Herbal medicine use in adults experiencing anxiety: Understanding a complex health behaviour

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Certificate of original authorship

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person nor material which to a substantial extent has been accepted for the award of any other degree or diploma at Charles Sturt University or any other educational institution, except where due acknowledgment is made in the thesis.

Any contribution made to the research by colleagues with whom I have worked at Charles Sturt University or elsewhere during my candidature is fully acknowledged. I agree that this thesis be accessible for the purpose of study and research in accordance with the normal conditions established by the Executive Director, Library Services or nominee, for the care, loan and reproduction of theses.

Signature

Erica Louise McIntyre
18 February 2016
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Statement of contributions to jointly authored works contained in this thesis and published works by the author contained in this thesis

Some of the results from the research in this thesis have been published in peer-reviewed journals. These manuscripts are presented in Chapters 2, 3 and 4. For the first paper in Chapter 2, I was responsible for conceptualising the paper, conducting the literature search, reviewing the literature, critically analysing the literature, and drafting the manuscript. For the manuscripts presented in Chapters 3 and 4, I was responsible for conceptualising the study, recruiting participants, collecting and analysing the data, and drafting the manuscript.

My supervisors Professor Anthony Saliba, Adjunct Professor Carmen Moran, Dr Karl Wiener, and Dr Jerome Sarris all provided support in the way of advice on research design and critical feedback on the manuscripts. The accuracy of the findings in each manuscript and the thesis are my responsibility.

Work published by the author incorporated into the thesis

http://www.biomedcentral.com/1472-6882/16/60


Relevant work published by the author not forming part of the thesis

Journal articles


Edited books

Book chapter

Published conference abstracts

List of abbreviations

ABS = Australian Bureau of Statistics
AHPRA = Australian Health Practitioner Regulation Agency
AMOS = Analysis of moment structures
ANOVA = Analysis of variance
AOR = Adjusted odds ratio
ARONAH = Australian Register of Naturopaths and Herbalists
CAM = Complementary and alternative medicine
CBT = Cognitive behavioural therapy
CFA = Confirmatory factor analysis
DASS = Depression Anxiety and Stress Scale
DSM = Diagnostic and Statistical Manual of Mental Disorders
EFA = Exploratory factor analysis
GAD = Generalised anxiety disorder
GABA = Gamma-aminobutyric acid
GP = General practitioner
ICD = International Classification of Diseases and Health-Related Problems
NMHWS = National Mental Health and Wellbeing Survey
OCD = Obsessive-compulsive disorder
PTSD = Post-traumatic stress disorder
RCT = Randomised controlled trial
SEM = Structural equation modeling
SNRIs = Serotonin noradrenaline reuptake inhibitors
SPSS = Statistical Package for the Social Sciences
SSRIs = Selective serotonin reuptake inhibitors
STAI = State-Trait Anxiety Inventory
TCM = Traditional Chinese medicine
TGA = Therapeutic Goods Administration
UK = United Kingdom
US = United States of America
WHM = Western herbal medicine
Abstract

Anxiety is a significant mental health problem in Australia, and Australians are high users of herbal medicines. Little is known about how adults experiencing anxiety are using herbal medicines in contemporary Australia. Therefore, the overall aims of this research are to describe the herbal medicine use behaviour of Australian adults who experience anxiety, explore their beliefs and attitudes to using herbal medicines, and identify the key predictors of intention to use herbal medicines for anxiety symptoms.

This research used a mixed-methods sequential exploratory design. First, a critical literature review was conducted with two aims: to identify the prevalence of herbal medicine use in adults with anxiety, and to identify the beliefs and attitudes that predict the intention to use herbal medicines or actual herbal medicine use behaviour. The prevalence of herbal medicine use in people experiencing anxiety ranged from 2.39% to 22% across four countries. A number of beliefs and attitudes were found to predict attitudes to and use of CAMs and herbal medicines.

Second, a qualitative study explored the beliefs and attitudes towards herbal medicine among adults who experienced anxiety. Using purposive sampling eight Australian adults with a subjective experience of anxiety who used herbal medicines were interviewed. Critical thematic analysis revealed three major themes: herbal medicines being different to pharmaceuticals, evidence and effectiveness, and barriers to herbal medicines. Findings informed the development of a quantitative questionnaire.

Third, a cross-sectional online survey was conducted. A questionnaire was developed that measured demographics, subjective experience of anxiety, herbal and pharmaceutical medicine use, communication with health care providers, information sources use, disclosure of herbal medicine use, and beliefs and attitudes to herbal medicine use. Two validated measures of anxiety were also used. Purposive criterion sampling was used to recruit adults representative of the Australian population who used herbal medicines and experienced anxiety (N = 400). Findings supported previous research that Australian adults are using herbal medicines to treat anxiety symptoms. They are consulting with a range of health practitioners; however, there were high rates of self-prescription of herbal medicines with many people not disclosing their herbal medicine use to doctors or other health professionals, and using non-professional information sources. People with an anxiety disorder diagnosis were more likely to use herbal medicines than those without, and those with more severe anxiety symptoms in
the previous week had greater current use of herbal medicines for anxiety symptoms compared to those with milder symptoms.

The theory of planned behaviour was used to develop a hypothesised theoretical model predicting the intention to use herbal medicines for anxiety symptoms that was tested using structural equation modeling. The model was supported and demonstrated that attitudes to herbal medicines, subjective norms, control beliefs, and anxiety symptoms were significant predictors of intention to use herbal medicines for anxiety symptoms.

The research findings provide an understanding of herbal medicine use behaviour in adults who experience anxiety that has implications for conventional and non-conventional health practitioners who treat anxiety, people with anxiety symptoms who use herbal medicines, policy makers in the area of herbal medicine regulation, and will guide future research.
Chapter 1
Herbal medicine use in adults who experience anxiety:
Introduction to the research

This chapter provides an overview of the aims and scope of the thesis including a clear statement of the research objectives, research questions, an outline of the thesis structure, and explains the researcher’s position. This chapter also provides an overview of anxiety in the modern world, the background to herbal medicine use for anxiety symptoms, discusses public health implications of using herbal medicines for anxiety symptoms, and introduces health behaviour theory in the context of this thesis. Finally, it describes the research design.

1.1. Aims and scope of thesis

1.1.1. Research aim
The overall aim of this research is to describe the herbal medicine use behaviour of Australian adults who experience anxiety, explore their beliefs and attitudes to using herbal medicines, and identify the key predictors of intention to use herbal medicines for anxiety symptoms.

1.1.2. Research objectives
This research had five main objectives:
1. To describe how adults who experience anxiety use herbal medicines.
2. To explore how adults who experience anxiety make decisions about herbal medicine use.
3. To explore the beliefs and attitudes towards herbal medicine of adults who experience anxiety.
4. To identify the key predictors of herbal medicine use for anxiety symptoms.
5. To develop and test a theoretical model of health behaviour that explains why adults who experience anxiety intended to use herbal medicines.

1.1.3. Research questions
In order to address the above objectives this thesis will answer six research questions:
1. What is the prevalence of herbal medicine use by adults who experience anxiety?
2. What are the beliefs and attitudes towards herbal medicines held by adults who experience anxiety?
3. What is the herbal medicine use behaviour of adults who experience anxiety?
4. How are people who experience anxiety making decisions about herbal medicine use; what information sources do they use, and do they consult with health practitioners?
5. Does anxiety symptom severity influence herbal medicine use for anxiety symptoms?
6. What factors predict the intention to use herbal medicines for anxiety symptoms in adults who experience anxiety?

1.1.4. **Significance and scope of thesis**

There is a high incidence of anxiety experienced in Australia (R. C. Kessler, Petukhova, Sampson, Zaslavsky, & Wittchen, 2012; T. Slade, Johnston, Oakley Browne, Andrews, & Whiteford, 2009b), and a high prevalence of herbal medicine use (P. Thompson, Jones, Evans, & Leslie, 2012). However, little is known about how adults with anxiety are using herbal medicines, and how they make their treatment decisions. The current research is significant as it seeks to understand and describe herbal medicine use in adults who experience anxiety. Understanding this health behaviour will inform health practitioners of the motivating factors for herbal medicine use, guide patient and public education about safe and effective use of these medicines, inform policy makers, and guide future research.

1.1.5. **Thesis structure**

This thesis is presented in a hybrid format (Sharmini, Spronken-Smith, Golding, & Harland, 2014), including three journal publications that constitute Chapters 2, 3 and 4. The structure of the thesis is presented as follows:

Chapter 1 provides an overview of the aims, scope and structure of the thesis in addition to providing background information that informs subsequent chapters. Therefore, this chapter defines the key concepts covered in the thesis, and provides an overview of contemporary herbal medicine use in Australia, anxiety and evidence-based treatments, public health issues related to using herbal medicines for anxiety symptoms, and introduces health behaviour theory as used in the context of this thesis. The study design and methodology is also presented.
Chapter 2 reports the first phase of this research providing a critical review of the literature relating to the prevalence of herbal medicine use in adults with anxiety, and the beliefs and attitudes that predict the intention to use herbal medicines or herbal medicine use behaviour. This review has been published in the journal *Advances in Integrative Medicine*.

Chapter 3 presents the results from the second phase of the study, which is a qualitative study that explores the beliefs and attitudes towards herbal medicines of adults who have experienced anxiety. These results are presented in a manuscript that has been published in the *International Journal of Qualitative Studies on Health and Well-being*.

Chapter 4 presents the results of the first stage of the quantitative phase of the research, and describes how Australian adults who experience anxiety symptoms are using herbal medicines. In addition, it describes the role of anxiety as a predictor in herbal medicine use. The results from this chapter are published in the journal *BMC Complementary and Alternative Medicine*.

Chapter 5 describes the testing of a hypothesised model predicting the intention to use herbal medicines and the relations between attitudes, subjective norms, control beliefs, anxiety symptoms using a structural equation modeling analysis.

Chapter 6 integrates the research findings within the thesis and discusses the implications with relation to people who experience anxiety and use herbal medicines, health policy makers, and health practitioners. Finally, future directions for research are recommended and study limitations are discussed.

To be consistent in the formatting of the thesis the published manuscripts are reproduced in Chapters 2, and 4 as unedited versions of the published manuscripts. However, as the published manuscript from Chapter 3 was published in American English this manuscript has been edited to Australian English conventions to be consistent with the thesis presentation.

### 1.2. Anxiety in the modern world: an overview

This section reports the epidemiology of anxiety, defines the experience of anxiety, describes the core features of anxiety and anxiety disorder diagnosis categories, and outlines current treatments for anxiety. In addition, this section highlights the importance of identifying people with sub-threshold anxiety symptoms, as people without an anxiety disorder diagnosis can also experience distress and may need treatment.
1.2.1. Epidemiology of anxiety in Australia

Anxiety disorders are prevalent in Australia. Results from the latest National Mental Health and Wellbeing Survey (NMHWS) conducted in 2007 (T. Slade, Teesson, & Burgess, 2009a) found 26.3% of Australian adults had an anxiety disorder diagnosis in their lifetime, and 14.4% experiencing an anxiety disorder in the previous 12 months. Of those with a disorder in the previous 12 months 22.2% reported their level of impairment as being severe. Anxiety disorders have the highest 12-month prevalence of all classes of mental disorders, with females (17.8%) having a higher prevalence than males (10.8%; T. Slade et al., 2009a). Anxiety disorders in the NMHWS were determined using International Classification of Diseases and Health-Related Problems 10th Revision (ICD-10) criteria, and included generalised anxiety disorder (GAD), panic disorder, agoraphobia, obsessive-compulsive disorder (OCD), post-traumatic stress disorder (PTSD), and social phobia. The 12-month and lifetime prevalence rates for each anxiety disorder are presented in Table 1.1. Notably these prevalence rates exclude people with “sub-threshold anxiety”, which refers to problematic generalised anxiety symptoms experienced by people without an anxiety disorder diagnosis (Kanuri, Taylor, Cohen, & Newman, 2015).

Table 1.1.

<table>
<thead>
<tr>
<th>Disorder diagnosis</th>
<th>12-month</th>
<th>Lifetime</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social phobia</td>
<td>4.2%</td>
<td>8.4%</td>
</tr>
<tr>
<td>Post-traumatic stress disorder (PTSD)</td>
<td>4.4%</td>
<td>7.2%</td>
</tr>
<tr>
<td>Generalised anxiety disorder (GAD)</td>
<td>1.9%</td>
<td>6.1%</td>
</tr>
<tr>
<td>Obsessive-compulsive disorder (OCD)</td>
<td>2.7%</td>
<td>3.8%</td>
</tr>
<tr>
<td>Panic disorder</td>
<td>1.8%</td>
<td>3.5%</td>
</tr>
<tr>
<td>Agoraphobia</td>
<td>1.2%</td>
<td>2.3%</td>
</tr>
</tbody>
</table>

Note. Prevalence rates as reported by McEvoy et al. (McEvoy, Grove, & Slade, 2011). These prevalence rates were weighted against known Australian population estimates and benchmarked to state, part of state, age, sex, household composition, education level, and work force status. They differ from that reported by Slade et al., (2009c) who reported unweighted figures, which are less accurate as they may be biased dependent on sample characteristics.
In Australia the 2007 NMHWS reported the 12-month prevalence of GAD symptoms at 2.7% of the adult population (T. Slade et al., 2009c). This figure is similar to the USA, which is estimated to have a 12-month prevalence of 3.1% and lifetime prevalence of 5.7% for GAD (Katzman, 2009). Comparison of prevalence rates between countries needs to be considered cautiously, as prevalence rates are dependent on the population studied and diagnostic criteria used. It could be argued that there would be lower prevalence rates for GAD when the Diagnostic and Statistical Manual of Mental Disorders (4th ed.; DSM-IV) criteria was applied, as it is thought to identify a more severe form of GAD than the ICD-10 (G. Andrews, Anderson, Slade, & Sunderland, 2008). An important consideration is that a number of researchers are critical of the DSM-IV criteria and suggest that it excludes many individuals who have clinically significant anxiety (G. Andrews et al., 2010; Beesdo-Baum et al., 2011; Katzman, 2009). It needs to be noted that the updated DSM-V criteria was introduced in 2013 (Association, 2013); therefore, the prevalence literature discussed in this thesis has used criteria from previous editions of the DSM.

1.2.2. Defining the experience of anxiety

Anxiety has always been difficult to summarise absolutely, as it has interacting physical, psychological, emotional, and cognitive components. Anxiety is considered to be an emotion related to fear, and is most frequently described as an emotional response that occurs when there is a dysfunctional reaction to a threat or stressor (Grös, Antony, Simms, & McCabe, 2007; Hoehn-Saric & McLeod, 2000). The complexity of anxiety is demonstrated by the diversity of symptoms, which can develop into clinical anxiety disorders, each of which have unique features. Dysfunctional anxiety causes distress for many people, and becomes a medicalised problem for people diagnosed with anxiety disorders; however, experiencing anxiety symptoms does not always lead to a disorder diagnosis. Many people who experience symptoms describe themselves as having “anxiety” (T. Slade & Andrews, 2001) and normalise the symptoms they experience even though they may be experiencing significant distress (Reavley & Jorm, 2011).

The diagnosis of an anxiety disorder is dependent on how the symptoms manifest in each person, and on the classification system used (G. Andrews et al., 2008; T. Slade & Andrews, 2001). In the English-speaking world, there are two classification systems used to diagnose anxiety disorders: the ICD, and the DSM; each differ in their categorisation, description, and criteria for diagnosis. Anxiety disorders described by
these systems include specific phobias, agoraphobia, social phobia (social anxiety disorder), panic disorder, mixed anxiety and depressive disorder, separation anxiety disorder, GAD, PTSD, and OCD (Association, 2013; World Health Organization, 1993). Both of these classification systems are continually revised as new research comes to the fore. These classification systems assist researchers and clinicians in identifying people who have anxiety disorders, and enable clinicians to educate clients and provide appropriate treatment (G. Andrews et al., 2008). Anxiety disorders are considered to be dimensional in terms of symptom expression, being experienced as mild when a disorder is first expressed through to severe when symptoms are at their worst, and reducing to mild again with successful treatment (G. Andrews et al., 2008).

1.2.3. **Core anxiety symptoms**

Core anxiety symptoms are thought to occur on a continuum from normal to extremely severe (S. H. Lovibond & Lovibond, 1996). The anxiety symptoms experienced in people with anxiety disorders are at the severe end of the continuum for anxiety symptoms, with those not meeting the criteria for a disorder still experiencing aspects of distressing anxiety (T. Slade & Andrews, 2001). Anxiety symptoms may be both somatic (sweating, palpitations, nervousness, trembling, muscular tension) and cognitive (intrusive thoughts, irrational fears, and worry). Regardless of the diagnostic system used there will be individuals who do not meet criteria for an anxiety disorder but may still need treatment for anxiety (G. Andrews et al., 2010; Kanuri et al., 2015).

There is a dearth of research focusing on individuals with distressing anxiety symptoms who do not meet the criteria for a diagnostic category, as the majority of clinical trials are conducted using DSM criteria (Katzman, 2009). It is also argued that there is a need to identify those with moderate anxiety in order to prevent the development of more serious disorders, and to prevent comorbid conditions (such as depression) developing (Kanuri et al., 2015; R. C. Kessler & Wittchen, 2002). In order to include people who experience problematic anxiety symptoms but do not meet the criteria for a disorder, this thesis will use the definition of anxiety as described by Lovibond and Lovibond (1996), which includes autonomic arousal, skeletal muscle tension, situational anxiety, and subjective anxious affect; these are considered to be the core features of anxiety. This definition of anxiety is widely used, and operationalised with the anxiety sub scale of the Depression Anxiety and Stress Scale (DASS), which is a widely used self-report measure of depression, anxiety, and stress symptoms (S. H. Lovibond & Lovibond, 1996). The DASS has been demonstrated to have excellent
reliability, and excellent convergent validity with alternative measures of anxiety symptoms in both clinical and general population samples (Crawford & Henry, 2003; Crawford, Cayley, Lovibond, Wilson, & Hartley, 2011). Therefore, this thesis will focus on generalised anxiety as it encompasses the core features of problematic anxiety as defined by Lovibond and Lovibond (1996).

1.2.4. Conventional treatments for anxiety

Conventional treatment refers to methods or medications commonly used that have demonstrated efficacy in treating anxiety symptoms or specific anxiety disorders. These include both pharmacological and psychological evidence-based treatments. The two most commonly used treatments for generalised anxiety are cognitive behavioural therapies (CBTs) and pharmacotherapies. Both CBTs and pharmacotherapies have demonstrated efficacy in the treatment of GAD (Durham, 2007; Hofmann & Smits, 2008; Olatunji, Cisler, & Deacon, 2010a). These therapies act via different mechanisms; for example, CBTs focus on addressing dysfunctional cognitions and the resulting behaviours improving frontal control over the limbic system, which compares to pharmacotherapies that reduce activity in the limbic system by directly targeting neurotransmitter systems (Ganasen, Ipser, & Stein, 2010). The primary psychological component of GAD is uncontrollable, excessive and unspecific worry, which has been the focus of CBT (Katzman, 2009; Olatunji, Cisler, & Deacon, 2010a). In contrast, pharmacotherapies focus on the physiological components of generalised anxiety and address dysfunctional hormonal systems such as the gamma-aminobutyric acid (GABA), serotonergic, and noradrenergic systems (Katzman, 2009). Acute treatment of generalised anxiety focuses on relief of symptoms; however, the long-term goal is remission and prevention of reoccurrence of both the behavioural dysfunction and anxiety symptoms (Katzman, 2009). Generalised anxiety disorder is considered one of the most difficult anxiety disorders to treat given the fluctuating nature of the symptoms, and a lower treatment response compared to other anxiety disorders (Olatunji, Cisler, & Deacon, 2010a). This emphasises the importance of needing to identify people at risk of developing GAD who may be experiencing milder anxiety symptoms, and the need to understand health behaviours that put people at risk of receiving inadequate treatment such as self-prescribing herbal medicines for anxiety symptoms without seeking professional help.
1.2.5. **Pharmaceutical treatments for anxiety symptoms**

A number of pharmacological treatments have demonstrated efficacy in the treatment of generalised anxiety. These medications act on the GABA, serotonergic and noradrenergic systems, which all play a role in the regulation of the stress response with regards to processing anxiety responses (Katzman, 2009). Clinical guidelines for the treatment of anxiety are provided by a number of different international organisations such as the National Institute for Health and Clinical Excellence, and the World Federation of Societies of Biological Psychiatry (Katzman, 2009). The majority of these organisations recommend antidepressants as first line pharmacological treatments which include: paroxetine, escitalopram, sertraline (selective serotonin reuptake inhibitors: SSRIs), and venlafaxine (serotonin noradrenaline reuptake inhibitor: SNRI; Katzman, 2009).

The efficacy of benzodiazepines in treating GAD supports the theory that there is dysfunction in the GABAergic system (Katzman, 2009; Möhler, 2012). This dysfunction is also supported by research demonstrating a reduction in benzodiazepine receptors in those with GAD (Katzman, 2009). Benzodiazepines appear to exert their anxiolytic effect via mechanisms that correct decreases in benzodiazepine receptor binding and restore homeostasis to the GABAergic system (Haas, Shekhar, & Goddard, 2009). Despite their effectiveness, benzodiazepines have long-term side effects, and problems with dependence and withdrawal, which have been seen to occur after as little as 4 weeks (Katzman, 2009). Recent treatment guidelines suggest that benzodiazepines should not be used beyond 4 weeks of treatment (Katzman, 2009), and to be effective in GAD pharmacotherapy needs to be taken for at least 6 months following a treatment response (Baldwin, Woods, Lawson, & Taylor, 2011b). In addition, although they have demonstrated efficacy in clinical trials, many people diagnosed with GAD do not respond to benzodiazepine treatment (Baldwin et al., 2014). This has led to other better tolerated treatment options such as SSRIs and SNRIs (Baldwin et al., 2011b).

Although SSRIs and SNRIs are now considered the first choice of pharmacotherapy in GAD, they also have problems. Like benzodiazepines many people do not respond to these medications, with response rates between 60 and 75% for SSRIs (Baldwin et al., 2011b). In addition, SSRIs and SNRIs take between 2 to 4 weeks to begin to relieve anxiety symptoms, with significant improvement of symptoms occurring between 6 and 12 weeks (Katzman, 2009). As many as 30-60% of patients do not achieve a complete reduction of symptoms with these treatments and there remains a risk of relapse (Katzman, 2009). Adverse effects can also be a problem, including
sleep problems, nausea, headaches, weight gain, and sexual dysfunction (Haas et al., 2009). In addition, discontinuing treatment needs to be managed, as rapidly stopping treatment can lead to further adverse symptoms associated with withdrawal (Baldwin et al., 2011b; Katzman, 2009). It is not always possible to manage a gradual withdrawal as patients can decide to cease treatment on their own (Katzman, 2009). It is estimated that approximately two-thirds of GAD patients taking SSRIs will not fully recover (Katzman, 2009). There is disagreement over the length of pharmacotherapy treatment needed to prevent relapse of GAD symptoms. Evidence based guidelines suggest a minimum of 6 months of treatment; however, results of more recent research have suggested longer treatment may be more beneficial (Baldwin et al., 2011b). As discontinuation of pharmacotherapy is most frequently related to adverse effects (Olatunji, Cisler, & Tolin, 2010b) there is a need to find alternative treatments with similar benefits that are better tolerated in the long-term. This need for more treatment choices is further emphasised as some individuals have a lack of response to more than one class of drug (Katzman, 2009).

1.2.6. Psychological treatments for anxiety symptoms

The most widely studied psychological treatment for anxiety disorders is CBT (Hofmann, Asnaani, Vonk, Sawyer, & Fang, 2012), which are interventions that focus on empowering the individual to actively cope with stressful events, and to tolerate and accept anxiety symptoms (Durham, 2007). They are recognised as effective treatments for anxiety disorders, and can be delivered as either individual or group psychoeducational therapy (Mitte, 2005). Meta-analyses have consistently shown moderate to large effect sizes for CBT compared to controls in the treatment of anxiety disorders (Hofmann et al., 2012; Hofmann & Smits, 2008; Olatunji, Cisler, & Tolin, 2010b; Öst, 2008). However, the effect sizes for GAD specifically are considered to be small in comparison to other anxiety disorders (Olatunji, Cisler, & Tolin, 2010b), which confirms findings that GAD is particularly difficult to treat (Öst, 2008). Despite the effect sizes reported in these analyses, study results need to be interpreted cautiously as there are inconsistencies between studies with different combinations of cognitive and behavioural treatments used, and different types of controls and placebos used, making it difficult to compare studies and draw conclusions about efficacy (Hofmann & Smits, 2008).

In a review of meta-analyses on the efficacy of CBT, Hofmann and Smits (2008) suggested that although CBT is considered the gold standard psychological
intervention for the treatment of anxiety disorders, there are few studies considered to be high quality randomised placebo controlled trials. In their previous meta-analysis on CBT for adult anxiety disorders only two studies specifically investigated GAD, which when pooled found a medium effect size (Hedges’ g = 0.51) for the use of CBT on reducing anxiety symptom severity; however, it was not statistically significant. Although Hofmann and Smits (2008) suggest that CBT may not be as efficacious compared to other active treatments, this was not supported by Mitte (2005) who used less stringent inclusion criteria in their meta-analysis that compared CBT to pharmacological treatments in GAD. This analysis included 19 studies that used CBT to treat adults with a GAD diagnosis, and compared effects sizes to another 46 pharmacological trials. They found that all CBT studies included showed CBT to be more efficacious compared to controls in the treatment of GAD, with medium to large effect sizes. In addition, they compared dropout rates between CBT and pharmacotherapy and found CBT to have a significantly lower dropout rate than pharmacotherapy. It is likely that there is an increased dropout rate for pharmacotherapy studies due to the unwanted side-effects that patients can-not tolerate with these treatments (Baldwin et al., 2011b). Comparing pharmacotherapy studies with CBT studies is difficult as there are many methodological differences, such as differences in scales used to measure treatment response, and differences in placebos used (Mitte, 2005).

Despite the benefits of CBT reported in these studies Öst (2008) demonstrated that there has been no improvement in the efficacy of CBT in the treatment of GAD since research began in the 1970s despite the length of treatment and attrition rates gradually increasing over time. Attrition rates are reported at between 9 to 21% (S. Taylor, Abramowitz, & McKay, 2012). It is concerning that treatment outcomes have not improved in over 3 decades of research, which suggests that other treatment approaches need to be considered. In addition, there is still a significant proportion of people who do not have a clinically significant improvement in generalised anxiety symptoms (Öst, 2008), with non-responders reported to be between 34 to 36% (S. Taylor et al., 2012). Barriers to accessing CBT also need to be considered as many individuals do not have access to treatment as it requires ongoing face-to-face sessions with trained practitioners, which can be prohibitive due to cost, accessibility and availability (Katzman, 2009). In order to address this issue CBT has become available as an online treatment option and found to be effective in reducing anxiety symptoms (Mureșan & Montgomery, 2012; Spek et al., 2007); however, individuals without
Internet access or with poor computer literacy will not have online therapy as a treatment option.

1.2.7. Complementary and alternative medicine (CAM)

As described above conventional treatments are not always suitable or effective for people experiencing anxiety. There are a number of CAMs that are used to treat anxiety symptoms with varying levels of evidence of efficacy and traditional use. Complementary and alternative medicines are considered to be treatments (both products and services) that are used outside of mainstream health care systems (Wieland, Manheimer, & Berman, 2011). There are many theoretical and operational definitions of CAM, which creates confusion for the public, health professionals, and researchers. The Cochrane Collaboration has highlighted the importance of using a consistent operational definition of CAM to ensure consistency in research, as it is impossible to compare findings between CAM studies due to inconsistency in the treatments included in the definition (Wieland et al., 2011). The operational definition they adopted includes a long list of treatments that fall into five domains: whole medical systems (e.g. Western herbal medicine [WHM], and traditional Chinese medicine [TCM]), biological therapies (e.g. herbal medicines and nutritional supplements), mind-body therapies (e.g. yoga and meditation), manipulative and body-based therapies (e.g. massage and chiropractic), and energy medicine (e.g. reiki and acupuncture; Wieland et al., 2011). Herbal medicines are biological therapies that are incorporated into whole medical systems such as TCM and WHM, and are one of the most popular CAMs used in Australia (Thomson, Jones, Evans, & Leslie, 2012; Xue, Zhang, Lin, Da Costa, & Story, 2007).

1.3. An overview of herbal medicine

This section gives readers who are not familiar with herbal medicines an overview of the history of herbal medicines. The contemporary context of herbal medicine use in Australia is discussed in relation to how the public prescribes and accesses these medicines, and the risks associated with their use. Current evidence for the use of herbal medicines in the treatment of anxiety symptoms is discussed in addition to safety issues of herbal medicine use.

This thesis will use the definition of herbal medicine used by the World Health Organization (WHO, 2001, p. 4):
“Herbal medicines include herbs, herbal materials, herbal preparations and finished herbal products, that contain as active ingredients parts of plants, or other plant materials, or combinations.”

For the purpose of the research in this thesis herbal products refer to tablets, capsules, liquid extracts, teas, decoctions, creams and ointments.

1.3.1. A brief history of herbal medicine use

Herbal medicines are the oldest form of medicine and have been used throughout the world as a primary form of treatment in many different societies and cultures for 1000s of years. Archaeological evidence for the use of plants as medicines dates back to prehistoric times (Halberstein, 2005). Evidence of herbal medicine use has been found across the globe from 1000 to 3000 years ago in ancient cultures of Greece, Egypt, China, India, Tibet, Mexico and Central America (Halberstein, 2005). Within these ancient cultures plants were used to treat a variety of ailments ranging from digestive problems to respiratory infections. Mental health problems were also treated and their pharmacopeias included psychoactive herbal medicines (Halberstein, 2005).

Herbal medicines were eventually incorporated into complete medical systems by a number of cultures, some of which have been used for over 2000 years (Yu et al., 2006). These include TCM, traditional Japanese medicine, Ayurveda (traditional Indian medicine), Korean medicine, WHM, and naturopathy. While each of these traditional medicine systems have unique philosophical frameworks, they all maintain a holistic approach that considers dysfunction in the person as an individual and not only the disease they present with (Casey, Adams, & Sibbritt, 2007; Patwardhan, Warude, Pushpangadan, & Bhatt, 2005; Yu et al., 2006). This philosophy is a defining feature that differentiates the prescription of herbal medicines from pharmaceutical medicines (Jagtenberg & Evans, 2003). The importance of a holistic philosophy is extended to the way in which herbal medicines are used, emphasising the need to use the whole plant and not its isolated constituents. For example, the principle of vitalism underpins WHM philosophy, which relies on energetic principles and the belief in a life force that is essential for maintaining life and good health (Jagtenberg & Evans, 2003). This contrasts with the reductionist approach of pharmaceutical medicine in which a single constituent produces a desired effect to relieve a symptom (Williamson, 2001).

It was not until the 20th century that herbal medicines ceased to dominate therapeutic intervention in the Western world, following the introduction of modern pharmaceuticals and other therapeutic techniques. Herbal medicines have been critical in the development of pharmaceutical drugs, with as much as 25% of synthetic drugs...
being derived from plant constituents (Halberstein, 2005). For example, *Papaver somniferum* (poppy flower) is used for morphine and codeine, and digoxin (used for heart conditions) is derived from *Digitalis lanata* (foxglove; Halberstein, 2005). Despite the long history of traditional use of herbal medicines, they increasingly lost their popularity in the Western world with the continued development and treatment success of pharmaceutical drugs. However, their popularity gradually increased again late in the 20th century (Casey et al., 2007; MacLennan, Myers, & Taylor, 2006), as they became widely manufactured for commercial profit and aggressively marketed to consumers (Jagtenberg & Evans, 2003).

### 1.3.2. Herbal medicine in contemporary Australia

The way in which herbal medicines are used is considerably different in modern Australian society compared to traditional use in ancient and indigenous cultures. In Australia herbal medicines are commercialised and widely available to the public as over-the-counter supplements in supermarkets, pharmacies and health food stores (A. L. Zhang, Story, Lin, Vitetta, & Xue, 2008). Herbal medicine products are part of the natural medicine industry, which is a lucrative profit driven industry. It is estimated that in 2005 Australians spent $1.86 billion on CAM products (which include herbal medicines; Xue et al., 2007). Herbal medicines in modern Australia are primarily self-prescribed, with 52% of herbal medicine users in the general population (A. L. Zhang et al., 2008), and 80% of pregnant women (Frawley et al., 2015) reporting to have self-prescribed them. Reasons for high rates of self-prescribing are suggested to be related to a combination of factors including wanting autonomy over health (Thomson, Jones, Browne, & Leslie, 2014), beliefs that herbal medicines are natural and safe (A. L. Zhang et al., 2008), and herbal medicine products being easy to access.

In Australia herbal medicine users also consult health practitioners with specialised training in herbal medicine prescribing, with the most popular being TCM practitioners, Western herbalists, and naturopaths (A. L. Zhang et al., 2008). As described previously, each of these professions prescribe herbal medicines within a philosophical framework that is unique to their medical system; in addition, they are trained to manufacture their own medicines. These professions often prescribe herbal medicines in conjunction with other CAM treatments such as acupuncture, nutritional supplements, dietary and lifestyle advice.

Of the herbal medicine professions only TCM practitioners are regulated by federal law in Australia and registered with the Australian Health Practitioner...
Regulation Agency (AHPRA). The remaining herbal medicine professions are self-regulated, generally operating outside conventional health care (Lin et al., 2009). However, there has been continued lobbying from the WHM and naturopathy professions, and recommendations from key stakeholders outside the professions, for regulation to ensure minimum education standards, and to protect the public (Bodeker & Kronenberg, 2002; Lin et al., 2009; P. McCabe, 2005; Spinks & Hollingsworth, 2012; J. Wardle, Steel, & McIntyre, 2013). The professional associations are primarily responsible for ensuring minimum education and practice standards; however, their requirements and quality of process vary considerably (Lin et al., 2009). In an attempt to address these issues an Australian Register of Naturopaths and Herbalists (ARONAH) was created independent from the professional associations. This register reflects the requirements for the National Registration and Accreditation Scheme for health practitioners (see http://www.aronah.org/about-aronah, ARONAH, n.d.). However, it is a voluntary register, and has yet to receive the full support of the professions (J. Wardle et al., 2013).

Conventional health practitioners such as general practitioners are also prescribing herbal medicines such as St John’s wort for mild to moderate depression (Pirotta et al., 2010). As evidence of efficacy emerges for herbal medicines they are becoming adopted into conventional health care. However, the way in which conventional practitioners prescribe them can be significantly different from those with specialised training, as they as prescribing within the context of their profession’s philosophical paradigm (Pirotta et al., 2010).

1.3.3. Prevalence of herbal medicine use in Australia

The incidence of herbal medicine use in Australia has been continuing to grow steadily since the early 1990s. Herbal medicine use in Australia has been found to be as high as 37% of the adult population (P. Thompson et al., 2012). This is higher than other culturally similar Western countries such as the UK (31%; Posadzki, Watson, Alotaibi, & Ernst, 2013a), and the US (25%; Wu, Wang, & Kennedy, 2011). The prevalence of herbal medicine use in adults experiencing anxiety in Australia is unknown. However, two Australian studies reported herbal medicine use under the umbrella of CAM. Parslow and Jorm (2004) reported that in the previous month just over 2% of CAM users (including herbal medicine) took a CAM for anxiety symptoms. The amount of herbal medicine use in this study is likely to be under reported as participants were presented with a predetermined list of medicines. In the Australian
National Health Survey 2007/2008, 70.8% of people using oral CAMs (herbal medicines, vitamins, and minerals) had a mental health condition, which was a predictor of CAM use (Spinks & Hollingsworth, 2012). Prevalence rates of herbal medicine use for treating anxiety are discussed in detail in Chapter 2.

How herbal medicines are defined can vary, which has resulted in inconsistent measurement of herbal medicine use in research. For example, the drinking of herbal teas has become commonplace and it is likely that most people consider these teas to be a beverage for enjoyment as opposed to being consumed for medicinal purposes. However, herbal teas are widely marketed for their healing properties, with phrases like “sleepy time tea” used to indicate that the tea will provide a specific effect. Traditionally teas have been used as medicines, and this practice continues today; for example, Western herbalists prescribe herbal teas for medicinal effects (Casey et al., 2007). In addition, herbal medicines are sometimes confused with nutritional supplements (Roy-Byrne et al., 2005). It is possible that herbal medicine use is inaccurately reported as researchers are not providing clear definitions of herbal medicines, or are incorrectly describing them.

1.3.4. Herbal medicines for treating anxiety symptoms

There has been a long history of herbal medicine use for treating anxiety symptoms. The language and diagnostic criteria used to describe anxiety has changed over time; however, many cultures have continued using herbal medicines for anxiety symptoms, with an emerging body of research evidence for the efficacy of specific herbal medicines in the treatment of a range of anxiety symptoms and disorders. For example, clinical trials have demonstrated efficacy for *Piper methysticum* (kava) for treating generalised anxiety symptoms (Sarris, LaPorte, & Schweitzer, 2011a), with *Passiflora incarnata* (passionflower) and *Valeriana officinalis* (valerian) demonstrating acute anxiolytic effects (Sarris, McIntyre, & Camfield, 2013c). For comprehensive reviews of the preclinical and clinical evidence for herbal anxiolytics see Sarris, McIntyre and Camfield (2013b) and (2013c) respectively. Despite the evidence for these medicines effective doses are yet to be confirmed. In addition, the most effective extraction type and standardisation needs to be determined to ensure these medicines are phytoequivalent (Sarris et al., 2013c).

While a number of herbal medicines have demonstrated anxiolytic effects in both animal studies and clinical trials, the mechanism of action for many of these herbs remains unclear. Individual constituents have been found to act in a variety of ways,
with the most common effects being on the GABA system (Sarris et al., 2013b). Alternatively, for example, in the case of *Rhodiola rosea* the anxiolytic effects appear to occur through regulation of the stress response via the hypothalamic-pituitary-adrenal axis (Sarris et al., 2013b). The range of constituents in herbal medicines also results in each plant exhibiting a range of biological activities (J. Zhang, Wider, Shang, Li, & Ernst, 2012a). Therefore, herbal anxiolytics can have several primary physiological effects (e.g. *Passiflora incarnata* is anxiolytic, antispasmodic, and anodyne; Felter & Lloyd, 1898; The British Herbal Medicine Association, 1983) in addition to secondary indirect effects such as increased absorption (Williamson, 2001). This is considered beneficial when treating complex symptomatology such as anxiety, as specific herbal medicines can be used that address each individual’s unique symptoms. However, the use of the whole plant has been criticised as a “shot-gun” approach as it is difficult to determine the exact mechanism of action, which compares to the targeted “silver bullet” approach of pharmaceuticals that act on specific biological targets within body systems (Williamson, 2001).

