



Literature Reviews

Factors Associated With Complementary and Alternative Medicine Use in Irritable Bowel Syndrome: A Literature Review

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Abstract

Aim: Irritable Bowel Syndrome (IBS) is a chronic functional bowel condition, which has substantial impact on quality of life and use of healthcare services. Patients often report using complementary and alternative medicine (CAM) for symptom management despite limited evidence to support its use. Psychological factors have been shown to be important in both influencing CAM use and as avenues of intervention to assist in managing IBS symptoms. Therefore, this review assessed prevalence of and psychological factors associated with CAM use by people with IBS. **Method:** Five electronic databases (including AMED, EMBASE and PsychINFO) were searched for studies that examined both the extent of and the reasons for CAM use. Five studies met the inclusion criteria. **Results:** Prevalence of CAM use ranged from 9% to 38%. CAM use was associated with psychosocial factors, including concerns about conventional medical care (i.e., the perceived harmful effects of medication, perception that conventional medicine had failed, and lack of satisfaction with conventional care) and anxiety. **Conclusion:** These findings identify psychological factors associated with CAM use which could be targeted through psychologically oriented management strategies for those affected with IBS.

Keywords: irritable bowel syndrome, complementary and alternative medicine, literature review

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Introduction

Irritable bowel syndrome (IBS) is a chronic functional bowel disorder characterised by numerous episodic symptoms including abdominal pain, constipation, diarrhoea, and abdominal bloating. Prevalence estimates range from 7 to 20% in western populations (Andrews et al., 2005; Grundmann & Yoon, 2010) with reported female predominance in healthcare seeking (Andrews et al., 2005; Hungin, Chang, Locke, Dennis, & Barghout, 2005; Wilson, Roberts, Roalfe, Bridge, & Singh, 2004). Many affected are frequent users of healthcare services (Talley, 2008) and may be referred for potentially costly secondary consultations (Wilson et al., 2004). IBS contributes to lost working hours and productivity (Dean et al., 2005; Hungin et al., 2005; Wilson et al., 2004) and impacts negatively on multiple facets of quality of life including sleep, diet, sexual function, and travel (Amouretti et al., 2006; Dancy & Backhouse, 1993; Dancy, Hutton-Young, Moye, & Devins, 2002; Faresjö et al., 2006; Lea & Whorwell, 2001). Additionally, symptoms may result in significant emotional distress and those affected may “catastrophise” IBS

symptoms as being indicative of a potentially life-threatening health condition (Lackner, Quigley, & Blanchard, 2004; Tanaka, Kanazawa, Fukudo, & Drossman, 2011). These issues highlight the need for effective treatment for IBS.

The aetiology of IBS is not fully understood and is currently linked to a complex interplay of biological and psychosocial factors (Tanaka et al., 2011). Consequently conventional medical treatment for IBS is often pharmacologically orientated towards symptom relief rather than directed towards potential aetiological factors (Chey, Maneerattaporn, & Saad, 2011; Harris & Heitkemper, 2012a, 2012b). Nevertheless, conventional medical treatment is frequently reported as unsatisfactory (Hayee & Forgacs, 2007) and considered limited given the scope of IBS symptoms. Many opt to use complementary and alternative medicine (CAM) in an effort to manage symptoms (Kong et al., 2005).

Complementary and Alternative Medicine Use in IBS

CAM includes primarily self-funded treatments or therapies that operate on different philosophical principles from those of the biomedical model of conventional medicine (Zollman & Vickers, 1999). CAM's prevalence for IBS has been reported between 37 and 50% (Drossman et al., 2009; Kong et al., 2005; Langmead, Chitnis, & Rampton, 2002) with similar rates reported for inflammatory bowel disease (IBD) (Hilsden, Verhoef, Rasmussen, Porcino, & DeBruyn, 2011; Langmead et al., 2002). Demographically, CAM-users are more likely to be female, have a greater disposable income, higher educational attainment and chronic health conditions with prolonged symptom discomfort (Astin, 1998; Bishop & Lewith, 2010; Metcalfe, Williams, McChesney, Patten, & Jetté, 2010; Talley, Boyce, & Jones, 1997).

The prevalence of CAM use presents a number of issues for those who practise conventional medical treatment of IBS. Firstly, CAM use may indicate that conventional medical care is not meeting patient treatment expectations, which may consist of either real or perceived shortcomings in medical care (Drossman et al., 2009; Smart, Mayberry, & Atkinson, 1986). Secondly, there is potential for harmful interactions between conventional pharmacologic treatment and some forms of CAM (Leung, Shalansky, Lo, & Jadusingh, 2009; Shane-McWhorter & Geil, 2002; Vincent & Furnham, 1997). Thirdly, many CAM treatments for IBS currently lack established efficacy (Ford et al., 2008). In the UK, for example, National Institute for Health and Clinical Excellence's guidelines for medical practitioners do not recommend the use of acupuncture or reflexology in IBS patients (NICE, 2008). Clearly issues with both conventional medical and CAM treatments exist. One further option for management of symptoms is to incorporate psychological factors into treatment protocol.

The Role of Psychological Factors in IBS Management

The role of psychological factors in IBS has been emphasised by the lack of aetiological consensus and conjecture that disturbance in the pathways between brain and gut results in IBS symptoms (Quigley, 2006). Evidence indicates that psychological factors related to illness, such as perceptions about illness, are important as they may impact on coping behaviours and quality of life (Hagger & Orbell, 2003; Rutter & Rutter, 2002), illness experience and conventional healthcare seeking (Lea & Whorwell, 2004; van Dulmen, Fennis, Mokkink, & Bleijenberg, 1996; van Dulmen, Fennis, Mokkink, van der Velden, & Bleijenberg, 1994, 1997).

Future healthcare seeking and anxiety have been shown to be reduced by following an intervention directed towards changing specific components of illness perceptions (Oerlemans, van Cranenburgh, Herremans, Spreeuwenberg, & van Dulmen, 2011; van Dulmen et al., 1996). Information-based interventions have demonstrated benefits in

symptom and anxiety reduction and improvements in quality of life through enhanced feelings of control and understanding of IBS (Jarrett et al., 2009; Ringström et al., 2010; Robinson et al., 2006). Illness related anxiety may also be reduced by giving a diagnosis of IBS (Hayee & Forgacs, 2007; Ilnyckyj, Graff, Blanchard, & Bernstein, 2003). Addressing such components could potentially be incorporated into conventional medical consultations to aid effective management of IBS symptoms (e.g. van Dulmen et al., 1997).

