] Shumay DM, Maskarinec G, Gotay CC, Heiby EM, Kakai H. Determinants of the degree of complementary and alternative medicine use among patients with cancer. J Altern Complement Med 2002;8(October (5)):661–71.

[41] Siahpush M. Postmodern values, dissatisfaction with conventional medicine and popularity of alternative therapies. J Sociol 1998;34(1):58–70.

[42] Sirois FM. Provider-based complementary and alternative medicine use among three chronic illness groups: associations with psychosocial factors and concurrent use of conventional health-care services. Complement Ther Med 2008;16(April (2)):73–80.

[43] Steginga SK, Occhipinti S, Gardiner RAF, Yaxley J, Heathcote P. A prospective study of the use of alternative therapies by men with localized prostate cancer. Patient Educ Couns 2004;55(October (1)):70–7.

[44] Testerman JK, Morton KR, Mason RA, Ronan AM. Patient motivations for using complementary and alternative medicine. J Evid-Based Complement Altern Med 2004;9(April (2)):81–92.

[45] Thomson P, Jones J, Browne M, Leslie SJ. Why people seek complementary and alternative medicine before conventional medical treatment: a population based study. Complement Ther Clin Pract 2014;20(November (4)):339–46.

[46] Jagtenberg T, Evans S. Global herbal medicine: a critique. J Altern Complement Med 2003;9(April (2)):321–9.

[47] Zinnbauer BJ, Pargament KI, Cole B, Rye MS, Butter EM, Belavich TG, et al. Religion and spirituality: unfuzzying the fuzzy. J Sci Study Relig 1997;36(4):549.

[48] Prins MA, Verhaak PFM, Bensing JM, van der Meer K. Health beliefs and perceived need for mental health care of anxiety and depression — The patients' perspective explored. Clin Psychol Rev 2008;28(July (6)):1038–58.

[49] Baldwin DS, Anderson IM, Nutt DJ, Bandelow B, Bond A, Davidson JRT, et al. Evidence-based guidelines for the pharmacological treatment of anxiety disorders: recommendations from the British Association for Psychopharmacology. J Psychopharmacol 2005;19(November (6)):567–96.

[50] Moulding R, Kyrios M. Anxiety disorders and control related beliefs: the exemplar of Obsessive-Compulsive Disorder (OCD). Clin Psychol Rev 2006;26(September (5)):573–83.

[51] Frass M, Strassl RP, Friehs H, Müllner M. Use and acceptance of complementary and alternative medicine among the general population and medical personnel: a systematic review. Ochsner 2012;12(1):45–56.

[52] Fischer FH, Lewith G, Witt CM, Linde K, Ammon von K, Cardini F, et al. High prevalence but limited evidence in complementary and alternative medicine: guidelines for future research. BMC Complement Altern Med 2014;14(1):46.