### 1.3.5. Safety of herbal medicines used for anxiety symptoms

There are a number of issues related to herbal medicine use relating to direct and indirect risks, including: self-prescription, non-disclosure to health professionals, and concurrent use with pharmaceutical medicines. However, compared to pharmaceutical anxiolytics herbal medicines are considered to be relatively safe, as they are better tolerated with fewer side-effects (Sarris et al., 2013c). It is argued that use of the whole plant, which includes dozens of active constituents, has a synergistic effect, which is preferable as it has fewer side effects and can have greater activity (Gilbert & Alves, 2003; Williamson, 2001).

Inappropriate self-prescription of herbal medicines has direct risks related to potentially ineffective treatment, incorrect dosing, use of poor quality medicines, and herb-drug interactions (J. J. L. Wardle & Adams, 2014). For example, one US study found that approximately half the herbal medicine users used these medicines contrary to their evidence-based indications (Bardia, Nisly, Zimmerman, Gryzlak, & Wallace, 2007). In addition, 36% of primary care patients with mood or anxiety disorders who were taking herbal medicines for anxiety symptoms took them concurrently with prescribed psychotropic medicines (Roy-Byrne et al., 2005). Concurrent use has also been described in psychiatric patients (Alderman & Kiepfer, 2003), and more broadly in the general population (A. L. Zhang et al., 2008). This is extremely concerning as there
is a risk of herb-drug interactions (Posadzki, Watson, & Ernst, 2013b). For example, herbal anxiolytics may potentiate the effects of benzodiazepines and SSRIs (Posadzki et al., 2013b). In addition, some of these medicines interact with other types of commonly prescribed pharmaceuticals such as the oral contraceptive pill (Posadzki, Watson, & Ernst, 2013b), and the safety of long-term treatment in more chronic forms of anxiety is yet to be established (Sarris et al., 2013c). This risk is amplified if people do not disclose their herbal medicine use to their health practitioners. High rates of non-disclosure of herbal medicine use have consistently been reported in the literature in adults with anxiety (Alderman & Kiepfer, 2003; P. Gardiner et al., 2007), other at risk populations (Frawley, 2014; Shorofi & Arbon, 2010), and the general population (A. L. Zhang et al., 2008).

Safety related to poor quality products is of particular concern for people who are self-prescribing. Product quality is influenced by a range of factors such as variability in the plant material used due to growing conditions or manufacturing; contamination, adulteration or plant substitution; inconsistency of plant part used and standardisation of plant constituents; and the complexity of herbal formulas (J. J. L. Wardle & Adams, 2014; J. Zhang et al., 2012a). In Australia herbal medicine products are regulated by the Therapeutic Goods Administration who enforce good manufacturing practice, which aims to ensure quality of the plant materials used and the final product (Therapeutic Goods Administration, 2015). Therefore, herbal medicines manufactured in Australia are less likely to be affected by contamination or adulteration. China and India have been found to have the highest prevalence of contamination (J. Zhang et al., 2012a).

In order to mitigate these risks there first needs to be an understanding of the herbal medicine use behaviour of adults who experience anxiety.

1.4. **Herbal medicine use in adults experiencing anxiety:**

**A public health issue**

There are significant implications for public health if people experiencing anxiety do not receive adequate treatment. As reported in the NMHWS over 2.3 million Australians had an anxiety disorder in the previous 12 months in 2007, with an average of 4 days of being unable to perform their usual role in the previous month as a result of health problems (Slade et al., 2009a). In addition, 37.8% of these people used mental health services in the previous 12 months (Slade et al., 2009a). Many people with anxiety disorders have comorbid health conditions that can further increase their use of
general health services (T. Slade et al., 2009c). Combined these statistics present a large financial cost to Australian society. Therefore, having an understanding of specific health behaviours and beliefs and attitudes to treatments is essential to ensure that people receive adequate treatment for anxiety and to prevent the development of more serious anxiety disorders. Treatment decision-making for specific health problems such as anxiety is complex and is dependent on the level of health literacy a person has, which influences health behaviour and health service use (Sørensen et al., 2012). This section will define health behaviour; discuss the importance of health literacy, health information seeking, and shared decision-making as it relates to herbal medicine use in adults experiencing anxiety.

1.4.1. **What is health behaviour?**

This section provides a definition of health behaviour in order to establish the context for the research design. The following is a widely accepted definition of health behaviour developed by Gochman (1997, p. 3):

"those personal attributes such as beliefs, expectations, motives, values, perceptions, and other cognitive elements; personality characteristics, including affective and emotional states and traits; and overt behavior patterns, actions, and habits that relate to health maintenance, to health restoration, and to health improvement"

This definition incorporates three categories of health behaviour: preventative health behaviour, illness behaviour, and sick-role behaviour (Glanz, Rimer, & Viswanath, 2008b). Preventative health behaviour refers to actions performed by a person who perceives themselves to be healthy, in order to prevent illness. Illness behaviour refers to actions performed to determine a person’s state of health and suitable treatment by people who perceive themselves to be unwell. Sick-role behaviour refers to actions by a person who perceives they are unwell with the aim of getting well, which includes having treatment—usually by a health professional (Glanz et al., 2008b). All three categories of health behaviour are relevant to people experiencing anxiety, and herbal medicine users. Herbal medicine use is primarily associated with preventative and sick-role behaviours. However, people engaging in illness behaviour may be considering herbal medicines as a treatment option.

Being able to participate in positive health behaviours is dependent on a range of factors that include: individual factors (e.g. beliefs, values, personality, health literacy), interpersonal factors (e.g. social norms and social interactions), organisational factors (e.g. structure of health services), community factors (e.g. access to services),
and public policy factors (e.g. regulation of herbal medicines) (Glanz et al., 2008b). All these factors influence treatment decision-making, which results in a health behaviour such as using herbal medicines to either treat or prevent anxiety symptoms.

1.4.2. Health literacy

A person’s level of health literacy is influenced by their actual literacy and comprehension skills, health education, and the quality of health care experiences (Sørensen et al., 2012). There have been many definitions of health literacy provided in the literature. Following a comprehensive review of the literature defining health literacy, Sørensen and colleagues (2012) identified 17 different definitions of health literacy. Based on expert review of these they developed the following inclusive definition (p. 3):

“Health literacy is linked to literacy and entails people’s knowledge, motivation and competences to access, understand, appraise, and apply health information in order to make judgments and take decisions in everyday life concerning healthcare, disease prevention and health promotion to maintain or improve quality of life during the life course.”

Two types of health literacy are relevant to this thesis: herbal medicine health literacy, and mental health literacy; both of which are dependent on having adequate general health literacy. Having adequate herbal medicine literacy is important as it helps to ensure safe and effective use of these medicines (Shreffler-Grant, Nichols, Weinert, & Ide, 2013). Similarly, good mental health literacy ensures that people can identify specific mental health problems such as problematic anxiety symptoms and seek appropriate treatment (Coles & Coleman, 2010). Having good mental health literacy provides a greater likelihood of early safe and effective treatment for anxiety symptoms that may prevent more serious anxiety disorders developing (Coles & Coleman, 2010).

Currently little is known about the levels of herbal medicine literacy in the Australian population; until recently there has been no validated reliable way to measure this (Shreffler-Grant, Weinert, & Nichols, 2014); however, research suggests that herbal medicine users can have poor herbal medicine literacy. One Australian study found 62.6% of hospital surgical patients who used herbal medicines reported to have none to very little knowledge of the medicines they were using (Shorofi & Arbon, 2010). People have also been found to use herbal medicines contrary to their evidence-based indications (Bardia et al., 2007). Despite these findings herbal medicine use in adults with anxiety disorders (Roy-Byrne et al., 2005) and CAM use more broadly has been associated with higher levels of education (Xue et al., 2007), and people who are
more educated have better general health literacy, as it requires good basic literacy and comprehension skills (Sørensen et al., 2012). Complementary and alternative medicine health literacy is considered complex, requiring good general health literacy (Shreffler-Grant et al., 2014).

Little is known about the mental health literacy for anxiety disorders, with the majority of research focusing on depression and schizophrenia. Studies in college students in the US and UK found that there was varied rates of recognition of specific anxiety disorders, differing beliefs about the causes of each disorder, and a lack of understanding of when to seek treatment (Coles & Coleman, 2010; Furnham & Lousley, 2013). Both studies found that obsessive-compulsive disorder (OCD) was the most recognised disorder, whereas GAD and panic disorder were the least recognised. In addition, the US study found that there was a lack of recognition of the causes of specific anxiety disorders, with 61% of participants believing GAD to be stress related, and 50% believing GAD symptoms did not require treatment (Coles & Coleman, 2010). This compared to the majority believing OCD is caused by mental illness and needs treatment. The UK study also found that beliefs about treatment seeking varied across anxiety disorders; those with GAD and social phobia were believed to need the least amount of treatment (Furnham & Lousley, 2013). Only one Australian study in a general population sample has explored mental health literacy for anxiety disorders; however, only included PTSD and social phobia (Reavley & Jorm, 2011). This study found that only a third of participants recognised PTSD and 9.2% recognised social phobia. These findings help explain why many people with anxiety delay seeking treatment advice.

In addition, having poor knowledge of anxiety symptoms and disorders can result in incorrect symptom attribution (i.e. somatic not psychological) and to normalising symptoms, which has been found to predict non-diagnosis of anxiety disorders (D. Kessler, Lloyd, Lewis, & Gray, 1999). Therefore, it is possible that people are using herbal medicines for anxiety symptoms rather than seek conventional evidence-based treatments, as they believe their symptoms are relatively normal, and that herbal medicines are a suitable treatment.

1.4.3. Health information seeking

The quality of health information a person is exposed to is an important factor influencing health behaviour. Being able to access reliable and credible health information, and to accurately interpret health information is dependent on adequate
levels of health literacy. In addition, a person’s health literacy is influenced by the type of health information a person is exposed to (e.g. friends and family, Internet, health professionals; Sørensen et al., 2012). If a person is exposed to a poor source of health information their level of health literacy may be compromised, as health information influences a person’s beliefs and attitudes, and ultimately their health behaviour (e.g. treatment decisions; Shreffler-Grant et al., 2013).

People seek health information from a variety of sources, such as health practitioners, the Internet, friends and family, and magazines. Of these information sources the Internet has become a popular way to seek health information, as it offers convenience, autonomy, and large amount of health information (Cotten & Gupta, 2004). People who seek health information on the Internet do so to be more informed and better equipped to engage in self-care (Lee, Hoti, Hughes, & Emmerton, 2015). However, there are also disadvantages to sourcing health information online, as there can be too much information available that can be perceived as disorganised and difficult to navigate (Cotten & Gupta, 2004). In addition, as there is no regulation of health information on the Internet the quality of information is difficult to determine (Cotten & Gupta, 2004). One study reported over 70% of online health information seekers did not discuss health information sources with their health practitioner, as they were either embarrassed or did not think that their practitioner had time for the discussion, and over 50% did not want to upset their health practitioner (Lee et al., 2015).

It is particularly difficult to determine valid and reliable information about herbal medicine and CAM more generally on the Internet (J. J. L. Wardle & Adams, 2014). Research has shown enormous variability in the quality of information, with sites providing inaccurate or biased information, misleading claims, and a lack of information relating to safe use (Pilkington et al., 2011; J. J. L. Wardle & Adams, 2014). This is concerning as CAM users have been found to self-prescribe and use the Internet as an information source for their treatment decision-making (Frawley et al., 2014). The use of non-professional information sources more generally is associated with decision-making about CAM use, with people also relying on friends and family for information. One study on psychiatric patients found 40.7% used CAM based on recommendations from friends and family (Alderman & Kiepfer, 2003). Another recent study on Australian pregnant women found 43% used friends and family as a source of information about CAM use (Frawley et al., 2014).
It is important to understand how adults experiencing anxiety are seeking health information, as the information sources they are using may not be accurate or reliable. Consequently, people may be making poor decisions about treating anxiety symptoms.

1.4.4. Shared decision-making (SDM)

Shared decision-making is considered to be the ideal approach to ensuring optimal health and well-being for people with mental health problems (Australian Health Ministers' Advisory Council, 2013). However, SDM requires that the client is willing and able to participate in collaborative decision-making with a health practitioner, and come to a consensus decision about the treatment approach (Joosten et al., 2008). Therefore, adequate health literacy is needed to participate in SDM with health practitioners. Paradoxically, SDM can improve health literacy, as health practitioners are able to provide and discuss information about anxiety and treatment options with their clients (Joosten et al., 2008). The foundation of SDM relies on establishing a strong therapeutic relationship between a health practitioner and their client with a focus on patient-centered care (Joosten et al., 2008).

While SDM is the recommended approach to mental health care, evidence suggests that conventional health practitioners are not always effectively using SDM. For example, people with anxiety still perceive stigma towards mental health problems from GPs (S. Clement et al., 2014), and discrimination for their choice to use CAMs (Thorburn, Faith, Keon, & Tippens, 2013; Y. Zhang, Peck, Spalding, Jones, & Cook, 2012b). This is problematic as people report dissatisfaction with conventional health practitioners as a factor that pushes them towards CAM use (Paltiel et al., 2001; Shumay, Maskarinec, Gotay, Heiby, & Kakai, 2002; Sirois & Gick, 2002), or not disclosing their herbal medicine use due to concerns about negative reactions from health practitioners (Thomson et al., 2012; Y. Zhang et al., 2012b). For example, one study on Australian adults found that 40% of CAM users did not disclose their CAM use (Thomson et al., 2012). In addition, people have reported continuing to use herbal medicines after their GP disagreed with using them and stated they would not discuss this with them in future (Chen, Bernard, & Cottrell, 2000).

For SDM to be effective health practitioners need to have adequate knowledge about the conditions they are presenting with (i.e. anxiety) and the treatment options available, which include herbal medicines. People have reported that they do not disclose their herbal medicine use, as they perceive that GPs do not have adequate
knowledge about herbal medicines (Y. Zhang et al., 2012b). Research has supported this perception, with one study of Australian GPs (N = 1178) reporting that the majority of participants were not comfortable discussing CAMs (including herbal medicines) with their patients as they did not have sufficient knowledge about these medicines (Pirotta et al., 2010). In addition, one US study found that only 20% of GPs felt comfortable discussing herbal medicines with their patients; their level of comfort discussing these medicines varied depending on the specific herb being discussed which related to their level of knowledge about that specific herb (Y. Zhang et al., 2012b). If GPs do not have adequate knowledge about herbal medicines it is difficult for them to assist their clients with treatment decision-making if they are choosing to use herbal medicines.

1.5. **The use of theory in understanding herbal medicine use behaviour**

This section provides a discussion on health behaviour theory and its relevance to herbal medicine use behaviour. It argues for the need to use theory in order to explain and predict herbal medicine use behaviour, and provides a rationale for using the theory of planned behaviour (TPB) to understand herbal medicine use.

1.5.1. **The importance of theory**

While a number of studies have explored the psychosocial variables involved in herbal medicine use behaviour—more frequently under the umbrella of CAM—few have done so using a theoretical framework of health behaviour (Lorenc, Ilan-Clarke, Robinson, & Blair, 2009). The use of theory is important as it enables a deeper understanding of the role of variables that influence a health behaviour, and the process needed to change that behaviour if it is undesirable (Glanz, Rimer, & Viswanath, 2008a). Glanz and colleagues (2008a, p. 26) define theory as:

“A theory is a set of interrelated concepts, definitions, and propositions that present a systematic view of events or situations by specifying relations among variables, in order to explain and predict the events or situations.”

This definition emphasises the importance of understanding the relationships between variables. Descriptive studies considering associations between variables and CAM use are vital; however, health behaviour theory is an important framework to understand relations between variables in decision-making and the role of risk factors in a specific behaviour. Understanding the role of risk factors enables researchers to develop interventions to change an undesirable behaviour (Noar & Zimmerman, 2005), such as self-prescribing herbal medicines while taking prescribed pharmaceuticals.
Health behaviour theories consider the differences in specific populations, situations and contexts (Noar & Zimmerman, 2005). There are a number of health behaviour theories used to explain and predict a range of behaviours; the most relevant to this thesis are described below.

1.5.2. **Health behaviour theories explaining CAM use**

Theories of health behaviour previously used in the area of CAM are the health locus of control, the self-regulatory model, the transtheoretical model (TTM), and the TPB (Ajzen, 1991) adapted from the theory of reasoned action (Lorenc et al., 2009). These health behaviour theories consider psychosocial influences that affect behaviour, which distinguishes them from healthcare utilisation models (Lorenc et al., 2009). Healthcare utilisation models have also been used in CAM research and include the sociobehavioural model (SBM; Andersen, 1995), and the consumer decision-making model. Each of these models have demonstrated various levels of success in explaining and predicting CAM or herbal medicine use (Lorenc et al., 2009). In their systematic review Lorenc and colleagues (2009) found 22 studies used a theoretical model to explore the predictors of CAM use (some of which included herbal medicine use within the definition of CAM), with the majority of studies using the SBM.

As a comprehensive review of health behaviour models is outside the scope of this thesis, this section will focus on the most commonly used health behaviour theories demonstrated to predict health behaviours as identified by Noar and Zimmerman (2005), which have also been successfully used to predict CAM or intention to use herbal medicines (Lorenc et al., 2009). These theories include the TTM and the TPB. The SBM will also be discussed, as it is the most frequently used healthcare utilisation model in the area of CAM (Lorenc et al., 2009).

1.5.2.1. **Transtheoretical Model (TTM)**

The TTM proposes that behaviour change occurs over a period of time, and progressively moves through five specific stages: precontemplation, contemplation, preparation, action, maintenance (Norcross, Krebs, & Prochaska, 2011). The TTM has been used extensively in researching health behaviour that is focused on changing negative health behaviours (Norcross et al., 2011). In addition, the model proposes that specific processes of change determine how an individual will change a behaviour (Norcross et al., 2011). At the core of this model is the belief that each process is uniquely effective at specific stages of change, and the assumption is that the processes of change are consistent across different behaviours (Norcross et al., 2011). These
stages of change are influenced by the pros and cons of changing a behaviour. When the pros are higher than the cons an individual will be more likely to act out that behaviour. For example, if someone in precontemplation stage identifies more pros for taking herbal medicines they are more likely to move into action and take herbal medicines. While the TTM has been demonstrated to predict change in a number of health related behaviours it is not suited to providing an explanation of why individuals are making specific treatment choices. While it may help to determine at what stage an individual decides to use a herbal medicine it does not seek to explain the underlying factors determining their treatment choice.

1.5.2.2. The Socio-Behavioural Model (SBM)

The SBM is a measure of healthcare services use, therefore is only applicable to decision making in relation to practitioner based treatment and not medicine use specifically. While the SBM is currently the most frequently used model in CAM use, it is criticised for being too simplistic to cover all the psychosocial complexities (Lorenc et al., 2009). The weakness of healthcare utilisation models is that they neglect to explain the complex interacting psychosocial factors that enable the explanation of a specific behaviour (Lorenc et al., 2009).

1.5.2.3. Theory of Planned Behaviour (TPB)

The TPB is an extension of the Theory of Reasoned Action that provides a comprehensive understanding of health behaviour that is not specific to health services use. The goal of the TPB is to understand a specific behaviour, and proposes that a specific health behaviour is determined by the strength of an individual’s intention to carry out that behaviour (Ajzen, 1991). The stronger the intention the more likely the behaviour will be performed. An intention is formed by the combination of three key determinants (subjective norms, attitudes, and perceived behavioural control) that intervene between external variables (e.g. demographic and personality factors) and the behaviour: social norms, perceived behavioural control, and attitudes (Ajzen, 1991). The TPB has been successfully used to explain and predict a range of health behaviours such as physical activity, dietary change, abstinence behaviours (McEachan, Conner, & Taylor, 2011), and the intention to use herbal medicines (Gupchup et al., 2006).

1.5.3. Determining a suitable health behaviour theory

Noar and Zimmerman (2005) argue that no specific health behaviour theory has been demonstrated to be more accurate than another. Therefore, there needs to be a
systematic process that determines the most suitable theory to explain a specific behaviour. Glanz and colleagues (2008a) suggest that when choosing a health behaviour theory three key criteria need to be considered: the logic of the theory, the extent to which the theory is relevant without compromising the ability to manage the number of concepts used, and whether or not it is a suitable fit with existing theories in a specific field. In addition, the choice of a theory needs to reflect an alignment with real world observation when empirically tested (Glanz et al, 2008a). Based on these criteria the TPB will be used in this research to develop a model of health behaviour that seeks to explain herbal medicines use for anxiety symptoms. The TPB is a logical fit with herbal medicine use behaviour as previous research has used the TPB to effectively explain CAM use in cancer patients (Hirai et al., 2008) and herbal medicine use in older adults (Gupchup et al., 2006). In these studies attitude towards either CAM or herbal medicine was found to be the strongest predictor of CAM use or intention to use herbal medicines, respectively. In addition, the decision to use herbal medicines could be described as a rational type of decision, and this type of decision is best explained by a theory with a clear link from intention to behaviour, such as the TPB (Noar & Zimmerman, 2005). It is argued that intention is the variable that most effectively predicts behaviour (Weinstein, 2007). The TPB also allows for empirical testing with prospective measurement of actual herbal medicine use behaviour, and can be applicable to everyday observations of herbal medicine use (Mao et al., 2012).

1.6. The research design

This study used a mixed methods framework to explore and understand the attitudes and beliefs of adults with a lived experience of anxiety symptoms towards herbal medicines. The methods used in this research were predetermined based on the research questions, and the procedures were implemented as planned at the beginning of the research process. Both qualitative and quantitative methods were used as distinct studies in which the data collection and analysis were conducted separately for each phase of the research (Creswell & Clark, 2011a). The use of mixed-methods was justified as little was known about the attitudes and beliefs of adults with an experience of anxiety symptoms towards herbal medicines or the predictors of herbal medicine use in this cohort. In addition, the research questions directed the need for different methods that enabled each of the research questions to be adequately answered (Creswell, 2014). A mixed-method design allowed for the connection and integration of different types of
data resulting in a more comprehensive explanation of herbal medicine use behaviour in adults with an experience of anxiety symptoms (Tashakkori & Teddlie, 2010).

1.6.1. The researchers position

This thesis topic came about due to my experience as a Western herbalist, and concerns about what I had seen in clinical practice. Many of the clients I had seen who were experiencing anxiety had self-prescribed herbal medicines before seeing me. Sometimes the herbs people were taking were not suitable as the dose was ineffective, the quality of the product was poor, or the medicine chosen was not suitable for their needs. In addition, they could be taking them concurrently with pharmaceutical medicines without realising the risk of interactions. I had a similar experience in my previous role as a pharmacy assistant with many people seeking and self-prescribing herbal medicines for their anxiety symptoms. Based on these experiences I recognised the importance of needing to understand more about how adults experiencing anxiety were using herbal medicines, and how they make decisions about herbal medicine use.

1.6.2. Pragmatism

This thesis uses a pragmatic approach to addressing the research aims. Mixed methods research can be criticised as it is believed to combine two different and incompatible epistemologies (e.g. post positivist and social constructionist; Tashakkori & Teddlie, 2010). However, the strength of mixed methods is that each stage of the research can be approached using unique epistemologies that recognise the appropriateness of each method used to answer the research questions (Creswell, 2014). Pragmatism is a paradigm that rejects dualism, and encourages methodological pluralism, allowing for use of the best approach to understanding the research problem (Creswell, 2014; Hastings, 2002). It also recognises that knowledge is constructed though a symbiotic relationship with the individual and their environment. Therefore, this research was based on a pragmatic paradigm that sought a practical approach to addressing the research questions, with each stage of the research being informed by the next using methods that were best suited to the research aims.

1.6.3. Sequential Exploratory Design

This research used a sequential exploratory design that had three distinct phases, the order of which was critical as the data collection and analysis of each phase informed subsequent phases. The initial critical review of the literature informed both the qualitative phase and the quantitative phase of the research. Second, the qualitative phase of this research sought to explore the phenomenon of herbal medicine use
behaviour in adults who have experienced anxiety symptoms, which informed the
development of the questionnaire used in the quantitative phase of the research that
sought to both describe and explain the behaviour.

1.6.3.1. Phase 1: Critical literature review

A critical literature review was conducted for the first phase of the research in
order to identify the prevalence of herbal medicine use in adults experiencing anxiety,
and the beliefs and attitudes predicting herbal medicine use. These findings were used
to inform the qualitative study and the questionnaire used in the third phase of the
research. The method and results are presented in Chapter 2.

1.6.3.2. Phase 2: Qualitative study

The second phase of the research used a qualitative framework that aimed to
explore the beliefs and attitudes of adults with a lived experience of anxiety symptoms
towards herbal medicine use, and their herbal medicine use behaviour. Interviews were
used to determine themes that reflected the aims of the research objectives (Creswell &
Clark, 2011b). Eight adults with a subjective experience of anxiety who used herbal
medicines were interviewed using open-ended questions. Critical thematic analysis of
the data revealed three major themes that reflected beliefs and attitudes to herbal
medicine use and treatment decision making: being different to pharmaceuticals,
evidence and effectiveness, and barriers to herbal medicines. The results were used to
inform, in part, the development of a questionnaire to be used in the third quantitative
phase. In addition, conclusions drawn from this study allowed for triangulation of the
results. For example, friends and family were described as informing the decision to use
herbal medicines, which was validated with the quantitative study finding that friends
and family were used as an information source and that subjective norms were
significant predictors of herbal medicine use for anxiety symptoms. The method and
results of the thematic analysis are described in Chapter 3.

1.6.3.3. Phase 3: Quantitative study

The results of the qualitative research were used to inform the development
of a questionnaire that sought to describe the herbal medicine use behaviour of
adults experiencing anxiety, and to test a theoretical model of health behaviour
predicting the intention to use herbal medicine for anxiety symptoms in this cohort in
order to explain their herbal medicine use behaviour. Four hundred adults who
experience anxiety and use herbal medicines completed an online questionnaire.
Descriptive statistics were used to analyse the first stage, with structural equation modeling used to test the proposed theoretical model in the second stage. This phase of the research is presented in two stages: descriptive, and theoretical model testing. The method and results of the first stage of this study are described and discussed in Chapter 4. The method and results of the testing of a theoretical path model are described and discussed in Chapter 5.
Chapter 2

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

2.1. Introduction

The previous chapter provided an overview of this thesis, and the context for the research. This chapter presents the results of the first phase of the research; the critical literature review. The review answers the first two research questions: what is the prevalence of herbal medicine use by adults who experience anxiety, and what are the beliefs and attitudes towards herbal medicines held by adults who experience anxiety? The results from this literature review were used to inform the development of the questionnaire used in the quantitative phase of the research, and informed the development of the theoretical model tested in Chapter 5.

The results of this literature review have been published as follows:

2.2. Background

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; R. C. Kessler et al., 2012), and 26.3% in Australia (T. Slade et al., 2009b). 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 generalised anxiety disorder (GAD) are referred to as having “sub-threshold anxiety” (Grenier et al., 2011; R. C. Kessler & Wittchen, 2002), 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 (Baldwin, Waldman, & Allgulander, 2011a; Mitte, 2005). 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” (Halberstein, 2005). 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 (A. L. Zhang et al., 2008). 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 (Posadzki et al., 2013a), 37% in Australia (P. Thompson et al., 2012), and 25% in the US (Wu et al., 2011).

Herbal medicines are distinguished from conventional pharmaceutical medicines by the use of whole plant parts and not their isolated constituents (Williamson, 2001). 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 (Sarris et al., 2013b), and in clinical trials (Sarris et al., 2013c). The herb kava (Piper methysticum) is the only herb to date demonstrating Level A evidence for the treatment of generalised anxiety (Sarris, Panossian, Schweitzer, Stough, & Scholey, 2011b). 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 Sarris and colleagues (2013c). 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 (Ravven, Zimmerman, Schultz, & Wallace, 2011; Roy-Byrne et al., 2005; A. L. Zhang et al., 2008). 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 (Astin, 1998).

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 behaviour 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 generalised 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 (Ravven et al., 2011; Roy-Byrne et al., 2005).

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 towards CAM (Bishop, Yardley, & Lewith, 2007), 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 behaviour in adults with anxiety.

2.3. Method

2.3.1. 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 behaviour 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 Table 2.1 for the inclusion and exclusion criteria, and Figure 2.1 for flow diagram.

Table 2.1.

Inclusion and exclusion criteria for literature review: aim one.

<table>
<thead>
<tr>
<th>Inclusion criteria</th>
<th>Exclusion criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Study sample included adults, who were diagnosed with an anxiety disorder, or reporting having anxiety symptoms (included the broad definition of having a mental health problem).</td>
<td>• Articles types: clinical trials or efficacy studies, qualitative studies, commentary, and reviews.</td>
</tr>
<tr>
<td>• Measured herbal medicine use. Herbal medicines are defined as the use of whole plant parts in the form of tablets, capsules, liquid extracts, teas, decoctions, creams and ointments.</td>
<td>• Study sample included children or adolescents.</td>
</tr>
<tr>
<td>• Articles included were investigative articles reporting prevalence of herbal medicine use (included articles assessing CAM use that included a measurement of herbal medicine use).</td>
<td></td>
</tr>
<tr>
<td>• Paper published in English.</td>
<td></td>
</tr>
</tbody>
</table>
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 Table 2.2 for inclusion and exclusion criteria for the second aim. Seventeen cross-sectional studies met the modified inclusion criteria for aim two. See Figure 2.2 for flow diagram.

**Figure 2.1.** Flow diagram of studies included in aim one.

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 Table 2.2 for inclusion and exclusion criteria for the second aim. Seventeen cross-sectional studies met the modified inclusion criteria for aim two. See Figure 2.2 for flow diagram.
Table 2.2.

**Inclusion and exclusion criteria for literature review: aim two**

<table>
<thead>
<tr>
<th>Inclusion criteria</th>
<th>Exclusion criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Study sample included adults, who were diagnosed with an anxiety disorder, or reporting having anxiety symptoms (included the broad definition of having a mental health problem). As no studies in this cohort were found the search was extended to include the general population and other patient cohorts.</td>
<td>• Articles types: clinical trials or efficacy studies, qualitative studies, commentaries, and reviews.</td>
</tr>
<tr>
<td>• Measured herbal medicine use. Herbal medicines are defined as the use of whole plant parts in the form of tablets, capsules, liquid extracts, teas, decoctions, creams and ointments.</td>
<td>• Study sample included children or adolescents.</td>
</tr>
<tr>
<td>• Investigative articles reporting herbal medicine use or CAM use that included herbal medicines.</td>
<td>• Descriptive studies that only considered correlations, or differences between groups.</td>
</tr>
<tr>
<td>• Articles using multivariate statistics to identify beliefs and attitudes as predictors of intention to use herbal medicines or herbal medicine use behaviour.</td>
<td>• Illness beliefs</td>
</tr>
<tr>
<td>Paper published in English.</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 2.2. Flow diagram of studies included in aim two.**

5227 references found in database search

182 references with relevant title (duplicates removed)  19 references found from hand searching  166 references excluded at title and abstract stage

35 full texts examined

17 articles include in review

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1 Table 2.1 and Table 2.2 were included as supplemental files in the published article. They have been included within the chapter of this thesis to assist the reader.
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 organised into three main thematic categories, which were informed by the literature.

2.4. Results

2.4.1. Prevalence of Herbal Medicine Use in Adults with Anxiety

Eight studies were found that met the criteria for the first aim (see Table 2.3). 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 ($n = 3,769$) 70.8% reported having a mental health condition, which was found to be a significant predictor of CAM use (Spinks & Hollingsworth, 2012). 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 ($N = 7,485$), and investigated associations between using CAM treatments and mental health (Parslow & Jorm, 2004). 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 ($N = 1,027$) in Turkey found that 18.7% of those with an anxiety disorder diagnosis used CAMs (included herbal medicines; Bahceci et al., 2013). 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 Finnish study ($N = 5,987$) 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 (Wahlström,
Sihvo, & Haukkala, 2008). 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 ($N = 9,271$; Ravven et al., 2011) 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 ($n = 2,198$) were significantly more likely to use herbal medicines for their anxiety symptoms than those not meeting the criteria for a disorder ($n = 7,073$), 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%, $n = 8,878$). 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.

Another US study of primary care patients with anxiety disorders ($N = 1,004$) found 21% to use non-prescription or herbal medicines in the previous 6 months (Bystritsky et al., 2012). This study also found adults diagnosed with GAD to use more herbal medicines than those with other anxiety disorder diagnoses (Bystritsky et al., 2012). There is often higher use of health services in people with GAD (Hunt, Slade, & Andrews, 2004), which may be a factor in the increased use of herbal medicines in this clinical population. Although, the reasons for the higher uptake of herbal medicines was not explored in those 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 (Roy-Byrne et al., 2005). 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 (Caumo, Levandovski, & Hidalgo, 2009). 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 (P. Gardiner et al., 2007) 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* = 3,315), 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 2.3 for details of these studies).
### Table 2.3.

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

<table>
<thead>
<tr>
<th>Author/date</th>
<th>Country</th>
<th>Sample</th>
<th>Measure of herbal medicine use</th>
<th>Measure of anxiety</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bahceci et al. (2013)</td>
<td>TUR</td>
<td>$N = 1,027$ (patients with mental disorders)</td>
<td>Current CAM use. Herbal medicines included as a biologically based therapy.</td>
<td>Anxiety disorder diagnosis.</td>
</tr>
<tr>
<td>Bystritsky et al. (2012)</td>
<td>US</td>
<td>$N = 1,004$ (primary care patients with anxiety disorder)</td>
<td>Non-prescription medications or herbal remedies used in previous 6 months to help with your mood or energy.</td>
<td>Type of anxiety disorder (method of measurement not reported)</td>
</tr>
<tr>
<td>Parslow and Jorm (2004)</td>
<td>AUS</td>
<td>$N = 7,485$ (general population)</td>
<td>CAM use in the previous month (from a predetermined list including herbal medicines).</td>
<td>Anxiety symptoms in previous month (method of measurement not reported)</td>
</tr>
<tr>
<td>Ravven, Zimmerman, and Schultz (2011)</td>
<td>US</td>
<td>$N = 9,271$ (general population)</td>
<td>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.</td>
<td>Anxiety disorder diagnosis. World Mental Health Survey Initiative version of the World Mental Health Composite International Diagnostic Interview.</td>
</tr>
<tr>
<td>Roy-Byrne et al. (2005)</td>
<td>US</td>
<td>$N = 682$ (primary care patients with anxiety disorder)</td>
<td>Herbal medicines used in previous 3 months.</td>
<td>Anxiety disorder diagnosis. World Health Organization’s 12-Month Composite International Diagnostic Interview.</td>
</tr>
<tr>
<td>Author/date</td>
<td>Country</td>
<td>Sample</td>
<td>Measure of herbal medicine use</td>
<td>Measure of anxiety</td>
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</tr>
<tr>
<td>Spinks and Hollingsworth (2012)</td>
<td>AUS</td>
<td>$N = 15,779$ (general population)</td>
<td>CAM (a vitamin, mineral or herbal supplement) use in previous 12 months.</td>
<td>Mental health condition (self-report)</td>
</tr>
<tr>
<td>Wahlström, Silvo and Haukkala (2008)</td>
<td>FIN</td>
<td>$N = 5,987$ (general population, adults over 30 years)</td>
<td>CAM (from a predetermined list of therapists) use in previous 12 months, and current use of biologically based therapies (included herbal medicine, natural or homeopathic remedies)</td>
<td>Anxiety disorder diagnosis.</td>
</tr>
</tbody>
</table>

*Note. AUS = Australia; US = United States of America; FIN = Finland; TUR = Turkey; CAM = complementary and alternative medicine.*
2.4.2. Beliefs and Attitudes Towards Herbal Medicines

Research on beliefs and attitudes towards herbal medicines began in the late 1990s as the use of CAMs began to increase. Most studies have focused on the beliefs and attitudes towards herbal medicines or herbal practitioners under the umbrella of CAM (e.g. Astin, 1998; Siahpush, 1999), with few studies exploring the beliefs and attitudes towards herbal medicines specifically (Gupchup et al., 2006). 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 (Bishop, Yardley, & Lewith, 2006).

There is inconsistency in the literature around what defines a belief or attitude, for example some studies have included behaviours (e.g. informing a doctor they take herbs) in the category of beliefs (Zeilmann et al., 2003). 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” (Fishbein & Ajzen, 1975, p.131). Attitudes will be defined as “a person’s general feeling of favorableness or unfavorableness toward some stimulus object” (Fishbein & Ajzen, 1975, p.216). In addition, beliefs can be confused with attitudes, for example, Sirois and colleagues (2002) 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’. Behaviours 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. towards 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 towards a behaviour (i.e. using herbal medicine; Fishbein & Ajzen, 1975).

Seventeen cross-sectional studies were found that explored beliefs and attitudes as predictors of herbal medicine use using multivariate statistics—see Table 2.4. All studies defined and operationalised 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 (Gupchup et al., 2006), 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.
Table 2.4.
Cross-sectional surveys on beliefs and attitudes as predictors of positive attitude towards herbal medicine, and herbal medicine or herbal practitioner use.