Psychological Influences on CAM Use

Beliefs and perceptions related to illness, treatment and healthcare have been implicated as factors important in CAM use. Concerns with efficacy of conventional medical treatment and dissatisfaction with doctor-patient communication have influenced CAM use in general (Bishop, Yardley, & Lewith, 2006; Horne, Weinman, & Hankins, 1999) and gastro-intestinal (GI) populations (Hilsden, Scott, & Verhoef, 1998; Scott, Verhoef, & Hilsden, 2003). General population studies have shown illness perceptions influence use of CAM (Bishop et al., 2006; Bishop, Yardley, & Lewith, 2007; Searle & Murphy, 2000) and CAM-users have been shown to report worse health status (Bishop & Lewith, 2010), and in those affected by IBS, poorer quality of life (van Tilburg et al., 2008) than those not using CAM. CAM use may be further facilitated by a positive attitude towards CAM (Astin, 1998; Vincent & Furnham, 1996). Similarly, when GI patients' perceived benefits of CAM use (i.e. decreased stress, anxiety and pain) outweigh perceived costs (i.e. financial outlay) CAM use is more likely (Giese, 2000). These findings suggest CAM-users may report differing beliefs and perceptions compared to those not using CAM. Therefore, synthesis of existing findings regarding influences on CAM use in IBS may be used to inform the practitioner-client consultation and direct the development of psychological components of management strategies for this complex and often intractable condition.

Aim of the Review

The aims of the review were to quantify the extent of CAM use and explore psychological factors associated with CAM uptake in those affected by IBS.

Method

Search Strategy

Electronic searches were conducted for articles published from 1978 onwards, when the Manning diagnostic criteria were published (Manning, Thompson, Heaton, & Morris, 1978). Five electronic databases were searched to identify studies that examined the prevalence of and factors that influence CAM use in IBS. These included AMED, EMBASE, Cinahl, PubMed, and PsychINFO databases. The Cochrane database for systematic reviews was also searched. Searching was conducted using the terms "irritable bowel syndrome", "complementary" and "alternative". Further searches were carried out using the terms "functional gastrointestinal" and "functional bowel" in conjunction with the terms previously listed. Search terms are listed in [Figure 1](#).

1. Irritable Bowel syndrome (all fields).
2. Functional Bowel (all fields).
3. Functional Gastrointestinal (all fields).
4. Complementary (all fields).
5. Alternative (all fields).
6. 1 or 2 or 3.
7. 6 and 4.
8. 6 and 5.

Figure 1. Review search terms and strategy.

Selection Process and Data Analysis

One researcher (LU) conducted initial searches and selection of abstracts. Duplicates were removed from the search and all abstracts subsequently read. Where it was unclear if a study fitted the review criteria, the full text was obtained. There were two main inclusion criteria. Firstly, studies had to include measurement regarding the extent of CAM use in IBS. Secondly, included studies needed to have examined psychological factors that influence CAM use in those affected by IBS (such as beliefs about treatment for IBS). No restrictions were placed on the type of analysis or design studies used and only studies published in English were included. Studies that focused exclusively on conventional care seeking or organic bowel conditions were excluded from the review. Reference lists of obtained articles were also checked for relevant studies. Two researchers (KM & PF), then cross-validated the final selection of studies from the 13 full text articles down to the final five that were included. Agreement to include the studies amongst the three researchers was unanimous. The process of identification of studies is presented in [Figure 2](#).

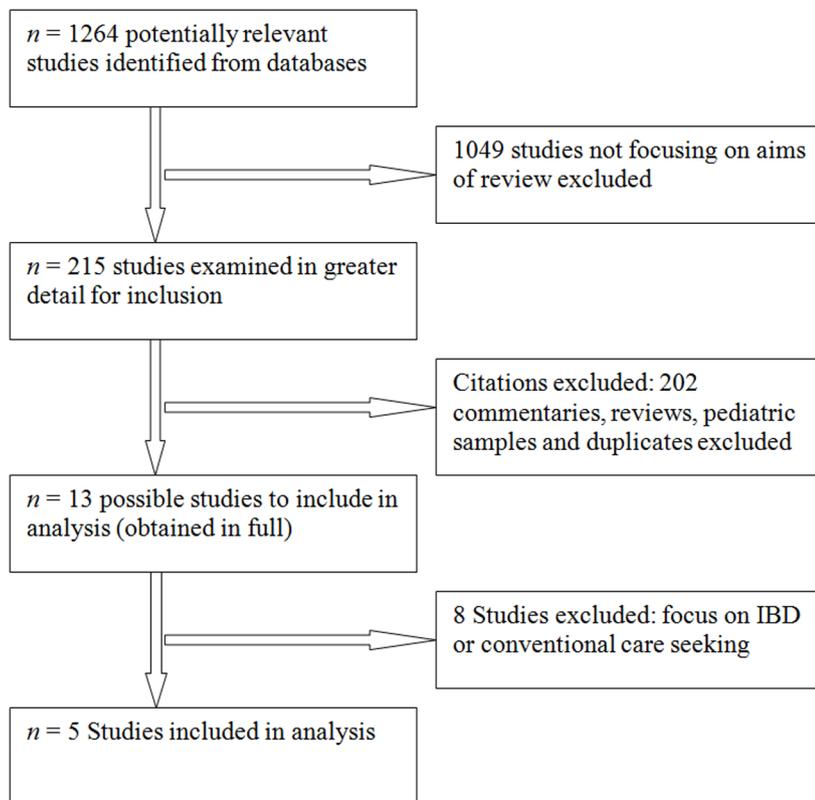


Figure 2. Flow chart showing the process of identifying relevant studies.

Results

Five studies met the inclusion criteria. Studies were conducted in the UK (Smart et al., 1986), Holland (Donker, Foets, & Spreuwenberg, 1999), Canada (Verhoef, Sutherland, & Brkich, 1990), Australia (Koloski, Talley, Huskic, & Boyce, 2003) and the US (van Tilburg et al., 2008). Four studies used a survey/questionnaire design and one (Donker et al., 1999) used quantifiable structured interviews. A summary of findings is provided in Table 1.

Included studies focused on participants with a functional bowel disorder (FBD, referring to IBS) or made sole reference to IBS. Recruitment and data collection varied from postal questionnaires (Smart et al., 1986), to recruitment from a general practitioner clinic (Donker et al., 1999) and outpatient clinic (Smart et al., 1986; Verhoef et al., 1990). Two studies used data collected from previous work by the respective authors, for example from a previous healthcare survey for those with FBD (van Tilburg et al., 2008), and previous population surveys (Koloski et al., 2003). The studies reported female predominance in samples, ranging from 60 to 75%.