<table>
<thead>
<tr>
<th>Author/date</th>
<th>Country</th>
<th>Sample characteristics</th>
<th>Scales used to measure beliefs or attitudes.</th>
<th>Dependent variable: Measure of CAM or HM use.</th>
<th>Significant predictors</th>
<th>Other beliefs and attitudes (not found to be significant predictors)</th>
</tr>
</thead>
</table>
  - 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 (2006) | 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) | UK      | \( N = 159 \) General population (17 to 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) |
<table>
<thead>
<tr>
<th>Author/date</th>
<th>Country</th>
<th>Sample characteristics</th>
<th>Scales used to measure beliefs or attitudes.</th>
<th>Dependent variable: Measure of CAM or HM use.</th>
<th>Significant predictors</th>
<th>Other beliefs and attitudes (not found to be significant predictors)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gupchup et al. (2006)</td>
<td>US</td>
<td>$N = 251$, adults (65 years and older)</td>
<td>59-item herbal medicine questionnaire (previously developed and validated)</td>
<td>Intentions to use herbal medicines in the 6 months.</td>
<td>Predicted intention to use herbal medicines:</td>
<td>Did not predict intention to use herbal medicines:</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Attitudes towards herbal medicines</td>
<td>• Subjective norms</td>
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<td></td>
<td>• Perceived behavioural control</td>
<td>• Religious beliefs</td>
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<td></td>
<td>• Belief in personal control over health</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>• Trust in conventional medical providers</td>
</tr>
<tr>
<td>Hildreth and Elman (2007)</td>
<td>US</td>
<td>$N = 1672$, adults (31 to 65 years)</td>
<td>Likert-type questions for beliefs about health control, spirituality and religiosity</td>
<td>Any CAM services use in the previous 12 months (included herbal medicine)</td>
<td>Predicted CAM use:</td>
<td>Did not predict CAM use:</td>
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<td>• Spiritual beliefs</td>
<td>• Religious beliefs</td>
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<td>• Belief in personal control over health</td>
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<td>• Greater desire for information</td>
<td>• Trust in conventional medical providers</td>
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<td>• Greater desire for involvement in health care decisions</td>
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<tr>
<td>McFadden, Hernández, and Ito (2010)</td>
<td>US</td>
<td>$N = 65$, graduate psychology students</td>
<td>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)</td>
<td>Past, current and future CAM use (practitioner).</td>
<td>Predicted past CAM use:</td>
<td>Did not predict CAM use at any stage:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Philosophical congruence with CAM</td>
<td>• Dissatisfaction with conventional medicine</td>
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<td></td>
<td>• Predicted current CAM use</td>
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<td></td>
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<td></td>
<td>• Holistic balance</td>
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<td></td>
<td>• Predicted future CAM use</td>
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<td></td>
<td>• Philosophical congruence with CAM</td>
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<td></td>
<td></td>
<td></td>
<td>• Provider control over health</td>
<td></td>
</tr>
<tr>
<td>Author/date</td>
<td>Country</td>
<td>Sample characteristics</td>
<td>Scales used to measure beliefs or attitudes.</td>
<td>Dependent variable: Measure of CAM or HM use.</td>
<td>Significant predictors</td>
<td>Other beliefs and attitudes (not found to be significant predictors)</td>
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<tr>
<td>O'Callaghan and Jordan (2003)</td>
<td>AUS</td>
<td>$N = 171$, adults (included first year psychology students)</td>
<td>Post-modern beliefs questionnaire (Siahpush, 1999). Attitudes towards CAM questionnaire.</td>
<td>How often they visited a CAM practitioner, included naturopathy* Attitudes towards CAM. *This study was included as prescription of herbal medicines is a core treatment of naturopathy in Australia.</td>
<td>Predicted positive attitudes towards CAM, and CAM use: • Post-modern beliefs (full scale) • Rejection of authority (sub scale) • Natural remedies (sub scale)</td>
<td>Did not predict CAM use, or attitudes to CAM: • Individual responsibility (sub scale) • Holism (sub scale)</td>
</tr>
<tr>
<td>Paltiel et al. (2001)</td>
<td>Israel</td>
<td>$N = 1,027$, adults, diagnosed with cancer</td>
<td>Defined CAM as any therapy not included in the orthodox biomedical framework for the treatment of cancer.</td>
<td>Ever used CAM (practitioner/medicine not specified) since cancer diagnosis, and recent CAM use (last 3 months). Did not report regressions for ever used CAM. *This study was included as prescription of herbal medicines is a core treatment of naturopathy in Israel.</td>
<td>Predicted recent CAM use: • Feeling of helplessness • Conventional medical care does not meet needs • Lack of trust in medical doctor</td>
<td></td>
</tr>
<tr>
<td>Author/date</td>
<td>Country</td>
<td>Sample characteristics</td>
<td>Scales used to measure beliefs or attitudes.</td>
<td>Dependent variable: Measure of CAM or HM use.</td>
<td>Significant predictors</td>
<td>Other beliefs and attitudes (not found to be significant predictors)</td>
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</tbody>
</table>
| Shumay et al. (2002) | 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) | 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 towards 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) |
<table>
<thead>
<tr>
<th>Author/date</th>
<th>Country</th>
<th>Sample characteristics</th>
<th>Scales used to measure beliefs or attitudes.</th>
<th>Dependent variable: Measure of CAM or HM use.</th>
<th>Significant predictors</th>
<th>Other beliefs and attitudes (not found to be significant predictors)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Siahpush (1999)</td>
<td>AUS</td>
<td>$N = 787$, adults, general population</td>
<td>Post-modern beliefs scale.</td>
<td>Attitudes towards CAM (medicines and practitioners).</td>
<td>Predicted positive attitudes towards CAM:</td>
<td>Did not predict positive attitudes to CAM:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Post-modern beliefs (full scale)</td>
<td>- Anti-science sentiments (sub scale)</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>- Faith in natural remedies (sub scale)</td>
<td>- Rejection of authority (sub scale)</td>
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<td></td>
<td></td>
<td>- Holistic view of health (sub scale)</td>
<td>- Dissatisfaction with the medical outcome</td>
</tr>
<tr>
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<td></td>
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<td>- Consumerist attitudes to health care (sub scale)</td>
<td>- Dissatisfaction with the medical encounter</td>
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<td></td>
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<td></td>
<td>- Need for individual responsibility (sub scale)</td>
<td></td>
</tr>
<tr>
<td>Sirois and Gick (2002)</td>
<td>Canada</td>
<td>$N = 199$, adults visiting conventional and CAM health clinics</td>
<td>MHLC scale Doctor satisfaction questionnaire</td>
<td>Use of CAM therapies (practitioners) in the past year.</td>
<td>Predicted CAM use:</td>
<td>Did not predict CAM use:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Dissatisfaction with medical doctors (both treatment efficacy, and relationship with doctor)</td>
<td>- Health locus of control</td>
</tr>
<tr>
<td>Sirois (2008)</td>
<td>Multinational</td>
<td>$N = 365$, people with chronic illness (16 years and older)</td>
<td>Control Beliefs Inventory</td>
<td>Consultations with a CAM practitioner in the past 6 months.</td>
<td>Predicted CAM use:</td>
<td>Did not predict CAM use:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Greater perceived health control</td>
<td>- Chance health control</td>
</tr>
<tr>
<td>Steginga et al. (2004)</td>
<td>AUS</td>
<td>$N = 111$, adult men with prostate cancer</td>
<td>MHLC scale</td>
<td>CAM use—current, 2 months following treatment, 12 months following treatment.</td>
<td>Did not predict CAM use</td>
<td>Did not predict CAM use</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td>- Health locus of control</td>
</tr>
<tr>
<td>Author/date</td>
<td>Country</td>
<td>Sample characteristics</td>
<td>Scales used to measure beliefs or attitudes.</td>
<td>Dependent variable: Measure of CAM or HM use.</td>
<td>Significant predictors</td>
<td>Other beliefs and attitudes (not found to be significant predictors)</td>
</tr>
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<td>---------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Testerman (2004) | US      | $N = 230$, outpatients from a family practice clinic (40 to 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) | AUS  | $N = 1,256$, 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. 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 (Astin, 1998), and views specifically related to health (Siahpush, 1999). The belief systems found to predict positive attitudes towards CAM, or CAM use, include cultural creative (Astin, 1998), post-modern values (Siahpush, 1999), philosophical congruence with CAM (McFadden et al., 2010), holism (Astin, 1998), spirituality (Thomson et al., 2014), and anti-technology (Siahpush, 1998). See Table 2.3 for belief systems found to predict CAM use or positive attitudes to CAM.

Table 2.5.
Belief systems predicting attitudes towards, or use of CAM.

<table>
<thead>
<tr>
<th>Belief system</th>
<th>Dependent variable</th>
<th>Sample</th>
<th>Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-modern philosophy</td>
<td>Attitudes towards CAM</td>
<td>Adults, general population (AUS)</td>
<td>(O'Callaghan &amp; Jordan, 2003; Siahpush, 1998; 1999)</td>
</tr>
<tr>
<td>Holism</td>
<td>CAM use</td>
<td>Adults, general population (US)</td>
<td>(Astin, 1998)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Adults, 40 to 60 years of age (US)</td>
<td>(Testerman et al., 2004)</td>
</tr>
<tr>
<td></td>
<td>CAM use (future)</td>
<td>Adults, graduate psychology students (US)</td>
<td>(McFadden et al., 2010)</td>
</tr>
<tr>
<td></td>
<td>Attitudes towards CAM</td>
<td>Adults, general population (AUS)</td>
<td>(Siahpush, 1999)</td>
</tr>
<tr>
<td></td>
<td>CAM use (current)</td>
<td>Adults, general population with current health problem (International, predominately UK and US)</td>
<td>(Bishop et al., 2006)</td>
</tr>
<tr>
<td>Cultural creative</td>
<td>CAM use</td>
<td>Adults, general population (US)</td>
<td>(Astin, 1998)</td>
</tr>
<tr>
<td>Philosophical congruence with CAM</td>
<td>CAM use (past and future)</td>
<td>Adults, graduate psychology students (US)</td>
<td>(McFadden et al., 2010)</td>
</tr>
<tr>
<td>Spirituality</td>
<td>Intention to use CAM (before conventional medicine)</td>
<td>Adults, general population (AUS)</td>
<td>(Thomson et al., 2014)</td>
</tr>
<tr>
<td></td>
<td>CAM use</td>
<td>Adults, 40 to 60 years of age (US)</td>
<td>(Testerman et al., 2004)</td>
</tr>
<tr>
<td>Anti-technology</td>
<td>Attitudes towards CAM</td>
<td>Adults, general population (AUS)</td>
<td>(Siahpush, 1998)</td>
</tr>
</tbody>
</table>
Postmodern values incorporate modern beliefs about nature, science and technology, health, authority, individual responsibility, and consumerism (Siahpush, 1998). In two separate studies Siahpush (1998; 1999) explored this belief system in relation to CAM, and found that having postmodern values predicted positive attitudes towards CAM use. A third study (O'Callaghan & Jordan, 2003) used the postmodern beliefs scale developed by Siahpush (1999), and while they found having postmodern values to predict both positive attitudes towards 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 (Jagtenberg & Evans, 2003). 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 (Astin, 1998; Bishop et al., 2006; McFadden et al., 2010; Testerman et al., 2004), or positive attitudes to CAM (Siahpush, 1999), in nonclinical populations. Conversely, other studies have found that holistic beliefs did not predict positive attitudes to CAM in nonclinical cohorts (O'Callaghan & Jordan, 2003; Siahpush, 1998). However, one study of adults with a health complaint (Bishop et al., 2006) 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 (McFadden et al., 2010).

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 (Astin, 1998, pp.1549-1550). Astin (1998) 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 (Thomson et al., 2014) and actual CAM use (Testerman et al., 2004). In contrast,
religious beliefs did not predict intentions to use CAM (Thomson et al., 2014). Spiritual beliefs are considered to be more unconventional and less formal than religious beliefs (Zinnbauer et al., 1997), which may help explain this finding.

Anti-technology beliefs have been found to predict CAM use (Siahpush, 1998), 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.

2.4.2.2. 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 (Paltiel et al., 2001), dissatisfaction with the treatment outcome (Paltiel et al., 2001), faith in natural treatments (O'Callaghan & Jordan, 2003), and attitude about treatment choice (Siahpush, 1999), have all been found to predict positive attitudes towards CAM, or the use of CAM. In addition, positive attitudes towards herbal medicines have been found to predict intention to use herbal medicines (Gupchup et al., 2006). See Table 2.4 for treatment beliefs and attitudes predicting CAM use, positive attitudes to CAM, or intention to use herbal medicines.

Table 2.6.

<table>
<thead>
<tr>
<th>Treatment belief or attitude</th>
<th>Dependent variable</th>
<th>Sample</th>
<th>Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faith in natural treatments</td>
<td>Attitudes towards CAM</td>
<td>Adults, general population (AUS)</td>
<td>O'Callaghan &amp; Jordan, 2003; Siahpush, 1998; 1999</td>
</tr>
<tr>
<td></td>
<td>CAM use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dissatisfaction with medical encounter</td>
<td>CAM use</td>
<td>Adult, health clinic patients (Canada)</td>
<td>Sirois &amp; Gick, 2002</td>
</tr>
<tr>
<td></td>
<td>CAM use (higher degree of)</td>
<td>Adult cancer patients (Hawaii)</td>
<td>Shumay et al., 2002</td>
</tr>
<tr>
<td></td>
<td>CAM use (recent)</td>
<td>Adults, cancer patients (Israel)</td>
<td>Paltiel et al., 2001</td>
</tr>
</tbody>
</table>
### Table 1

<table>
<thead>
<tr>
<th>Treatment belief or attitude</th>
<th>Dependent variable</th>
<th>Sample</th>
<th>Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dissatisfaction with treatment outcome</td>
<td>Attitudes towards CAM</td>
<td>Adults, general population (AUS)</td>
<td>(Siahpush, 1998)</td>
</tr>
<tr>
<td></td>
<td>CAM use (recent)</td>
<td>Adults, cancer patients (Israel)</td>
<td>(Paltiel et al., 2001)</td>
</tr>
<tr>
<td></td>
<td>CAM use (degree off)</td>
<td>Adults, cancer patients (Hawaii)</td>
<td>(Shumay et al., 2002)</td>
</tr>
<tr>
<td></td>
<td>CAM use (past 12 months)</td>
<td>Adult, health clinic patients (Canada)</td>
<td>(Sirois &amp; Gick, 2002)</td>
</tr>
<tr>
<td>Treatment choice</td>
<td>Attitudes towards CAM</td>
<td>Adults, general population (AUS)</td>
<td>(Siahpush, 1998; 1999)</td>
</tr>
<tr>
<td>Attitudes towards herbal medicines</td>
<td>Intention to use herbal medicines</td>
<td>Older adults (65 years and older) (US)</td>
<td>(Gupchup et al., 2006)</td>
</tr>
</tbody>
</table>

*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; Siahpush, 1999). Four studies explored faith in natural treatments, three of which found it predicted positive attitudes to CAM (O'Callaghan & Jordan, 2003; Siahpush, 1998; 1999), and CAM use (O'Callaghan & Jordan, 2003). 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 (Bishop et al., 2006). 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 (Furnham, 2000). 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 towards CAM (Siahpush, 1998; 1999).

Being dissatisfied with conventional medicine is proposed to push people towards CAM use. It is suggested that there are two dimensions to this attitude: dissatisfaction with the medical encounter, and dissatisfaction with the treatment outcome (Siahpush, 1999). *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 (1998) 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 follow-up study Siahpush (1999) 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 (Testerman et al., 2004). Similarly, attitudes towards doctors was not found to predict use of biologically based CAM therapies in adults with a self-reported health condition (Bishop et al., 2006), and degree of trust in health provider was not found to predict CAM use in HIV patients (London et al., 2003). Both negative attitudes (Astin, 1998), and scepticism towards conventional medicine did not predict CAM use in general population samples (Astin, 1998; Furnham, 2000).

However, other studies demonstrate dissatisfaction with the medical encounter does predict CAM use (Paltiel et al., 2001; Shumay et al., 2002; Sirois & Gick, 2002), or attitudes to CAM (Siahpush, 1998). In addition, three of these studies found dissatisfaction with the treatment outcome to predict positive attitudes to CAM (Paltiel et al., 2001; Shumay et al., 2002; Sirois & Gick, 2002). However, these three studies involved clinical cohorts, such as cancer patients (Paltiel et al., 2001; Shumay et al., 2002), and adults visiting health clinics (Sirois & Gick, 2002). 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 behaviour (Theory of Planned Behaviour) to identify beliefs and attitudes as predictors of intention to use herbal medicines (Gupchup et al., 2006). In their study attitudes were formed from: behavioural 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. 
2.4.2.3. 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 towards 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 (Siahpush, 1999). 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 2.5 for control and empowerment beliefs and attitudes found to predict positive attitudes towards CAM, intention to use CAM and actual CAM use.
Table 2.7.
Control and empowerment beliefs and attitudes predicting positive attitudes towards, intention to use, or actual use of CAM.

<table>
<thead>
<tr>
<th>Treatment belief</th>
<th>Dependent variable</th>
<th>Sample</th>
<th>Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helplessness</td>
<td>CAM use (recent)</td>
<td>Adults, cancer patients (Israel)</td>
<td>(Paltiel et al., 2001)</td>
</tr>
<tr>
<td>Rejection of authority</td>
<td>Attitudes towards CAM</td>
<td>Adults, general population (AUS)</td>
<td>(O'Callaghan &amp; Jordan, 2003; Siahpush, 1999)</td>
</tr>
<tr>
<td></td>
<td>CAM use</td>
<td></td>
<td>(O'Callaghan &amp; Jordan, 2003)</td>
</tr>
<tr>
<td>Dissatisfaction with information</td>
<td>Higher degree of CAM use</td>
<td>Adult cancer patients (Hawaii)</td>
<td>(Shumay et al., 2002)</td>
</tr>
<tr>
<td></td>
<td>CAM use (previous 6 months)</td>
<td>Adults, HIV patients (US)</td>
<td>(London et al., 2003)</td>
</tr>
<tr>
<td>Personal control over health</td>
<td>Attitudes towards CAM</td>
<td>Adults, general population (AUS)</td>
<td>(Siahpush, 1999)</td>
</tr>
<tr>
<td></td>
<td>CAM use (previous 6 months)</td>
<td>Adults, HIV patients (US)</td>
<td>(London et al., 2003)</td>
</tr>
<tr>
<td></td>
<td>CAM use</td>
<td>People with chronic illness 16 years and older (Multinational)</td>
<td>(Sirois, 2008)</td>
</tr>
<tr>
<td></td>
<td>Intention to use CAM</td>
<td>Adults, general population (AUS)</td>
<td>(Thomson et al., 2014)</td>
</tr>
<tr>
<td></td>
<td>CAM use (future)</td>
<td>Adults, graduate psychology students (US)</td>
<td>(McFadden et al., 2010)</td>
</tr>
</tbody>
</table>
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 hypothesised that users of CAM will have greater individual control over their health. *Personal control over health* relates to a person’s beliefs about control over their health, such as health care provider control, internal control, and control over health outcomes (Sirois & Gick, 2002). Research in general population samples has found that people with a greater desire for control over their health (McFadden et al., 2010; Thomson et al., 2014), who believe in individual responsibility for health (Siahpush, 1999), intend to, and are more likely to use CAM (London et al., 2003; Sirois, 2008). This is a logical finding as it relates to the 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 (Gupchup et al., 2006), or the use of CAMs (Astin, 1998; Bishop et al., 2006; Sirois, 2008; Sirois & Gick, 2002; Steginga et al., 2004; Testerman et al., 2004). 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 (London et al., 2003), and a greater amount of CAM use compared to those who are satisfied with information (Shumay et al., 2002). 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 (Paltiel et al., 2001), 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.
This belief has been explored in three studies; two found rejection of authority to predict positive attitudes to CAM (O'Callaghan & Jordan, 2003; Siahpush, 1999), while the other did not (Siahpush, 1998). In addition, one study found rejection of authority to predict actual CAM use (O'Callaghan & Jordan, 2003). 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.

2.5. 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 (Bystritsky et al., 2012). Of those with an anxiety disorder diagnosis, people with GAD had the highest rates of herbal medicine use (Bystritsky et al., 2012; Ravven et al., 2011). 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 (Hunt et al., 2004).

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 behaviour. Some studies found demographic variables such as having a higher level of education (Astin, 1998; Siahpush, 1999), and being female (Sirois, 2008) 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 (Jagtenberg & Evans, 2003). Stronger conclusions could be drawn from
this body of research if there was more consistent use of assessment tools, in particular the measurement 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; Prins, Verhaak, Bensing, & van der Meer, 2008). 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 (Baldwin et al., 2005). 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 (Moulding & Kyrios, 2006), which may be achieved through using herbal medicines. In addition, when anxiety symptoms are more severe there is a reduced sense of control (Moulding & Kyrios, 2006) 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.

As this review covered a limited number of databases it is possible some literature in the area was not located. 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

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2 This limitation was included following the article being published.
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 (Frass, Strassl, Friehs, & Müllner, 2012). It is likely that beliefs and attitudes to specific CAM treatments will differ (Bishop et al., 2007).

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.

2.6. 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 hypothesised 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 standardised definitions and measures (Fischer et al., 2014), 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.
Chapter 3

Herbal medicine use in adults who experience anxiety:
A qualitative exploration

3.1. Introduction

The previous chapter reported the prevalence of herbal medicine use in adults with anxiety. In addition, while the review found no studies that explored the beliefs and attitudes towards herbal medicines of adults who experience anxiety, 17 studies were found that explored the beliefs and attitudes towards herbal medicines in a variety of other cohorts. Therefore, the aim of this chapter is to explore the beliefs and attitudes towards herbal medicines of adults who have experienced anxiety. Therefore, this chapter answers research question 2: what are the beliefs and attitudes towards herbal medicines held by adults who experience anxiety?

The results of this study have been published as follows:

3.2. Background

Herbal medicine is a popular complementary and alternative medicine (CAM) used throughout the world, with lifetime prevalence of use reported as high as 37% in Australia (P. Thompson et al., 2012). Herbal medicines are used to treat a range of health concerns, including common mental health problems such as anxiety (Bystritsky et al., 2012; Parslow & Jorm, 2004). The prevalence of herbal medicine use has been reported to be as high as 21% in patients with anxiety disorders (Bystritsky et al., 2012). Anxiety is the most prevalent mental health problem in Australia, with a reported 26% of Australians having an anxiety disorder diagnosis in their lifetime (T. Slade et al., 2009b). In addition, an unknown number of people are experiencing problematic ‘sub-threshold’ anxiety who do not meet the criteria for a disorder and may not be identified as needing treatment (Grenier et al., 2011; R. C. Kessler & Wittchen, 2002).

Evidence-based treatments for anxiety symptoms include both psychological interventions (e.g. cognitive behavioural therapy) and pharmaceutical drugs (e.g. selective serotonin reuptake inhibitors). While these treatments provide relief for many
people, they are not always effective (Huh, Goebert, Takeshita, Lu, & Kang, 2011; S. Taylor, Abramowitz, & McKay, 2012), may not align with peoples beliefs (Prins et al., 2008), have unwanted side-effects, or are difficult to access (due to cost, location, or stigma; Baldwin et al., 2011b; Prins et al., 2008). These barriers to conventional treatment may be a factor causing people to consider herbal medicines as an alternative, or to complement evidence-based treatments to further relieve symptoms. Other clinical groups (e.g. cancer patients) and general population samples have been found to use herbal medicines as they are dissatisfied with their conventional treatments (Shumay et al., 2002; Sirois & Gick, 2002). However, this has yet to be explored in adults experiencing anxiety.

While there are benefits in having an alternative treatment choice for anxiety symptoms, herbal medicines can be problematic if used incorrectly. For example, people who self-medicate with herbal medicines may place themselves at risk of not receiving the most effective treatments. In addition, there is a risk of people using herbs incorrectly, such as taking the wrong dosage, or less effective preparations (e.g. non-standardised extracts), or choosing herbs that can interact with pharmaceuticals. Herbal medicines are currently being used concurrently with pharmaceuticals. For example, in a general population sample Zhang and colleagues (2008) found 28.8% of participants (n = 2,526) took both a pharmaceutical treatment and a herbal medicine for the same condition in the last 12 months, as they received no benefit from the pharmaceutical. In addition, they found that 51.8% of herbal medicine users (n = 571) self-prescribed them.

Previous research has found that adults with anxiety and other mental health conditions are self-prescribing herbal medicines, using them concurrently with pharmaceuticals, and not disclosing this use to their health care providers (Knaudt, Connor, Weisler, Churchill, & Davidson, 1999; Alderman & Kiepfer, 2003). For example, in a cohort of psychiatric outpatients (N = 213)—50% of which had a diagnosis of an anxiety disorder—CAM users (which included herbal medicines) used these treatments concurrently with pharmaceuticals for their psychiatric (63%) and physical (68%) symptoms (Knaudt et al., 1999). In addition, 49% of CAM users did not disclose their herbal medicine use to their doctors. Another study of adult psychiatry patients (N = 52) found that 51.9% had used either herbal or vitamin supplements, with 37% of these users not disclosing this use to their doctors (Alderman & Kiepfer, 2003). These studies present a concerning trend of self-prescribing of herbal medicines with concurrent use of pharmaceutical medicines that creates a risk of harm. Research has
identified a number of beliefs and attitudes that predict the intention to use herbal medicines in both the general population and specific clinical groups. Predictors identified include specific belief systems (e.g. holism, postmodern values; Bishop et al., 2006; Siahpush, 1999), treatment beliefs and attitudes (e.g. faith in natural treatments, dissatisfaction with the medical encounter; O'Callaghan & Jordan, 2003; Siahpush, 1998), and control and empowerment beliefs and attitudes (e.g. rejection of authority and personal control over health; O'Callaghan & Jordan, 2003; Thomson et al., 2014). However, this may not reflect the beliefs and attitudes of people who experience anxiety and use herbal medicines.

As some people experiencing anxiety are choosing to use herbal medicines, and are potentially using them unsafely, an understanding of the beliefs and attitudes that lead to their intention to use herbal medicines is needed. This will contribute to understanding the level of risk in the community so that the relative need for future research can be determined, and policy developers can address educational needs or other risk interventions. While previous studies have provided some insight into the beliefs and attitudes to herbal medicines in a range of cohorts, no study to date has explored these phenomena in adults experiencing anxiety. Therefore, the aims of this study are to explore the beliefs and attitudes towards herbal medicines of adults who have experienced anxiety, and how they make decisions about herbal medicine use.

3.3. Materials and Methods

Ethical approval for the study was provided by Charles Sturt University Human Ethics Committee and conformed to the Declaration of Helsinki (see Appendix A).

3.3.1. Sample Strategy and Participants

Purposive sampling was used to recruit Australian adults (18 years of age and over) who have experienced anxiety symptoms and have used herbal medicines. People were recruited through advertisements in health practitioner clinics (general practitioners, herbalists, naturopaths, and psychologists), on Facebook, via university forums and newsletters, and through snowballing. A total of eight people (two males, six females) were interviewed from the Blue Mountains and Central Western areas of New South Wales, Australia. The age range was 37 to 69 years. Most interviewees were employed as professionals with two being mature age university students. Recruitment
ceased at eight people as no new insights were developing relative to the research objectives (Mason, 2010).

3.3.2. The role of the researcher

This research was approached using a social constructionist perspective. The ontological assumption was that truth is subjective and constructed by an individual’s perceptions and experiences, and their social relationships (T. Andrews, 2012). The epistemology assumes that the researcher has an inevitable role in influencing the interviewee’s story, as the interviewer has existing knowledge and experience that will influence a person’s responses, and interpretation of those responses (Patten, 2002). As this perspective assumes each person defines their own reality, a predetermined definition of anxiety was not used to recruit participants (T. Andrews, 2012), and the subjective lived experience of each person was acknowledged.

The truthfulness and meaningfulness of the data was ensured through use of an audit trail to document the data collection and analysis to ensure transparency and record decision making as part of a reflexive process (Burr, 2015). This process was used throughout to assist in identifying potential bias influenced by the interviewer’s background as a Western herbalist that may have compromised the perspective of each interviewee. During the interviews it was discovered that three of the participants knew the first author was a herbalist, therefore it was explained to these participants that the focus of the interview was on exploring their own subjective experience. There were no notable differences in the themes identified between the participants who knew the interviewer was a herbalist and those who did not.

3.3.3. Data collection and analyses

Data collection and analyses occurred concurrently over 4 months between October 2013 and January 2014, and was conducted by the first author. After responding to advertisements (Appendix B) participants were contacted by the first author, given information about the study (Appendix C), and a time and place of mutual agreement was arranged for the interviews. Interviews were conducted at a location that was convenient to the participants. Participants received a $15 grocery voucher to acknowledge their generosity for participating. Prior to beginning the interviews participants completed a consent form ensuring informed consent. The interview guide (Appendix D) incorporated questions from Joos, Glassen, and Musselmann (2012) who explored herbal medicine use in cancer patients, with additional questions developed from reviewing the herbal medicine use literature. Questions covered topics related to
decision making in herbal medicine use and the participant’s experiences using herbal medicines (see Appendix E for interview questions). The interview guide was semi-structured, using open-ended questions that were asked for each participant, with different probing questions used as needed to encourage richer responses, or added as a result of an iterative reflexive process that identified additional themes needing to be explored. Each interview lasted between 30 to 45 minutes. Interviews were audio recorded on a computer. The interviewer transcribed (verbatim) audio recordings from each interview.

The analytic purpose of the study was to explore and identify implicit and explicit semantic themes related to the beliefs and attitudes that adults with an experience of anxiety held towards herbal medicines and treatment decision-making, which would be used to inform the development of a questionnaire. A critical thematic analysis was used as it is flexible and applies a clear process to organise and describe data, while allowing for interpretation (Braun & Clarke, 2006). Familiarisation with the data began during transcription of each interview. NVivo 10 was used to code and organise the data into themes. Each transcribed interview was read initially and coded. Code descriptions were developed that reflected the entire dataset, and were revised as needed, as transcripts were read and reread. Codes were organised into themes that reflected the analytic objectives of the study. The second author assessed a sample of text for consistency of coding relative to the theme definitions, and there was 100% inter-coder agreement. The thematic definitions and categories were revised as links between concepts were developed in relation to the broader meanings and relationships that were identified. To ensure developing themes were grounded in the data they were checked against the data throughout the analysis. To ensure anonymity of participants pseudonyms were used and descriptive data was removed when reporting the results.

3.4. Results

3.4.1. Description of participants and their herbal medicine use

All participants had a subjective experience of anxiety, with two having been diagnosed with an anxiety disorder (i.e. GAD). The remaining six participants described anxiety that were secondary to other problems, such as stress, insomnia, or depression. The anxiety experienced by those without a diagnosis was significant enough for them to seek treatment for their symptoms. All participants described getting relief from
anxiety in varying degrees from using herbal medicines, however this did not occur in every instance they were used as described by Betty.

Betty: I have used St John's wort as well for I guess that's more anxiety and depression … that didn't work so well for me.

Participants reported using herbal medicines to treat a range of conditions, such as digestive problems, muscular pain, allergies, glandular fever, depression, insomnia, and anxiety. These medicines were taken in a variety of ways including teas, tablets, capsules, liquid formulas and creams. Participants reported using a range of herbs such as chamomile, valerian, and St John’s wort. There was a varied amount of herbal medicine use amongst participants with some having tried them only a few times and others taking them regularly as part of their regular health care. The way in which herbal medicines were prescribed also varied with some people self-prescribing only, others only using herbs prescribed by a practitioner, and some using a combination of both approaches.

Sally: I've been prescribed things in the past. Um, but because I've got a little bit of knowledge about things, and I know where to go for information I do tend to self-prescribe.

Participants’ first experiences with herbal medicine use ranged from having used as a child through to recent use as an adult. All participants had some positive attitudes towards herbal medicines, although within their interviews some people contradicted these attitudes and remained cautious about using them.

All participants said they would be willing to disclose their herbal medicine use to a health practitioner. However, in most cases they did not see why disclosure was necessary unless it was directly related to the issue being treated. While most people stated they did not care what their doctor thought about their herbal medicine use, some participants contradicted this as they described avoiding discussing it for fear of not being taken seriously. For example, when asked if he tells his doctor he uses herbal medicines, David replied: “I do say I've had the odd vitamin C and those sort of things. But the other things I don't … I think my current doctor's rather skeptical about all those things … yeah just some of the things he says, well I think, you know, I'm not going to mention that.”
3.4.2. **Major themes**

Three major themes were identified that reflected beliefs and attitudes to herbal medicines, and treatment decision-making in adults having experienced anxiety: 1) herbal medicines being different to pharmaceuticals, 2) evidence and effectiveness, and 3) barriers to herbal medicine use. Each major theme included subthemes, which are presented in Table 3.1.
Table 3.1.

*Major themes and subthemes reflecting beliefs and attitudes to herbal medicines*

<table>
<thead>
<tr>
<th>Major themes and subthemes</th>
<th>Theme description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Herbal medicines being different to pharmaceuticals</strong></td>
<td>Descriptions of herbal medicines having unique properties that differentiate them from pharmaceutical medicines.</td>
</tr>
<tr>
<td>Herbal medicine qualities</td>
<td>Beliefs about the perceived qualities of herbal medicines (e.g. being safe because they are natural, gentle, or healing).</td>
</tr>
<tr>
<td>Appropriate use of herbal medicines</td>
<td>Beliefs about when it is appropriate to use herbal medicines for a particular situation.</td>
</tr>
<tr>
<td><strong>Evidence and effectiveness</strong></td>
<td>Descriptions of beliefs about what constitutes evidence and effectiveness of herbal medicines.</td>
</tr>
<tr>
<td>Previous experience (own)</td>
<td>Descriptions of people’s experiences with herbal medicines as a form of evidence for their effectiveness.</td>
</tr>
<tr>
<td>Previous experience (others)</td>
<td>Descriptions of anecdotal experiences of important others with herbal medicines as a form of evidence for their effectiveness.</td>
</tr>
<tr>
<td>Information sources</td>
<td>Descriptions of the information sources used to determine the effectiveness of a herbal medicine.</td>
</tr>
<tr>
<td><strong>Barriers to herbal medicine use</strong></td>
<td>Descriptions of things that are perceived to prevent the use of herbal medicines.</td>
</tr>
<tr>
<td>Cost</td>
<td>Beliefs that cost is a barrier (actual or perceived) to using herbal medicine.</td>
</tr>
<tr>
<td>Confusion</td>
<td>Descriptions of being confused about herbal medicine information, and product choice.</td>
</tr>
<tr>
<td>Treatment effectiveness</td>
<td>Descriptions of previous experience with herbal medicine treatment effectiveness as a barrier to using herbal medicines.</td>
</tr>
</tbody>
</table>
3.4.2.2. Herbal medicines being different to pharmaceuticals

The first theme identified was that herbal medicines differed from pharmaceuticals. This was the primary reason people chose herbal medicines as a treatment. For most participants the decision to use herbal medicines for the first time was the consequence of a disappointing experience with conventional medicine (not working or unwanted side-effects). Some participants were initially introduced to taking herbal medicines via family members. For all participants the perceived qualities of herbal medicines was the main factor that differentiated them from pharmaceutical products. Being different to pharmaceuticals incorporated the subthemes herbal medicine qualities, and appropriate use.

Herbal medicine qualities. All participants discussed beliefs about the qualities of herbal medicines. They described a range of attributes herbal medicines have that differentiated them from pharmaceuticals. Herbal medicines were described as being safe and having less side-effects than pharmaceuticals, being gentle or healing, and that these qualities were because herbal medicines are natural. Being gentler with less side-effects appeared to be the primary reason why someone would choose a herbal medicine over a pharmaceutical.

Betty: In many regards they’re, I guess they’re a lot more gentle, a lot more soothing then, then a lot of the Western [pharmaceutical] medicines.

Emily: Xanax also puts you in a bit of a state of, I could stand stirring a cup of coffee for 10 minutes and just be staring at the window not realise I’m doing anything. Whereas Anxioton [herbal formula] is just a nice calm, you don’t feel like it’s mind altering at all like the Xanax…

A common theme was the belief that being natural was an important quality of herbal medicines, and they were preferred over pharmaceutical medicines because of this. Some participants believed it should be the first choice of treatment for this reason.

Linda: ... if it’s based on a natural process and it’s not synthesised then it should always be the option before taking some unknown drug that’s been made chemically. If you can treat your body, or your mental health, or your physical heath with something more natural it should always be used as a first priority.

In contrast, there were also concerns about the belief that natural is better, and this belief should not be the sole reason for making treatment decisions. Most participants had these concerns.
Kelly: I think that I don't have an idea that if it’s natural it’s good, and if it’s not natural it’s bad. I think that’s a stupid, dangerous, ridiculous bifurcation ... it frightens me the idea that people may be very vulnerable, not psychologically vulnerable so much as physically vulnerable, might get access to ingredients that can have an active effect on your system, without knowing really what the implications of that are.

Appropriate use of herbal medicines. Whether or not herbal medicines are suitable for a particular situation was an important factor in decision making for all participants. All participants believed that both conventional and herbal medicines were important treatment options, and what they chose to use was dependent on each situation. The need to use conventional medicine in certain situations was recognised by all participants.

Greg: I think [for] a lot of lifestyle diseases and prevention things, I think that herbal medicine has a very strong role to play ... For things more serious, like you know, things requiring surgery, or you know cancer, then obviously it’s a bit more limited there.

Mary: ... some people say try, you know, modern [conventional] medicine first and if it doesn't work use herbal. I have no issue with using either one first, or using them both together. I think it depends on what you need it for. Yeah, totally, and it depends on the person again. What works for one may not work for someone else.

While the qualities of herbal medicine can attract people to using them, conversely they can be a barrier to use. For example, while the gentle action of herbs (i.e. having less side-effects) was desirable, being slower to act was considered a problem especially when a fast action is needed to relieve symptoms or treat an infection.

Betty: ... the severity of an illness ... if I’m dealing with something that just needs to be knocked on the head really quickly, which herbal medicines tend to need a bit of time.

Sally: ... it’s probably a slower approach to addressing a problem than prescription [pharmaceutical] drugs.

3.4.2.3. Effectiveness and evidence

Evidence and effectiveness was widely discussed by all participants and included their own experience of herbal medicines, the experience of others (descriptive norms), and information sources. These beliefs influence a person’s decision about whether or not they will take a particular herbal medicine for a specific condition. Those who were more ambivalent about their effectiveness, or questioned the evidence for their effects seemed less likely to use herbal medicine compared to those who had
stronger beliefs about effectiveness. However, all participants believed herbal medicines had some level of effectiveness, and that there was evidence for this. People believed that if a herb has evidence (as defined by them) for a particular effect then the expectation is that it should be effective.

Previous experience (own). Having had a previous experience with herbal medicines was an important form of evidence for effectiveness. A previous positive experience meant that a person was more likely to try herbal medicines again in the future, even if they had a negative experience in another context. For one participant their negative experience with herbal medicines meant they were reluctant to try them again.

Kelly: I would have to say that I am probably a bit ambivalent. On the one hand I recognise that there’s a very long tradition, a great deal of clinical experience for however many thousands of years I don't even know. On the other hand my own personal experience has not been a positive one. I’ve not noticed any benefit from trying herbal medicines. So I’m not really sure how I feel about, about them.

Most participants described positive experiences, however, they described their effects differently to that of pharmaceuticals. For example, herbal medicines were referred to as being calming, rather then being described as having a direct effect on anxiety symptoms. Mary discussed using valerian to "calm her down” when she is stressed, and Linda, who took St John’s wort for depression, said it “calms me down cause you kind of get a bit anxious”. The two participants who had more severe anxiety had contrasting experiences.