Study Methodologies

All studies examined group differences. Two studies (van Tilburg et al., 2008; Verhoef et al., 1990) used one group of IBS/FBD outpatients and analysed participants in terms of those who had used or not used CAM. Smart et al. (1986) compared 96 IBS patients to 143 patients with other unspecified organic upper GI disorders and 222 Crohn's disease patients. Donker et al. (1999) and Koloski et al. (2003) compared an IBS group to healthy controls in addition to healthcare (including alternative healthcare) consulters and non-consulters.

Table 1

Summary of Studies Included in the Review

First author, Year, Country	Participants	Diagnosis of IBS	Outcomes	Extent of CAM use	Reasons for CAM use
Smart et al. (1986) (UK)	<i>n</i> = 96 IBS patients (<i>n</i> = 67 female); <i>n</i> = 143 organic GI (<i>n</i> = 84 female); <i>n</i> = 222 Crohn's disease (<i>n</i> = 137 female).	IBS - Manning et al. (1978).	Questionnaire – practices and practitioners. No. of treatments, treatment options.	CAM use: IBS (11%); GI (4%); Crohn's (6%). Consulted CAM practitioner: IBS (16%); GI (2%); Crohn's (6%).	CAM use significantly more likely if conventional treatment “had failed” in those with IBS.
Verhoef et al. (1990) (Canada)	<i>n</i> = 395 GI adult outpatients (<i>n</i> = 237 female) (<i>n</i> = 63 Functional diagnosis)	Gastroenterologist consensus scale 1 (functional) – 5 (organic).	CAM use and scepticism towards conventional medicine index.	50% of CAM-users had functional diagnoses (13% of non users). 41% of CAM use not for bowel disorder but other health issue.	CAM-users significantly less satisfied with conventional treatment (54% vs. 85% non-users); had more stressful life events in previous year (70% vs. 47%); more sceptical of conventional medicine (49% vs. 13%) and less satisfied with conventional practitioner answers (77% vs. 91%).
Donker et al. (1999) (Holland)	<i>n</i> = 10787 GP registered (age 15+, 51% female) <i>n</i> = 53 (<i>n</i> = 37 female) IBS patients via General practice.	Diagnosed prior to study.	Questionnaire – experienced health; GHQ (30); no. of complaints (14 days prior); BIOPRO scale (<i>n</i> = 53 interviews).	32% of those with IBS consulted CAM practitioner (15% non-IBS).	IBS patients had significantly poorer health (and “other” complaints); higher GHQ and BIOPRO scores compared to population group.
Koloski et al. (2003) (Australia)	<i>n</i> = 207 IBS/FD patients (<i>n</i> = 143 female); <i>n</i> = 100 controls (no. symptoms – not included in all analyses).	Abdominal pain > 1 month; Rome I criteria. IBS or functional dyspepsia.	Healthcare seeking SSI; Psychological morbidity.	86.5% functional GI group sought conventional healthcare. 20.8% had sought alternative healthcare. 9% had used CAM in previous 12 months.	Females significantly more likely to use CAM in contrast to greater pain and perception of symptoms predicting conventional care seeking.
van Tilburg et al. (2008) (US)	<i>n</i> = 1012 patients with IBS or other functional diagnosis (<i>n</i> = 248 male). CAM-users and non-CAM users compared.	Patient index cards screened to determine IBS or other functional diagnosis.	Set of questionnaires including: symptom severity (IBS-SS); Quality of life (IBS-QOL); Psychological distress (Brief symptom inventory – BSI); Ratings of perceived effectiveness of treatment.	CAM use was 35% over past three months in FBD, 38% in IBS; ginger, massage and yoga were the most popular CAM treatments.	Factors that predicted CAM use were being female, higher education level and higher anxiety (BSI). Dissatisfaction with conventional care and perception of lack of effectiveness of prescription medication were not associated with CAM use.

Note. BIOPRO = Biographical list of problems; BSI = Brief Symptom Inventory; GHQ = General Health Questionnaire; IBS-QOL = Irritable Bowel Syndrome Quality of Life; IBS-SS = IBS symptom severity scale; SSI = Semi-structured interview.

Smart et al. (1986) assessed the frequency of CAM use in patients with a diagnosis of IBS according to the Manning criteria (Manning et al., 1978) and for whom a clinical examination revealed no bowel abnormalities. Patients with organic GI disorders were recruited from the same outpatient clinic as those with IBS and Crohn's

patients were contacted via post. All participants completed a questionnaire on alternative medicine consultations. Verhoef et al. (1990) however, examined patients who sought alternative treatment for the problem which had required a consultation with a GI specialist in the past two years. Differences in demographic profile and health status between CAM users and non-users were compared. Of the 395 GI patients recruited, 55 were classified as having a functional GI disorder with diagnosis made by four GI specialists. This study excluded patients who used CAM for health problems other than their diagnosed GI disorders. Participants completed a three item index based on scepticism towards conventional medicine and were asked about alternative medicine use during the previous two years.

Donker et al. (1999) focused on the health status of 53 patients with IBS recruited from general practices participating in the Dutch National Survey of Morbidity and Intervention in General Practice and compared their use of healthcare services including CAM to a population sample of 10787. Participants were asked about healthcare use, health problems in the two weeks prior to being questioned and completed the General Health Questionnaire (GHQ) a screening tool for psychiatric illness (Goldberg, 1972) and the biographic problem list (BIOPRO) which measured social problems (Hosman, 1983). Health related behaviour (e.g., smoking, exercise) and the amount of healthcare sought was also measured which ranged from seeing a doctor (previous three months), a physical therapist (previous 12 months), a specialist (last two years) and an alternative therapist (previous five years).

Using semi-structured interviews and questionnaires, Koloski et al. (2003) considered usage of both conventional and alternative healthcare in 207 patients with functional GI diagnoses (IBS or functional dyspepsia). Participants were recruited from one of two previous surveys carried out by the authors and separated into consulters or non-consulters for both conventional and alternative healthcare. Participants were asked about frequency, access and satisfaction with healthcare. The structured interview for bowel symptoms was administered to give a functional diagnosis based on the Rome I criteria (Drossman et al., 1994). This structured interview also accounted for aspects related to quality of life and extent of symptoms. In addition, participants were given the Composite International Diagnostic Interview (World Health Organization, 1997) designed to assess past and current psychological disturbance.