Emily: It [herbal medicine] honestly works ... I was only taking two of the Anxioton [herbal formula] or something, and I didn’t notice much, and she [the naturopath] said look can you just do what I ask and take the four a day. And I went oh ok, did it, and then all of a sudden it was like [I could cope without having to ring my dad to calm me down].

Previous experience (others). When asked what they believed was good evidence all participants valued anecdotal evidence, and considered it important when making decisions about using herbal medicines. Most participants valued this more highly than other forms of evidence, including scientific evidence. Even Kelly who was highly educated with a good understanding of research methodology and evidence-
based treatments believed that anecdotal evidence was important when evaluating the effectiveness of herbal medicines.

Kelly: Well I think there is two sides to that. One is if people take them and report a benefit, and that happens for many here in many different situations with many different clients ... I think that’s good evidence.

David: Well proof of the pudding to a certain extent. That there’s some evidence that it works ... that someone had told me by word of mouth that they’d been taking this whatever it was for a period of time and they felt that it cured them, I'd probably be prepared to give it a go.

Information sources. While all participants believed there was evidence for the effectiveness of herbal medicines, there were varied opinions about what was considered good evidence. Participants used a range of information sources to get evidence about the effectiveness of herbal medicines, and had various levels of knowledge about herbal medicines that influenced their beliefs about them and how they used them. They obtained their information from a range of sources, including family and friends, the Internet, and health practitioners—some of whom were herbalists. Only one participant relied solely on a naturopath (also a herbalist) for information and prescription of herbal medicines, which contrasted with another participant who only self-prescribed herbal medicines and relied on information from friends, or health food shop assistants. All other participants used a range of sources for herbal medicine information.

Greg: From hearing anecdotal stories ... [and] through the naturopath herself I suppose ... [when I was younger my partner was studying herbal medicine and] I was reading a lot of her notes ... and just conversations with different people over the years. Oh, I subscribe to Go Health, and when I go to GoVita I just read their magazine a lot, and sometimes I’ll purchase products based on some articles.

People did seek information from their doctors, however they would make their decisions about treatments after considering other information sources as well.

Emily: Everything that’s happened to me ever in my life, whether it’s a cold, my hands, my anxiety, I’ll go to my doctor and find out what it is. But then I’ll go to my naturopath or my healer and say, what have you got? ... cause I still trust the GPs … and I think making an informed decision with both of the information [sources] that you can get [is the smart thing to do].

3.4.2.4. Barriers to using herbal medicines

Barriers to using herbal medicine incorporated the subthemes of cost, confusion, and treatment effectiveness (both herbal medicine and conventional
All participants discussed their beliefs about the things that either empower them or prevent them from using herbal medicines.

Cost. For most participants the cost of herbal medicines was a concern that could be a barrier to using them. However, one participant was “not influenced by the cost of herbal medicines”. Two participants believed that the price of herbal medicines indicated their quality and consequently how effective they are.

Linda: I think what I’ve worked out is that the better ones obviously cost a bit more ... Sometimes I can’t afford it. I’ll always buy that [a herbal medicine] before buying something from a chemist, ah or going to a doctor ... but I’m a single mum and sometimes I actually can't afford anything.

Sally: There’s probably some things out there that I wouldn’t mind trying, but I think they’re just over priced ... So price does come into it for certain things. But then I'll pay ... I don’t buy the cheaper version. I’ll buy good quality things. But there’s a certain cut off point where it might put me off trying something because of the price.

Confusion. Most participants were confused about herbal medicine information. This confusion could relate to not knowing which product is most suitable to use, and what information sources are reliable.

Linda: There’s a lot of, you know, this works for me, and this works for me, and everyone’s got their opinion on what works for them ... you sort of listen to different people and you go to the health food shop and they tell you about something and yeah. And it’s hard to sort of know what you should be buying.

One participant was confused by the different types of herbal medicine preparations, and described a perceived difference in their effectiveness.

Greg: ... there seems to be two different schools of naturopathy ... and they [drop doses] don’t seem to have as an effective response ... When I've gone to a naturopath that uses the full [therapeutic] dose it seemed to work better ... When I have used the drop dose ... sometimes they still work, but not as much ... and sometimes they haven’t worked at all to be honest.

Treatment effectiveness. As mentioned above, previous experience influences beliefs about effectiveness, and can also be a barrier to using herbal medicines when either conventional medicine is already working for someone, or if herbal medicine is not working.

David: I’ve looked at them [herbal medicines] and thought about them, and I’ve sort of been a bit reluctant to try them because what I’m taking seems to be, well seems to work quite well.
Sally: ... sometimes it’s a reoccurring health problem, and something [a herbal medicine] might be working, but the barrier might be it’s not working well enough ... and you're willing to try ... a more traditional [conventional] medicine approach.

3.5. Discussion

This study aimed to explore the beliefs and attitudes towards herbal medicines of adults who have experienced anxiety. Three major themes were identified that influenced the participants’ herbal medicine use: herbal medicines being different to pharmaceuticals, evidence and effectiveness, and barriers to using herbal medicines. Previous research in other cohorts suggests that users of herbal medicines are likely to have post-modern values incorporating beliefs about the importance of natural remedies (O’Callaghan & Jordan, 2003), holism (McFadden et al., 2010), having control over their health (Thomson et al., 2014), and a dissatisfied attitude towards a medical encounter or treatment outcome (Sirois & Gick, 2002). This current study confirms that similar beliefs exist in this sample of adults experiencing anxiety.

In this study, the participants identified the qualities of herbal medicine as the primary reason for seeking an alternative treatment. The perceived differences between herbal medicines and pharmaceutical medicines appeared to draw people towards using herbal medicines. These differences are important to people as they provide an alternative choice if they are dissatisfied with conventional treatment. This finding is consistent with previous research identifying dissatisfaction with the treatment outcome to be important for users of herbal medicines in other clinical groups (Shumay et al., 2002; Sirois & Gick, 2002). In the current study participants spoke about their dislike of side-effects and potential harm from pharmaceutical treatments, which in one participant with more severe anxiety caused her anxiety to increase. These qualities of pharmaceuticals may cause people to believe they have less control over their health, and consequently drive people to seek alternative treatments.

The current study found that various types of evidence were important, however anecdotal evidence was the most influential on treatment decision-making. This is consistent with previous research on psychiatry patients (Alderman & Kiepfer, 2003), and cancer patients (Saini et al., 2011) who relied heavily on friends and family as information sources about herbal medicines. This reliance on anecdotal evidence could be related to trust. People have more trust in others they have close relationships with compared to authority figures. Rejection of authority is an attitude found to predict herbal medicine use (O’Callaghan & Jordan, 2003). Although not explored directly in
this study, we did not find evidence for this attitude. All participants were willing to consult with doctors if needed. Alternatively, people who have previous experience with a specific health treatment are considered experts of their own experience by others in their community (Cotten & Gupta, 2004). This may partially explain why people value anecdotal evidence over scientific evidence.

The varied experiences of effectiveness described by participants, may be explained by the different ways in which herbal medicines were used, and how anxiety was experienced. No two people experienced anxiety in the same way, and each person took different herbal medicines in different contexts. These unique experiences influenced their beliefs and attitudes. The two participants with more extreme anxiety symptoms had opposing experiences with their treatments. One had a very positive experience, with their prescription of herbal medicines being managed by a herbal medicine practitioner, while the other had a negative experience following over the counter advice from a herbalist in a health food store. The different contexts of prescription may provide some explanation for the difference in perceived effectiveness. The person seeing the practitioner was also supported in other ways including lifestyle change, nutritional supplements, and a therapeutic alliance. It is possible that this holistic approach provides a greater benefit to people compared to over-the-counter sales.

The belief that herbs are slower to act than pharmaceutical drugs was a barrier to using herbal medicines. This belief contradicts some of the research evidence for particular herbs. For example, kava has been demonstrated to have a rapid effect similar to that of benzodiazepines in relieving anxiety symptoms (Sarris et al., 2011a). However, it seems there is a lack of evidence for many herbal anxiolytics, so it is difficult to determine the speed of action of many of the herbs taken. It could be that people are not taking adequate doses of these medicines, or have taken poor quality products that do not provide a reliable result, particularly when self-prescribing. Future research should explore the reasons behind this belief. Despite herbal medicines being considered an affordable form of medicine (World Health Organization, 1998), most participants believed cost was a barrier to using herbal medicines and believed they were expensive. This is partly due to pharmaceutical medicines being subsidised in Australia making them an affordable treatment option.

Using a qualitative approach allowed for exploration of data that uncovered some unique findings that can be used to inform future research. However, there are
limitations in this study that need consideration. This was part of a mixed-methods postgraduate study that had time and financial constraints. It is possible that other themes may have been identified if there were a greater number of participants. However, this was a special interest group with a specific scope, and the analytic purpose of the study was achieved (Mason, 2010). In consideration of these restrictions, modest claims have been made about the findings. As this is a qualitative study seeking to explore phenomena in this specific cohort no generalisable conclusions can be made from these results.

3.6. Conclusion

The study showed that participants tend to rely on herbal medicines because they believe they are effective and have different qualities from pharmaceutical drugs. This tendency is based on their belief that they are safe and “natural”, and from their previous experience and the experiences of family and friends. However, participants acknowledged that the available information about herbal medicines can be confusing, and that herbal medicines are not able to treat all health problems, therefore conventional medicine is also important. The study also demonstrated a reliance on non-professional information sources and anecdotes, and beliefs about the safety of “natural” treatments that exposes people to the risk of taking ineffective treatments, or herb-drug interactions. Further research could focus on how to balance patient autonomy and empowerment, while ensuring safe and effective treatment for anxiety should be a focus of future research. The results of this study will inform future research, and provide guidance for health practitioners.

As people are using herbal medicines as an alternative to evidence-based treatments, or concurrently with pharmaceutical treatments it is critical they are provided with information about treatment options, which includes possible interactions with pharmaceuticals, and the suitability of specific treatments for their particular needs. Therefore, future research needs to contribute to education strategies both for people experiencing anxiety using herbal medicines, and for health practitioners. It is critical that health practitioners supporting people with anxiety have herbal medicine knowledge so they can educate them about the potential problems of self-prescribing, and encourage discussion about herbal medicine use. In addition, concerns about not being taken seriously were raised by participants in this study, which can push people away from health care providers, or cause them to not disclose their medicine use. Therefore, when health practitioners have discussions with people about treatment
options they need to empathise with them, and respect their beliefs and treatment
decisions. This is particularly important for people with more severe anxiety, due to the
risk of interactions with pharmaceuticals, or not receiving suitable treatment to help
manage anxiety symptoms.
Chapter 4

Herbal medicine use behaviour in Australian adults who experience anxiety: A descriptive study

4.1. Introduction

The previous chapter identified beliefs and attitudes towards herbal medicines of a group of adults who have experienced anxiety. Three major themes were described: herbal medicines being different to pharmaceuticals, evidence and effectiveness, and barriers to using herbal medicines. The findings were consistent with previous research described in Chapter 2 that users of herbal medicines are likely to have beliefs about the importance of natural treatments, having control over their health, and a dissatisfied attitude towards the medical encounter or treatment outcome. In addition, the previous chapter described how adults with an experience of anxiety were using herbal medicines. Findings from the previous two chapters were also used to inform the development of a questionnaire used in this quantitative phase. The aim of this chapter is to describe the herbal medicine use behaviour of Australian adults who experience anxiety, and answer questions 3 to 5: what is the herbal medicine use behaviour of adults who experience anxiety; how are people who experience anxiety making decisions about herbal medicine use; and does anxiety symptom severity influence herbal medicine use for anxiety symptoms?

The results of this study have been published as follows:


4.2. Background

The experience of anxiety is complex, and anxiety disorders are the most prevalent mental health condition in Australia. Over a quarter of Australian adults reported having an anxiety disorder diagnosis in their lifetime, and 14.4% had a diagnosis in the previous 12 months (T. Slade et al., 2009b). These figures exclude many people who experience problematic anxiety symptoms but do not meet the diagnostic criteria of an anxiety disorder (Grenier et al., 2011; R. C. Kessler & Wittchen, 2002), thus is likely to underestimate prevalence. Both psychological and
pharmaceutical evidence-based treatments are used to treat anxiety symptoms with varying levels of success. People can have poor treatment compliance, find treatments ineffective, or be concerned about the unwanted side-effects of pharmacotherapies (S. Taylor et al., 2012). In addition, people may not seek treatment through health professionals due to fear of stigma or lack of accessibility (S. Clement et al., 2014). This may lead people to seek out alternative or complementary treatments such as herbal medicines, which are widely available to the public and allow for self-preservation.

Herbal medicines are a popular complementary and alternative medicine (CAM) in Australia, with recent prevalence in the general population estimated at 37% (P. Thompson et al., 2012). However, little is known about herbal medicine use in adults who experience anxiety. A recent review of the literature found that herbal medicine use for anxiety symptoms ranged from 2% (general population sample) to 22% (of those with an anxiety disorder diagnosis) across four countries (McIntyre, Saliba, Wiener, & Sarris, 2015b). This review also found that people with more severe anxiety (i.e. an anxiety disorder diagnosis) were significantly more likely to use herbal medicines compared to those with less severe anxiety (i.e. no disorder diagnosis; Bystritsky et al., 2012; Ravven et al., 2011). In addition, people with a generalised anxiety disorder (GAD) diagnosis (Diagnostic and Statistical Manual of Mental Disorders-IV) used more herbal medicines compared to those with any other anxiety disorder diagnosis (Bahceci et al., 2013; Wahlström et al., 2008).

While herbal medicines may complement conventional treatments, or provide an effective alternative for some people, there are potential problems with the use of herbal medicines. For example, there is a risk of herb-drug interaction if taking pharmaceutical medicines concurrently with herbal medicines (Posadzki et al., 2013b). There is also a risk that those who are self-prescribing may be using ineffective treatments, or may not be receiving the most suitable treatments (J. J. L. Wardle & Adams, 2014). This is supported by research revealing that people using herbal medicines do not necessarily take them consistent with their evidence-based indications. Bardia and colleagues (2007) found that only 54.9% of herbal medicine users in the US used herbal medicines in line with their evidence-based indications. The authors suggest that the correct information on the indications for herbal medicines may not be reaching consumers. One explanation for this may be that people are getting their herbal medicine information from non-professional sources such as friends and family, the Internet, or popular media. High use of non-professional information sources for herbal
medicines has been reported in an Australian study of pregnant women, with 32% of herbal medicine users \((n = 458)\) self-prescribing them for anxiety symptoms (Frawley et al., 2015), but it is unclear how this relates to information sources in the general population.

The potential risks of herbal medicine use are increased if people do not disclose their herbal medicine use to health practitioners. Non-disclosure of CAM use was found to be as high as 37% in Australian psychiatric patients \((N = 52;\) Alderman & Kiepfer, 2003). Research on a range of cohorts has found high non-disclosure rates of CAM use to health practitioners for fear of discrimination, or beliefs that their CAM use is not relevant to the practitioner, or that the practitioner did not ask about their CAM use (A. Robinson & McGrail, 2004). The non-disclosure rates of herbal medicine use in adults experiencing anxiety is yet to be reported.

As there is no research to date that has reported the herbal medicine use behaviour of adults experiencing anxiety, the overall aim of this study was to identify how Australian adults who experience anxiety are using herbal medicines. As people with an anxiety disorder diagnosis have been found to have greater use of herbal medicines than those without a diagnosis (Ravven et al., 2011), we hypothesised:

1. Having an anxiety disorder diagnosis would predict a greater probability of herbal medicine use for anxiety symptoms in the previous 12 months compared to those without a disorder diagnosis
2. Having more severe anxiety symptoms in the previous week would predict greater current herbal medicine use for anxiety symptoms than people with less severe symptoms

4.3. Methods

4.3.1. Recruitment and participants

Purposive criterion sampling was used to recruit Australian adults (18 years and over) who have used herbal medicines, and have experienced anxiety symptoms in their lifetime. Anxiety symptoms were described to participants as sweating, palpitations, nervousness, trembling, muscular tension, restlessness, feeling easily fatigued, irritability, over reaction to surprises, difficulty concentrating, irrational fears, worry, and sleep disturbances. Herbal medicines were defined as medicines made from whole plant parts in the form of tablets, capsules, liquid extracts, teas, decoctions, creams and ointments.
Survey invitations (Appendix F) were emailed to 10,575 members of an existing database representative of the general Australian population. The database consisted of people who had registered their interest in participating in research. Eight hundred and ninety six people responded to the invitation—a response rate of 8.47%. Of the 896 respondents 62.2% \((n = 544)\) had used herbal medicines, and 79.6% \((n = 710)\) had experienced anxiety symptoms. Four hundred people met the criteria for the study (i.e. used herbal medicines and had experienced anxiety).

4.3.2. Procedure

Ethics approval was provided by Charles Sturt University (2014/033) in accordance with the declaration of Helsinki (see Appendix G).

Once participants responded to the emailed invitation they were directed to a GroupQuality® online survey tool where participants could complete the survey. An information page was presented to participants that asked for informed consent (Appendix H). Continuing to complete the survey was considered consent. They were then required to answer yes or no to three screening questions: 1) Are you 18 years of age or older?; 2) To the best of your knowledge, have you ever experienced anxiety?; and 3) Have you ever used herbal medicines? If answering no to any of these questions they did not meet the criteria, were thanked for their time, and could not continue with the survey. The survey took approximately 30 minutes to complete. Participants were paid a nominal amount for their participation based on time taken to complete ($10 for 30 minutes).

4.3.3. Measures

Demographic and medicine use questionnaire. A questionnaire was used that included the demographic items: age, gender, postcode, and education level; and items measuring herbal and pharmaceutical medicine use, communication with health care providers, information sources use and disclosure of herbal medicine use.

Health practitioner and herbal medicine use questions. Participants were asked which health providers they had seen in the previous 12 months from a list of practitioners who were considered most likely to prescribe herbal medicines; they also had the opportunity to indicate “other” if there were practitioners they had seen that were not on the list. Both the practitioner use questions and the herbal medicine use questions were adapted from the International Complementary and Alternative Medicine Questionnaire (Quandt et al., 2009), which measures CAM use. The changes made to the questionnaire were related to formatting to enable improved online
delivery, and to focus specifically on herbal medicines rather than CAM in general. The question *Have you used any of these herbs in the last 12 months?* was presented to participants with the option of choosing from a list of 17 herbs commonly used to treat anxiety, plus the option of choosing “herbal formula” or “other herbs used”. For each herb selected a series of questions were asked relating to how the medicines were used, which included current use of each herb selected. A variable for current herbal medicine use was created, with \( 2 = \text{Yes} \) if participants indicated they currently used at least one herbal medicine for anxiety, and \( 1 = \text{No} \) if they did not currently use a herbal medicine for anxiety. The item *During the last 12 months I have used herbal medicines to treat anxiety symptoms* was measured using a Likert type scale ranging from \( 1 = \text{False} \) and \( 7 = \text{True} \). See Appendix I for the questionnaire.

**Anxiety disorder diagnosis.** A dichotomous (Yes, No) item was used to measure self-reported anxiety disorder diagnosis: *Have you ever been diagnosed with an anxiety disorder?*

*The State-Trait Anxiety Inventory (STAI).* The STAI was used to measure both state and trait anxiety. This scale has been widely used, and has demonstrated good reliability and validity in both general and clinical populations (STAI-State alpha = .94, STAI-Trait alpha = .94; Crawford et al., 2011).

*The Depression Anxiety and Stress Scale short version (DASS-21).* The DASS-21 was used as a secondary measure of anxiety, and to identify those with stress and depression symptoms (P. F. Lovibond & Lovibond, 1995) as it is a widely used clinical screening tool for these constructs and has good reliability (alpha = .89 stress, .90 depression, .79 anxiety) and validity (Crawford et al., 2011).

### 4.3.4. Statistical analysis

The data were analysed using SPSS Statistics Version 22. The data were checked for missing values, and items recoded as required. Only one missing value was found for age. Listwise exclusion of the missing value was performed. Statistical assumptions were checked for all relevant analyses, including skewness and kurtosis of variables. Normal distributions were checked using histograms, and boxplots used to check for univariate outliers. All assumptions were found to be within acceptable range.

Descriptive statistics were used to report means, frequencies, and percentages. Chi-square test for goodness of fit was used to determine differences in the frequency of herbal medicine use for anxiety symptoms between those with and without an anxiety disorder diagnosis.
As we found a high amount of nondisclosure of herbal medicine use in our sample, we sought to determine whether there was a relationship between nondisclosure and the following variables: anxiety disorder diagnosis, anxiety symptoms in the previous 12 months, having used herbal medicines for anxiety symptoms, having used pharmaceuticals for anxiety symptoms, and having used a combination of herbal medicines and pharmaceutical for anxiety symptoms. Chi-square test of contingency was used to test relations between dichotomous variables, and Cramer’s V was used to report effect size (Cohen, 1992).

A two-way analysis of variance (ANOVA) was used to examine the effects of anxiety disorder diagnosis and having anxiety symptoms in previous 12 months on herbal medicine use in the previous 12 months. In addition, simple logistic regression was performed to determine whether anxiety symptoms in the previous week predicted current herbal medicine use for anxiety symptoms (a dichotomous variable).

4.4. Results

4.4.1. Participant demographics

Of the 400 participants there were 203 males (50.8%) and 197 females (49.3%). The mean age was 49.1 ($SD = 15.53$), with ages ranging from 18 to 85. The majority of participants resided in the state of New South Wales (NSW; 34%), while the least represented state was the Northern Territory (NT; $n = 1$). The highest level of education for the majority of participants was Bachelor Degree (22.8%), with the least amount of participants either having a Year 10 or equivalent (12%) or a Postgraduate qualification (12%) as their highest level of education. Participants’ demographics are summarised in Table 4.1.
Table 4.1.

Participants’ demographics including: age, gender, state of residence, and education level.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Education level</th>
<th>Total N = 400</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% (n)</td>
<td>% (n)</td>
</tr>
<tr>
<td>Female</td>
<td>49.3 (197)</td>
<td>12 (48)</td>
</tr>
<tr>
<td>Male</td>
<td>50.8 (203)</td>
<td>15.8 (63)</td>
</tr>
<tr>
<td>Age</td>
<td>Year 10 or equivalent</td>
<td>12 (48)</td>
</tr>
<tr>
<td>18–30</td>
<td>16 (64)</td>
<td>16 (64)</td>
</tr>
<tr>
<td>31-40</td>
<td>14.5 (58)</td>
<td>21.5 (86)</td>
</tr>
<tr>
<td>41-50</td>
<td>19.5 (78)</td>
<td>22.8 (91)</td>
</tr>
<tr>
<td>51-60</td>
<td>22.6 (90)</td>
<td>12 (48)</td>
</tr>
<tr>
<td>&gt; 60</td>
<td>27.3 (109)</td>
<td></td>
</tr>
<tr>
<td>State/Territory</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACT</td>
<td>2.75 (11)</td>
<td></td>
</tr>
<tr>
<td>NSW</td>
<td>34 (133)</td>
<td></td>
</tr>
<tr>
<td>NT</td>
<td>0.3 (1)</td>
<td></td>
</tr>
<tr>
<td>QLD</td>
<td>14.3 (57)</td>
<td></td>
</tr>
<tr>
<td>SA</td>
<td>9.3 (37)</td>
<td></td>
</tr>
<tr>
<td>TAS</td>
<td>3.8 (15)</td>
<td></td>
</tr>
<tr>
<td>VIC</td>
<td>25.3 (101)</td>
<td></td>
</tr>
<tr>
<td>WA</td>
<td>11 (44)</td>
<td></td>
</tr>
</tbody>
</table>

Note. There was missing data for one participant on the variable age and state/territory. ACT = Australian Capital Territory; NSW = New South Wales; NT = Northern Territory, QLD = Queensland; SA = South Australia; TAS = Tasmania; VIC = Victoria; WA = Western Australia.

4.4.2. Scale reliabilities and mental health characteristics of participants

The reliabilities for each of the DASS-21 and the STAI scales in the current study were excellent, and within the range of previous research using similar cohorts. The Cronbach alpha levels are displayed in Table 1 with means and standard deviations, along with reference to previous studies using general population and similar clinical samples. The mean scores for the DASS-21 scales indicate that this cohort has worse
mental health compared to general population norms, with stress classified as mild, and depression and anxiety as moderate (S. H. Lovibond & Lovibond, 1996). The mean scores for the STAI State and Trait scales were between general population and clinical norms, as shown in Table 4.2.

Table 4.2.
Scale reliabilities of the DASS-21 and STAI

<table>
<thead>
<tr>
<th>Scale</th>
<th>Current study</th>
<th>General population norms</th>
<th>Clinical population</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>α</td>
</tr>
<tr>
<td>DASS-21</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stress</td>
<td>8.07</td>
<td>5.28</td>
<td>.91</td>
</tr>
<tr>
<td>Depression</td>
<td>6.98</td>
<td>5.87</td>
<td>.94</td>
</tr>
<tr>
<td>Anxiety</td>
<td>5.82</td>
<td>5.14</td>
<td>.90</td>
</tr>
<tr>
<td>STAI Trait</td>
<td>46.63</td>
<td>12.39</td>
<td>.94</td>
</tr>
<tr>
<td>STAI State</td>
<td>43.65</td>
<td>12.87</td>
<td>.94</td>
</tr>
</tbody>
</table>

Note. α = Cronbach alpha; DASS = Depression Anxiety Stress Scale; STAI = State Trait Anxiety Inventory.

aAustralian general population norms taken from (Crawford et al., 2011).
bClinical population norms (anxiety or mood disorder diagnosis) for the DASS-21 taken from (Brown, Chorpita, Korotitsch, & Barlow, 1997).
cClinical population norms (GAD diagnosis) for the STAI State and Trait scales taken from (B. L. Kennedy, Schwab, Morris, & Beldia, 2001)
dNot reported in results.

4.4.3. Anxiety and medicine use characteristics

The majority of participants (82.3%) experienced anxiety symptoms in the previous 12 months, with 47% reporting having previously been diagnosed with an anxiety disorder (type of disorder not specified). In addition, 72.8% of participants used herbal medicines specifically for anxiety symptoms in their lifetime, while 55.3% had used prescribed pharmaceuticals, with 27.5% having used herbal medicines concurrently with prescribed pharmaceuticals. Of those with an anxiety disorder diagnosis (n = 188), 83.5% used herbal medicines for anxiety symptoms, which compared to 63.2% of those without a disorder diagnosis (n = 134). Chi-square test for goodness of fit indicated that those with an anxiety disorder diagnosis reported a
significantly greater frequency of herbal medicine use for anxiety symptoms than those without a diagnosis, \( \chi^2 (1, N = 188) = 84.45, p = .000 \). Cohen’s \( w \) was 0.67, which is a large effect size (Cohen, 1992).

4.4.4. **Practitioner use and herbal medicine prescribing**

General practitioners were the most frequently consulted health practitioner, with 87% of people having seen a medical doctor in the last 12 months, with an average of 12 visits over this time. In contrast, Western herbalists (4.8%) and homeopaths (4.5%) were the practitioners seen by the least number of participants. However, while it was not common for people to consult Western herbalists, those who did had an average of 7.5 visits in the previous 12 months, which was the second highest number of consultations for a practitioner during that time. The second most consulted practitioners in the previous 12 months were psychologists (19.5%), who were seen an average of 6.2 times. All health practitioners were reported to have prescribed herbal medicines to varying degrees, with the most frequent being traditional Chinese medicine (TCM) practitioners (83.3%), Western herbalists (73.7%), and naturopaths (77%). This compared to the lowest prescribers of herbal medicines, who were psychiatrists (9.1%), psychologists (7.7%), and general practitioners (5.5%). Health practitioner use and herbal medicine prescription is summarised in Table 4.3.
Table 4.3.
Type of health practitioner seen and prescription of herbal medicines

<table>
<thead>
<tr>
<th>Practitioner type</th>
<th>Frequency of type of practitioner seen in the previous 12 months&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Number of visits in the previous 12 months&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Frequency of herbal medicine prescription by practitioner&lt;sup&gt;c&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% (n)</td>
<td>M&lt;sup&gt;b&lt;/sup&gt;</td>
<td>% (n)&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>General practitioner</td>
<td>87 (348)</td>
<td>12.04</td>
<td>5.5 (19)</td>
</tr>
<tr>
<td>Psychologist</td>
<td>19.5 (78)</td>
<td>6.20</td>
<td>7.7 (6)</td>
</tr>
<tr>
<td>Chiropractor</td>
<td>15 (60)</td>
<td>6.62</td>
<td>15 (9)</td>
</tr>
<tr>
<td>Acupuncturist</td>
<td>13 (52)</td>
<td>6.73</td>
<td>42.3 (22)</td>
</tr>
<tr>
<td>Naturopath</td>
<td>12 (48)</td>
<td>2.76</td>
<td>77.1 (37)</td>
</tr>
<tr>
<td>TCM practitioner</td>
<td>12 (48)</td>
<td>4.83</td>
<td>83.3 (40)</td>
</tr>
<tr>
<td>Nutritionist</td>
<td>10.3 (41)</td>
<td>3.07</td>
<td>19.5 (8)</td>
</tr>
<tr>
<td>Psychiatrist</td>
<td>8.3 (33)</td>
<td>4.88</td>
<td>9.1 (3)</td>
</tr>
<tr>
<td>Western herbalist</td>
<td>4.8 (19)</td>
<td>7.56</td>
<td>73.7 (14)</td>
</tr>
<tr>
<td>Homeopath</td>
<td>4.5 (18)</td>
<td>4.00</td>
<td>72.2 (13)</td>
</tr>
<tr>
<td>Other</td>
<td>16.8 (67)</td>
<td>8.89</td>
<td>12.1 (8)</td>
</tr>
<tr>
<td>Manual therapist</td>
<td>5 (20)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical specialist</td>
<td>4.8 (19)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAM practitioner&lt;sup&gt;d&lt;/sup&gt;</td>
<td>2.8 (11)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>6.8 (27)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. TCM = Traditional Chinese medicine practitioner; CAM = Complementary and alternative medicine.

<sup>a</sup>A multiple response item; participants were asked to select from a predetermined list of health practitioners or other where they could list the other type of practitioner seen.

<sup>b</sup>Mean number of visits to practitioner in previous 12 months.

<sup>c</sup>Frequency and percentage of number of each practitioner seen in the previous 12 months.

<sup>d</sup>Other CAM practitioners included iridologist, reflexologist; and Japanese, Korean, and Indonesian herbalists as described by participants.
4.4.5. **Herbal medicine use**

The most commonly used herbal medicine to treat anxiety symptoms in the previous 12-months was chamomile (43%), followed by lavender (32.5%). For all herbs used self-prescription was common, and ranged from 8.7% (gotu kola) to 68% (chamomile) for individual herbs. Ginkgo was reported to be the most frequently prescribed herb (31.3%) to treat anxiety symptoms by a herbal medicine practitioner, with oats being the least prescribed by these practitioners (5.1%). The least used herbs for anxiety symptoms in the previous 12 months were zizyphus (1.5%), bacopa (2%), and skullcap (2%). See Table 4.4 for the frequency of herbal medicines used for anxiety symptoms, and how they were prescribed. Chamomile was most frequently ingested as a tea (89.7%), with liquorice most frequently used as a powder (59.1%), valerian most frequently used as a tablet (70.5%), and lavender most frequently used as a liquid extract (34.3%). All herbal medicines were used in a range of different preparations (see Table 4.5).
Table 4.4.
Frequency of herbal medicines used to treat anxiety symptoms and who prescribed each medicine

<table>
<thead>
<tr>
<th>Herbal medicine</th>
<th>Use in previous 12 months (N = 400)</th>
<th>Current use&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Who prescribed % (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% (n)</td>
<td>% (n)</td>
<td>Self-prescribed</td>
</tr>
<tr>
<td>Bacopa</td>
<td>2 (8)</td>
<td>62.5 (5)</td>
<td>35.7 (5)</td>
</tr>
<tr>
<td>Chamomile</td>
<td>43 (172)</td>
<td>65.1 (112)</td>
<td>68 (119)</td>
</tr>
<tr>
<td>Ginkgo</td>
<td>13.8 (55)</td>
<td>47.3 (26)</td>
<td>42.2 (27)</td>
</tr>
<tr>
<td>Ginseng&lt;sup&gt;b&lt;/sup&gt;</td>
<td>19.5 (78)</td>
<td>50 (39)</td>
<td>37.1 (33)</td>
</tr>
<tr>
<td>Gotu kola</td>
<td>1.5 (6)</td>
<td>83.3 (5)</td>
<td>8.7 (2)</td>
</tr>
<tr>
<td>Kava</td>
<td>3.5 (14)</td>
<td>42.9 (6)</td>
<td>16.7 (5)</td>
</tr>
<tr>
<td>Lavender</td>
<td>32.5 (130)</td>
<td>60.8 (79)</td>
<td>58.6 (82)</td>
</tr>
<tr>
<td>Lemon balm</td>
<td>8.3 (33)</td>
<td>57.6 (19)</td>
<td>32.7 (16)</td>
</tr>
<tr>
<td>Liquorice</td>
<td>11 (44)</td>
<td>43.2 (19)</td>
<td>50.8 (30)</td>
</tr>
<tr>
<td>Oats</td>
<td>15.5 (62)</td>
<td>59.7 (37)</td>
<td>55.1 (43)</td>
</tr>
</tbody>
</table>
## Herbal medicine Use in previous 12 months (N = 400)

<table>
<thead>
<tr>
<th>Herbal medicine</th>
<th>Use in previous 12 months</th>
<th>Current use&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Who prescribed % (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% (n)</td>
<td>% (n)</td>
<td>Self-prescribed</td>
</tr>
<tr>
<td>Passionflower</td>
<td>7 (28)</td>
<td>60.7 (17)</td>
<td>29.4 (15)</td>
</tr>
<tr>
<td>Rhodiola</td>
<td>3 (12)</td>
<td>58.3 (7)</td>
<td>10.8 (4)</td>
</tr>
<tr>
<td>Skullcap</td>
<td>2 (8)</td>
<td>37.5 (3)</td>
<td>9.4 (3)</td>
</tr>
<tr>
<td>St John’s wort</td>
<td>19.3 (77)</td>
<td>39 (30)</td>
<td>36 (36)</td>
</tr>
<tr>
<td>Valerian</td>
<td>20.8 (83)</td>
<td>45.8 (38)</td>
<td>45.7 (48)</td>
</tr>
<tr>
<td>Withania</td>
<td>2.5 (10)</td>
<td>60 (6)</td>
<td>11.4 (4)</td>
</tr>
<tr>
<td>Zizyphus</td>
<td>1.5 (6)</td>
<td>83.3 (5)</td>
<td>9.7 (3)</td>
</tr>
<tr>
<td>Other</td>
<td>19.8 (79)</td>
<td>40 (32)</td>
<td>26.9 (28)</td>
</tr>
</tbody>
</table>

<sup>a</sup>Reported as percentage of users of each herb in the previous 12 months.

<sup>b</sup>Either Korean or Siberian ginseng

<sup>c</sup>Herbal medicine practitioner included naturopaths, Western herbalists, traditional Chinese medicine practitioners, and acupuncturists.

<sup>d</sup>Other CAM = includes chiropractors, nutritionists, and homeopaths.

<sup>e</sup>Other general = any other health practitioner not listed.
Table 4.5.

Percentage of users for each herbal medicine preparation

<table>
<thead>
<tr>
<th>Herbal medicine</th>
<th>Herbal medicine preparation type</th>
<th>% (n)&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tea</td>
<td>Powder</td>
</tr>
<tr>
<td>Bacopa</td>
<td>21.4 (3)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Chamomile</td>
<td>89.7 (157)</td>
<td>1.7 (3)</td>
</tr>
<tr>
<td>Ginkgo</td>
<td>32.8 (21)</td>
<td>7.8 (5)</td>
</tr>
<tr>
<td>Ginseng (Korean or Siberian)</td>
<td>30.3 (27)</td>
<td>7.9 (7)</td>
</tr>
<tr>
<td>Gotu kola</td>
<td>8.7 (2)</td>
<td>4.3 (1)</td>
</tr>
<tr>
<td>Kava</td>
<td>16.7 (5)</td>
<td>6.7 (2)</td>
</tr>
<tr>
<td>Lavender</td>
<td>20 (28)</td>
<td>7.9 (11)</td>
</tr>
<tr>
<td>Lemon balm</td>
<td>44.9 (22)</td>
<td>6.1 (3)</td>
</tr>
<tr>
<td>Liquorice</td>
<td>40.9 (18)</td>
<td>59.1 (26)</td>
</tr>
<tr>
<td>Oats</td>
<td>10.3 (8)</td>
<td>28.2 (22)</td>
</tr>
<tr>
<td>Passionflower</td>
<td>23.5 (12)</td>
<td>3.9 (2)</td>
</tr>
<tr>
<td>Rhodiola</td>
<td>8.1 (3)</td>
<td>5.4 (2)</td>
</tr>
<tr>
<td>Skullcap</td>
<td>9.4 (3)</td>
<td>3.1 (1)</td>
</tr>
<tr>
<td>St John’s wort</td>
<td>6 (6)</td>
<td>1 (1)</td>
</tr>
<tr>
<td>Valerian</td>
<td>4.8 (5)</td>
<td>1 (1)</td>
</tr>
<tr>
<td>Withania</td>
<td>14.3 (5)</td>
<td>8.6 (3)</td>
</tr>
<tr>
<td>Zizyphus</td>
<td>3.2 (1)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Other</td>
<td>14.4 (15)</td>
<td>0 (0)</td>
</tr>
</tbody>
</table>

<sup>a</sup>Reported as percentage of users of each herb in previous 12 months.
4.4.6. **Information sources**

The Internet (53%) was the most frequently used source of information for herbal medicines, with media advertisements being used the least (5.5%). Use of information sources is displayed in Table 4.6.

Table 4.6.

*Frequency of use of herbal medicine information sources*

<table>
<thead>
<tr>
<th>Information sources</th>
<th>Frequency of use</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% (n)*</td>
</tr>
<tr>
<td>The Internet</td>
<td>53 (212)</td>
</tr>
<tr>
<td>Friend or family</td>
<td>43.8 (175)</td>
</tr>
<tr>
<td>Health food shop assistant</td>
<td>24.8 (99)</td>
</tr>
<tr>
<td>Herbal medicine practitioner</td>
<td>21.8 (87)</td>
</tr>
<tr>
<td>General practitioner</td>
<td>21.5 (86)</td>
</tr>
<tr>
<td>Magazines/newspapers</td>
<td>17.5 (70)</td>
</tr>
<tr>
<td>Pharmacist</td>
<td>17.3 (69)</td>
</tr>
<tr>
<td>Pharmacy assistant</td>
<td>13.8 (55)</td>
</tr>
<tr>
<td>Other health care provider</td>
<td>9.5 (38)</td>
</tr>
<tr>
<td>Other</td>
<td>9.5 (38)</td>
</tr>
<tr>
<td>Media advertising</td>
<td>5.5 (22)</td>
</tr>
</tbody>
</table>

*Multiple response item reported as percent of cases.*

4.4.7. **Disclosure of herbal medicine use**

Forty-eight percent of participants did not disclose their herbal medicine use to their doctor, with 55.3% not disclosing to other health care providers.

Disclosure of herbal medicine use to both medical doctors and other health practitioners had small significant relations with the following variables: having had an anxiety disorder diagnosis, having used herbal medicines for anxiety symptoms, having
used pharmaceutical medicines for anxiety symptoms, and having used a combination of pharmaceutical and herbal medicines for anxiety symptoms. The effect size of all these relations was small according to Cramer’s V (Cohen, 1992). These results mean that people who had an anxiety disorder diagnosis, or used either herbal medicines or pharmaceuticals for anxiety symptoms, were significantly more likely to disclose their herbal medicine use to their doctor and other health practitioners. However, those who used a combination of herbal and pharmaceutical medicines for anxiety symptoms were significantly less likely to disclose their use. There was no relation found between disclosure of herbal medicine use and having anxiety symptoms in the previous 12 months. Statistics and results for the chi-square tests of contingency are presented in Table 4.7.
Table 4.7.
Disclosure of herbal medicine use to doctor and other health practitioners

<table>
<thead>
<tr>
<th></th>
<th>Disclosure of herbal medicine use to doctor</th>
<th>Disclosure of herbal medicine use to other health practitioners</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( (N = 400, \ df = 1) )</td>
<td>( (N = 400, \ df = 1) )</td>
</tr>
<tr>
<td>No</td>
<td>Yes</td>
<td>Cramer's V</td>
</tr>
<tr>
<td>% (n)</td>
<td>% (n)</td>
<td>% (n)</td>
</tr>
<tr>
<td>No</td>
<td>43.8 (91)</td>
<td>46.3 (87)</td>
</tr>
<tr>
<td>Yes</td>
<td>56.3 (117)</td>
<td>53.7 (101)</td>
</tr>
<tr>
<td>Total</td>
<td>47 (188)</td>
<td>47 (188)</td>
</tr>
<tr>
<td>Anxiety disorder diagnosis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>15.9 (33)</td>
<td>54.1 (178)</td>
</tr>
<tr>
<td>No</td>
<td>84.1 (175)</td>
<td>45.9 (151)</td>
</tr>
<tr>
<td>Total</td>
<td>82.3 (329)</td>
<td>82.3 (329)</td>
</tr>
<tr>
<td>Anxiety symptoms in previous 12 months</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>20.7 (43)</td>
<td>48.5 (141)</td>
</tr>
<tr>
<td>No</td>
<td>79.3 (165)</td>
<td>51.5 (150)</td>
</tr>
<tr>
<td>Total</td>
<td>72.8 (291)</td>
<td>72.8 (291)</td>
</tr>
<tr>
<td>Used herbal medicines for anxiety symptoms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>34.4 (66)</td>
<td>73.4 (80)</td>
</tr>
<tr>
<td>No</td>
<td>65.6 (126)</td>
<td>26.6 (29)</td>
</tr>
<tr>
<td>Total</td>
<td>27.3 (109)</td>
<td>27.3 (109)</td>
</tr>
</tbody>
</table>

Chi square: .1488** \( p = .000 \), \( \text{Cramer's } V = .19 \)

Chi square: .105 \( p = .305 \), \( \text{Cramer's } V = .321 \)

Chi square: .946** \( p = .002 \), \( \text{Cramer's } V = .15 \)

Chi square: .99 \( p = .321 \), \( \text{Cramer's } V = .321 \)
Disclosure of herbal medicine use to doctor (N = 400, df = 1)

<table>
<thead>
<tr>
<th></th>
<th>No</th>
<th>Yes</th>
<th>Total</th>
<th>Chi square</th>
<th>p</th>
<th>Cramer’s V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Used pharmaceuticals for anxiety symptoms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>35.1 (73)</td>
<td>64.9 (135)</td>
<td>55.3 (221)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>52.5 (106)</td>
<td>44.8 (86)</td>
<td>44.8 (179)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>48 (192)</td>
<td>52 (208)</td>
<td>100 (400)</td>
<td>16.33**</td>
<td>.000</td>
<td>.20</td>
</tr>
</tbody>
</table>

Disclosure of herbal medicine use to other health practitioners (N = 400, df = 1)

<table>
<thead>
<tr>
<th></th>
<th>No</th>
<th>Yes</th>
<th>Total</th>
<th>Chi square</th>
<th>p</th>
<th>Cramer’s V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Used pharmaceuticals for anxiety symptoms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>48.4 (107)</td>
<td>51.6 (114)</td>
<td>55.3 (221)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>63.7 (114)</td>
<td>36.3 (65)</td>
<td>44.8 (179)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>55.3 (221)</td>
<td>44.8 (179)</td>
<td>100 (400)</td>
<td>9.39**</td>
<td>.002</td>
<td>.15</td>
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</tbody>
</table>

Combined pharmaceuticals with herbal medicines for anxiety symptoms

<table>
<thead>
<tr>
<th></th>
<th>No</th>
<th>Yes</th>
<th>Total</th>
<th>Chi square</th>
<th>p</th>
<th>Cramer’s V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>40.9 (45)</td>
<td>59.1 (65)</td>
<td>27.5 (110)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>60.7 (176)</td>
<td>39.3 (114)</td>
<td>72.5 (290)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>55.3 (221)</td>
<td>44.8 (179)</td>
<td>100 (400)</td>
<td>12.62**</td>
<td>.000</td>
<td>.18</td>
</tr>
</tbody>
</table>

**< p = 0.01

Note. Chi-square test of contingency tested relations between dichotomous variables.
4.4.8. **Anxiety severity and herbal medicine use for anxiety symptoms**

We further investigated the characteristics of those who used herbal medicines for anxiety symptoms. First, we were interested in whether having anxiety symptoms in the previous 12 months or an anxiety disorder diagnosis, influenced the probability of herbal medicine use in the previous 12 months. Second, we wanted to know if anxiety symptom severity in the previous week predicted current herbal medicine use for anxiety symptoms.

A two-way analysis of variance (ANOVA) was used to examine the effects of anxiety disorder diagnosis and having anxiety symptoms in the previous 12 months on herbal medicine use in the previous 12 months. There was homogeneity of variances as assessed by Levene’s test, $p = .45$. People with a previous anxiety disorder diagnosis ($M = 4.90, SE = 0.25, 95\% \text{ CI} [4.40, 5.40]$) were more likely to use herbal medicines in the previous 12 months than those without an anxiety disorder diagnosis ($M = 4.04, SE = 0.18, 95\% \text{ CI} [3.70, 4.39]$). Anxiety disorder diagnosis accounted for 2% of the variability of herbal medicine use in the previous 12 months, which is a small effect size ($\eta^2 = .02$). Anxiety symptoms in the previous 12 months accounted for 2% of the variability in herbal medicine use for anxiety symptoms in the previous 12 months, partial $\eta^2 = .02$ (see Table 4.8).

People with anxiety symptoms in the previous 12 months ($M = 4.95, SE = 0.12, 95\% \text{ CI} [4.71, 5.19]$) were significantly more likely to use herbal medicines for anxiety symptoms in the previous 12 months than those without anxiety symptoms ($M = 3.99, SE = 0.28, 95\% \text{ CI} [3.44, 4.55]$). Anxiety symptoms in the previous 12 months accounted for 2% of the variability of herbal medicine use in the previous 12 months, which is a small effect size, partial $\eta^2 = .02$. See Table 4.8 for results of the two-way ANOVA. There was no interaction between anxiety disorder diagnosis and anxiety symptoms in the previous 12 months.
Table 4.8.
Anxiety disorder diagnosis and anxiety symptoms in previous 12 months predicting herbal medicine use.

<table>
<thead>
<tr>
<th>Variables</th>
<th>df</th>
<th>F</th>
<th>SS</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety disorder diagnosis</td>
<td>1, 396</td>
<td>7.77</td>
<td>36.78</td>
<td>.006**</td>
</tr>
<tr>
<td>Anxiety symptoms in previous 12 months</td>
<td>1, 396</td>
<td>9.66</td>
<td>45.75</td>
<td>.002**</td>
</tr>
<tr>
<td>AD x AS</td>
<td>1, 396</td>
<td>2.54</td>
<td>12.05</td>
<td>.112</td>
</tr>
</tbody>
</table>

**< p = 0.01.

Note. AD = anxiety disorder diagnosis; AS = anxiety symptoms. A two-way analysis of variance (ANOVA) examined the effects of anxiety disorder diagnosis and having anxiety symptoms in previous 12 months on herbal medicine use in the previous 12 months.

Simple logistic regression showed that severity of anxiety symptoms in the previous week statistically significantly predicted 6% (Nagelkerke $R^2$) of the variance in current herbal medicine use for anxiety symptoms, $\chi^2 = 18.03$, and correctly classified 63.5% of cases. The results and odds ratio are presented in Table 4.9, which suggest that the odds of currently using herbal medicines for anxiety symptoms are significantly greater for people with more severe anxiety symptoms.

Table 4.9.
Logistic regression predicting likelihood of current herbal medicine use for anxiety symptoms

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE</th>
<th>Wald</th>
<th>df</th>
<th>p</th>
<th>Odds Ratio</th>
<th>95% CI for Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety symptoms</td>
<td>.09</td>
<td>.02</td>
<td>16.20</td>
<td>1</td>
<td>.00</td>
<td>1.10</td>
<td>[1.05, 1.15]</td>
</tr>
</tbody>
</table>

4.5. Discussion

This is the first known study to provide a comprehensive description of how Australian adults who experience anxiety symptoms are using herbal medicines. Almost half the participants had previously been diagnosed with an anxiety disorder, with the remaining having experienced anxiety symptoms. The majority (73%) used herbal medicines specifically for their anxiety symptoms, with half the cohort having experienced moderate to severe anxiety symptoms in the previous week. These results
support previous research finding that Australian adults are using herbal medicines for anxiety symptoms (A. L. Zhang et al., 2008).

Participants had consultations with a range of health professionals. Medical doctors were the most frequently consulted health practitioners in the previous 12 months, but they did not prescribe herbal medicines often. This contrasted with Western herbalists who were one of the least consulted practitioners, who prescribed herbal medicines most frequently. The low frequency of consultations with Western herbalists is consistent with previous research including Australian woman (J. Adams, Sibbritt, & Young, 2007). Western herbalists are unregulated in Australia and not considered part of the conventional health system (J. J. L. Wardle & Adams, 2014), which may partly explain why so few people reported consulting these practitioners. However, in the current study consultations to naturopaths (who are also unregulated) were reported to be as frequent as TCM practitioners who are regulated, suggesting other factors are involved. Some practitioners specialise in Western herbal medicine, but advertise themselves as other types of practitioners; for example, many naturopaths specialise in Western herbal medicine. This may cause confusion for health care consumers in terms of being able to accurately identify what type of practitioner they are consulting, which may have affected the accuracy of the reporting of these consults. Despite the low number of participants consulting Western herbalists they were reported to have the second highest number visits in the previous 12 months for a practitioner. It is unclear why this is the case.

Practitioners with specialised training in the clinical prescription of herbal medicines (i.e. Western herbalists, TCM practitioners, and naturopaths) were reported to prescribe herbal medicines more frequently than other practitioners (e.g. medical doctors and psychologists). This is unsurprising given that other health practitioners do not receive undergraduate training in herbal medicine prescribing, therefore may either lack confidence or ability to prescribe these medicines, be unaware of the efficacy and safety of herbal medicines, or choose other treatments that they consider more appropriate, such as pharmaceuticals and psychological interventions.

A range of herbal medicines were being used to treat anxiety symptoms, with variation in the preparation types used for each herb. This is likely to relate to factors such as taste, availability of the type of preparation, who is prescribing or selling the herbal medicine, and cultural use. For example, chamomile was the most frequently used herbal medicine for anxiety symptoms, the most frequently self-prescribed, and
consumed as a tea. The high rates of self-prescription of chamomile is likely to reflect this herb being widely available, and commonly being consumed as a beverage for enjoyment. In contrast, valerian and St John’s wort were also frequently self-prescribed, however they are more commonly available as a tablet, which was the preparation most frequently used for these herbs.

High amounts of self-prescribing of herbal medicines was found in this cohort (up to 68%), which is consistent with self-prescribing previously reported in the Australian general population (51.8%; A. L. Zhang et al., 2008), and more recently in women during pregnancy (77.9%; Frawley et al., 2015). In contrast, there was less practitioner prescribing reported, with only up to 31.3% of individual herbs being prescribed by herbal medicine practitioners, which is slightly higher than previously reported in the general Australian population (27.4; A. L. Zhang et al., 2008). People with anxiety disorders have been found to have barriers to accessing health care, such as lack of time, treatment cost, embarrassment, and stigma (Prins et al., 2008), which may partly explain the high rates of self-prescribing of herbal medicines in our study. In addition, people with mental health problems have reported preference to self-manage their symptoms (Olesen, Butterworth, & Leach, 2010). We also found that 48% of participants did not disclose their herbal medicine use to their treating medical doctor. This is consistent with research in psychiatric outpatients finding that between 37 (Alderman & Kiepfer, 2003) and 49 percent (Knaudt et al., 1999) of patients did not disclose their CAM use to their healthcare providers. In addition, over 27% of participants had used herbal medicines concurrently with pharmaceuticals for their anxiety symptoms, which is consistent with CAM users in an Australian population sample (26%; A. L. Zhang et al., 2008). However, in our study the people who had an anxiety disorder diagnosis, or used pharmaceutical medicines for anxiety symptoms were more likely to disclose their herbal medicine use to their medical doctor. It is difficult to identify why these people are more likely to disclose herbal medicine use as it contradicts findings from research mentioned previously. Perhaps they are more comfortable with discussing their anxiety and other issues with their health practitioners as they have already been prescribed a medication for their anxiety symptoms and may not be concerned about the stigma, or they have an established rapport with their health care providers and feel supported to disclose their use.

Self-prescription and non-disclosure of herbal medicine use is problematic as it does not allow for health practitioners to provide their patients with optimal care, and
there is the potential for herb-drugs interactions. For example, kava (*Piper methysticum*), gingko (*Gingko biloba*), St John’s wort (*Hypericum perforatum*) and ginseng (*Panax ginseng*)—all used by participants in our study—have been found to interact with various classes of commonly prescribed pharmaceuticals (Posadzki 2012). The reasons for this behaviour are unclear, however it may be that those who are combining herbal medicines with pharmaceuticals are concerned about disclosing this to their health care providers for fear of discrimination. Discrimination in health care was found to be related to self-prescribed herbal medicine use in a representative sample of US adults (Thorburn et al., 2013). In addition, being dissatisfied with the medical encounter has been found to predict CAM use in both cancer (Paltiel et al., 2001; Shumay et al., 2002) and general population samples (Siahpush, 1998; Sirois & Gick, 2002). More research is needed in this area to determine the reasons for discrimination by health practitioners, especially considering that people with mental health problems report stigma as a barrier to health care (S. Clement et al., 2014).

Herbs with evidence of efficacy in treating anxiety (i.e. kava and passionflower; Sarris et al., 2013c) were not frequently used in this study, suggesting that people may not receive information about the efficacy of these herbal medicines. This is consistent with a US study finding that people were not using herbal medicines according to their evidence-based indications (Bardia et al., 2007). This may be related to our finding that non-professional information sources, such as the internet and family and friends, were the most frequently used when making decisions about herbal medicine use. High use of non-professional information sources has previously been found in psychiatric patients (Alderman & Kiepfer, 2003) and other at risk cohorts, such as pregnant women (Frawley et al., 2015). It is not clear why people use non-professional information sources. However, qualitative interviews found that people with anxiety value their own experience and that of important others as a form of evidence (McIntyre, Saliba, & Moran, 2015a). This is an important behaviour to understand, and needs more research.

Almost half the participants were currently taking herbal medicines for anxiety symptoms while not experiencing problematic anxiety symptoms in the previous week. It is unclear why they were taking these medicines. However, herbal medicines could be effective in providing some relief of anxiety symptoms, or are being taken as a preventative treatment. Maintaining health and preventing illness (Alderman & Kiepfer, 2003) have previously been identified as reasons for taking herbal medicines. Zhang
and colleagues (A. L. Zhang et al., 2008) reported that over 50% of Australian adults who took commonly used herbs did so to enhance their health. The use of herbal anxiolytics when experiencing less severe anxiety may potentially prevent subthreshold anxiety from developing into a more serious disorder. This is an area for future research.

We found that people with an anxiety disorder diagnosis were more likely to use herbal medicines than those without. This is consistent with previous research reporting higher amounts of herbal medicine use in people with an anxiety disorder diagnosis (Ravven et al., 2011). We also found people with anxiety symptoms in the previous week had greater current use of herbal medicines for anxiety symptoms compared to those without, which suggests that anxiety severity increases the use of herbal medicines for anxiety symptoms. As over 30% of people with anxiety disorders do not respond to evidence-based psychological and pharmaceutical treatments (S. Taylor et al., 2012), they may seek additional relief for anxiety symptoms, which could be one reason why people are taking herbal medicines concurrently with pharmaceuticals. Some people may also be using psychological treatments at the same time as taking herbal medicines. Participants were not asked about their use of psychological therapies in this study. Future research could seek to determine the full range of treatments people are using for their anxiety symptoms and reasons for choosing these therapies.

In respect to study limitations, this study relied on self-report of previous herbal medicine use and anxiety disorder diagnosis, which may be affected by recall bias. As a convenience sample was used the generalisability of the results is limited due to potential response bias. In addition, the prevalence of herbal medicine use for anxiety symptoms in this cohort cannot be generalised to the broader population. However, the sample demographics suggest that the sample was reasonably representative of the Australian population with regards to gender (Australian Bureau of Statistics, 2015b), and geographic location (Australian Bureau of Statistics, 2015a), but slightly older than the median population age (Australian Bureau of Statistics, 2015b). This study does provide a comprehensive description of herbal medicine use behaviour in a sample of adults who experience anxiety. More research on specific population samples is needed to determine prevalence rates of herbal medicine use for anxiety.

Future research should seek to understand decision making involved in using herbal medicines for anxiety symptoms. In certain instances self-prescription can be
done safely, however it can be difficult for the public to assess the information presented to them (Shreffler-Grant et al., 2014). In addition, it is difficult to determine if people are receiving the most suitable treatment for their needs, as they are self-prescribing, consulting with a range of health practitioners, and not disclosing their herbal medicine use. Therefore, it needs to be determined how accurate reliable information can be made more accessible to both the public and health practitioners, so they can be better educated about the efficacy, effectiveness, and safety of herbal anxiolytics to ensure the most suitable treatments are used. As medical doctors were the most frequently seen health care provider in our study it is critical that they continue to educate themselves and their patients about herbal medicine.

4.6. Conclusions

This study is the first to measure how a cohort of Australian adults with an experience of anxiety are using herbal medicines. Herbal medicines are being used by adults with anxiety and are commonly self-prescribed for anxiety symptoms. Health practitioners who are experts in herbal medicine prescribing are consulted infrequently. In addition, herbal medicine use is often not disclosed to health practitioners. These behaviours are concerning as people may not be receiving the most suitable treatments for their needs, and may even be dangerous. These findings can inform future research to assist in determining the reasons for non-disclosure, and high rates of self-prescribing. Given that herbal medicine use and self-prescription in the general population is increasing, it is critical we develop a better understanding of why people are using these medicines, and how we can develop improved health literacy to help with treatment decision making to ensure they receive optimal care.
Chapter 5

Predicting the intention to use herbal medicines for anxiety symptoms: A model of health behaviour

5.1. Introduction

This chapter describes part two of the third phase of this research. The literature review in Chapter 2 reported that several beliefs and attitudes were found to predict the intention to use herbal medicines, or actual herbal medicine use behaviour. Both Chapter 2 and Chapter 4 reported that people with more severe anxiety symptoms used more herbal medicines for these symptoms. In addition, Chapter 2 proposed that control beliefs, and dissatisfaction with the medical encounter might be important predictors of herbal medicine use for anxiety symptoms, and provide some explanation of why people with more severe anxiety are using more herbal medicines for their symptoms. As reported in Chapter 3 and 4, family and friends influence a person’s decision making related to herbal medicine use for anxiety symptoms. Based on these findings this chapter addresses research question 6 of this thesis: what factors predict the intention to use herbal medicines for anxiety symptoms in adults who experience anxiety? Therefore, the aim of this chapter is to test a hypothesised theoretical model predicting the intention to use herbal medicines for anxiety symptoms.

5.2. Background

5.2.1. Theory of reasoned action and planned behaviour

The theory of planned behaviour (TPB) is an extension of the theory of reasoned action (TRA; Ajzen, 1991). The TRA hypothesises that attitudes and subjective norms alone are significant predictors of the intention to act out a specific behaviour, and that the strength of intention predicts whether or not a person actually performs the behaviour being measured (Ajzen, 1991); to what extent each of the predictors influence intention depends on the specific behaviour. For example, if there are strong social pressures to perform a particular behaviour, subjective norms may explain more variance in intention than attitudes. In later years, perceived behavioural control was added to the TRA to develop the TPB to account for behaviours with partial
volitional control (i.e. being an individual’s decision to perform a behaviour or not; Ajzen, 1991).

The combination of attitudes, subjective norms, and perceived behavioural control have been found to account for 44.3% of the variance in intention across a range of health behaviours (McEachan et al., 2011). As a large amount of variance in intention remains unexplained, other factors should be included in the TPB to help explain specific behaviours (Ajzen, 1991). How accurately the TPB explains a specific behaviour, and to what extent the constructs relate to each other depends on each behaviour. In addition, research has demonstrated that the constructs used in the TPB are not always significant contributors to the model (McEachan et al., 2011), and it is suggested that theoretical models need to be developed that offer alternative hypotheses that consider the unique theoretical circumstances of each behaviour (Noar & Zimmerman, 2005). Therefore, additional (e.g. anxiety symptoms) or modified variables (e.g. types of control beliefs) need to be considered in terms of their theoretical importance in predicting a behaviour (i.e. herbal medicine use for anxiety symptoms).

5.2.1.1. **Intention and behaviour relationship**

Intentions reflect motivational factors that influence behaviour (Ajzen, 1991). The strength of the intention determines how likely it is that someone will engage in a behaviour. The majority of studies using the TPB to explore predictors of health behaviour have used prospective measures of behaviour, with meta-analysis finding intention to have a medium to large mean correlation with prospective behaviour ($\rho = 0.43$; McEachan et al., 2011). In addition, prospective behaviour has been found to have a medium to large mean correlation with actual behaviour ($\rho = 0.50$; McEachan et al., 2011). The extent to which intention accurately predicts actual behaviour is dependent on a range of factors such as the specific behaviour, amount of actual control a person has, and length of time between the measurement of intention and actual behaviour (Ajzen, 2011). In studies focused on health behaviours the TPB has only been able to explain 19.3% of the variance in actual behaviour, while adding past behaviour to the model accounts for an additional 10.9% of the variance (McEachan et al., 2011). As a large amount of variance in both intention and actual behaviour remains unexplained by the TPB, other factors must be involved in the prediction of intention and behaviour that need to be identified, which supports the need to develop a theoretical model to accommodate unique factors in specific behaviours (Sniehotta & Presseau, 2014).
5.2.1.2.  *Attitude*

In the TPB attitude towards a specific behaviour is determined by salient beliefs about that behaviour (Ajzen, 1991). Attitude has consistently been found to be a significant predictor of intention in a range of health behaviours. Meta-analysis found attitude to be the strongest predictor of intention across a range of behaviours ($B = 0.35$), explaining up to 12.59% of the variance in intention depending on the behaviour (McEachan et al., 2011). The more positive the attitude to a behaviour, the stronger the intention to perform that behaviour.

5.2.1.3.  *Subjective norms*

Subjective norms (also known as social injunctive norms) reflect the amount of perceived social pressure a person receives towards acting out a specific behaviour (Ajzen, 1991). It is suggested that subjective norms influence a person’s intention to act out a behaviour as they are motivated by the possibility of social rewards and punishments (White, Smith, Terry, Greenslade, & McKimmie, 2009). Subjective norms have been found to have the least influence on intention in various health behaviours, accounting for an average of 6.26% of the variance in intention across various health behaviours (McEachan et al., 2011). In addition, which social factors are of most value in influencing subjective norms in the TPB is contested, and is dependent on the type of behaviour being studied, and how the construct is measured (Conner & Armitage, 1998). These social factors can include beliefs about: what other people think about a behaviour (injunctive norms), how other people perform a behaviour (descriptive norms), and a person’s own moral principles towards a behaviour (personal injunctive norms; Conner & Armitage, 1998). As reported in Chapters 3 and 4, family and friends were found to be an important source of information about herbal medicines in people experiencing anxiety. Therefore, in the current study, social injunctive norms were hypothesised to be an important factor in predicting the intention to use herbal medicines for anxiety symptoms.

5.2.1.4.  *Control beliefs*

The perceived behavioral control (i.e. control beliefs) component of the TPB is intended to reflect the extent to which a person perceives they are able to perform a behaviour (Ajzen, 1991). The extent to which perceived behavioral control influences behaviour directly is dependent on the specific behaviour being performed, and the actual control (i.e. available resources) the person has that enables them to perform the
behaviour (Ajzen, 1991). There is no consistency in how researchers operationalise control beliefs when testing the TPB; however, research has demonstrated that the construct measures two distinct control processes: self-efficacy (i.e. autonomy beliefs) and control beliefs (i.e. perceived control of the behaviour), and that each of these constructs has a direct effect on intention (Conner & Armitage, 1998; Manstead, 2011). Having a lack of actual control over a behaviour reduces the predictive validity of the intention behaviour relation (Ajzen, 2011). Therefore, the extent to which perceived control is likely to reflect actual control needs to be considered relative to the specific behaviour before including it in a TPB model (Ajzen, 2011).

An important consideration in the current study was the affect of anxiety symptoms on perceived control of the behaviour. Anxiety symptoms can influence a person’s ability to self-regulate, which can reduce their ability to reason (Gino et al., 2012; Maner et al., 2007). For example, people with anxiety may worry about making the right treatment decision and avoid making a decision altogether. Further, people with anxiety are reported to have a greater desire for control over their health than those without anxiety, as they perceive they have less control over both internal and external factors related to health (D. H. Shapiro, Schwartz, & Astin, 1996). Therefore, it is likely that perceived control of the behaviour would not be an accurate proxy for actual control, and that autonomy beliefs may be a more important type of control belief when predicting intention to use herbal medicines for anxiety symptoms in adults experiencing anxiety.

Chapter 2 of this thesis found that certain beliefs about personal control over health were important predictors of CAM use; specifically, that people wanting more control over their health and who believe in individual responsibility for health were more likely to use CAMs. Having personal control over health aligns with the philosophy of herbal medicine, which emphasises the importance of empowering the individual (Casey et al., 2007). Based on these findings the current study used a measure of control beliefs that reflects the perceived control a person would have over their anxiety if they used herbal medicines.

5.2.2. Anxiety

Previously in this thesis the severity of anxiety symptoms were found to predict current herbal medicine use for anxiety symptoms (as described in Chapter 4, p. 96). However, it remains unclear the extent to which anxiety symptoms influence decision-making in this health behaviour. State anxiety affects decision-making, as it
impairs information processing (Gino et al., 2012). In addition, people with more severe anxiety demonstrate increased risk aversion, preferring to choose a safer option when making everyday decisions (C. A. Hartley & Phelps, 2012). People in an anxious state have been found to rely on the advice of others to help make decisions (Gino et al., 2012), which may help explain why people with a GAD diagnosis are higher users of health services than the general population. Based on these findings it is likely that severity of anxiety symptoms will influence the intention to use herbal medicines to treat anxiety symptoms. Therefore, anxiety symptoms have been included as an independent predictor of intention in the hypothesised path model presented below.

5.2.3. Hypotheses

The TPB was used to inform the development of a hypothesised theoretical model of health behaviour predicting the intention to use herbal medicines as shown in Figure 5.1. The four hypotheses represented in the model are:

H1: More favourable attitudes towards using herbal medicines for anxiety symptoms will positively predict the intention to use herbal medicines for anxiety symptoms.

H2: More agreeable subjective norms will positively predict the intention to use herbal medicines for anxiety symptoms.

H3: Stronger control beliefs will positively predict the intention to use herbal medicines for anxiety symptoms.

H4: More severe anxiety symptoms will positively predict the intention to use herbal medicines for anxiety symptoms.

Figure 5.1. Hypothesised path diagram for predicting the intention to use herbal medicines for anxiety symptoms.
5.3. **Method**

5.3.1. **Recruitment and sample**

The ethics approval, sample characteristics, sampling, and data collection procedures are described in Chapter 4.

5.3.2. **Measures**

**Anxiety symptoms.** The latent variable Anxiety Symptoms used in the path model was operationalised as the mean score on the Anxiety subscale of the DASS-21. See Chapter 4 (p. 82) for a full description of this scale.

**Theory of planned behaviour variables.** 36 items reflecting the TPB constructs Behavioural Beliefs, Outcome Evaluation, Attitude, Motivation to Comply, Subjective Norms, Autonomy Beliefs, Control Beliefs, and Intention were included in the questionnaire, as they were part of a larger study. While not all of these constructs were included in the hypothesised model presented, it was important to include them all in an EFA to ensure the direct measures accurately reflected each construct, and the latent constructs demonstrated discriminant validity. A description of the development of these items follows.

5.3.3. **Development of TPB items**

As the TPB had not been used in the context of herbal medicine use for anxiety symptoms, development of the TPB items was informed by a review of the literature on the beliefs and attitudes to CAM (see Chapter 2), and the results from qualitative interviews described in Chapter 3 to ensure all the relevant themes were captured. The item construction was based on Ajzen’s guidelines for developing a TPB questionnaire (Ajzen, 2006). Ajzen recommends the use of focus groups to collect qualitative data for developing TPB items; however, this current study used in-depth interviews as the anonymity of participants was considered to be critical given the sensitive nature of experiencing anxiety. Face validity of the items was assessed by subject matter experts to ensure clarity, comprehension, and length of the items was optimal to ensure no ambiguity. These experts were practitioners who prescribed herbal medicines and had experience with treating people with anxiety symptoms who use herbal medicines, which included: one psychologist/herbalist, one general practitioner/herbalist, and one naturopath/herbalist. The feedback provided was incorporated to develop the final 36 items included in the study questionnaire that
reflected the latent constructs included in the extended model of the theory of planned behaviour.

All items were scored using 7-point Likert type scales that varied for each item. Prior to analysis items that were presented in a negative direction were recoded to ensure that higher values represented a positive direction. The 36 items included in the study and the constructs they were designed to measure are presented in Appendix J with the recoded response scales.

5.3.4. Data analysis

A two-step approach to SEM was used for testing the hypotheses and latent path model as recommended by Anderson and Gerbing (1988). In preparation for the first step of confirmatory factor analysis (CFA), the measurement model was tested using exploratory factor analysis (EFA). The EFA was conducted in order to identify the factor structure of the TPB items, to ensure the corresponding items adequately measured the theoretical constructs (not for scale development). Following this, the CFA was conducted to determine the relations between the observed variables and their corresponding latent constructs. In the second step the hypothesised latent path model was tested, with the direction, size, and significance of each parameter estimated. A model generating approach to SEM was used in which a hypothesised model is proposed, tested, and adjusted as necessary to achieve a well fitting model that is both driven by theory and statistically well fitting (Byrne, 2010). However, as described in the results section no adjustment to the model was needed.

IBM SPSS Statistics Premium Edition Version 22 was used to check statistical assumptions and conduct the EFA. IBM SPSS Amos Version 22 was used for the CFA and SEM analysis.

5.3.5. Data screening

Appropriate data screening was conducted for the EFA that included analysis of missing data, normality, linearity, and multicolinearity (Ullman, 2013). Additional parametric assumptions were checked for the CFA and SEM analysis, which included multivariate normality, multivariate outliers, and linearity (Tabachnick & Fidell, 2013)—these are reported in the SEM modeling results (section 5.4.3.5).

5.3.5.1. Missing data

No missing data was found.
5.3.5.2. Univariate normality

The majority of variables were within the acceptable range for skewness and kurtosis. Due to the nature of the sample it was expected that there would be nonnormal data for some variables. All items measuring the latent variables Outcome Expectations and Autonomy Beliefs were moderately to severely leptokurtic. To transform these variables would misrepresent the data, therefore this was not considered appropriate and were retained for the EFA. Kurtosis is considered to be particularly problematic in SEM analysis, with z-values greater than 2.3 considered to be nonnormal (Lei & Lomax, 2005); all variables included in the SEM analysis were within the acceptable range. For skewness, kurtosis, and standard error values see Table 5.1 for all items included in the EFA.
Table 5.1.
Assessment of normality for items included in analysis

<table>
<thead>
<tr>
<th>Item number</th>
<th>Variable</th>
<th>Mean</th>
<th>SD</th>
<th>Skew</th>
<th>SE</th>
<th>Kurtosis</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>My using herbal medicines to treat anxiety symptoms would be (favourable/unfavourable)</td>
<td>4.89</td>
<td>1.576</td>
<td>-0.701</td>
<td>0.122</td>
<td>0.056</td>
<td>0.243</td>
</tr>
<tr>
<td>2</td>
<td>My using herbal medicines to treat anxiety symptoms would be (good/bad)</td>
<td>5.11</td>
<td>1.454</td>
<td>-0.801</td>
<td>0.122</td>
<td>0.465</td>
<td>0.243</td>
</tr>
<tr>
<td>3</td>
<td>My using herbal medicines to treat anxiety symptoms would be (pleasant/unpleasant)</td>
<td>5.15</td>
<td>1.471</td>
<td>-0.774</td>
<td>0.122</td>
<td>0.331</td>
<td>0.243</td>
</tr>
<tr>
<td>4</td>
<td>My using herbal medicines to treat anxiety symptoms would be (beneficial/harmful)</td>
<td>5.25</td>
<td>1.402</td>
<td>-0.865</td>
<td>0.122</td>
<td>0.694</td>
<td>0.243</td>
</tr>
<tr>
<td>5</td>
<td>My using herbal medicines to treat anxiety symptoms would be (positive/negative)</td>
<td>5.25</td>
<td>1.445</td>
<td>-0.803</td>
<td>0.122</td>
<td>0.552</td>
<td>0.243</td>
</tr>
<tr>
<td>6</td>
<td>Most people who are important to me approve of me using herbal medicines for treating anxiety symptoms</td>
<td>5.14</td>
<td>1.649</td>
<td>-0.812</td>
<td>0.122</td>
<td>0.065</td>
<td>0.243</td>
</tr>
<tr>
<td>7</td>
<td>Most people whose opinions I value would approve of me using herbal medicines for treating anxiety symptoms</td>
<td>5.15</td>
<td>1.617</td>
<td>-0.855</td>
<td>0.122</td>
<td>0.186</td>
<td>0.243</td>
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<tr>
<td>Item number</td>
<td>Variable</td>
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<td>SD</td>
<td>Skew</td>
<td>SE</td>
<td>Kurtosis</td>
<td>SE</td>
</tr>
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<td>------------</td>
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</tr>
<tr>
<td>8</td>
<td>My doctor thinks that I should/should not use herbal medicines to</td>
<td>4.01</td>
<td>1.519</td>
<td>-0.194</td>
<td>0.122</td>
<td>-0.044</td>
<td>0.243</td>
</tr>
<tr>
<td></td>
<td>relieve my anxiety symptoms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>My friends believe I should/should not use herbal medicines to</td>
<td>4.68</td>
<td>1.473</td>
<td>-0.462</td>
<td>0.122</td>
<td>0.087</td>
<td>0.243</td>
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<tr>
<td></td>
<td>relieve my anxiety symptoms</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>My family believe I should/should not use herbal medicines to</td>
<td>4.69</td>
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<td>-0.501</td>
<td>0.122</td>
<td>-0.140</td>
<td>0.243</td>
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<tr>
<td></td>
<td>help relieve my anxiety symptoms</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Most people like me have used herbal medicines for treating anxiety</td>
<td>4.64</td>
<td>1.522</td>
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<td>0.122</td>
<td>-0.293</td>
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<td></td>
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</tr>
<tr>
<td>12</td>
<td>Most of my friends who have experienced anxiety have used herbal</td>
<td>4.30</td>
<td>1.649</td>
<td>-0.189</td>
<td>0.122</td>
<td>-0.641</td>
<td>0.243</td>
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<td></td>
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<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>13</td>
<td>Most of my family have used herbal medicines for their anxiety symptoms</td>
<td>4.01</td>
<td>1.704</td>
<td>-0.123</td>
<td>0.122</td>
<td>-0.752</td>
<td>0.243</td>
</tr>
<tr>
<td>14</td>
<td>When it comes to treating anxiety symptoms, I want to do what my doctor</td>
<td>4.88</td>
<td>1.596</td>
<td>-0.602</td>
<td>0.122</td>
<td>-0.095</td>
<td>0.243</td>
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<tr>
<td></td>
<td>thinks I should do</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>When it comes to treating anxiety symptoms, I want to do what my friends</td>
<td>3.34</td>
<td>1.668</td>
<td>0.136</td>
<td>0.122</td>
<td>-0.870</td>
<td>0.243</td>
</tr>
<tr>
<td></td>
<td>think I should do</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>When it comes to treating anxiety symptoms, I want to do what my family</td>
<td>3.81</td>
<td>1.704</td>
<td>-0.207</td>
<td>0.122</td>
<td>-0.850</td>
<td>0.243</td>
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<td>Skew</td>
<td>SE</td>
<td>Kurtosis</td>
<td>SE</td>
</tr>
<tr>
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<td>------</td>
</tr>
<tr>
<td>17</td>
<td>My having less anxiety symptoms is</td>
<td>6.30</td>
<td>1.202</td>
<td>-2.049</td>
<td>0.122</td>
<td>4.169</td>
<td>0.243</td>
</tr>
<tr>
<td>18</td>
<td>For me to feel calmer is</td>
<td>6.37</td>
<td>1.123</td>
<td>-2.232</td>
<td>0.122</td>
<td>5.298</td>
<td>0.243</td>
</tr>
<tr>
<td>19</td>
<td>For me to worry less is</td>
<td>6.37</td>
<td>1.112</td>
<td>-2.115</td>
<td>0.122</td>
<td>4.448</td>
<td>0.243</td>
</tr>
<tr>
<td>20</td>
<td>For me to feel happier is</td>
<td>6.44</td>
<td>1.017</td>
<td>-2.221</td>
<td>0.122</td>
<td>5.455</td>
<td>0.243</td>
</tr>
<tr>
<td>21</td>
<td>For me to feel more comfortable is</td>
<td>6.37</td>
<td>1.123</td>
<td>-2.264</td>
<td>0.122</td>
<td>5.629</td>
<td>0.243</td>
</tr>
<tr>
<td>22</td>
<td>My having better general health is</td>
<td>6.43</td>
<td>1.052</td>
<td>-2.012</td>
<td>0.122</td>
<td>3.700</td>
<td>0.243</td>
</tr>
<tr>
<td>23</td>
<td>Taking herbal medicines will result in me having less anxiety symptoms</td>
<td>4.86</td>
<td>1.589</td>
<td>-0.790</td>
<td>0.122</td>
<td>0.087</td>
<td>0.243</td>
</tr>
<tr>
<td>24</td>
<td>Taking herbal medicines to treat my anxiety symptoms would help me feel calmer</td>
<td>5.04</td>
<td>1.616</td>
<td>-0.903</td>
<td>0.122</td>
<td>0.281</td>
<td>0.243</td>
</tr>
<tr>
<td>25</td>
<td>Taking herbal medicines to treat my anxiety symptoms would help me to worry less</td>
<td>4.82</td>
<td>1.610</td>
<td>-0.784</td>
<td>0.122</td>
<td>-0.002</td>
<td>0.243</td>
</tr>
<tr>
<td>26</td>
<td>Taking herbal medicines to treat my anxiety symptoms would help me feel happier</td>
<td>4.80</td>
<td>1.603</td>
<td>-0.784</td>
<td>0.122</td>
<td>0.082</td>
<td>0.243</td>
</tr>
<tr>
<td>27</td>
<td>Taking herbal medicines to treat my anxiety symptoms would help me feel more comfortable</td>
<td>4.97</td>
<td>1.611</td>
<td>-0.814</td>
<td>0.122</td>
<td>0.082</td>
<td>0.243</td>
</tr>
<tr>
<td>Item number</td>
<td>Variable</td>
<td>Mean</td>
<td>SD</td>
<td>Skew</td>
<td>SE</td>
<td>Kurtosis</td>
<td>SE</td>
</tr>
<tr>
<td>-------------</td>
<td>--------------------------------------------------------------------------</td>
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<td>-------</td>
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<td>----------</td>
<td>------</td>
</tr>
<tr>
<td>28</td>
<td>Taking herbal medicines to treat my anxiety symptoms would help me sleep better</td>
<td>5.06</td>
<td>1.628</td>
<td>-0.854</td>
<td>0.122</td>
<td>0.193</td>
<td>0.243</td>
</tr>
<tr>
<td>29</td>
<td>Taking herbal medicines will result in me being healthier</td>
<td>4.99</td>
<td>1.584</td>
<td>-0.809</td>
<td>0.122</td>
<td>0.248</td>
<td>0.243</td>
</tr>
<tr>
<td>30</td>
<td>I am in control of my health when I take herbal medicines.</td>
<td>4.87</td>
<td>1.548</td>
<td>-0.556</td>
<td>0.122</td>
<td>-0.051</td>
<td>0.243</td>
</tr>
<tr>
<td>31</td>
<td>I am in control of my anxiety symptoms when I take herbal medicines.</td>
<td>4.63</td>
<td>1.676</td>
<td>-0.551</td>
<td>0.122</td>
<td>-0.295</td>
<td>0.243</td>
</tr>
<tr>
<td>32</td>
<td>Using herbal medicines helps me take control of my anxiety symptoms</td>
<td>5.08</td>
<td>1.698</td>
<td>-0.841</td>
<td>0.122</td>
<td>0.090</td>
<td>0.243</td>
</tr>
<tr>
<td>33</td>
<td>Taking herbal medicines to treat anxiety symptoms is up to me</td>
<td>6.14</td>
<td>1.239</td>
<td>-1.548</td>
<td>0.122</td>
<td>2.077</td>
<td>0.243</td>
</tr>
<tr>
<td>34</td>
<td>Taking herbal medicines to treat my health concerns is up to me</td>
<td>6.12</td>
<td>1.244</td>
<td>-1.635</td>
<td>0.122</td>
<td>2.750</td>
<td>0.243</td>
</tr>
<tr>
<td>35</td>
<td>During the next 3 months I plan to use herbal medicines to treat my anxiety symptoms</td>
<td>4.39</td>
<td>2.112</td>
<td>-0.348</td>
<td>0.122</td>
<td>-1.184</td>
<td>0.243</td>
</tr>
<tr>
<td>36</td>
<td>During the next 3 months how likely is it that you will use herbal medicines to help treat your anxiety symptoms?</td>
<td>4.38</td>
<td>2.117</td>
<td>-0.356</td>
<td>0.122</td>
<td>-1.205</td>
<td>0.243</td>
</tr>
</tbody>
</table>

*Note.* SD = Standard deviation; SE = Standard error.
5.3.5.3. Univariate outliers

Standardised z-scores over 3.29 were identified as univariate outliers (Tabachnick & Fidell, 2013). There were a number of univariate outliers in the Outcome Evaluation (6-items) and Autonomous Control Belief (2-items) items, which was to be expected given the nature of the questions. The individual cases were retained in the sample for the EFA.