Using data from 1012 FBD patients recruited from an “outpatient” healthcare maintenance organisation in a previous study (Nyrop et al., 2007), van Tilburg et al. (2008) examined CAM use in IBS and FBD. Participants were assessed for symptom severity at a “baseline” visit to the clinic with the Irritable Bowel Syndrome Severity Scale (IBS-SS) (Francis, Morris, & Whorwell, 1997), quality of life using the Irritable Bowel Syndrome Quality of Life scale, IBS-QOL (Patrick et al., 1998), psychological distress using the Brief Symptom inventory (BSI) (Derogatis, 1993), perceived treatment effectiveness, and CAM use.

Extent of CAM Use

The reviewed studies indicated CAM use at between 9 and 38.4%. Smart et al. (1986) found significantly more of those with IBS had visited an alternative practitioner compared to Crohn's and organic GI patients. Current alternative medicine use was significantly greater in the IBS group and herbal treatments and homeopathy were used most frequently (Smart et al., 1986). Verhoef et al. (1990) reported that 50% of CAM-users had FBD (compared to 13% of non-CAM users) and 9% used CAM for the condition they presented to a gastroenterologist. Chiropractors (for conditions other than GI), herbalists, naturopaths and reflexologists were that most frequently CAM practitioners and 46% of participants had visited more than one type of CAM practitioner.

Donker et al. (1999) found the IBS patient group had paid significantly more visits to an alternative practitioner than the population group (32% compared with 15%). Koloski et al. (2003) revealed that 86.5% of the functional GI group had sought conventional healthcare at some point, and a reported 20.8% of participants had sought alternative healthcare, with only 9% using any CAM in the previous 12 months. The most frequently accessed treatment was naturopathy. Van Tilburg et al. (2008) found 35% of those with FBD and 38.4% of those with IBS had used CAM with ginger, massage therapy and yoga being the most frequently used treatments.

Reasons for CAM Use

Demographics and Functional Diagnosis — Koloski et al. (2003) found 88.4% of the 20.8% of CAM users were female. However, 79.8% of participants (64% who were female) did not use alternative healthcare. Neither Donker et al. (1999), Smart et al. (1986) or Verhoef et al. (1990) specifically examined the role of gender although Donker et al. (1999) reported that a majority of IBS patients were female. Van Tilburg et al. (2008) found being female and higher educational attainment predicted CAM use. Verhoef et al. (1990) reported that a functional diagnosis was an independent predictor of CAM use compared to those with organic GI disorders. Similarly, Smart et al. (1986) reported more patients with IBS than Crohn's used CAM.

Perception of Symptoms — Donker et al. (1999) found significantly more IBS outpatients used CAM than the population group and those with IBS reported significantly more intense symptoms (e.g., abdominal pain and "secondary" symptoms including tiredness, backache and headaches). Koloski et al. (2003) found that physical symptoms of IBS significantly predicted conventional care seeking rather than CAM use. Van Tilburg et al. (2008) found stronger perceptions of symptom severity were associated with CAM use but not when controlling for demographics and other variables (e.g. the IBS-QOL and IBS-SS) in a logistic regression model.

Patient Perception of Conventional Treatment — Smart et al. (1986) found that the IBS group were more likely to report using alternative treatments if they perceived conventional treatment had failed. Verhoef et al. (1990) observed that 54% of CAM-users with GI disorders (including IBS) were satisfied with conventional treatment compared with 85% of non-CAM participants and that GI patients who used CAM were significantly more sceptical (49%) of conventional medicine than those not using CAM (13%). Verhoef et al. (1990) also revealed associations between a functional diagnosis and scepticism towards conventional medicine, and that these variables both (independently) significantly predicted the use of CAM. In relation to communication between conventional practitioner and patient, CAM-users were less satisfied with responses from conventional practitioners than non-CAM users (77% vs. 91%). Koloski et al. (2003) found dissatisfaction did not significantly influence CAM use, although there was some difference between CAM-users and non-CAM users. Van Tilburg et al. (2008) found no association between CAM use and satisfaction with physician care during their primary visit and that CAM-users did not rate their conventional prescription medication as being less effective than non-CAM users.

Beliefs About CAM Treatments and Therapies — One study reported expectations of CAM efficacy as a rationale for IBS patients to use CAM. Koloski et al. (2003) found a desire to treat the GI problem with a more natural approach, the potential for alternative treatments to work and personal recommendation were all factors (albeit not significant) that appear to influence CAM use. Donker et al. (1999) reported that 92% of CAM-users felt CAM had helped.

Other Psychosocial Factors — Verhoef et al. (1990) found stressful life events in the previous year significantly predicted CAM use in those with FBD. Donker et al. (1999) reported that those with IBS had higher scores on the

GHQ than the population group. Differences were observed in the two groups' BIOPRO scores where those with IBS reported greater concerns about the future, lower self-confidence, fewer social interactions, and relationship difficulties. The IBS group reported more occupational absence in the two months prior to the study. Additionally, having IBS resulted in significantly more visits to the family GP, a physical therapist and a GI specialist. The significant differences observed in healthcare seeking (including CAM use) between the two groups may be influenced by such psychosocial factors (Donker et al., 1999). Koloski et al. (2003) observed differences, albeit not significant, between both sets of healthcare consulters (CAM and conventional treatment) and non-consulters in psychological disturbance and perception of symptoms. Van Tilburg et al. (2008) found CAM-users reported significantly poorer IBS-QOL scores compared to those not using CAM. CAM-users also reported higher scores on the somatisation, anxiety and depression subscales of the BSI. Logistic regression analysis revealed that anxiety was the sole significant psychosocial predictor of CAM use.

Discussion

Prevalence of CAM was lower than CAM use reported by Kong et al. (2005) and Langmead et al. (2002). However, this might be explained by reviewed studies focusing on consultation with a CAM practitioner as opposed to self-directed treatments (Kong et al., 2005). The reviewed studies included patient group and healthy control population comparisons, in addition to comparisons of those with IBS who used CAM and those not using CAM. Findings indicate that those with IBS who use CAM may report more severe symptoms and have concerns about conventional medicine including unhappiness and dissatisfaction with conventional care.

Female predominance was evident, which is concurrent with what is known about IBS (e.g. Andrews et al., 2005), however, in terms of CAM, there was limited agreement with findings from non-illness specific investigation into CAM use. CAM use in general has been reported to have female predominance (e.g. Astin, 1998), although only one reviewed study (van Tilburg et al., 2008) found that being female was an independent predictor of CAM use in those with a functional GI diagnosis. It should be noted however that the reviewed studies had a predominantly female representation which is consistent with previous findings that a greater proportion of females than males seek healthcare for IBS/functional GI symptoms (Andrews et al., 2005; Hungin et al., 2005). It has yet to be ascertained whether this disparity between males and females is due to biological or environmental distinctions related to gender or might be explained by differences in healthcare seeking (Corazziari, 2004).