5.3.5.4. Factorability of R

A correlation matrix was used to assess the correlations between individual items. The majority of items need correlations above .30 to proceed with an EFA (Tabachnick & Fidell, 2013). Variables that were less than .30 were excluded from the EFA unless theoretically important. The adequacy of the model was marvelous, KMO = .93, and Bartlett’s Test of Sphericity was significant (p = .000) indicating that the items correlate to each other well and were suitable for factor analysis (Tabachnick & Fidell, 2013).

5.4. Results

5.4.1. Exploratory factor analysis (EFA)

An EFA was conducted for all 36 items using maximum likelihood extraction, as it is the preferred method of factor extraction (Costello & Osborne, 2005; Preacher & MacCallum, 2003). As the factor analysis was theoretically based, a common factor analysis was used as the objective was to identify latent structures, and it was not known how much specific and error variance to expect (Hair, Black, Babin, & Anderson, 2015). Oblique (promax) rotation was used as the factors were expected to correlate with each other (Preacher & MacCallum, 2003). Eight factors were extracted from the analysis that explained 83.93% of the variance in the model. The extent to which each item correlates with other items was assessed with communality values, which are shown in Appendix K. Communalities for all items were greater than .5, with the exception of one item that was slightly less than five (.492); therefore, the model was considered to explain an adequate amount of variance (Hair et al., 2015). Most factor scores were over .50 indicating they have practical significance (Hair et al., 2015). Five factor scores were over 1; while it is unusual to have loadings > .80 these items were retained as they had practical significance and were theoretically important (Hair et al., 2015). The results of the oblique (promax) rotation of the final 8-factor solution are shown in Table 5.2.
<table>
<thead>
<tr>
<th>Item</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
<th>Factor 4</th>
<th>Factor 5</th>
<th>Factor 6</th>
<th>Factor 7</th>
<th>Factor 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>My using herbal medicines to treat anxiety symptoms would be</td>
<td>.846</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(favourable/unfavourable)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>My using herbal medicines to treat anxiety symptoms would be</td>
<td>.959</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>(good/bad)</td>
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<tr>
<td>My using herbal medicines to treat anxiety symptoms would be</td>
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<td></td>
<td></td>
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<td>(pleasant/unpleasant)</td>
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<td>(beneficial/harmful)</td>
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<td></td>
<td></td>
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<tr>
<td>My using herbal medicines to treat anxiety symptoms would be</td>
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<td>(positive/negative)</td>
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<td>medicines for treating anxiety symptoms</td>
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<td></td>
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<td>Most people whose opinions I value would approve of me using herbal</td>
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<td></td>
</tr>
<tr>
<td>When it comes to treating anxiety symptoms, I want to do what my friends think I should do.</td>
<td>.661</td>
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<td>When it comes to treating anxiety symptoms, I want to do what my family thinks I should do.</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>For me to worry less is</td>
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<td></td>
<td></td>
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</tr>
<tr>
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<td></td>
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<tr>
<td>For me to feel more comfortable is</td>
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<td></td>
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<tr>
<td>My having better general health is</td>
<td>.902</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taking herbal medicines will result in me having less anxiety symptoms</td>
<td>.884</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taking herbal medicines to treat my anxiety symptoms would help me feel calmer</td>
<td>.948</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taking herbal medicines to treat my anxiety symptoms would help me to worry less</td>
<td>.998</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item</td>
<td>Factor</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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</tr>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taking herbal medicines to treat my anxiety symptoms would help me feel happier</td>
<td>1.008</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taking herbal medicines to treat my anxiety symptoms would help me feel more comfortable</td>
<td>.906</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taking herbal medicines to treat my anxiety symptoms would help me sleep better</td>
<td>.782</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taking herbal medicines will result in me being healthier</td>
<td>.789</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am in control of my health when I take herbal medicines.</td>
<td>1.016</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am in control of my anxiety symptoms when I take herbal medicines.</td>
<td>.453</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taking herbal medicines to treat anxiety symptoms is up to me</td>
<td>1.020</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taking herbal medicines to treat my health concerns is up to me</td>
<td>.752</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>During the next 3 months I plan to use herbal medicines to treat my anxiety symptoms</td>
<td>.932</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>During the next 3 months how likely is it that you will use herbal medicines to help treat your anxiety symptoms?</td>
<td>.941</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
5.4.2. **Reliability**

A reliability analysis was conducted on each of the latent factors included in the hypothesised path model. Cronbach’s alpha was used as a measure of reliability. All factors showed very good to excellent reliability (Kline, 2005), as shown in Table 5.3.

Table 5.3.

*Descriptive statistics for the latent constructs in the hypothesised path model, including Cronbach’s alpha*

<table>
<thead>
<tr>
<th>Latent construct (Factor)</th>
<th>No. of items</th>
<th>M (SD)</th>
<th>Skewness</th>
<th>Kurtosis</th>
<th>α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude (3)</td>
<td>5</td>
<td>25.65 (6.65)</td>
<td>-0.747</td>
<td>0.448</td>
<td>.94</td>
</tr>
<tr>
<td>Intention (5)</td>
<td>2</td>
<td>8.77 (4.20)</td>
<td>-0.357</td>
<td>-1.183</td>
<td>.99</td>
</tr>
<tr>
<td>Subjective norms (6)</td>
<td>2</td>
<td>10.29 (3.16)</td>
<td>-0.834</td>
<td>0.256</td>
<td>.93</td>
</tr>
<tr>
<td>Control beliefs (8)</td>
<td>2</td>
<td>9.50 (2.96)</td>
<td>-0.524</td>
<td>-0.300</td>
<td>.82</td>
</tr>
</tbody>
</table>

5.4.3. **Structural equation modelling (SEM)**

5.4.3.1. **Assumptions**

*Multivariate normality.* Maximum likelihood estimation in SEM assumes the sample population is multivariate normal to allow for reliable interpretation of parameters (Byrne, 2010). However, meeting the multivariate normality assumption is considered to be an unrealistic expectation for most studies (Lei & Lomax, 2005). A number of reviews have been conducted on nonnormality in SEM, with broad agreement that maximum likelihood estimation is reasonably robust against moderate violations of nonnormality (Lei & Lomax, 2005).

*Multivariate outliers.* Assessment of Mahalanobis distance detected 64 multivariate outliers ($p < .05$), for variables included in the CFA and path model testing. As removing this number of cases would reduce the power of the analysis and misrepresent the sample they were retained for the SEM analyses.

*Linearity.* Curve estimation was used to test all relationships included in the latent model, which were all determined to be sufficiently linear for inclusion in covariance based SEM analysis.
5.4.3.2. Step 1 of the SEM analysis: confirmatory factor analysis (CFA)

A CFA was done to confirm the latent factor structure of a simplified measurement model, and to assess the validity of the latent variables to be used in the hypothesised path model. As the number of parameters for adequate power in SEM analysis are recommended to be no less than a ratio of 5:1 cases for each parameter (Bentler & Chou, 1987), the full measurement model was too complex to be tested with CFA on this sample. Only the latent factors relevant to testing the hypothesised model above (see Figure 5.1) were included in the CFA. These included Attitude, Intention, Subjective Norms, and Control Beliefs. All four factors were expected to co-vary with each other. The latent factor for Anxiety Symptoms was not included in the CFA, as the anxiety subscale of the DASS-21 is a well-validated and reliable measure of anxiety symptoms (see Chapter 4, page 82). The latent factor structure of the simplified model needed to demonstrate good model fit before testing the hypothesised latent model (Tabachnick & Fidell, 2013).

5.4.3.3. Assessment of measurement model fit

All model parameters were successfully estimated. Examination of the measurement model fit indices showed the $\chi^2$ value was significant ($p = .006$), suggesting inadequate fit. However, this statistic is unreliable in samples with over 200 cases, and when data is nonnormal, therefore other fit indices are needed to confirm the model is a good fit (Lei & Lomax, 2005). The fit indices are shown in Table 5.4 and suggest that the 4-factor measurement model is well fitting and suitable for use in further path analyses. The CFI value is $>.95$ therefore considered to be a good fit (Tabachnick & Fidell, 2013), and indicates that the model adequately describes the sample data (Byrne, 2010). The SRMR value is $<.05$ also indicating a good fit (Byrne, 2010), and that the correlations are explained to within an average error of .02. RMSEA values $<.05$ suggest good fit and that this is a parsimonious model (Tabachnick & Fidell, 2013). The nonsignificant PCLOSE value suggests that we can be 90% confident that the RMSEA value will fall between .022 and .059 in the population. The measurement model and its correlations are shown in Figure 5.2.
Table 5.4.

Summary of Goodness-of-fit Indices for the 4-factor measurement model

<p>| | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>$\chi^2$</td>
<td>df</td>
<td>CFI</td>
<td>SRMR</td>
<td>RMSEA</td>
<td>90% CI</td>
<td>PCLOSE</td>
</tr>
<tr>
<td>62.13</td>
<td>37</td>
<td>.994</td>
<td>.0234</td>
<td>.041</td>
<td>[.022–.059]</td>
<td>.779</td>
</tr>
</tbody>
</table>

Figure 5.2. Four factor measurement model.

5.4.3.4. Convergent and discriminant validity

Following confirmation of the measurement model fit each of the constructs (factors) were assessed for convergent and discriminant validity. To demonstrate convergent validity the average variance extracted (AVE) should be greater than 0.5, and to show discriminant validity the composite reliability (CR) should be greater than 0.7 (Hair et al., 2015). As shown in Table 5.5, the convergent and discriminant validity was adequate for all factors.
Table 5.5.
**AVE, CR and factor loadings for latent factors**

<table>
<thead>
<tr>
<th></th>
<th>Subjective Norms</th>
<th>Attitude</th>
<th>Intention</th>
<th>Control Beliefs</th>
<th>CR</th>
<th>AVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subjective Norms</td>
<td>.935</td>
<td></td>
<td></td>
<td></td>
<td>.933</td>
<td>.874</td>
</tr>
<tr>
<td>Attitude</td>
<td>.721</td>
<td>.876</td>
<td></td>
<td></td>
<td>.943</td>
<td>.767</td>
</tr>
<tr>
<td>Intention</td>
<td>.537</td>
<td>.615</td>
<td>.985</td>
<td></td>
<td>.985</td>
<td>.970</td>
</tr>
<tr>
<td>Control Beliefs</td>
<td>.456</td>
<td>.553</td>
<td>.627</td>
<td>.842</td>
<td>.828</td>
<td>.709</td>
</tr>
</tbody>
</table>

*Note. CR = composite reliability; AVE = average variance extracted*

5.4.3.5. **Step 2 of the SEM analysis: Latent path model results**

Composite latent variables for Subjective Norms, Attitude, Intention, and Control Beliefs were created from the observed variables for use in the hypothesised path model. The model fit indices showed the $\chi^2$ value was not significant ($p = .739$), suggesting that this is a good fitting model. In addition, CFI, SRMR, RMSEA and PCLOSE fit indices also support the model being a good fit as shown in Table 5.6. We can be 90% confident that the RMSEA value will fall between .000 and .059 in the population.

Table 5.6.
**Summary of Goodness-of-fit Indices for the path model predicting intention to use herbal medicines for anxiety symptoms**

<table>
<thead>
<tr>
<th>$\chi^2$</th>
<th>df</th>
<th>CFI</th>
<th>SRMR</th>
<th>RMSEA</th>
<th>90% CI</th>
<th>PCLOSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.248</td>
<td>3</td>
<td>1.00</td>
<td>.009</td>
<td>.000</td>
<td>[.000–.059]</td>
<td>.918</td>
</tr>
</tbody>
</table>
Figure 5.3. Path model predicting intention to use herbal medicines for anxiety symptoms.

Note. All paths were significant, \( p = .00 \), except Subjective Norms to Intention, which was significant, \( p = .016 \).

5.4.3.6. Results of hypothesis testing

As shown above the hypothesised path model was found to fit the data well. The standardised regression weights for the model (see Figure 5.3) suggest that Attitude, Subjective Norms, and Control Beliefs each positively predicted Intention. Anxiety Symptoms also positively predicted Intention. In other words, a more positive attitude towards using herbal medicines for anxiety symptoms increased the intention to use herbal medicines, as did a stronger belief that important others supported their use of herbal medicines to treat anxiety symptoms. In addition, a stronger belief that taking herbal medicines helps to control anxiety increased the intention to use herbal medicines for this purpose. The more severe the anxiety symptoms the greater the intention to use herbal medicines to relieve them. Together all four independent variables explained 56% of the variance in intention to use herbal medicines.

5.5. Discussion and conclusion

The aim of this Chapter was to test a hypothesised model that predicted the intention to use herbal medicines for anxiety symptoms. The hypothesised path model was supported as it demonstrated good model fit. The latent variables attitude, subjective norms, control beliefs, and anxiety symptoms all positively and significantly predicted the intention to use herbal medicines for anxiety symptoms to varying degrees.
Control beliefs were found to have the largest influence on intention to use herbal medicines. There are no comparable studies in adults with anxiety; however, this finding is consistent with previous research in general population samples reporting people who perceived they had more control over their health were more likely to use CAM (Siros, 2008), and to try CAM prior to conventional medicine (Thomson et al., 2014). However, perceived behavioural control did not predict herbal medicine use in older outpatients (Gupchup et al., 2006). It is difficult to draw comparisons between these studies as different measures were used for control beliefs, and herbal medicine use.

Subjective norms were a significant predictor of intention, but explained the least amount of variance in intention. This suggests that people are less influenced by what others think about their herbal medicine use compared to other factors. This is consistent with other health behaviours in which subjective norms explained the least amount of variance in intention compared to other TPB variables (McEachan et al., 2011). One study found that subjective norms did not predict the intention to use herbal medicines (Gupchup et al., 2006); however, their sample consisted of older adults with no mental health condition making it difficult to draw comparisons between studies. Positive attitudes to herbal medicine use for anxiety symptoms were a strong predictor of intention in the model tested. This finding was expected as attitudes towards a behaviour have repeatedly been found to be a significant strong predictor of intention in various health behaviours (McEachan et al., 2011), and in general herbal medicine use behaviour (Gupchup et al., 2006).

As hypothesised, anxiety symptoms were found to be a significant predictor of intention. This supports findings reported previously in this thesis that anxiety symptom severity predicted current herbal medicine use (see Chapter 4, p. 97). Anxiety symptom severity is likely to influence decision-making about herbal medicine use for treating anxiety symptoms. Reasons for this finding can only be hypothesised at this stage, and will be further discussed in the following chapter.

Limitations in the SEM analysis need to be noted. The use of single indicators to reflect complex constructs, although recommended in the TPB, may not adequately explain the variance accounted for in intention. In addition, only two items were used to measure the constructs control beliefs and subjective norms, the use of more items may have provided a greater explanation of the variance in the model. Exploring the specific attitudes and beliefs about herbal medicines would provide a deeper level of
understanding the health behaviour of people choosing to use herbal medicines for anxiety symptoms. However, larger sample sizes are needed for testing more complex theoretical models.

5.6. Chapter summary

Despite the limitations mentioned, the findings in this chapter have assisted in understanding the relations between the attitudes to herbal medicines, subjective norms, control beliefs, anxiety symptoms and the intention to use herbal medicines for anxiety symptoms. Discussion of the implications of these findings is presented in the following chapter.
Chapter 6

General discussion and conclusion

6.1. Overview

The purpose of this chapter is to examine the results described in previous chapters in a broader context that aligns with the aims of this thesis: to describe the herbal medicine use behaviour of Australian adults who experience anxiety, explore their beliefs and attitudes to using herbal medicines, and identify the key predictors involved in developing an intention to use herbal medicines for anxiety symptoms. Using a sequential mixed-methods design this thesis presents an innovative body of work that reveals critical insights about the health behaviour of adults who experience anxiety and use herbal medicines, and the broader implications for the treatment of anxiety in contemporary Australia. Congruent with the epistemology of pragmatism used in this thesis, the broader implications of the findings are discussed with their relevance to all stakeholders: people who experience anxiety, health care providers who treat anxiety (both conventional health practitioners and herbalists), policy makers, and researchers. In addition, limitations of this study and future directions for research are discussed.

6.2. Primary findings

6.2.1. Prevalence of herbal medicine use in adults experiencing anxiety

The literature review in Chapter 2 reported that the prevalence of herbal medicine use for anxiety symptoms in Australian adults remains undetermined, as there is a dearth of research. As discussed previously, true prevalence cannot be determined from past research due to inconsistent measurement of both herbal medicine use and anxiety. Up to 22% of adults with an anxiety disorder diagnosis were reported to use herbal medicines for anxiety symptoms. The findings in this thesis confirmed that Australian adults experiencing anxiety are using herbal medicines for a range of health conditions in a variety of preparations, and see a range of health practitioners, which is consistent with the general Australian population (A. L. Zhang et al., 2008).

6.2.2. Safe and effective use of herbal medicines: a public health issue

This thesis reported that many people with anxiety who use herbal medicines are doing so potentially unsafely or with poor effectiveness, as they are self-prescribing,
using non-professional information sources, using herbal medicines concurrently with pharmaceuticals, and/or not disclosing herbal medicine use to health practitioners. The behaviours identified create direct and indirect risks. Direct risks include using herbal medicines inappropriately leading to side-effects or herb drug interactions, and issues related to the quality of the herbal medicine products being used (J. J. L. Wardle & Adams, 2014). Indirect risks include delayed or incorrect diagnosis of anxiety symptoms and disorders and potentially ineffective treatment, which can place people at risk of developing more severe anxiety, or affective and substance abuse disorders (A. Thompson, Issakidis, & Hunt, 2008). Consequently, there are implications for public health in terms of the prevention of mental health problems and adequate treatment of anxiety symptoms and disorders.

6.2.2.1. Prescription of herbal medicines

This thesis reported a high amount of self-prescribing of herbal medicines as a form of self-care for the treatment of anxiety symptoms. This finding is consistent with previous research in other populations (Frawley, 2014; A. L. Zhang et al., 2008). The self-prescribing of herbal teas such as chamomile reported by participants in this study may be considered to be relatively harmless. However, the self-prescription of stronger therapeutic preparations such as tablets, have a greater potential for both direct and indirect risks, as they are more concentrated preparations that use higher dosing (Jagtenberg & Evans, 2003). In a critical evaluation of systematic reviews on herb-drug interactions, the herbs ginkgo, ginseng, kava, and St John’s wort were found to have the most clinically important herb-drug interactions (Posadzki et al., 2013b); all of which were self-prescribed as tablet preparations in the quantitative study. In contrast, this thesis reported low rates of practitioner prescribing; however, practitioner prescribing was higher than previous research in the general population (A. L. Zhang et al., 2008).

People may be self-prescribing because they perceive herbal medicines to be safe (A. L. Zhang et al., 2008), as they are natural products that are widely available in retail environments. Alternatively, they may be self-prescribing herbal medicines, as they believe their anxiety symptoms are relatively normal, or they may not recognise that there are more appropriate treatments (Reavley & Jorm, 2011). Some people may prefer to self-prescribe herbal medicine to avoid face-to-face communication with health practitioners, such as those with social anxiety disorder (SAD; Erwin, Turk, Heimberg, Fresco, & Hantula, 2004). Self-prescription is a convenient option for people
who dislike face-to-face interactions, as a prescription is not required for many herbal medicine products and they are widely available to purchase online.

The behaviours described in this thesis suggest that adults with anxiety who use herbal medicines may prefer patient-driven decision-making in relation to their treatment. This preference has been found previously in herbal medicine users in the general population (R. J. Adams et al., 2010). The preference for patient-driven decision-making may be related to perceived barriers to shared decision-making with health practitioners, such as power differentials (e.g. authoritarian practitioners), lack of time during a consultation, inadequate provision of information by a practitioner (e.g. lack of herbal medicine knowledge), and the influence of social norms (e.g. perceiving a practitioner does not approve of herbal medicine use; Joseph-Williams, Elwyn, & Edwards, 2014). These are all factors that have been found to influence herbal medicine use or CAM use more broadly (A. Robinson & McGrail, 2004; Thorburn et al., 2013).

6.2.2.2. People use herbal medicines concurrently with prescribed pharmaceuticals

Consistent with previous research in other populations (Spinks & Hollingsworth, 2012; A. L. Zhang et al., 2008), this thesis reported that many people (27.5%) in the quantitative study had used pharmaceuticals concurrently with herbal medicines for their anxiety symptoms. In addition, those who used these medicines concurrently were more likely not to disclose this to their health practitioners. This is a significant concern as herbal anxiolytics have been found to interact with commonly prescribed pharmaceuticals. For example, St John’s wort was commonly self-prescribed in this study and is known to interact with a number of pharmaceuticals such as SSRIs (Posadzki et al., 2013b; Russo et al., 2013), which are commonly taken to treat anxiety symptoms. These findings need urgent attention in order to reduce risk of interactions. This is particularly important for people with an anxiety disorder diagnosis, as they were found to be more likely to be taking these medicines concurrently. Having beliefs about herbal medicines being natural and safe may be one explanation for the concurrent use of these medicines, as they may not be aware harmful interactions are possible. These beliefs are discussed below in section 6.2.3.

6.2.2.3. People rely on non-professional sources when seeking information about herbal medicine use

Consistent with previous research (J. Adams et al., 2011; Alderman & Kiepfer, 2003; Frawley et al., 2014) the quantitative study in this thesis found that many people
used non-professional sources when seeking information about herbal medicines. In this study the Internet and ‘friends and family’ were the most common sources. Reliance on the Internet is concerning, as information about herbal medicines and CAMs on the Internet is unreliable, and accurate information related to interactions and dosage is difficult for consumers to locate (J. J. L. Wardle & Adams, 2014). Interestingly, the popularity of the Internet as an information source in this study is inconsistent with a recent study on pregnant women in Australia (Frawley et al., 2014) that found it to be the least used information source for CAMs. This difference may be related to the uniqueness of each population. For example, pregnant women may perceive a greater risk in trusting the Internet as an information source.

Subjective norms have consistently been found to influence a range of health behaviours (McEachan et al., 2011). The qualitative study in this thesis found that anecdotal evidence based on friends and family’s previous experience with herbal or conventional medicines influenced the decision to use herbal medicines. The theoretical model supported this finding, demonstrating that subjective norms are a significant predictor of the intention to use herbal medicines for anxiety symptoms. People with anxiety symptoms are more likely to seek advice from others (Gino et al., 2012), which may partly explain the influence of subjective norms on herbal medicine use in this study. However, this is not a behaviour unique to adults with anxiety, as previous research in other populations has found anecdotal evidence from friends and family to influence herbal medicine use (Alderman & Kiepfer, 2003; Frawley et al., 2014; George, Ioannides-Demos, Santamaria, Kong, & Stewart, 2004; Klafke, Eliott, Wittert, & Olver, 2012; Saini et al., 2011). Possible explanations include being more trusting of family and friends than health professionals who are considered authority figures (O'Callaghan & Jordan, 2003), or that people having previous experience with health treatments are being considered experts of their own experience (Cotten & Gupta, 2004).

6.2.2.4. People experiencing anxiety consult with a variety of health practitioners

Despite the high rates of self-prescribing and reliance on non-professional information sources, this thesis found that people were seeing a range of health practitioners for their anxiety symptoms, with GPs and psychologists most frequently consulted. It was less common for people to consult specialist herbal medicine practitioners, with only 4.8% consulting a Western herbalist and 12% consulting either a naturopath or traditional Chinese medicine (TCM) practitioner. However, the number
of people consulting herbal medicine practitioners in this study is more than reported previously in the general population with 4.4% of herbal medicine users consulting a Western herbalist and naturopath, and 3% consulting a TCM practitioner (A. L. Zhang et al., 2008). This increase in herbal medicine practitioner consultations is inconsistent with reports that Western herbalist and naturopathic consultations are declining in Australia (Sibbritt, 2014), and may be related to the unique features of adults with anxiety. However, the low rates of herbal medicine practitioner consultations compared to conventional practitioners are unsurprising considering that herbal medicine practitioners predominantly operate outside the mainstream health system, are unregulated (with the exception of TCM practitioners), and are difficult to access without financial resources. In Australia there are no rebates under the universal health care scheme (Medicare) for seeing herbal medicine practitioners, as there are for seeing GPs, psychologists, or psychiatrists; however, private health funds provide rebates for herbal medicine practitioner consultations. People with health insurance have been reported to be more likely to consult conventional health practitioners (Saliba, 2008) and use CAMs (Frawley et al., 2013; Spinks & Hollingsworth, 2012; Xue et al., 2007). This aligns with research finding that people on higher incomes than average use more CAM treatments and services (Xue et al., 2007). Therefore, it is likely that the lack of integration of herbal medicine practitioners in mainstream health care presents a barrier to some people related to cost, as consultations are less affordable, consequently motivating people to self-prescribe herbal medicines.

6.2.2.5. Disclosure of herbal medicine use to health practitioners

Although people are consulting health practitioners, this thesis reported that many did not disclose their herbal medicine use to either their GPs (48%) or other health practitioners (55.3%). This is consistent with rates of non-disclosure reported in the general population (Faith, Thorburn, & Tippens, 2013; Xue et al., 2007) and other populations that could be considered at high risk of side-effects or complications such as pregnant women (Frawley et al., 2015) and surgical patients (Shorofi & Arbon, 2010). Non-disclosure may be related to people not believing they need to disclose due to lack of knowledge of safety issues (Shorofi & Arbon, 2010; Xue et al., 2007). The qualitative study in this thesis also found this belief, with people stating that they would only disclose their herbal medicine use if they thought it was relevant, or that there was no need to as the medicines were natural and therefore safe.
However, this thesis found that people who had an anxiety disorder diagnosis compared to those without a diagnosis were more likely to disclose herbal medicine use to health professionals. Similarly, it was found that people who had used either herbal medicines or pharmaceuticals for anxiety symptoms, were more likely to disclose their herbal medicine use to their doctor or other health practitioners. This is consistent with previous research reporting that people with mental health conditions have been reported to be significantly more likely to disclose using St. John’s wort and vitamin supplements than those without a mental health condition (R. J. Adams et al., 2010). In contrast, it was found that those who combined herbal and pharmaceutical medicines for anxiety symptoms were less likely to disclose their herbal medicine use. It is unclear why those who were using herbs concurrently with pharmaceuticals were less likely to disclose. However, the qualitative study in this thesis found that although people sought general treatment information from their GPs, they would make treatment decisions after considering other information sources and not necessarily disclose their treatment decision. Similarly, another study of general practice patients in the US reported that 16% of people who had a negative response from their GP after discussing CAM use, would continue to use CAM but not disclose it (Chen et al., 2000). Their study found that over 26% of patients were concerned that their choice to use CAM might result in reduced care, and 13% believed their GPs were not ready to discuss CAM use with them. These findings are consistent with research reporting discrimination in health care being associated with using herbal medicines (Thorburn et al., 2013), emphasising the need for practitioners to understand and empathise with their client’s beliefs and values relating to herbal medicine use.

In contrast, willingness to disclose may be related to frequency of health care. People with an anxiety disorder diagnosis have been found to consult health professionals more frequently than those without a diagnosis (Issakidis & Andrews, 2002), and people with more regular health care are more likely to trust their health practitioners (Hall et al., 2002). Further, one study reported that people describing good relationships with their conventional health practitioners were more likely to disclose CAM use, as were people with regular sources of health care (Faith et al., 2013). Another study found that people reporting a good relationship with their CAM provider were more likely to disclosure CAM use (Sirois, 2014). The importance of regular health care is further emphasised as people who self-prescribed herbal medicines were less likely to disclose their use of these medicines compared to those who saw a CAM
practitioner (Faith et al., 2013). However, people with an anxiety disorder diagnosis are likely to have a poorer health status than those without (M. B. Stein, Roy-Byrne, Craske, & Bystritsky, 2005), and being in good health has predicted seeking advice about CAMs from GPs, and disclosing CAM use in the general population (Thomson et al., 2012). Reasons for this contradiction are unclear.

6.2.3. **Beliefs and attitudes influencing herbal medicine use for anxiety symptoms**

Determining the beliefs and attitudes that influence herbal medicine use behaviour is important as it assists health practitioners to better understand their patients and provide optimum care. As described in the literature review (Chapter 2, p. 41) only 17 cross-sectional studies were found that used multivariate statistics to understand relations between beliefs and attitudes and herbal medicine use. Theoretical approaches to understanding herbal medicine use and CAM use more generally are not used (Lorenc et al., 2009). Without using a theoretical framework it is difficult to understand the complex relationships involved in decision-making related to specific health behaviours (Glanz et al., 2008a), such as herbal medicine use. In this thesis the theory of planned behaviour (TPB) provided the theoretical foundation for the hypothesised model that successfully predicted the intention to use herbal medicines for anxiety symptoms.

The literature review described a number of beliefs and attitudes that influence herbal medicine use in a range of cohorts, which fell into three broad categories: belief systems/philosophies, treatment beliefs and attitudes, and control and empowerment beliefs and attitudes. Based on these findings it was proposed that people having a post-modern philosophy with beliefs in holism, faith in natural treatments, dissatisfaction with the medical encounter, and a belief in having individual control over health are more likely to use herbal medicines. The results in this thesis give some support to this hypothesis. The qualitative study described that people used herbal medicines, as they perceived them as safe, having fewer side-effects compared to pharmaceuticals, being gentle or healing, and being natural. In addition, this study found that most people initially used herbal medicines, as they previously had a disappointing experience with conventional medicine. The theoretical model presented in Chapter 5 confirmed that attitudes towards herbal medicines, and control beliefs were independent predictors of intention to use herbal medicines for anxiety symptoms. Previous research using the TPB has found a more positive attitude to herbal medicines predicts the intention to use them in a sample of older adults (Gupchup et al., 2006).
Various types of control beliefs have been reported to predict CAM use in a variety of populations (McFadden et al., 2010; Sirois, 2008; Thomson et al., 2014); however, this has not been a consistent finding (Gupchup et al., 2006; Testerman et al., 2004). These conflicting findings are likely to be related to different operationalisation of control beliefs and use of different population groups. This thesis confirmed that control beliefs specifically related to desire to control health were the strongest predictor of the intention to use herbal medicines for anxiety symptoms in the theoretical model. Specifically, the greater the belief that a person will have control over their anxiety symptoms by using herbal medicines, the more likely they would be to use them. This finding suggests that people are using herbal medicines for their anxiety symptoms as they believe they will have greater control over managing anxiety. Consistent with this finding, beliefs about personal control over health have been shown to be predictors of herbal medicine and CAM use in the general population (Sirois, 2008; Thomson et al., 2014).

Wanting more control over anxiety symptoms may be one reason why people self-prescribe and use the Internet as an information source. Sourcing information about treatment options over the Internet provides people with autonomy in their decision-making, and a sense of empowerment (Cotten & Gupta, 2004). However, autonomous decision-making can be problematic when there is poor health literacy, information sourced is inaccurate, or if decision-making is impaired as a result of cognitive and emotional dysfunction due to anxiety symptoms (C. A. Hartley & Phelps, 2012). The desire for control over health has also been associated with people experiencing anxiety. People with problematic anxiety perceive they have less control over both internal and external health related factors compared to psychologically normal people (D. H. Shapiro et al., 1996). The unique cognitive symptoms experienced by people with anxiety may help explain this finding, which is discussed in the following section.

6.2.4. Anxiety symptoms influence the decision to use herbal medicines

Chapter 4 of this thesis reported that those with an anxiety disorder diagnosis were more likely to use herbal medicines than those without a diagnosis. In addition, the theoretical model presented in Chapter 5 confirmed that having more severe anxiety symptoms predicted the intention to use herbal medicines to treat anxiety symptoms. This finding is consistent with previous research reporting that people with an anxiety disorder diagnosis, compared to those without, used more herbal medicines (Bystritsky et al., 2012; Ravven et al., 2011). As people with an anxiety disorder diagnosis
experience more severe anxiety symptoms they are more likely to use conventional
evidence-based treatments than those without a diagnosis (Harris et al., 2015).
However, as many people with anxiety disorders (over 30%) do not respond to
conventional treatments (S. Taylor et al., 2012), they may be looking for
complementary treatments to relieve symptoms, or alternative treatments due to
unwanted side-effects from pharmaceuticals or lack of access to psychological
treatment options. The results in this thesis suggest that people experiencing anxiety are
looking for alternatives, as the unique properties of herbal medicines (i.e. beliefs about
being safe and natural) were found to be an important reason for using them to treat
anxiety. In particular, people reported being concerned about potential side-effects of
pharmaceuticals. These findings are consistent with literature reporting that people
gravitate towards using herbal medicines as they believe them to be safer and more
natural than pharmaceuticals (O'Callaghan & Jordan, 2003; Siahpush, 1998; 1999), and
want more personal control over their health (McFadden et al., 2010; Sirois, 2008;
Thomson et al., 2014).