Although there has been limited examination of many psychological aspects in general populations of CAM-users, points of contrast and similarity exist with what is currently known about possible psychological influences on CAM use. Illness related perceptions, for example, were not found to be strong influences on CAM use. This is in contrast to findings from Bishop et al. (2006) who found stronger perceived consequences of illness (from a general population) predicted use of CAM. This finding may be more indicative of a lack of measurement of such constructs. With illness perceptions being a key component for intervention in IBS (e.g. Oerlemans et al., 2011) this represents one important aspect that could be addressed by future research. CAM-users however, reported poorer quality of life and more severe symptoms, which concurs to an extent with Astin (1998) who established CAM-users from a general population reported poorer health than those not using CAM. There are further similarities in CAM-users affected by IBD who report amplified symptom perception and poorer quality of life (Hilsden et al., 1998; Langmead et al., 2002; Scott et al., 2003). One study (Koloski et al., 2003) found increased perception of IBS symptoms predicted conventional care seeking suggesting it worthwhile to investigate this further in relation to use of CAM.

Treatment related beliefs however, appeared more influential on CAM use than illness perceptions. For example, findings showed a negative perception of conventional medical care influenced CAM use as did a desire to treat GI symptoms with a more natural approach (Bishop et al., 2006; Vincent & Furnham, 1996). A degree of dissatisfaction with conventional medicine also appears evident, as found by Scott et al. (2003) in IBD patients. However, future research should clarify whether this is due to issues with conventional treatment itself and the healthcare consultation, or both factors.

A major strength of this review is that it is the first to synthesise both prevalence estimates and evidence of why people affected with IBS use CAM. Several psychological factors that have a role in influencing CAM use have been highlighted. These findings may be beneficial in informing areas of potential intervention in conventional medical consultations. The review further highlights the paucity of research in this important area, thus highlighting the need for additional research that would aid understanding of influences on CAM use. This review has identified specific areas of investigation that could be addressed by future research. This may include addressing specific psychological components of illness and treatment beliefs and assessing potential influence of these factors on CAM use in those affected by IBS. Furthermore, exploring aspects of the health practitioner-client relationship to determine where dissatisfaction may arise could have potential benefits in targeting and implementing future improvements in healthcare.

Conversely this review has a number of limitations that need to be considered. Due to differences in sample size and measures used in the selected studies, meta-analysis was not deemed appropriate due to variation in both study design and reporting of findings. However, across the five reviewed studies, there were common themes why those with IBS turn to CAM although the methodological variation in the studies makes generalisation of findings problematic and potentially limited. Group comparisons in each study differed notably and it might be suggested that a protocol of studying CAM-users compared with those not using CAM may be advantageous in terms of explaining psychological influences on CAM use more precisely. There may also be benefit in examining factors that pull people to different forms of CAM (Bishop et al., 2006) as findings suggested that CAM is, at least partially, sometimes viewed as a single entity in terms of treatment. The reviewed studies were also conducted in different countries where differences in healthcare service provision may exist in addition to cultural differences. Furthermore, there was variation in participant numbers in each of the studies. Two studies for example (Donker et al., 1999; Verhoef et al., 1990) had relatively small numbers of participants with IBS/FBD. There is some ambiguity concerning the scope of functional GI diagnosis (Verhoef et al., 1990) and if all participants had IBS or different functional diagnoses (such as functional dyspepsia) (Koloski et al., 2003).

It was notable that none of the reviewed studies considered emotional response to illness, something that is often a concern in those with IBS (e.g. Tanaka et al., 2011). CAM use was however predicted by higher reported anxiety in one study (van Tilburg et al., 2008) but it is unclear if anxiety was present pre or post-illness. The psychosocial factors (e.g. BIOPRO responses) reported by Donker et al. (1999) in the IBS group warrant further investigation as this particular study focused on a small group of those affected by IBS and a considerably larger population group. Further longitudinal investigation may reveal the extent to which these factors influence CAM use and if differences exist on such constructs between CAM-users and those not using CAM. Additionally, there were notable differences in the measurement of symptom experience. Smart et al. (1986) did not consider symptom duration important in predicting CAM use in IBS as more patients with IBS were currently using CAM than the Crohn's group (who have similar symptoms). Two studies (Donker et al., 1999; van Tilburg et al., 2008) considered the severity of GI symptoms and one considered ratings of quality of life (van Tilburg et al., 2008). Verhoef et al. (1990)

however, did not consider participants' reported symptoms. Further investigation into perceived severity of IBS symptoms is therefore warranted to determine if CAM-users report more severe IBS symptoms.

Furthermore in relation to concerns about conventional medical treatment, "failure" of (Smart et al., 1986) and "dissatisfaction" with conventional treatment (Koloski et al., 2003) may reflect sub-dimensions of the same construct. Both refer to treatment, the consultation or both. In the studies reviewed, measurement of these factors varied considerably. Koloski et al. (2003) conducted a healthcare seeking interview while Smart et al. (1986) asked specifically about failure of conventional treatment. Verhoef et al. (1990) assessed scepticism towards conventional medicine. Van Tilburg et al. (2008) considered first healthcare visits and perceived effectiveness of prescription medication. Moreover, four studies (Donker et al., 1999; Koloski et al., 2003; Smart et al., 1986; Verhoef et al., 1990) focused solely on CAM consultations thus neglecting "off the shelf" products from the analysis. Clarification of the nature of dissatisfaction and a more expansive inclusion of CAM, which would include self-purchased treatments and consideration of different forms of CAM, are additional factors that could be addressed in future research.

Conclusion and Implications

CAM's use has been shown to be associated with psychological factors which could be targeted through psychologically based management strategies for those affected with IBS. Such interventions may be beneficial in addressing negative symptom or treatment perceptions and emotional distress that may accompany IBS symptoms (e.g. van Dulmen et al., 1996) in addition to focusing on providing information about IBS (e.g. Jarrett et al., 2009). It is possible that CAM-users may initially benefit more from such intervention as evidence suggests those with IBS using CAM report an amplified or more intense illness experience than those not using CAM. This may extend to CAM-users reporting poorer quality of life despite using CAM although future longitudinal studies are required to support this. The array of psychological factors identified by this review also suggests that the application of a theoretical framework to future research may aid understanding and inform translation to practical interventions. One such model, the common-sense model of illness representation (Leventhal, Brissette, & Leventhal, 2003) has incorporated both illness perceptions and treatment beliefs (e.g. Bishop et al., 2006). This model has had success in both exploration and translation of findings into practical change in illness perceptions resulting in benefits to health (McAndrew et al., 2008).