Trait and state anxiety (i.e. anxiety symptoms) have been found to influence
decision-making. People higher in trait anxiety are less likely to make risky decisions
(C. A. Hartley & Phelps, 2012; Maner et al., 2007). In addition, people who are
clinically anxious have been found to be more risk averse than non-clinical controls
(Maner et al., 2007). This may partially explain why people with an anxiety disorder
diagnosis were more likely to use herbal medicines than those without a diagnosis. Risk
aversion is related to heightened physiological arousal (associated with fear) in response
to choices that are perceived as risky (C. A. Hartley & Phelps, 2012). As people believe
herbal medicines are a safer option than pharmaceuticals they perceive them to be a less
risky form of treatment. This finding may help explain why those with more severe
anxiety symptoms were found to be more likely to use herbal medicines for these
symptoms than those with less severe symptoms (as reported in Chapter 4). In addition,
people who self-prescribe herbal medicines have been found to be less willing to take
risks than those who see a herbal medicine practitioner (R. J. Adams et al., 2010). As
described in Chapter 4, the rate of self-prescription of herbal medicines is relatively
high in this study compared to consultations with herbal medicine practitioners. This is
an interesting finding considering that it could be considered more risky (particularly in
terms of safety) to self-prescribe. This behaviour could be related to familiarity and trust
(of a specific herbal medicine due to previous experience), or the perceived safety of
herbal products. This thesis did not investigate the relations between risk-taking, state and trait anxiety, and herbal medicine use; this is an area for further research.

In addition, decision-making can cause anxiety, especially in people diagnosed with anxiety disorders who are higher in anxiety sensitivity (who fear anxiety related symptoms; Floyd, Garfield, & LaSota, 2005). Expectations of harm (e.g. medication side-effects) or negative evaluation (e.g. others disapproval of herbal medicine use) can increase state anxiety (Reiss, 1991). Decision-making can be affected by heightened state anxiety, as it lowers self-confidence, consequently increasing the motivation to reduce uncertainty by seeking advice from others and increasing reliance on the advice they receive, regardless of the quality of the advice given (Gino et al., 2012). Consequently, this advice seeking about health problems can reduce anxiety (Gino et al., 2012). However, people may not seek advice from health professionals for treatment decisions; as reported previously in this thesis it was more common for people experiencing anxiety to source information from the Internet and friends and family. This is of particular concern as people experiencing anxiety can have difficulty discriminating between good and bad advice (Gino et al., 2012); therefore, even if they sought advice from a health practitioner, they may choose to take advice from friends and family, which highlights the importance of good health literacy and shared decision-making.

It needs to be noted that in this thesis anxiety symptoms explained a small proportion of variance in intention to use herbal medicines. In addition, anxiety disorder diagnosis and anxiety symptoms over the last 12 months were weak predictors of herbal medicine use. Possible explanations for these findings include: that herbal medicines may not be the first choice for treating anxiety symptoms, or they may provide some relief of somatic symptoms but not cognitive symptoms. Biological treatments (i.e. herbal medicines or pharmaceuticals) do not address the cognitive component of anxiety, which may be a more significant problem for some people (e.g. those with GAD; S. Taylor et al., 2012). In addition, this thesis reported that many people with normal to mild anxiety symptoms were currently using herbal medicines for their symptoms. This behaviour may be explained by the herbal medicines being effective in managing their anxiety symptoms. A number of herbal medicines have been found to be effective in treating anxiety symptoms (Ernst, 2006; Sarris et al., 2013c). Alternatively, they may have been taking herbal medicines preventatively to maintain their mental health. Maintaining wellbeing has been reported as the main reason people in the
general population take oral CAMs including herbal medicines (R. J. Adams et al., 2010; Thomson et al., 2014; A. L. Zhang et al., 2008).

6.3. Implications of findings

6.3.1. Implications for people seeking treatment for anxiety symptoms

The primary message resulting from this research for people seeking treatment for anxiety symptoms who are using herbal medicines relates to safety and efficacy. This study found that people using herbal medicines for anxiety frequently consulted non-professional information sources, and consequently may not be receiving accurate information about the efficacy, dose, or safety of the herbal medicines they are using. In addition, people reported finding it difficult to choose herbal medicine products, indicating the need for additional information, and possibly resulting in the use of inappropriate treatments for their anxiety symptoms. It is essential that people are able to discern good information from bad, which requires good functional health literacy. This may be difficult for many people, as previous research found that 50% of an Australian general population sample had less than adequate functional health literacy (R. J. Adams et al., 2009). It is recommended that herbal medicine consumers communicate with herbal medicine practitioners, or refer to reliable information sources to assist them with their treatment decisions.

Determining which information sources are reliable can be challenging for herbal medicine consumers and it is difficult to determine the quality of herbal products. It is important to be able to determine quality as it can affect the safety and effectiveness of the product used (J. J. L. Wardle & Adams, 2014). In Australia the TGA enforces strict requirements for good manufacturing practice (Therapeutic Goods Administration, 2015). However, this is not necessarily the case for products manufactured elsewhere. There is a greater risk of compromised quality when purchasing online from countries other than Australia (J. Zhang et al., 2012a). Considering this thesis reported that many people sought herbal medicine information from the Internet, it is possible they are also purchasing herbal medicine online from various countries. Information about where herbal medicines are being purchased was not collected in this study. However, research in 2007 found that only 1.2% of herbal medicine users in the general population purchased herbal medicines on the Internet or telephone (A. L. Zhang et al., 2008). There is likely to be greater availability of herbal product online in 2016 (at the time of writing this thesis), and more research is needed
to determine where people are purchasing herbal medicine products. It is recommended that people purchasing herbal medicines for anxiety symptoms (or other health purposes), do so from reputable Australian manufacturers that are required to comply with TGA manufacturing requirements.

Effective self-care requires good mental health literacy in order to judge when it is necessary to see a health practitioner for accurate diagnosis and treatment advice. It is recommended that people seeking treatment for anxiety symptoms determine the severity of their symptoms before considering self-prescribing herbal medicines, as they may be placing themselves at risk of not receiving the most appropriate treatment for their needs. However, this may be challenging for some people, as low mental health literacy is associated with a delay in seeking professional help in adults with anxiety disorders (Coles & Coleman, 2010). If people do not seek professional help it is difficult for them to receive an accurate diagnosis and appropriate treatment advice.

6.3.2. Implications for conventional health practitioners and herbal medicine practitioners treating anxiety

The primary message for health practitioners related to the findings from this thesis is that people with anxiety are using herbal medicine in a variety of ways and it is important to understand the characteristics and determinants of this use. Health practitioners have a critical role to play in ensuring people are making safe and effective treatment decisions. This thesis reports that adults experiencing anxiety are consulting a range of conventional and CAM practitioners. However, as described previously there are barriers to engaging in shared decision-making with health practitioners due to a perceived lack of support, or fear of judgment related to a person’s choice to use herbal medicines. This is a serious concern as it may further alienate people from conventional health care, putting them at risk of not receiving the most appropriate treatment (Doyle et al., 2013).

Discrimination in health care has been found to be related to use of herbal medicines (Thorburn et al., 2013), as has dissatisfaction with the medical encounter (Paltiel et al., 2001; Shumay et al., 2002; Siahpush, 1998; Sirois & Gick, 2002). Additionally, some CAM practitioners may be discouraging of conventional treatments (J. J. L. Wardle & Adams, 2014). These are additional barriers for people experiencing anxiety as they can also experience discrimination and stigma related to their mental health condition (S. Clement et al., 2014). The combined influence of stigma towards treatment choice and having a mental health problem may prevent people seeking
advice from health professionals. Therefore, all health practitioners need to ensure positive consultation experiences by focusing on patient-centered care and shared decision-making. Regardless of the treatment beliefs of individual conventional and non-conventional health practitioners, their client’s beliefs and values need to be respected without judgment, which aligns with the patient-centered approach.

Ensuring shared decision-making and establishing trust is crucial considering that this thesis found that people are relying heavily on non-professional information sources for advice about their herbal medicine use. Results from the qualitative interviews suggest that this reliance on friends and family for information may be influenced by trust. Therefore, it is important that practitioners establish a strong therapeutic alliance (i.e. the relationship between a health practitioner and their client) with their clients in order to develop trust. Research has consistently shown that patient-centered care is associated with a strong therapeutic alliance, which helps to establish trust, facilitates open communication, and improves treatment outcomes (Bann et al., 2010). A patient-centered approach with shared decision-making is considered best practice in mental health care (Australian Health Ministers' Advisory Council, 2013). Therefore, practitioners need to ensure they are adequately equipped and confident to engage in shared decision-making with their clients. In an already challenging environment, it is nontrivial for practitioners to become skilled in shared decision-making. Future research needs to investigate the challenges to achieving this.

Lack of communication with health practitioners is a concern as it can create treatment dissatisfaction and poor adherence, and compromises the ability to correctly diagnose; therefore, preventing effective treatment (Joosten et al., 2008). As people with anxiety disorders are likely to have poorer general health status than those without a diagnosis, and may be on multiple medications (Ravven et al., 2011; M. B. Stein et al., 2005), lack of communication with health professionals also places them at greater risk of using herbal medicines unsafely or ineffectively. People are more likely to disclose their herbal medicine use if health practitioners believe it is important to ask about their supplement use (Tarn et al., 2015). Questions about herbal medicine use, and treatment preferences should be asked routinely in consultations. However, disclosing this information is not enough; conventional health professionals need adequate knowledge to provide treatment advice, which requires them to have good health literacy about herbal medicines and CAMs more generally. This is crucial as Australian GPs have been found to lack knowledge about the side-effects and interactions of commonly used
herbal medicines (Pirotta et al., 2010). Therefore, incorporating basic herbal medicine education into both undergraduate and postgraduate clinical training may enhance shared decision-making and enable conventional health practitioners to confidently advise or alternatively refer to the most appropriate health practitioners (Templeman et al., 2015). However, the amount of herbal medicine knowledge needed by conventional health practitioners to adequately discuss or prescribe herbal medicines has not been clarified. It is an unreasonable expectation for GPs to commit to specialised herbal medicine training. More research is needed to determine the ideal level of knowledge required to provide adequate information to clients.

As described in this thesis, people are using a range of herbal medicines for anxiety symptoms. In addition, the popularity of herbal medicines more broadly is increasing, and there is an emerging evidence base for these treatments. Therefore, broader adoption of herbal medicines as complementary treatments for anxiety would likely enhance conventional health care. Herbal medicines with evidence of efficacy could be integrated into mainstream health care. In addition, as herbal medicines have less side-effects than pharmaceuticals and can be more cost effective (Solomon et al., 2013), they are treatments that should be considered routinely for treating anxiety symptoms. For example, kava should be a first line treatment in treating generalised anxiety as it has demonstrated Level A evidence of efficacy (Sarris et al., 2011a); however, as reported in this thesis few conventional practitioners prescribed herbal medicines for anxiety symptoms, and it appears that research on herbal medicine efficacy is not translating into the clinical practice of conventional health practitioners. St John’s wort is an example of a herb that has demonstrated efficacy in the treatment of mild to moderate depression (K. Clement et al., 2006); however, it is yet to be considered a first line treatment. One study of Australian GPs found that only 31% prescribed St John’s wort for mild to moderate depression, and that GPs with more knowledge about the effects of St John’s wort were more likely to prescribe it than those without this knowledge (McGarry et al., 2007). This is concerning as economic modeling has shown St John’s wort to be a more cost effective treatment option for individuals than commonly prescribed antidepressants (Solomon et al., 2013). Therefore, given the widespread use of herbal medicines it is necessary that conventional health practitioners have adequate knowledge of the evidence base for these medicines to enable them to prescribe herbal medicines if suitable, refer to
specialised herbal medicine practitioners if appropriate, or discuss efficacy and safety with clients.

Knowledge about herbal medicine practitioners and the service they provide is important for enabling collaboration and communication between different health professionals in order to provide adequate care and treatment outcomes for people with anxiety. There are low rates of referrals from conventional health practitioners to CAM practitioners; for example, only 12% of general practitioners referred clients to a herbalist and 10% to a naturopath (Lin et al., 2009), compared to 46% of mental health practitioners referring to CAM practitioners (Morgan & Francis, 2008). Conversely, being able to determine the severity of anxiety symptoms is a necessary skill for herbal medicine practitioners so they can determine when to refer to other more suitable health practitioners (J. J. L. Wardle & Adams, 2014). Therefore, herbal medicine practitioners need adequate training in managing mental health problems within their scope of practice, and clients would likely benefit if conventional health practitioners and herbal medicine practitioners communicate more effectively with each other.

The Australian Department of Health recommends mental health practitioners affirm “a person’s right to exercise self-determination, to exercise personal control, to make decisions and to learn and grow through experience” (Australian Health Ministers' Advisory Council, 2013). Therefore, the challenge for all health practitioners is to minimise risk related to duty of care while allowing people to have personal control and autonomy over managing their anxiety.

6.3.3. Implications for policy makers

As anxiety is one of the most common mental health problems experienced by Australians (T. Slade et al., 2009a), the findings in this thesis have broader implications for health policy makers, specifically for both optimising safe and effective treatment outcomes for people experiencing anxiety symptoms, and the prevention of more severe anxiety symptoms and disorders. This should involve the integration of evidence-based herbal medicines as a treatment option into mainstream mental health care, regulation of herbal medicine practitioners, and adequate access to accurate and reliable health information—specifically related to anxiety symptoms and disorders.

6.3.3.1. Integration of herbal medicine into mainstream mental health care

Commentators have highlighted problems with the pluralistic attitudes in both conventional and complementary medicine calling for integration (Hawk et al., 2015; P.
Herbal medicine use is widespread, with many people using herbal medicines for anxiety symptoms and mental health problems more generally. Therefore, the integration of herbal medicines as treatment options into mainstream mental health care should be a serious consideration for policy makers. This will better enable people with anxiety who wish to use herbal medicines to receive safe and effective treatments (Sarris et al., 2014). The importance of integrative mental health care has been emphasised in a white paper (Sarris et al., 2014) that provided a strategic vision for improved mental health care. The aim of integrative mental health is to facilitate a more inclusive, holistic approach that emphasises the importance of prevention and wellness. The proposed model incorporates non-conventional treatments in order to address issues with conventional treatments such as poor adherence, lack of access to mental health care, inadequate treatment effectiveness, side effects of pharmaceuticals, and patient preferences (Sarris et al., 2014). In addition, the white paper recommends facilitating increased awareness of evidence-based CAM. A number of herbal anxiolytics have a growing evidence base, and have the potential to assist in the prevention of the development of more severe anxiety symptoms or disorders (Sarris et al., 2013c), potentially preventing the need for conventional treatments. As over 30% of people with anxiety disorders do not respond to conventional treatments (S. Taylor, Abramowitz, & McKay, 2012), herbal medicines could be an important treatment option. Effective integration also relies on ensuring access to accurate and reliable information on herbal medicines for treating anxiety. It is in the best interest of the public that an appropriate level of herbal medicine education is incorporated into mainstream mental health care.

6.3.3.2. Regulation of herbal medicine practitioners

This thesis reports that people with anxiety are seeing a range of herbal medicine practitioners. Effective integrative mental health care includes incorporating herbal medicine practitioners into mainstream health care. This is currently a challenge as the only nationally regulated practitioners specialising in the prescription of herbal medicines are TCM practitioners (Australian Health Practitioner Regulation Agency, 2014). Being able to identify a suitably qualified herbal medicine practitioner is reported to be confusing by both the public and health practitioners (Lin et al., 2009). Despite continued recommendations for regulation of naturopaths and Western herbalists (Bodeker & Kronenberg, 2002; Lin et al., 2009; P. McCabe, 2005; Spinks & Hollingsworth, 2012; J. Wardle et al., 2013) they remain self-regulated professions
generally operating outside conventional health care. Attempts are being made by these professions to improve professional standards to protect the public, and make it easier to identify qualified practitioners. For example, the Australian Register of Naturopaths and Herbalists (ARONAH) opened in 2013 as a register that mirrors the requirements for the National Registration and Accreditation Scheme for health practitioners (Australian Register of Naturopaths and Herbalists, n.d.). However, this is a voluntary register, and the absence of health practitioner regulation under federal law means there are no minimum standards for education needed to practice as a Western herbalist or naturopath. Consequently, there is reluctance by conventional health professionals to refer patients to Western herbalists and naturopaths (Lin et al., 2009), and a lack of equitable access to these health practitioners.

Currently, professional associations are primarily responsible for enforcing minimum education standards and professional requirements; however, there is significant discrepancy between the educational and professional standards they enforce (J. Wardle et al., 2013). It is essential that these professions be regulated to ensure public safety and enable health practitioners and the public to determine suitably qualified herbal medicine practitioners. Making suitably qualified herbal medicine specialists more identifiable may encourage people to seek herbal medicine advice when they need it as opposed to self-prescribing. Ensuring access to a variety of evidence-informed treatment options for people experiencing anxiety aligns with the principles of recovery from mental illness by ensuring consumer choice (Australian Health Ministers' Advisory Council, 2013). However, the current regulatory status of herbal medicine practitioners makes it difficult to facilitate shared decision-making when a client’s preference is to use herbal medicines.

6.3.3.3. Access to accurate and reliable health information to enable safe and effective self-care

Many people self-prescribe herbal medicines for anxiety symptoms and other health conditions. Being able to engage in self-care is critical as it embodies self-determination and empowerment, which are necessary elements for prevention of and recovery from mental illness (Australian Health Ministers' Advisory Council, 2013). However, ineffective self-care of mental health problems eventually creates a burden on the health care system, as it compromises treatment adherence, and is associated with increased morbidity and mortality (Patel et al., 2013). Having access to reliable health information is critical to enable adequate health literacy so people experiencing anxiety
can recognise their symptoms and make appropriate decisions about their treatments (Sørensen et al., 2012). Having good mental health literacy related to anxiety provides an understanding of anxiety symptoms and their risk factors, knowing when it is appropriate to rely on self-care (e.g. self-prescribe herbal medicines), what treatments to use, when to consult a health practitioner, and what type of health practitioner will best meet their treatment needs.

In addition, people need good herbal medicine literacy in order to assess the effectiveness, safety and quality of herbal medicine products (Shreffler-Grant et al., 2013). Having good health literacy extends to being able to critically evaluate information provided by friends and family, as opposed to relying on trust, and being able to determine when it is necessary to see a herbal medicine or other type of health practitioner (Shreffler-Grant et al., 2013). In addition, people need to be able to assess the effectiveness, safety and quality of herbal medicine products (Shreffler-Grant et al., 2013). This is a complex amount of information to navigate, and may not be easily accessible for many people. The qualitative study in this thesis reported that people found herbal medicine information confusing, especially with regards to which product was most suitable for their needs, and what information sources were reliable. Users of herbal medicines have been reported to have poor knowledge of the medicines they are taking. For example, 62.6% of herbal medicine users in an Australian hospital reported none to very little knowledge about the herbal medicines they were taking (Shorofi & Arbon, 2010), and people have been found to use herbal medicines for the wrong evidence-based indications (Bardia et al., 2007). In addition, 46.6% of herbal medicine users in the general population were unaware of potential risks. These findings indicate an urgent need public health interventions aimed at improving public herbal medicine health literacy.

Many people seek information on the Internet about both herbal medicines, and anxiety symptoms (Van Ameringen, Mancini, Simpson, & Patterson, 2010). For some people the Internet is their primary source of health information. For example, people who are socially anxious can find it difficult to have face-to-face interactions with health practitioners, so use the Internet to source information about social anxiety and treatments (Erwin et al., 2004). One US study explored how adults used the Internet to find information on social anxiety disorder (SAD) and its treatments, and their psychological characteristics (Erwin et al., 2004). They found that 92% of those who sought information about SAD online met the criteria for SAD, and had greater social
anxiety and social impairment (i.e. socialised face-to-face less frequently and had less social connections) than a comparison group of people with SAD receiving treatment at an anxiety clinic. They also found that of the Internet users with SAD ($n = 384$) 31% of participants reported using herbal medicines to treat social anxiety symptoms, and concluded that it is likely that people with more severe SAD avoided face-to-face interactions with health practitioners. In addition, certain personality types such as those who are introverted may prefer to use the Internet for similar reasons (van der Aa et al., 2009). Therefore, the Internet is an important platform for information dissemination.

However, the quality of health information provided online is variable and difficult to determine, as it is unregulated (Cotten & Gupta, 2004). Determining the reliability of herbal medicine information online is particularly difficult as many sites present misleading claims, or inaccurate information (Pilkington et al., 2011; J. J. L. Wardle & Adams, 2014). This is particularly concerning as herbal medicine health literacy is complex and requires a good level of general health literacy (Shreffler-Grant et al., 2014). Therefore, policy makers need to determine a way to provide reliable information about anxiety and herbal medicines on the Internet in a centralised way that is easy to locate and understand. The Herbal Hub is an example of an online herbal medicine information website available in the UK (www.herbalhub.net). It provides information on herbal medicines, suggests suitable products, and includes a decision-making tool to determine if self-care is appropriate. However, to my knowledge at the time of writing this thesis, no resources such as this are available in Australia, and the effectiveness of this website has not been established. In addition to information provision, there needs to be effective education strategies to enable people to locate this information.

Previous research has identified there is generally poor mental health literacy for anxiety disorders (Furnham & Lousley, 2013; Reavley & Jorm, 2011). Initiatives aimed at improving mental health literacy have yet to focus specifically on anxiety (Reavley & Jorm, 2011). Therefore, public health interventions should be targeted at improving mental health literacy specifically for anxiety symptoms and disorders. Use of tools like MACSCREEN, which was developed as an online screening tool for people concerned about anxiety symptoms (Van Ameringen et al., 2010) could be incorporated into mental health literacy initiatives. Therefore, the focus of future policy needs to be directed at facilitating good health literacy to enable people to confidently
recognise anxiety symptoms and make decisions about the best treatment approach. These initiatives need to include reliable information on herbal medicines.

### 6.4. Significant contributions of the research

The contributions in this thesis are of most significance to health practitioners who treat people with anxiety symptoms, adults with anxiety symptoms who use herbal medicines, policy makers in public health, and future researchers. First, Chapter 2 provides a comprehensive critical review of the literature on the prevalence of herbal medicine use in adults experiencing anxiety. In addition, a critical review and synthesis of the literature explored the beliefs and attitudes that predict herbal medicine use. This is the first study to report such a comprehensive analysis of the literature in this area. Consequently, it contributes to understanding herbal medicine use prevalence in adults with anxiety and the beliefs and attitudes towards the use of these medicines.

Second, the qualitative study in Chapter 3 provides a rich description of the beliefs and attitudes towards herbal medicines of adults who experience anxiety. This study found three themes that influenced the decision to use herbal medicines: herbal medicines being different to pharmaceuticals, evidence and effectiveness, and barriers to using herbal medicines. This thesis is the first to report that beliefs and attitudes previously identified as predictors of herbal medicine use in other populations were relevant to a population of adults experiencing anxiety, highlighting the need for further research to understand these beliefs and attitudes.

Third, Chapter 4 describes a quantitative study that reported that adults who experience anxiety are using herbal medicines in a variety of ways, and seeing a range of health practitioners. High rates of self-prescription were reported, and many people (27.5%) were using herbal medicines concurrently with pharmaceuticals and not disclosing their herbal medicine use to their doctor (48%). In addition, people reported using non-professional information sources such as the Internet and family and friends more frequently than credible information sources such as health practitioners. This is the first study to provide a comprehensive description of herbal medicine and health services use in Australian adults who experience anxiety, and to identify self-care behaviours in this population that are potentially dangerous. The findings have important implications for health practitioners and public health related to health literacy and shared-decision making to enable safe use of herbal medicines in this population.
Fourth, Chapter 4 reports that anxiety symptom severity predicted current herbal medicine use for anxiety symptoms. In addition, people with an anxiety disorder diagnosis, or who experienced anxiety symptoms were significantly more likely to use herbal medicines in the previous 12 months. These findings contribute to our understanding of factors associated with using herbal medicines, and are important for health practitioners, as conventional treatments may not providing adequate relief of anxiety symptoms. These findings also highlight the need for more research to establish the efficacy and effectiveness of herbal anxiolytics, as this research suggests they are an important complementary medicine for people experiencing anxiety.

Fifth, the study in Chapter 5 used structural equation modeling (SEM) to confirm a theoretical model that accurately predicted 56% of the variance in intention to use herbal medicines for anxiety symptoms. This model confirmed that anxiety symptoms, control beliefs, subjective norms, and attitude to herbal medicines positively and independently predicted the intention to use herbal medicines for anxiety symptoms. This study was innovative as it is the first to use a theoretical model to explain the relations between variables involved in decision-making in herbal medicine use for anxiety symptoms. These findings provide a robust contribution to our understanding of this health behaviour, and highlight the need for interventions to facilitate safe and effective use of herbal medicines for anxiety symptoms.

6.1 Future directions for research

There are many areas for future research that have been identified from the results of this thesis. More research is needed on herbal medicine use specifically as opposed to CAM generally, as it is a biological treatment with unique safety and efficacy issues. In addition, herbal medicines have an increasing evidence base, are becoming increasingly popular with health consumers, and are becoming more accepted within conventional health care. Following are the suggested areas for future research.

6.4.1 Health behaviour research

In terms of health behaviour, it is critical to further develop the findings in this thesis. A more comprehensive understanding of which factors influence people to choose specific types of medicines and practitioners to treat anxiety symptoms is needed. In addition, it is important to have a more in-depth understanding of why people are relying on non-professional information sources and not disclosing their herbal medicine use. This thesis provided some explanation for these behaviours, and identified some key predictors of the intention to use herbal medicines; however, future
research needs to determine which specific beliefs are involved in forming attitudes towards herbal medicine use for anxiety symptoms, so that interventions can be developed that are able to target dysfunctional beliefs that lead to making unsafe or ineffective decisions about treatment.

As there was some unexplained variance in the theoretical model, future research needs to determine other factors influencing the decision to use herbal medicines use for anxiety symptoms. Therefore, future studies need to continue to incorporate health behaviour theory as it allows for a more detailed understanding of relations between variables, how they influence behaviour, and assist to identify where to implement change for problematic behaviours (Glanz et al., 2008a), such as inappropriate use of herbal medicines.

6.4.2. Health services research

People experiencing anxiety consult a variety of health practitioners, who were reported to prescribe herbal medicines for anxiety symptoms to various degrees. Therefore, health services research is needed to further understand herbal medicine use for anxiety symptoms. Consequently, future research in this area relates to all practitioners who treat people with anxiety symptoms who use herbal medicines.

6.4.2.1. Workforce surveys

There is limited knowledge of how herbal medicine practitioners manage and treat people experiencing anxiety. Therefore, an understanding of the actual prescribing practice of herbal medicine practitioners for treating anxiety is needed. In addition, research needs to develop a description of the herbal medicine practitioner workforce. This research should aim to determine the number of herbal medicine practitioners providing treatment to people with anxiety symptoms, their practice location, and how they are managing treatment (e.g. tools used to monitor outcomes, consultation times, number of clients being treated, herbal medicines and other treatments prescribed). Level of education also needs to be determined. Given the lack of standardised training, it is currently unknown if herbal medicine practitioners are adequately trained in mental health (M. J. Leach, McIntyre, & Frawley, 2014; Lin et al., 2009; Morgan & Francis, 2008). Therefore, gaps in practitioner knowledge need to be identified. This would allow for improvement in undergraduate curriculums and professional development programs.
6.4.2.2. **Communication between health practitioners**

Little is known about the referral practices between herbal medicine practitioners and conventional health practitioners. One study has described the referral practices and treatment approaches of naturopaths and Western herbalists for mental health conditions including anxiety (Morgan & Francis, 2008); however, relied on hypothetical vignettes to assess treatments used by practitioners. Research needs to determine the quality of the working relationships between mental health and herbal medicine practitioners. Specifically, how herbal medicine practitioners and conventional mental health care providers are referring to each other. While there is some movement in conventional medicine towards an integrative approach to mental health care (Sarris et al., 2014), there is a dearth of research exploring how these professions work together, and how they can improve their approach to collaboration. Working together as an integrative health care team is in the best interests of the individual and provides them with more health care choice.

6.4.2.3. **Beliefs and attitudes of conventional health practitioners to herbal medicines**

This thesis described dissatisfaction with the medical encounter to influence the decision to use herbal medicines, which could be related to discrimination by health care practitioners. Therefore, understanding the beliefs and attitudes of conventional health practitioners towards herbal medicines is needed. There has been research describing the beliefs and attitudes of conventional health practitioners towards CAM (Morgan & Francis, 2008). However, little is known about their beliefs and attitudes towards using herbal medicines for anxiety symptoms specifically. Identifying these beliefs and attitudes will assist in developing education strategies enabling health practitioners to better understand and empathise with their patients’ choices, and consequently participate effectively in shared decision-making.

6.4.3. **Clinical research**

Many of the herbal medicines used for anxiety symptoms by participants in this thesis have little evidence of efficacy in treating anxiety symptoms. There is emerging evidence for using herbal medicines for treating anxiety symptoms (Sarris et al., 2013b; 2013c), and a long history of traditional use; however, further research is considered crucial to establish efficacy, clinical effectiveness, and safety. Therefore, well-designed clinical trials are needed to establish the efficacy of individual herbs and commercially available herbal formulations in both specific anxiety disorders, and sub-
threshold anxiety symptoms. Longitudinal studies should include people with moderate anxiety symptoms, to determine whether use of herbal anxiolytics prevents sub-threshold anxiety symptoms from developing into more serious disorders.

As people reported consulting with herbal medicine practitioners in this thesis, whole systems research is needed to explore the effectiveness of herbal medicine practitioner prescribing for anxiety symptoms in real world clinical practice. Very few studies have attempted this type of study design (Sarris, Gadsden, & Schweitzer, 2013a). This research approach is crucial given the dearth of research on the effectiveness of herbal medicine prescribing by herbal medicine practitioners in general and specifically for anxiety symptoms.

6.4.4. Public health research

6.4.4.1. Herbal medicine and mental health literacy

The current level of herbal medicine health literacy in the public is unclear. Research is needed to determine the publics’ herbal medicine health literacy with regards to treatments for anxiety and other health conditions. Further validation of tools such as the MSU CAM Health Literacy Scale (Shreffler-Grant et al., 2014) is needed, which measures knowledge on the effect, dose, safety, and availability of herbal medicines. More research on mental health literacy for anxiety symptoms and disorders is needed to determine the publics’ ability to recognise them. This research will assist to identify gaps in knowledge so education strategies can be developed.

People are using herbal medicines for anxiety symptoms, and GPs have reported feeling inadequately equipped to discuss their clients’ use of these medicines (Pirotta et al., 2010), and that they find CAM research difficult to locate (McGuire et al., 2009). Therefore, research needs to determine how best to translate herbal medicine research into clinical practice. It is critical to determine how to improve access to this information for GPs and other mental health practitioners.

6.5. Limitations

This thesis provides insight into how Australian adults who experience anxiety are using herbal medicines and their treatment decision-making. A mixed-methods approach was used that included two cohorts: a group of Australian adults who had experienced anxiety and used herbal medicines (N = 8) for the qualitative phase, and a large sample (N = 400) for the quantitative phase accessed from a database
representative of the Australian population. This section discusses limitations of the study design that need consideration when interpreting the results.

The qualitative results provided insights into the beliefs and attitudes towards herbal medicines in a specific population of adults with an experience of anxiety, and informed the development of the questionnaire used in the quantitative phase. As this population was a special interest group and the aim of the study was exploratory, findings cannot be generalised to a wider population. The qualitative results allowed for triangulation of the findings when interpreting the results. Analysis of the quantitative data supported a number of the qualitative findings, specifically the influence of social norms (including friends and family as information sources) and attitudes about decision-making related to herbal medicine use.

The qualitative results provided a comprehensive description of herbal medicine use behaviour, and identified key predictors of the intention to use herbal medicines. However, there are limitations related to online cross-sectional survey designs. The use of a convenience sampling technique may cause response bias. However, the quantitative sample was representative of the Australian population with regards to gender (Australian Bureau of Statistics, 2015b), and geographic location (Australian Bureau of Statistics, 2015a). Random error may have been a factor influenced by sampling bias; however the use of a large sample size reduces this problem (Sica, 2006).

Retrospective questionnaire items are widely used in quantitative research; however, as this study relied on self-report it may be affected by recall bias. Some questions on herbal medicine use and anxiety symptoms asked about the previous 12 months, and over the lifetime; recall bias may have occurred for these questions particularly for those who did not have a recent experience of anxiety. Research has demonstrated retrospective prevalence rates of anxiety disorders tend to be significantly underestimated (Moffitt et al., 2010). However, this study also measured current herbal medicine use. In addition, validated reliable research tools were used to measure anxiety symptoms, and trait anxiety. Use of the DASS-21 and the STAI allowed for comparisons with clinical and general population norms (Crawford et al., 2011). Items developed for use in the questionnaire need further refinement to ensure they are reliable and valid. However, the items used to represent the constructs used in the theoretical model (i.e. attitudes, control beliefs, social norms, and intention)
demonstrated good internal reliability and construct validity, indicating they were accurate measures of each construct relative to the sample (Hair et al., 2015). The use of online surveys has the benefit of convenience for participants as they can complete them at their own leisure. In addition, online surveys have demonstrated a perceived increased anonymity for participants that allows them to more freely discuss sensitive health information, with more truthful self-reporting and less social desirability bias (Kays, Gathercoal, & Buhrow, 2012). Further, online surveys may overcome volunteer bias associated with traditional recruitment methods, where certain personality types tend to be over represented in the sample (Saliba & Ostojic, 2014).

The theoretical model tested in this thesis was supported with good model fit; however, 44% of the variance remains unexplained. While fit indices are sensitive to variables omitted from the model, good model fit is no guarantee that all the important variables have been included. The omission of variables can present a misleading picture of the causal structure; therefore, the influence of each predictor variable needs to be interpreted with caution, as there can be biased parameter or standard error estimates (Tomarken & Waller, 2005). However, the model tested was theoretically based, and the variables chosen were previously shown to be predictors of herbal medicine use, thus mitigating the above concerns. In addition, the proportion of variance explained by the model (56%) is greater than the average amount found to predict intention across a range of health behaviours when using the TPB (McEachan et al., 2011).

Despite the limitations discussed, the quantitative study cohort was large and recruited from a representative sample of the Australian adult population. Therefore, the results presented in this thesis are likely to be reasonably representative of adults who experience anxiety and use herbal medicines.

6.6. Conclusion

This thesis has explored the use of herbal medicines in adults who experience anxiety. While many studies have explored herbal medicine use within the broad category of CAM, few studies have specifically focused on herbal medicine use, and no studies have done so in adults experiencing anxiety in Australia. Using a pragmatic approach to understanding health behaviour, using mixed methodology, this thesis makes a significant contribution to the growing body of research seeking to understand herbal medicine use, and treatment decision-making of adults experiencing anxiety. The
critical review of the literature identified the prevalence of herbal medicine use in adults with anxiety, and the beliefs and attitudes that predict the intention to use herbal medicines or the actual behaviour of herbal medicine use. The findings from the literature review informed the development of the qualitative interviews and quantitative questionnaires used in the subsequent phases of the research. The qualitative study provided a rich description of the beliefs and attitudes towards herbal medicine amongst adults who experienced anxiety. Findings from this phase also informed the development of the quantitative questionnaire and the hypothesised theoretical model predicting the intention to use herbal medicines for anxiety symptoms. The model was tested using structural equation modeling and demonstrated that attitudes to herbal medicines, subjective norms, control beliefs, and severity of anxiety symptoms were significant predictors of intention to use herbal medicines for anxiety symptoms.

The findings presented in this thesis will assist health practitioners who treat anxiety, people with anxiety symptoms who use herbal medicines, policy makers in public health and herbal medicine regulation, and future researchers in this field. Specifically, people experiencing anxiety need to be supported to make safe and effective treatment decisions that align with their beliefs and values, and be empowered to feel in control over their anxiety symptoms. The results emphasise the need for better integration of herbal medicines and herbal medicine practitioners in mainstream healthcare, and improved public and practitioner health literacy, specifically for herbal medicines and anxiety symptoms and disorders. In addition, effective communication and shared-decision making in mental health care is essential. Implementation of these strategies will help to ensure people experiencing anxiety are receiving the most suitable treatment to help manage their anxiety symptoms, and the safe and effective use of herbal medicines.
References


Appendix A: Ethics approval for the qualitative study

26 June 2013

Ms Erica McIntyre
20 Goodare Street
BLACKHEATH NSW 2785

Dear Ms McIntyre,

The CSU Human Research Ethics Committee (HREC) operates in accordance with the National Health and Medical Research Council’s National Statement on Ethical Conduct in Research Involving Humans.

The HREC has reviewed your report requesting a variation for your research project “Attitudes, beliefs and barriers to herbal medicine use: Why and how do individuals with anxiety use herbal medicines?” protocol number 2013/027 and I am pleased to advise that this request for a variation meets the requirements of the National Statement; and variation for this research is granted for a twelve month period from 26 June 2013.

Please note the following conditions of approval:

- all Consent Forms and Information Sheets are to be printed on Charles Sturt University letterhead. Students should liaise with their Supervisor to arrange to have these documents printed;
- you must notify the Committee immediately in writing should your research differ in any way from that proposed. Forms are available at http://www.csu.edu.au/_data/assets/word_doc/0010/176833/ehrec_annrep.doc
- you must notify the Committee immediately if any serious and or unexpected adverse events or outcomes occur associated with your research, that might affect the participants and therefore ethical acceptability of the project. An Adverse Incident form is available from the website: as above;
- amendments to the research design must be reviewed and approved by the Human Research Ethics Committee before commencement. Forms are available at the website above;
- if an extension of the approval period is required, a request must be submitted to the Human Research Ethics Committee. Forms are available at the website above;
- you are required to complete a Progress Report form, which can be downloaded as above, by 16 May 2014 if your research has not been completed by that date;

www.csu.edu.au

CRICOS Provider Numbers for Charles Sturt University are 00009F (NSW), 01947G (VIC) and 02996B (ACT). ABN: 83 878 708 551

Last updated: February 2013
Next review: February 2014
• you are required to submit a final report, the form is available from the website above.

You are reminded that an approval letter from the CSU HREC constitutes ethical approval only.

If your research involves the use of radiation, biological materials or chemicals separate approval is required from the appropriate University Committee.

Please don’t hesitate to contact the Executive Officer: telephone (02) 6338 4628 or email ethics@csu.edu.au if you have any enquiries about this matter.

Yours sincerely,

\[Signature\]

Julie Hicks  
Executive Officer  
Human Research Ethics Committee  
Direct Telephone: (02) 6338 4628  
Email: ethics@csu.edu.au

Cc: Associate Professor Anthony Sibilia; Professor Carmela Maran

This HREC is constituted and operates in accordance with the National Health and Medical Research Council’s (NHMRC) National Statement on Ethical Conduct in Human Research (2007)
Appendix B: Advertisement for qualitative study

Attitudes, beliefs and barriers to herbal medicine use: Why and how do individuals with anxiety use herbal medicines?