Competing Interests

None of the authors has a conflict of interest to declare.

References

Note: * indicates studies included in the review.

- Amouretti, M., Le Pen, C., Gaudin, A. F., Bommelaer, G., Frexinos, J., Ruszniewski, P., . . . Hasnaoui, A. (2006). Impact of irritable bowel syndrome (IBS) on health-related quality of life (HRQOL). *Gastroenterologie Clinique et Biologique*, 30(2), 241-246. doi:10.1016/S0399-8320(06)73160-8

- Andrews, E. B., Eaton, S. C., Hollis, K. A., Hopkins, J. S., Ameen, V., Hamm, L. R., . . . Mangel, A. W. (2005). Prevalence and demographics of irritable bowel syndrome: Results from a large web-based survey. *Alimentary Pharmacology & Therapeutics*, 22(10), 935-942. doi:10.1111/j.1365-2036.2005.02671.x
- Astin, J. A. (1998). Why patients use alternative medicine: Results of a national study. *Journal of the American Medical Association*, 279(19), 1548-1553. doi:10.1001/jama.279.19.1548
- Bishop, F. L., & Lewith, G. T. (2010). Who uses CAM? A narrative review of demographic characteristics and health factors associated with CAM use. *Evidence-Based Complementary and Alternative Medicine*, 7(1), 11-28. doi:10.1093/ecam/nen023
- Bishop, F. L., Yardley, L., & Lewith, G. T. (2006). Why do people use different forms of complementary medicine? Multivariate associations between treatment and illness beliefs and complementary medicine use. *Psychology & Health*, 21(5), 683-698. doi:10.1080/14768320500444216
- Bishop, F. L., Yardley, L., & Lewith, G. T. (2007). A systematic review of beliefs involved in the use of complementary and alternative medicine. *Journal of Health Psychology*, 12(6), 851-867. doi:10.1177/1359105307082447
- Chey, W. D., Maneerattaporn, M., & Saad, R. (2011). Pharmacologic and complementary and alternative medicine therapies for irritable bowel syndrome. *Gut and Liver*, 5(3), 253-266. doi:10.5009/gnl.2011.5.3.253
- Corazziari, E. (2004). Definition and epidemiology of functional gastrointestinal disorders. *Best Practice & Research. Clinical Gastroenterology*, 18(4), 613-631. doi:10.1016/j.bpg.2004.04.012
- Dancey, C. P., & Backhouse, S. (1993). Towards a better understanding of patients with irritable bowel syndrome. *Journal of Advanced Nursing*, 18(9), 1443-1450. doi:10.1046/j.1365-2648.1993.18091443.x
- Dancey, C. P., Hutton-Young, S. A., Moye, S., & Devins, G. M. (2002). Perceived stigma, illness intrusiveness and quality of life in men and women with irritable bowel syndrome. *Psychology Health and Medicine*, 7(4), 381. doi:10.1080/1354850021000015203
- Dean, B. B., Aguilar, D., Barghout, V., Kahler, K. H., Frech, F., Groves, D., & Ofman, J. J. (2005). Impairment in work productivity and health-related quality of life in patients with IBS. *The American Journal of Managed Care*, 11(Suppl.), S17-S26. <http://www.ajmc.com/>
- Derogatis, L. R. (1993). *BSI Brief Symptom Inventory: Administration, scoring, and procedures manual* (4th ed.). Minneapolis, MN: National Computer Systems.
- *Donker, G. A., Foets, M., & Spreeuwenberg, P. (1999). Patients with irritable bowel syndrome: Health status and use of health care services. *The British Journal of General Practice*, 49(447), 787-792. <http://www.ncbi.nlm.nih.gov/pmc/journals/261/>
- Drossman, D. A., Morris, C. B., Schneck, S., Hu, Y. J. B., Norton, N. J., Norton, W. F., & Bangdiwala, S. I. (2009). International survey of patients with IBS: Symptom features and their severity, health status, treatments, and risk taking to achieve clinical benefit. *Journal of Clinical Gastroenterology*, 43(6), 541-550. doi:10.1097/MCG.0b013e318189a7f9
- Drossman, D. A., Richter, J. E., Talley, N. J., Corazziari, E., Thompson, W. G., & Whitehead, W. E. (1994). *Functional gastrointestinal disorders*. Boston, MA: Little, Brown.
- Faresjö, A., Anastasiou, F., Lionis, C., Johansson, S., Wallander, M.-A., & Faresjö, T. (2006). Health-related quality of life of irritable bowel syndrome patients in different cultural settings. *Health and Quality of Life Outcomes*, 4, 21. doi:10.1186/1477-7525-4-21

- Ford, A. C., Talley, N. J., Spiegel, B. M. R., Foxx-Orenstein, A. E., Schiller, L., Quigley, E. M. M., & Moayyedi, P. (2008). Effect of fibre, antispasmodics, and peppermint oil in the treatment of irritable bowel syndrome: Systematic review and meta-analysis. *BMJ (Clinical Research Ed.)*, *337*, a2313. doi:10.1136/bmj.a2313
- Francis, C. Y., Morris, J., & Whorwell, P. J. (1997). The irritable bowel severity scoring system: A simple method of monitoring irritable bowel syndrome and its progress. *Alimentary Pharmacology & Therapeutics*, *11*(2), 395-402. doi:10.1046/j.1365-2036.1997.142318000.x
- Giese, L. A. (2000). A study of alternative health care use for gastrointestinal disorders. *Gastroenterology Nursing*, *23*(1), 19-27. doi:10.1097/00001610-200001000-00005
- Goldberg, D. (1972). *The detection of psychiatric illness by questionnaire*. London, England: Oxford University Press.
- Grundmann, O., & Yoon, S. L. (2010). Irritable bowel syndrome: Epidemiology, diagnosis and treatment: An update for health-care practitioners. *Journal of Gastroenterology and Hepatology*, *25*(4), 691-699. doi:10.1111/j.1440-1746.2009.06120.x
- Hagger, M., & Orbell, S. (2003). A meta-analytic review of the common-sense model of illness representations. *Psychology & Health*, *18*(2), 141-184. doi:10.1080/088704403100081321
- Harris, L. A., & Heitkemper, M. M. (2012a). Practical considerations for recognizing and managing severe irritable bowel syndrome. *Gastroenterology Nursing*, *35*(1), 12-21. doi:10.1097/SGA.0b013e31823ff0e8
- Harris, L. A., & Heitkemper, M. M. (2012b). Practical considerations for recognizing and managing severe irritable bowel syndrome (CE-Test). *Gastroenterology Nursing*, *35*(1), 22-23. doi:10.1097/SGA.0b013e31823ff0e8
- Hayee, B., & Forgacs, I. (2007). Psychological approach to managing irritable bowel syndrome. *BMJ (Clinical Research Ed.)*, *334*(7603), 1105-1109. doi:10.1136/bmj.39199.679236.AE
- Hilsden, R. J., Scott, C. M., & Verhoef, M. J. (1998). Complementary medicine use by patients with inflammatory bowel disease. *The American Journal of Gastroenterology*, *93*(5), 697-701. doi:10.1111/j.1572-0241.1998.208_a.x
- Hilsden, R. J., Verhoef, M. J., Rasmussen, H., Porcino, A., & DeBruyn, J. C. C. (2011). Use of complementary and alternative medicine by patients with inflammatory bowel disease. *Inflammatory Bowel Diseases*, *17*(2), 655-662. doi:10.1002/ibd.21360
- Horne, R., Weinman, J., & Hankins, M. (1999). The beliefs about medicines questionnaire: The development and evaluation of a new method for assessing the cognitive representation of medication. *Psychology & Health*, *14*(1), 1-24. doi:10.1080/08870449908407311
- Hosman, C. (1983). *Psychosocial problems and help seeking: A social-psychological study for preventive mental health care*. Lisse, Netherlands: Swets & Zeitlinger.
- Hungin, A. P. S., Chang, L., Locke, G. R., Dennis, E. H., & Barghout, V. (2005). Irritable bowel syndrome in the United States: Prevalence, symptom patterns and impact. *Alimentary Pharmacology & Therapeutics*, *21*(11), 1365-1375. doi:10.1111/j.1365-2036.2005.02463.x
- Ilnyckyj, A., Graff, L. A., Blanchard, J. F., & Bernstein, C. N. (2003). Therapeutic value of a gastroenterology consultation in irritable bowel syndrome. *Alimentary Pharmacology & Therapeutics*, *17*(7), 871-880. doi:10.1046/j.1365-2036.2003.01523.x

- Jarrett, M. E., Cain, K. C., Burr, R. L., Hertig, V. L., Rosen, S. N., & Heitkemper, M. M. (2009). Comprehensive self-management for irritable bowel syndrome: Randomized trial of in-person vs. combined in-person and telephone sessions. *The American Journal of Gastroenterology*, *104*(12), 3004-3014. doi:10.1038/ajg.2009.479
- *Koloski, N. A., Talley, N. J., Huskic, S. S., & Boyce, P. M. (2003). Predictors of conventional and alternative health care seeking for irritable bowel syndrome and functional dyspepsia. *Alimentary Pharmacology & Therapeutics*, *17*(6), 841-851. doi:10.1046/j.1365-2036.2003.01498.x
- Kong, S. C., Hurlstone, D. P., Pocock, C. Y., Walkington, L. A., Farquharson, N. R., Bramble, M. G., . . . Sanders, D. (2005). The incidence of self-prescribed oral complementary and alternative medicine use by patients with gastrointestinal diseases. *Journal of Clinical Gastroenterology*, *39*(2), 138-141. doi:10.1097/01.mcg.0000155570.19340.61
- Lackner, J. M., Quigley, B. M., & Blanchard, E. B. (2004). Depression and abdominal pain in IBS patients: The mediating role of catastrophizing. *Psychosomatic Medicine*, *66*(3), 435-441. doi:10.1097/01.psy.0000126195.82317.46
- Langmead, L., Chitnis, M., & Rampton, D. S. (2002). Use of complementary therapies by patients with IBD may indicate psychosocial distress. *Inflammatory Bowel Diseases*, *8*(3), 174-179. doi:10.1097/00054725-200205000-00003
- Lea, R., & Whorwell, P. J. (2001). Quality of life in irritable bowel syndrome. *PharmacoEconomics*, *19*(6), 643-653. doi:10.2165/00019053-200119060-00003
- Lea, R., & Whorwell, P. J. (2004). Psychological influences on the irritable bowel syndrome. *Minerva Medica*, *95*(5), 443-450. <http://www.minervamedica.it/en/journals/minerva-medica/index.php>
- Leung, V. W. Y., Shalansky, S. J., Lo, M. K., & Jadusingh, E. A. (2009). Prevalence of use and the risk of adverse effects associated with complementary and alternative medicine in a cohort of patients receiving warfarin. *The Annals of Pharmacotherapy*, *43*(5), 875-881. doi:10.1345/aph.1L631
- Leventhal, H., Brissette, I., & Leventhal, E. A. (2003). The common-sense model of self-regulation of health and illness. In L. D. Cameron & H. Leventhal (Eds.), *The self-regulation of health and illness behaviour* (pp. 42-65). London, England: Routledge.
- Manning, A. P., Thompson, W. G., Heaton, K. W., & Morris, A. F. (1978). Towards positive diagnosis of the irritable bowel. *British Medical Journal*, *2*(6138), 653-654. doi:10.1136/bmj.2.6138.653
- McAndrew, L. M., Musumeci-Szabó, T. J., Mora, P. A., Vileikyte, L., Burns, E., Halm, E. A., . . . Leventhal, H. (2008). Using the common sense model to design interventions for the prevention and management of chronic illness threats: From description to process. *British Journal of Health Psychology*, *13*(2), 195-204. doi:10.1348/135910708X295604
- Metcalfe, A., Williams, J., McChesney, J., Patten, S. B., & Jetté, N. (2010). Use of complementary and alternative medicine by those with a chronic disease and the general population: Results of a national population based survey. *BMC Complementary and Alternative Medicine*, *10*, 58. doi:10.1186/1472-6882-10-58
- National Institute of Clinical Excellence. (2008). *Irritable bowel syndrome in adults (CG61): Diagnosis and management of irritable bowel syndrome in primary care*. London, England: National Institute for Health and Clinical Excellence.
- Nyrop, K. A., Palsson, O. S., Levy, R. L., Korff, M. V., Feld, A. D., Turner, M. J., & Whitehead, W. E. (2007). Costs of health care for irritable bowel syndrome, chronic constipation, functional diarrhoea and functional abdominal pain. *Alimentary Pharmacology & Therapeutics*, *26*(2), 237-248. doi:10.1111/j.1365-2036.2007.03370.x