Do you experience anxiety? Do you use herbal medicines? Are you an Australian adult (18 years and older)? If the answer is yes, you are invited to participate in a study exploring your beliefs, attitudes towards, and reasons for using herbal medicines.

This study is exploring the factors that influence adults who experience anxiety to use herbal medicines and how they use herbal medicines. This is an area of interest as previous research has shown adults with anxiety to be high users of herbal medicines.

The project involves participation in a interview (60 to 90 minutes) where you will be asked to share your knowledge of and experience with using herbal medicines. The interview will take place at a suitable time and location that is convenient to both you and the researcher. The interview will be recorded and fully transcribed by the researcher. The transcription will be sent to you so you can confirm its accuracy and add further comments if needed. To acknowledge your generosity for participating in the interview you will receive a gift of a grocery voucher to the value of $15.

Your participation in this study is completely voluntary and interview data will be de-identified to protect your privacy. You will be free to withdraw from the study at any time for any reason, and without any consequences.

Would you like to participate?

If you would like more information, or to participate in this study please contact Erica McIntyre on, phone 0438 448 653, or email emcintyre@csu.edu.au.

This study is being supervised by Associate Professor Anthony Saliba, and Professor Carmen Moran, Charles Sturt University, and has been approved by the Human Research Ethics Committee, reference number 2013/027.

Thank you for considering being part of this research project.
Appendix C: Information sheet for quantitative study

Dear Participant

My name is Erica McIntyre. I am a PhD student enrolled at Charles Sturt University in the School of Psychology. I would like to invite you to participate in my research project titled: “Attitudes, beliefs and barriers to herbal medicine use: Why and how do individuals with anxiety use herbal medicines?”. This study is one of the requirements for completing the Doctor of Philosophy (Psychology) at Charles Sturt University.

Dr Anthony Saliba and Dr Carmen Moran from Charles Sturt University are supervising the study. Following are their contact details:

Associate Professor Anthony Saliba, Ph: 02 6933 2306
Email: asaliba@csu.edu.au
Professor Carmen Moran, Ph: 02 6933 2957
Email: cmoran@csu.edu.au

Purpose of research

This study is exploring the factors that influence people to use herbal medicines and how people use herbal medicine, with a specific focus on Australian adults with anxiety. This is an area of interest as previous research has shown adults with anxiety to be high users of herbal medicines.

Herbal medicine is defined as: the use of whole plant parts in the form of tablets, capsules, liquid extracts, teas, decoctions, creams and ointments to treat or prevent a condition or maintain wellness. These products may either be self selected or prescribed by a health practitioner.

Eligibility for study

This study requires Australian participants of any background aged 18 years and over who are able to read and understand English, and who experience anxiety.

Procedure

If you agree to participate in this study you will need to attend an interview in which you will be asked to share your knowledge of and experience with using herbal medicines. The interview will take place at a suitable time and location that is mutually convenient.

To acknowledge your generosity for participating in the interview you will receive a gift of a grocery voucher to the value of $15.

The interview is expected to take between 60 to 90 minutes to complete. You will be asked for basic demographic information, and to discuss your beliefs and experiences with using herbal medicines, as part of this semi-structured interview. The interview will be recorded.

Once the interview has been conducted it will be fully transcribed by myself. The transcription will be sent to you so you can confirm its accuracy and add further comments if needed.

Confidentiality and volunteer information

To ensure your privacy a pseudonym will be used to protect your identity and will not appear on any materials with your name. In addition, any personal details will be changed on the transcript and all reports. All materials used throughout the study
including the audio recording, consent form and transcribed and coded data will be kept in a secure location in my office or the office of Associate Professor Anthony Saliba. The data will be destroyed 5 years from completion of the project.

Your participation in this study is completely voluntary. You will be free to withdraw from the study at any time for any reason, and without any consequences.

**Use of interview data**

The information collected during the interview will be used within my Doctoral thesis and may be included in academic publications or presented at conferences.

**Risk to participant**

There is minimal risk associated with this study. The interviews are expected to be an enjoyable experience, however if you do experience emotional distress there are services available to help you. You can contact:

- Lifeline on 13 11 14
- beyondblue info line on 1300 22 4636 or www.beyondblue.org.au
- Visit your local General Practitioner (GP) for advice.

**Ethics approval**

Charles Sturt University’s Human Research Ethics Committee has approved this project. If you have any complaints or reservations about the ethical conduct of this project, you may contact the Committee through the Executive Officer:

  The Executive Officer  
  Human Research Ethics Committee  
  Office of Academic Governance  
  Charles Sturt University  
  Panorama Avenue  
  Bathurst NSW 2795  
  Tel: (02) 6338 4628  
  Email: ethics@csu.edu.au

Any issues you raise will be treated in confidence and investigated fully and you will be informed of the outcome.

**Would you like to participate?**

If you would like to participate in this study please contact myself (Erica McIntyre) on the mobile number below. Should you agree to participate in this project you will be required to complete a Consent Form prior to beginning the interview.

**More information**

If you would like further information on this study please contact either myself, or Associate Professor Anthony Saliba, or Professor Carmen Moran.

Your participation in this project is highly valued and appreciated. Thank you very much for your time.

Kind regards

Erica McIntyre  
Mobile: 0438 448 653  
Email: em McIntyre@csu.edu.au
Appendix D: Interview guide for qualitative study

1. Welcome the participant and ask them to take a seat and ensure they are comfortable.

2. Thank the participant for agreeing to be part of this study.

3. Confirm that the participant has adequate information about the study, and understands what is expected during their participation, and that they understand their right to withdraw from the study or terminate the interview at any time.

4. Once the participant agrees that they would like to participate they will be asked to sign the Consent Form (the interview will not commence until the form is signed).

5. The interview will begin with some basic demographic questions:
   a. What is your age?
   b. What is your gender? Male/female
   c. What is your residential postcode?

6. The interview questions will be asked of participant in the order they appear on the Interview question sheet. Any questions that have been answered in response to previous questions will be skipped. Any irrelevant questions for that individual participant (e.g. they do not use herbal medicines) will be skipped. Probing questions will be used if necessary to help facilitate answers.

7. Concluding comments and thank you.
Appendix E: Interview questions for qualitative study

Thank you for agreeing to participate in this study and volunteer your time. This interview will seek to explore what your beliefs are about herbal medicines, and to understand why and how you use herbal medicines.

1. Could you tell me how you first became aware of herbal medicine?
2. What are your beliefs about herbal medicines?
3. What were your expectations towards herbal medicine?*
4. Do you think herbal medicines are effective?
   a. Do you think there is evidence for the effects of herbal medicines?#
   b. What do you believe is good evidence?#
5. When do you think herbal medicines should be used?
6. What is your understanding of how herbal medicines work?
7. Do you have any concerns about herbal medicines?
8. What factors influence your decision to use (or not use) herbal medicines?
9. What are your main sources of information about herbal medicine?*
10. What role does the cost of herbal medicine play regarding your decision to use it?*
    a. Are there any other barriers to you using herbal medicine?#
11. Could you tell me about your experience with herbal medicines?
    a. What kind of benefit (or not) they have provided?#
12. How did you come to use herbal medicine?*
13. What have you taken herbal medicines for?
14. What herbal medicines have you taken?
15. How have you taken herbal medicines?
16. Do you tell your doctor that you use herbal medicines?*
17. Do you tell other health care providers that you use herbal medicines?
18. Is there any else you would like to comment on in relation to the questions we have covered today?

Additional possible question:

1. Do you think of herbal teas as a medicine?

*Questions used by (Joos, Glassen, & Musselmann, 2012).

# Probing questions. Additional probing questions may be used that are relevant to the primary question.
Appendix F: Survey invitations for quantitative study

Invitation to participate

Beliefs about herbal medicines: Why and how do individuals who experience anxiety use herbal medicines?

- Do you experience anxiety?
- Do you use herbal medicines?
- Are you an Australian adult (18 years and older)?

If the answer is yes to all these questions, you are invited to participate in a study exploring your attitudes towards, and reasons for using herbal medicines. This study is interested in the factors that influence adults who experience anxiety to use herbal medicines, and how they use herbal medicines. This is one of the requirements for completing the Doctor of Philosophy (Psychology) at Charles Sturt University.

The study involves an online questionnaire that should take approximately 20 to 30 minutes to complete. You will be asked basic demographic information, and to complete a series of brief questionnaires.

Your participation is completely voluntary. All responses are anonymous to protect your privacy, and you will not be asked for any identifying information. You will be free to withdraw from the study at any time for any reason, and without any consequences.

Would you like to participate?

If you would like more information please contact Erica McIntyre at emcintyre@csu.edu.au.

You will find the information page and survey at (Survey Monkey link to be added here) where you can participate in this study.

This study is being supervised by Professor Anthony Saliba, Professor Carmen Moran, and Dr Karl Wiener, Charles Sturt University, and has been approved by the Human Research Ethics Committee, reference number 2013/033.

Thank you for considering being part of this research project.
7 August 2014

Ms Erica McIntyre
20 Goodare Street
BLACKHEATH NSW 2785

Dear Ms McIntyre,

The CSU Human Research Ethics Committee (HREC) operates in accordance with the National Health and Medical Research Council’s National Statement on Ethical Conduct in Research Involving Humans.

The HREC has reviewed your report requesting a variation for your research project “Beliefs and attitudes to herbal medicine use in adults who experience anxiety”, protocol number 2014/033 and I am pleased to advise that this request for a variation meets the requirements of the National Statement, and variation for this research 7 August 2014.

Please note the following conditions of approval:

- all Consent Forms and Information Sheets are to be printed on Charles Sturt University letterhead. Students should liaise with their Supervisor to arrange to have these documents printed;
- you must notify the Committee immediately in writing should your research differ in any way from that proposed. Forms are available at http://www.csu.edu.au/_data/assets/word_doc/0010/176833/ehrc_annrep.doc;
- you must notify the Committee immediately if any serious and or unexpected adverse events or outcomes occur associated with your research, that might affect the participants and therefore ethical acceptability of the project. An Adverse Incident form is available from the website: as above;
- amendments to the research design must be reviewed and approved by the Human Research Ethics Committee before commencement. Forms are available at the website above;
- if an extension of the approval period is required, a request must be submitted to the Human Research Ethics Committee. Forms are available at the website above;
- you are required to complete a Progress Report form, which can be downloaded as above, by 15 May 2015 if your research has not been completed by that date;
- you are required to submit a final report, the form is available from the website above.

You are reminded that an approval letter from the CSU HREC constitutes ethical approval only.

If your research involves the use of radiation, biological materials or chemicals separate approval is required from the appropriate University Committee.

Please don’t hesitate to contact the Executive Officer: telephone (02) 6338 4628 or email ethics@csu.edu.au if you have any enquiries about this matter.

Yours sincerely,

Julie Hicks
Executive Officer
Human Research Ethics Committee
Direct Telephone: (02) 6338 4628
Email: ethics@csu.edu.au

Cc: Professor Anthony Saliba Dr Karl Wiener

This HREC is constituted and operates in accordance with the National Health and Medical Research Council’s (NHMRC) National Statement on Ethical Conduct in Human Research (2007)
Appendix H: Information page for online quantitative study

Dear Participant

My name is Erica McIntyre. I am a PhD student enrolled at Charles Sturt University in the School of Psychology. I would like to invite you to participate in my research project titled: “Attitudes, beliefs and barriers to herbal medicine use: Why and how do individuals who experience anxiety use herbal medicines?”. This study is one of the requirements for completing the Doctor of Philosophy (Psychology) at Charles Sturt University.

Professor Anthony Saliba, Professor Carmen Moran, and Dr Karl Wiener from Charles Sturt University are supervising the study.

Purpose of research

This study is exploring the factors that influence people to use herbal medicines, and how they use herbal medicine, with a specific focus on Australian adults who experience anxiety.

Eligibility for study

This study requires Australian participants of any background aged 18 years and over who are able to read and understand English, who experience anxiety, and use herbal medicines.

Procedure

Following this information page you will be asked questions about herbal medicine use, beliefs about herbal medicine, and to complete a number of standardised questionnaires that measure anxiety symptoms. You will also be asked for basic demographic information.

The questionnaire is expected to take between 20 to 30 minutes to complete.

Confidentiality and volunteer information

Your participation in this survey is completely voluntary. All responses will be collected anonymously to ensure your privacy. You will not be asked for any identifying information.

You will be free to withdraw from the study at any time up to the point that you submit your questionnaire, and you will not be penalised should you choose to withdraw from the study. By completing and submitting your answers you will be giving consent for your answers to be used for research purposes, which might include possible publication of the aggregated data in peer reviewed articles.

Use of interview data

The information collected will be used within my PhD thesis and may be included in academic publications or presented at conferences.

Risk to participant

There is minimal risk associated with this study. The study is expected to be an enjoyable experience, however if you do experience emotional distress there are services available to help you. You can contact:

- Lifeline on 13 11 14
- beyondblue info line on 1300 22 4636 or www.beyondblue.org.au
- Visit your local General Practitioner (GP) for advice.

Ethics approval

Charles Sturt University’s Human Research Ethics Committee has approved this project. If you have any complaints or reservations about the ethical conduct of this project, you may contact the Committee through the Executive Officer at the contact details below.
Any issues you raise will be treated in confidence and investigated fully and you will be informed of the outcome.

**More information**

If you would like further information on this study please contact Erica McIntyre at emcintyre@csu.edu.au, or Associate Professor Anthony Saliba at asaliba@csu.edu.au, or Professor Carmen Moran at cmoran@csu.edu.au, or Dr Karl Wiener at kwiener@csu.edu.au

Your participation in this project is highly valued and appreciated. Thank you very much for your time.

**Consent**

By clicking on the NEXT button I acknowledge that:

- I understand that I am free to withdraw my participation in the research at any time, and that if I do I will not be subjected to any discriminatory treatment.
- The purpose of the research has been explained to me and I have read and understood the information given to me
- I have read the information above and understood the written explanation given to me and am aware of the purpose of the research including the potential risks/discomforts associated with the research
- I understand that any information or personal details provided about me during this research are confidential and that neither my name nor any other identifying information will be used or published
- Charles Sturt University’s Human Research Ethics Committee has approved this study. I understand that if I have any complaints or concerns about this research I can contact:

  The Executive Officer  
  Human Research Ethics Committee  
  Office of Academic Governance  
  Charles Sturt University  
  Panorama Avenue  
  Bathurst NSW 2795  
  Tel: (02) 6338 4628  
  Email: ethics@csu.edu.au

Please click on the NEXT button if you consent to participating in this study.
Appendix I: Questionnaire for the online quantitative study

Demographics (1)

Screening questions.

1. Are you 18 years of age or older?
   □ Yes
   □ No*
   *If answering no skip to page: Thank you for your time. You are not required to continue with the questionnaire.

2. This study is focused on people who experience anxiety. Anxiety symptoms include sweating, palpitations, nervousness, trembling, muscular tension, restlessness, feeling easily fatigued, irritability, over reaction to surprises, difficulty concentrating, irrational fears, worry, and sleep disturbances.
   To the best of your knowledge, have you ever experienced anxiety?
   □ Yes
   □ No*
   * If answering no skip to page: Thank you for your time. You are not required to continue with the questionnaire.

3. Herbal medicines are medicines made from whole plant parts in the form of tablets, capsules, liquid extracts, teas, decoctions, creams and ointments.
   Have you ever used herbal medicines?
   □ Yes
   □ No*
   * If answering no skip to page: Thank you for your time. You are not required to continue with the questionnaire.

Demographics (2)

4. What is your gender:
   □ Male
   □ Female

5. Your age in years is: ______

6. What is the postcode for your permanent residence? ______

7. What is your highest level of education?
   □ Year 10 or equivalent
   □ Year 12 or equivalent
   □ Trade certificate
Diploma or Advanced Diploma
Bachelor degree
Postgraduate qualification

8. What is your employment status? (Tick all that apply)
- Employed full-time
- Employed part-time
- Employed casually
- Retired
- Home duties
- Unemployed
- Student

9. Have you ever been diagnosed with an anxiety disorder?
- Yes
- No

10. Have you experienced anxiety symptoms in the last 12 months?
- Yes
- No

11. Have you ever used prescribed pharmaceutical medicines for anxiety symptoms?
- Yes
- No

12. Have you ever used herbal medicines for anxiety symptoms?
- Yes
- No

13. Have you ever used pharmaceutical medicines together with herbal medicines for anxiety symptoms?
- Yes
- No

14. Do you recall a negative media story on herbal medicines in the last month?
- Yes
- No

Health care providers

Health problems may be attended to by a variety of complementary and conventional health care providers. The following questions ask about the health care providers you have seen in the last 12 months.
15. Have you seen any of the following health providers in the last 12 months? *(Tick all that apply)*

- General practitioner (Doctor)
- Western herbalist
- Chinese medicine practitioner
- Acupuncturist
- Naturopath
- Psychiatrist
- Psychologist
- Homeopath
- Nutritionist
- Chiropractor
- Other (please specify) ____________
- None

*(For each provider questions 16 to 19 are asked repeated on a new page for all health providers chosen)*

16. How many times did you see a “*enter choice here*” in the last 12 months? ___

17. Please indicate the *main* reason you last saw this provider.

- For an acute illness/condition (one that lasted less than one month)
- To treat a long-term health condition (one that lasted more than one month) or its symptoms
- To improve wellbeing
- Other (please specify) ____________

18. How helpful was it for you to see this provider?

- Very helpful
- Somewhat helpful
- Not at all helpful
- Don’t know

19. Did this practitioner prescribe herbal medicines?

- Yes
- No

**Herbal medicine use**

Herbal medicines are medicines made from whole plant parts in the form of tablets, capsules, liquid extracts, teas, decoctions, creams and ointments.

The following questions ask about your herbal medicine use.
20. The following is a list of commonly used herbal medicines. Have you used any of these herbal medicines in the last 12 months? *(Tick all that apply)*

- □ Bacopa (Brahmi)
- □ Chamomile
- □ Ginkgo
- □ Ginseng (either Korean or Siberian)
- □ Gotu kola *(Centella)*
- □ Kava
- □ Lavender
- □ Lemon balm
- □ Liquorice
- □ Oats
- □ Passionflower
- □ Rhodiola
- □ Skullcap
- □ St John’s wort *(Hypericum)*
- □ Valerian
- □ Withania
- □ Zizyphus
- □ Herbal formula (combination of herbs)
- □ Other (Please specify other herbs used)

*(For each herb used questions 21 to 27 are asked and repeated on a new page for each herb chosen)*

21. Do you currently use “*insert herb here*”?  
   - □ Yes
   - □ No

22. Did you take “*insert herb here*” in a formula that included other herbs? *(Do not ask this question if they answered “Herbal formula” in question 22)*

   - □ Yes
   - □ No

23. In what form did you take “*insert herb here*”?  
   - □ Tea
   - □ Powder
   - □ Tablet
   - □ Liquid extract/tincture
   - □ Other
24. Did you take “insert herb here” to treat anxiety symptoms?
   □ Yes
   □ No

25. Who prescribed “insert herb here”?
   □ Self-prescribed
   □ General practitioner (Doctor)
   □ Western herbalist
   □ Chinese medicine practitioner
   □ Acupuncturist
   □ Naturopath
   □ Health food/pharmacy shop assistant
   □ Pharmacist
   □ Psychiatrist
   □ Psychologist
   □ Homeopath
   □ Nutritionist
   □ Chiropractor
   □ Other

26. Please indicate the main reason that applies to your last use.
   □ For an acute illness/condition (one that lasted less than one month)
   □ To treat a long-term health condition (one that lasted more than one month) or its symptoms
   □ To improve wellbeing
   □ To prevent illness
   □ Other

27. How helpful did you find this herbal medicine?
   □ Very
   □ Somewhat
   □ Not at all
   □ Don’t know

Communication and information

28. Do you tell your doctor you take herbal medicines?
   □ Yes
   □ No
29. Do you tell other health care providers you take herbal medicines?

- Yes
- No

30. What information sources have you used to make decisions about herbal medicines use? Please select all that apply.

- Herbal medicine practitioner
- General practitioner (Medical doctor)
- Other health care provider
- The Internet
- Magazines/newspapers
- Health food shop assistant
- Pharmacy assistant
- Pharmacist
- Media advertising
- Friend or family
- Other (please specify)

**Attitudes towards herbal medicines questionnaire**

The following questions may sound similar, but they measure different things. Please read each question carefully before answering.

Please answer the following statements choosing a score on a scale of 1 to 7, with 1 = Favourable and 7 = Unfavourable.

31. My using herbal medicines to treat anxiety symptoms would be

32. My using herbal medicines to treat health concerns would be

Please answer the following statements choosing a score on a scale of 1 to 7, with 1 = Good and 7 = Bad.

33. My using herbal medicines to treat anxiety symptoms would be

34. My using herbal medicines to treat health concerns would be

Please answer the following statements choosing a score on a scale of 1 to 7, with 1 = Pleasant and 7 = Unpleasant.

35. My using herbal medicines to treat anxiety symptoms would be

36. My using herbal medicines to treat health concerns would be

Please answer the following statements choosing a score on a scale of 1 to 7, with 1 = Beneficial and 7 = Harmful.

37. My using herbal medicines to treat anxiety symptoms would be

38. My using herbal medicines to treat health concerns would be

Please answer the following statements choosing a score on a scale of 1 to 7, with 1 = Positive and 7 = Negative.

39. My using herbal medicines to treat anxiety symptoms would be

40. My using herbal medicines to treat health concerns would be
Please answer the following statements choosing a score on a scale of 1 to 7, with $1 = \text{Agree}$ and $7 = \text{Disagree}$

41. Most people who are important to me approve of me using herbal medicines for treating anxiety symptoms
42. Most people who are important to me approve of me using herbal medicines for treating health concerns
43. Most people whose opinions I value would approve of me using herbal medicines for treating anxiety symptoms
44. Most people whose opinions I value would approve of me using herbal medicines for treating health concerns
45. My friends believe that herbal medicines are ineffective
46. My family believe that herbal medicines are ineffective
47. My doctor believes that herbal medicines are ineffective

On a scale of 1 to 7, with $1 = \text{I should}$ and $7 = \text{I should not}$ please select a score to complete the following statements.

48. My doctor thinks that ———— use herbal medicines to relieve my anxiety symptoms
49. My doctor thinks that ———— use herbal medicines to treat my health concerns
50. My friends believe ———— use herbal medicines to relieve my anxiety symptoms
51. My friends believe ———— use herbal medicines to treat my health concerns
52. My family believe ———— use herbal medicines to help relieve my anxiety symptoms
53. My family believe ———— use herbal medicines to treat my health concerns

Please answer the following statements choosing a score on a scale of 1 to 7, with $1 = \text{Likely}$ and $7 = \text{Unlikely}$.

54. Most people like me have used herbal medicines for treating anxiety symptoms
55. Most people like me have used herbal medicines for treating health concerns
56. Most of my friends who have experienced anxiety have used herbal medicines
57. Most of my family have used herbal medicines for their anxiety symptoms
58. Most of my family have used herbal medicines for their health concerns

Please answer the following statements choosing a score on a scale of 1 to 7, with $1 = \text{Very much}$ and $7 = \text{Not at all}$.

59. When it comes to matters of health, how much do you want to be like your friends?
60. When it comes to treating anxiety symptoms, how much do you want to be like your friends?
61. When it comes to matters of health, how much do you want to be like your family?
62. When it comes to treating anxiety symptoms, how much do you want to be like your family?
63. When it comes to matters of health, how much do you want to be like other people who experience anxiety?
64. When it comes to treating anxiety symptoms, how much do you want to be like other people who experience anxiety?

Please answer the following statements choosing a score on a scale of 1 to 7, with 1 = Agree and 7 = Disagree

65. When it comes to matters of health, I want to do what my doctor thinks I should do.
66. When it comes to treating anxiety symptoms, I want to do what my doctor thinks I should do.
67. When it comes to matters of health, I want to do what my friends think I should do.
68. When it comes to treating anxiety symptoms, I want to do what my friends think I should do.
69. When it comes to matters of health, I want to do what my family thinks I should do.
70. When it comes to treating anxiety symptoms, I want to do what my family thinks I should do.

Please answer the following statements choosing a score on a scale of 1 to 7, with 1 = Likely and 7 = Unlikely

71. Taking herbal medicines will result in me having less anxiety symptoms
72. Taking herbal medicines to treat my anxiety symptoms would help me feel calmer
73. Taking herbal medicines to treat my anxiety symptoms would help me to worry less
74. Taking herbal medicines to treat my anxiety symptoms would help me feel happier
75. Taking herbal medicines to treat my anxiety symptoms would help me feel more comfortable
76. Taking herbal medicines to treat my anxiety symptoms would help me sleep better
77. Taking herbal medicines will result in me being healthier

Please answer the following statements choosing a score on a scale of 1 to 7, with 1 = Good and 7 = Bad

78. My having less anxiety symptoms is
79. For me to feel calmer is
80. For me to worry less is
81. For me to feel happier is
82. For me to feel more comfortable is
83. My having better general health is
Please answer the following statements choosing a score on a scale of 1 to 7, with 1 = Likely and 7 = Unlikely

84. During the next 3 months I plan to use herbal medicines to treat my anxiety symptoms
85. During the next 3 months how likely is it that you will use herbal medicines to help treat your anxiety symptoms?
86. During the next 3 months I plan to use herbal medicines to treat my future health problems
87. During the next 3 months I plan to use herbal medicines to prevent health problems
88. During the next 3 months I plan to use herbal medicines to maintain my wellbeing

Please answer the following statements choosing a score on a scale of 1 to 7, with 1 = True and 7 = False

89. During the last 12 months I have used herbal medicines to treat anxiety symptoms
90. During the last 12 months I have used herbal medicines to treat health concerns
91. I have never used herbal medicines to treat anxiety symptoms
92. I have never used herbal medicines to treat health concerns
93. When I have used herbal medicines for health concerns they have been effective
94. When I have used herbal medicines for anxiety symptoms they have been effective

Please answer the following statements choosing a score on a scale of 1 to 7, with 1 = Negative and 7 = Positive

95. My previous experience with using herbal medicines for health concerns has been
96. My previous experience with using herbal medicines for anxiety symptoms has been

Please answer the following statements choosing a score on a scale of 1 to 7, with 1 = Agree and 7 = Disagree

97. Herbal medicines are expensive
98. Herbal medicines are not always available
99. I am in control of my health when I take herbal medicines.
100. I am in control of my anxiety symptoms when I take herbal medicines
101. The cost of herbal medicines is important
102. The cost of herbal medicines would prevent me from taking them
103. If I had unexpected financial demands, it would be more difficult for me to use herbal medicines
104. Convenience is an important determinant of using herbal medicines
105. The taste of herbal medicines is important
106. The taste of herbal medicines prevents me from using them
107. The quality of herbal medicines is unreliable
108. The quality of herbal medicines is important
109. When choosing a herbal medicine the brand is important to me.
Please answer the following statements choosing a score on a scale of 1 to 7, with 1 = Agree and 7 = Disagree

110. If a pharmaceutical medicine is working for me I would not try a herbal medicine
111. If I need a medicine to work quickly I would not use herbal medicines
112. I believe herbal medicines are effective
113. I believe herbal medicine is quackery
114. The use of herbal medicines leads to the cure of disease
115. The use of herbal medicines slows the progression of disease
116. The use of herbal medicines helps to prevent disease
117. The use of herbal medicines enhances physical and immune strength
118. Herbal medicines do not have good evidence for effectiveness
119. I believe it's acceptable to self-prescribe herbal medicines
120. I believe a herbalist should prescribe herbal medicines
121. I believe a doctor should prescribe herbal medicines

Please answer the following statements choosing a score on a scale of 1 to 7, with 1 = Agree and 7 = Disagree

122. I use herbal medicines because they are natural
123. I believe herbal medicines help the body to heal itself
124. I believe herbal medicines are safer than pharmaceutical medicines
125. Herbal medicines have less side-effects compared to pharmaceutical medicines
126. Herbal medicines should be the first choice of treatment

Please answer the following statements choosing a score on a scale of 1 to 7, with 1 = Agree and 7 = Disagree

127. I believe herbal medicines should complement conventional medicines
128. The use of herbal medicines is detrimental to conventional medical care
129. The use of herbal medicines complements conventional medical care
130. Conventional medical care is not enough
131. Using herbal medicines will result in me using less pharmaceutical medicines
132. Using herbal medicine will result in less visits to the doctor

Please answer the following statements choosing a score on a scale of 1 to 7, with 1 = Very rarely and 7 = Very frequently

133. How often have you been unable to choose a herbal medicine to use because it was too confusing?
134. How often have you wanted to use herbal medicines but were unable to choose the right one to use?
135. How often have you wanted to use herbal medicines but were unable to determine the quality of the product?
136. How often have you wanted to use herbal medicines but didn't know which product to take?
Please answer the following statements choosing a score on a scale of 1 to 7, with 1 = Agree and 7 = Disagree

137. Compared to other people, I know less about herbal medicines
138. Among my circle of friends I am one of the most knowledgeable about herbal medicines
139. I am always looking for the latest information about herbal medicines
140. I am aware of the side-effects of herbal medicines
141. Generally I find information about herbal medicines confusing
142. I find it hard to know which information source to use when looking for information on herbal medicines

Please answer the following statements choosing a score on a scale of 1 to 7, with 1 = Agree and 7 = Disagree

143. I regularly use the internet as a source of information about herbal medicines
144. I regularly use friends as a source of information about herbal medicines
145. I regularly use family as a source of information about herbal medicines
146. I regularly use my doctor as a source of information about herbal medicines
147. I regularly use magazines as a source of information about herbal medicines

Please answer the following statements choosing a score on a scale of 1 to 7, with 1 = Agree and 7 = Disagree

148. I trust my friends for information on herbal medicines
149. I trust my family for information on herbal medicines
150. I trust my doctor for information on herbal medicines
151. I trust my herbalist for information on herbal medicines
152. I trust my pharmacist for information on herbal medicines
153. I trust the health food shop assistant for information on herbal medicines
154. I trust the internet for information on herbal medicines
155. I trust magazines for information on herbal medicines

Please answer the following statements choosing a score on a scale of 1 to 7, with 1 = Agree and 7 = Disagree

156. Taking herbal medicines to treat anxiety symptoms is up to me.
157. Taking herbal medicines to treat my health concerns is up to me.
158. Using herbal medicines helps me take control of my anxiety symptoms
159. Using herbal medicines helps me take control of my health
160. If my doctor recommended a pharmaceutical medicine, it would be more difficult for me to use herbal medicines
161. I prefer to self-prescribe herbal medicines

Please answer the following statements choosing a score on a scale of 1 to 7, with 1 = Not at all and 7 = Very much

162. Generally speaking, how much do you care what your doctor thinks you should do?
163. Generally speaking, how much do you care what your friends think you should do?
164. Generally speaking, how much do you care what your family think you should do?
Treatment beliefs
(The Complementary and Alternative Beliefs Inventory: CAMBI)
The following statements relate to your treatment beliefs.
Please read each statement and indicate the degree to which the statement applies to you personally.
Each question is answered on a scale of 1 (Strongly agree) to 7 (Strongly disagree)
1. Treatments should have no negative side effects
2. It is important to me that treatments are non-toxic
3. Treatments should only use natural ingredients
4. It is important for treatments to boost my immune system
5. Treatments should enable my body to heal itself
6. Treatments should increase my natural ability to stay healthy
7. Treatment providers should treat patients as equal partners
8. Patients should take an active role in their treatment
9. Treatment providers should make all decisions about treatment
10. Treatment providers should help patients make their own decisions about treatment
11. Treatment providers should control what is talked about during consultations
12. Health is about harmonizing your body, mind and spirit
13. Imbalances in a person’s life are a major cause of illness
14. Treatments should concentrate only on symptoms rather than the whole person
15. Treatments should focus on people’s overall well-being
16. I think my body has a natural ability to heal itself
17. There is no need for treatments to be concerned with natural healing powers

Psychological wellbeing (DASS-21)
The following scale measures psychological wellbeing.
Please read each statement and indicate how much the statement applied to you over the past week.
These questions are answered on a 4-point Likert scale:
0 = Did not apply to me at all
1 = Applied to me to some degree, or some of the time
2 = Applied to me to a considerable degree, or a good part of time
3 = Applied to me very much, or most of the time
1. I found it hard to wind down
2. I was aware of dryness of my mouth
3. I couldn't seem to experience any positive feeling at all
4. I experienced breathing difficulty (eg, excessively rapid breathing, breathlessness in the absence of physical exertion)
5. I found it difficult to work up the initiative to do things
6. I tended to over-react to situations
7. I experienced trembling (eg, in the hands)
8. I felt that I was using a lot of nervous energy
9. I was worried about situations in which I might panic and make a fool of myself
10. I felt that I had nothing to look forward to
11. I found myself getting agitated
12. I found it difficult to relax
13. I felt down-hearted and blue
14. I was intolerant of anything that kept me from getting on with what I was doing
15. I felt I was close to panic
16. I was unable to become enthusiastic about anything
17. I felt I wasn't worth much as a person
18. I felt that I was rather touchy
19. I was aware of the action of my heart in the absence of physical exertion (eg, sense of heart rate increase, heart missing a beat)
20. I felt scared without any good reason
21. I felt that life was meaningless

Psychological wellbeing: Section 2
(The State-Trait Anxiety Inventory for Adults)

As the State-Trait Anxiety Inventory for Adults is a copyrighted instrument it may not be reproduced in full. There are 40 items in total. Five example items follow from the State subscale.

These questions are answered on a 4-point Likert scale ranging from 1 = Not at all to 4 = Very much so

1. I feel calm
2. I am presently worrying over possible misfortunes
3. I feel indecisive
4. I feel steady
5. I feel pleasant

Thank you for taking the time to complete the survey.
### Appendix J: Theory of planned behaviour, hypothesised constructs and 36 items included in questionnaire and recoded response scales

<table>
<thead>
<tr>
<th>Latent construct</th>
<th>Item number</th>
<th>Items (direct measures of latent construct)</th>
<th>Recoded response scales</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude</td>
<td>1</td>
<td>My using herbal medicines to treat anxiety symptoms would be:</td>
<td>1 = unfavourable to 7 = favourable</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>My using herbal medicines to treat anxiety symptoms would be:</td>
<td>1 = bad to 7 = good</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>My using herbal medicines to treat anxiety symptoms would be:</td>
<td>1 = unpleasant to 7 = pleasant</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>My using herbal medicines to treat anxiety symptoms would be:</td>
<td>1 = harmful to 7 = beneficial</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>My using herbal medicines to treat anxiety symptoms would be:</td>
<td>1 = negative to 7 = positive</td>
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<tr>
<td></td>
<td>6</td>
<td>Most people who are important to me approve of me using herbal medicines for treating anxiety symptoms</td>
<td>1 = disagree to 7 = agree</td>
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<tr>
<td></td>
<td>7</td>
<td>Most people whose opinions I value would approve of me using herbal medicines for treating anxiety symptoms</td>
<td></td>
</tr>
<tr>
<td>Latent construct</td>
<td>Item number</td>
<td>Items (direct measures of latent construct)</td>
<td>Recoded response scales</td>
</tr>
<tr>
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<tr>
<td>Normative belief strength</td>
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<td>My doctor thinks that________ use herbal medicines to relieve my anxiety symptoms</td>
<td>1 = I should not to</td>
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<td></td>
<td>9</td>
<td>My friends believe________ use herbal medicines to relieve my anxiety symptoms</td>
<td>7 = I should</td>
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<td>10</td>
<td>My family believe________ use herbal medicines to help relieve my anxiety symptoms</td>
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<td>Descriptive normative beliefs</td>
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<td>Most of my friends who have experienced anxiety have used herbal medicines</td>
<td>7 = agree</td>
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<td></td>
<td>13</td>
<td>Most of my family have used herbal medicines for their anxiety symptoms</td>
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<td>Motivation to comply beliefs</td>
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<td>When it comes to treating anxiety symptoms, I want to do what my doctor thinks I should do.</td>
<td>1 = disagree to</td>
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<td>When it comes to treating anxiety symptoms, I want to do what my friends think I should do.</td>
<td>7 = agree</td>
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<td>16</td>
<td>When it comes to treating anxiety symptoms, I want to do what my family thinks I should do.</td>
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<td>Outcome evaluation</td>
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<td>My having less anxiety symptoms is</td>
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<td>For me to feel calmer is</td>
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<td>For me to worry less is</td>
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<td>For me to feel happier is</td>
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<td>For me to feel more comfortable is</td>
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<td>Behavioural belief strength</td>
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<td>Taking herbal medicines to treat my anxiety symptoms would help me feel calmer</td>
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<td>Taking herbal medicines to treat my anxiety symptoms would help me feel happier</td>
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<td>Taking herbal medicines to treat my anxiety symptoms would help me sleep better</td>
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<td>Control belief strength</td>
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<td>I am in control of my anxiety symptoms when I take herbal medicines.</td>
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<td>Using herbal medicines helps me take control of my anxiety symptoms</td>
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<td>Latent construct</td>
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<td>Items (direct measures of latent construct)</td>
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<td>Autonomy beliefs</td>
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<td>Taking herbal medicines to treat anxiety symptoms is up to me</td>
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<td>During the next 3 months I plan to use herbal medicines to treat my anxiety symptoms</td>
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<td>36</td>
<td>During the next 3 months how likely is it that you will use herbal medicines to help treat your anxiety symptoms?</td>
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### Appendix K: Communality values for items in final EFA model

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<th>Item</th>
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<td>When it comes to treating anxiety symptoms, I want to do what my</td>
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<td>friends think I should do.</td>
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<td>family thinks I should do.</td>
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<td>For me to worry less is</td>
<td>.895</td>
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<tr>
<td>For me to feel happier is</td>
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<td>For me to feel more comfortable is</td>
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<td>My having better general health is</td>
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<td>Taking herbal medicines will result in me having less anxiety</td>
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<td>symptoms</td>
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<td>Taking herbal medicines to treat my anxiety symptoms would help me</td>
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<td>feel calmer</td>
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<td>Extraction</td>
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<tr>
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<td>Taking herbal medicines to treat my anxiety symptoms would help me sleep better</td>
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<td>Taking herbal medicines will result in me being healthier</td>
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<td>I am in control of my health when I take herbal medicines.</td>
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<tr>
<td>I am in control of my anxiety symptoms when I take herbal medicines.</td>
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<td>Taking herbal medicines to treat anxiety symptoms is up to me</td>
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<td>Taking herbal medicines to treat my health concerns is up to me</td>
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<td>During the next 3 months I plan to use herbal medicines to treat my anxiety symptoms</td>
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<tr>
<td>During the next 3 months how likely is it that you will use herbal medicines to help treat your anxiety symptoms?</td>
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