- Oerlemans, S., van Cranenburgh, O., Herremans, P.-J., Spreeuwenberg, P., & van Dulmen, S. (2011). Intervening on cognitions and behavior in irritable bowel syndrome: A feasibility trial using PDAs. *Journal of Psychosomatic Research, 70*(3), 267-277. doi:10.1016/j.jpsychores.2010.09.018
- Patrick, D. L., Drossman, D. A., Frederick, I. O., DiCesare, J., & Puder, K. L. (1998). Quality of life in persons with irritable bowel syndrome: Development and validation of a new measure. *Digestive Diseases and Sciences, 43*(2), 400-411. doi:10.1023/A:1018831127942
- Quigley, E. M. M. (2006). Changing face of irritable bowel syndrome. *World Journal of Gastroenterology: WJG, 12*(1), 1-5. <http://www.wjgnet.com/1007-9327/>
- Ringström, G., Störsrud, S., Posserud, I., Lundqvist, S., Westman, B., & Simrén, M. (2010). Structured patient education is superior to written information in the management of patients with irritable bowel syndrome: A randomized controlled study. *European Journal of Gastroenterology & Hepatology, 22*(4), 420-428. doi:10.1097/MEG.0b013e3283333b61
- Robinson, A., Lee, V., Kennedy, A., Middleton, L., Rogers, A., Thompson, D. G., & Reeves, D. (2006). A randomised controlled trial of self-help interventions in patients with a primary care diagnosis of irritable bowel syndrome. *Gut, 55*(5), 643-648. doi:10.1136/gut.2004.062901
- Rutter, C. L., & Rutter, D. R. (2002). Illness representation, coping and outcome in irritable bowel syndrome (IBS). *British Journal of Health Psychology, 7*(4), 377-391. doi:10.1348/135910702320645372
- Scott, C. M., Verhoef, M. J., & Hilsden, R. J. (2003). Inflammatory bowel disease patients' decisions to use complementary therapies: Links to existing models of care. *Complementary Therapies in Medicine, 11*(1), 22-27. [http://www.journals.elsevier.com/complementary-therapies-in-medicine/doi:10.1016/S0965-2299\(02\)00107-3](http://www.journals.elsevier.com/complementary-therapies-in-medicine/doi:10.1016/S0965-2299(02)00107-3)
- Searle, A., & Murphy, S. (2000). Representations of illness: Their relationship with an understanding of and adherence to homoeopathic treatment. *Psychology Health and Medicine, 5*(2), 179-191. doi:10.1080/713690179
- Shane-McWhorter, L., & Geil, P. (2002). Interactions between complementary therapies or nutrition supplements and conventional medications. *Diabetes Spectrum, 15*(4), 262-266. doi:10.2337/diaspect.15.4.262
- *Smart, H. L., Mayberry, J. F., & Atkinson, M. (1986). Alternative medicine consultations and remedies in patients with the irritable bowel syndrome. *Gut, 27*(7), 826-828. doi:10.1136/gut.27.7.826
- Talley, N. J. (2008). Functional gastrointestinal disorders as a public health problem. *Neurogastroenterology and Motility: The Official Journal of the European Gastrointestinal Motility, 20*(Suppl. s1), 121-129. doi:10.1111/j.1365-2982.2008.01097.x
- Talley, N. J., Boyce, P. M., & Jones, M. (1997). Predictors of health care seeking for irritable bowel syndrome: A population based study. *Gut, 41*(3), 394-398. doi:10.1136/gut.41.3.394
- Tanaka, Y., Kanazawa, M., Fukudo, S., & Drossman, D. A. (2011). Biopsychosocial model of irritable bowel syndrome. *Journal of Neurogastroenterology and Motility, 17*(2), 131-139. doi:10.5056/jnm.2011.17.2.131
- van Dulmen, A. M., Fennis, J. F., Mokkink, H. G. A., & Bleijenberg, G. (1996). The relationship between complaint-related cognitions in referred patients with irritable bowel syndrome and subsequent health care seeking behaviour in primary care. *Family Practice, 13*(1), 12-17. doi:10.1093/fampra/13.1.12

- van Dulmen, A. M., Fennis, J. F., Mokkink, H. G. A., van der Velden, H. G., & Bleijenberg, G. (1994). Doctors' perception of patients' cognitions and complaints in irritable bowel syndrome at an out-patient clinic. *Journal of Psychosomatic Research*, 38(6), 581-590. doi:10.1016/0022-3999(94)90055-8
- van Dulmen, A. M., Fennis, J. F. M., Mokkink, H. G. A., van der Velden, H. G. M., & Bleijenberg, G. (1997). Persisting improvement in complaint-related cognitions initiated during medical consultations in functional abdominal complaints. *Psychological Medicine*, 27(3), 725-729. doi:10.1017/S0033291796003777
- *van Tilburg, M. A. L., Palsson, O. S., Levy, R. L., Feld, A. D., Turner, M. J., Drossman, D. A., & Whitehead, W. E. (2008). Complementary and alternative medicine use and cost in functional bowel disorders: A six month prospective study in a large HMO. *BMC Complementary and Alternative Medicine*, 8, 46. doi:10.1186/1472-6882-8-46
- *Verhoef, M. J., Sutherland, L. R., & Brkich, L. (1990). Use of alternative medicine by patients attending a gastroenterology clinic. *CMAJ: Canadian Medical Association Journal*, 142(2), 121-125.
- Vincent, C., & Furnham, A. (1996). Why do patients turn to complementary medicine? An empirical study. *The British Journal of Clinical Psychology*, 35(1), 37-48. doi:10.1111/j.2044-8260.1996.tb01160.x
- Vincent, C., & Furnham, A. (1997). *Complementary medicine: A research perspective*. Chichester, England: John Wiley and Sons.
- Wilson, S., Roberts, L., Roalfe, A., Bridge, P., & Singh, S. (2004). Prevalence of irritable bowel syndrome: A community survey. *The British Journal of General Practice*, 54(504), 495-502. <http://www.rcgp.org.uk/Publications/BJGP.aspx>
- World Health Organization. (1997). *Composite International Diagnostic Interview (CIDI), Core Version 2.1, Interviewer's Manual*. Geneva, Switzerland: Author.
- Zollman, C., & Vickers, A. (1999). What is complementary medicine? *BMJ (Clinical Research Ed.)*, 319(7211), 693-696. doi:10.1136/bmj.319.7211.693