A critical review of complementary and alternative medicine use by women with cyclic perimenstrual pain and discomfort: A focus upon prevalence, patterns and applications of use and users' motivations, information seeking and self-perceived efficacy

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Competing interests

The Authors declare that they have no competing interests to disclose.

Abstract:

Introduction: Complementary and alternative medicine (CAM) is used for treating cyclic perimenstrual pain and discomfort. This critical review examines women's reported CAM use, its perceived effectiveness and information relating to women's attitudes, behaviours, motivations and patterns of CAM use in its treatment. *Material and methods:* An extensive search of the main medical databases EBSCO, CINAHL, Medline, AMED and SCOPUS, as well as additional hand searches, was conducted. Papers included were confined to those that had been peer-reviewed, written in English and containing original research into CAM use for cyclic perimenstrual pain and discomfort amongst adult women. *Results:* CAM, particularly herbal medicine, nutritional supplements and massage, is widely used for a range of cyclic perimenstrual pain and discomfort symptoms. A large number of CAM modalities are adopted, often simultaneously and with little professional oversight. Women's assessment of efficacy of different CAM modalities is positive, though the majority of users are self-prescribing apparently without professional guidance. Although the uptake of CAM for cyclic perimenstrual pain and discomfort is wide-spread, little empirical data is available regarding which women are using CAM, their motivations for doing so and importantly the sources via which women receive information about CAM. *Conclusions:* This review highlights the extensive use of (often self-prescribed) CAM in a number of countries to alleviate the widespread symptoms of cyclic perimenstrual pain and discomfort. An understanding of all health care utilisation by women with perimenstrual pain and discomfort is vital to help ensure safe, effective and coordinated health care that can lead to optimal patient outcomes.

Keywords:

perimenstrual pain, perimenstrual discomfort, complementary and alternative medicine, premenstrual syndrome, dysmenorrhea.

Abbreviations:

CAM, complementary and alternative medicine;

CHM, Chinese herbal medicine;

CPPD, cyclic perimenstrual pain and discomfort;

PMS, premenstrual syndrome;

TCM, traditional Chinese medicine

Key Message:

The prevalence of perimenstrual pain and discomfort is high worldwide however the predominant treatment strategies are unsupervised by professional health providers. Complementary and alternative medicine although frequently used has undocumented benefits and risks.

Introduction

Cyclic perimenstrual pain and discomfort (CPPD) encompasses symptom clusters that recur in the premenstrual or luteal phase of the menstrual cycle (known as premenstrual syndrome or PMS) as well as those that may continue, or begin, during menstruation itself such as dysmenorrhea (1). Symptoms may be predominantly physical (dysmenorrhea, headache, nausea, fluid retention, bloating, painful or tender breasts), affective (mental or emotional), or some combination of both (2), are related to cyclical hormone changes, may involve one or many symptoms, may vary from one cycle to the next and appear to have no single etiology (2-4).

CPPD is widely experienced by women across cultures, at some time during their reproductive life, with prevalence rates of women experiencing at least one CPPD-related symptom assessed as between 80 - 97% (4,5). Whilst not all symptoms necessarily require treatment those women with moderately severe to severe symptoms, occurring in 40% (4) and between 2-10% (2,5) of women respectively, will probably seek help. A lack of both definitional clarity and understanding of underlying mechanism(s) (3) have resulted in the absence of a satisfactory treatment strategy (3). It is possible that attitudes to CPPD amongst different cultures affect not only the experience of these symptoms but also the adoption of certain treatment-seeking behaviours (6). Despite CPPD symptoms potentially resulting in varying levels of discomfort and interfering greatly with women's ability to work and lead a normal life at times during their cycles, many researchers have reported that with less severe CPPD symptoms women often do not seek professional help (7-17).

Current conventional treatments for CPPD include mainly hormone therapies, anti-depressants, analgesics and anti-inflammatory drugs, symptomatic drug regimes such as diuretics and, less frequently, surgical interventions such as oophorectomy (2,18,19). The variety of conventional treatments for CPPD, over 300 to date, range from conventional drugs through to nutritional and psychological approaches. All available treatments are recognised as not being wholly applicable or satisfactory for all women nor as necessarily providing long term solutions due to the unknown but likely mixed etiology of symptoms (3,19).

Meanwhile, the use of complementary and alternative medicine (CAM) – comprising a range of diverse health care practices and products not traditionally associated with the medical curriculum or medical profession such as herbal medicine, acupuncture and massage – is high (20,21) , particularly amongst women (22,23). There appears to be considerable use of CAM amongst women with CPPD (9,10,13-15,24-30), and a growing acceptance amongst medical professionals of the possible suitability of some CAM modalities for their treatment particularly herbal medicine, supplements and acupuncture (31,32).

Whilst there are clinical trials showing efficacy of some CAM for treating aspects of CPPD such as acupuncture in treating dysmenorrhea (33) and *Vitex agnus-castus* (Chaste tree berry) for PMS (34) there is a need for further efficacy research. Moreover, while initial work provides some baseline data on CAM use for CPPD, this topic has till now been somewhat uncoordinated and *ad hoc* (2,4). There is currently no critical or systematic overview of this sub-field of empirical literature, a situation made more pronounced and significant by the fact CAM use for CPPD raises challenges for those looking to provide and manage safe, effective care for affected women. There is a gap in health care providers' knowledge as to 'best practice' in treatment and an unknown risk regarding women's concomitant use of all therapies and the extent to which women fully disclose all treatments to their health carers.

In direct response to this identified research gap, this paper reports findings from the first critical review of CAM use amongst women with CPPD with a focus upon prevalence of use, those using CAM as well as self-perceived efficacy, motivations and information seeking behaviour of users.

Material and methods

In order to identify the contemporary literature reporting on CAM use for CPPD database searches of EBSCO, CINAHL, Medline, AMED and SCOPUS were conducted, using the following keywords "problem bleeding" or "abnormal uterine bleeding" or "abnormal vaginal bleeding" or "dysfunctional uterine bleeding" or "atypical uterine bleeding" or "inter*menstrual bleeding" or "excessive uterine bleeding" or "excessive vaginal bleeding" or "excessive menstrual bleeding" or "menstruation disorder" or "menstruation disturbance" or "irregular bleeding/periods" or "irregular menstrual cycles" or "irregular menses" or "prolonged menstrual bleeding" or "prolonged uterine bleeding" or "prolonged periods" or "severe acute uterine bleeding" or "severe acute vaginal bleeding" or "dysmenorrh*ea" or "menstrual dysfunction", "polymenorrh*ea" or "oligomenorrh*ea" or "hypermenorrh*ea" or "menometrorrhagia", "uterine/vaginal h*emorrhage" or "metrorrhagia" or "painful periods" or "menstrual pain" or "irregular menses" or "frequent menses" or "menorrhagia" or "heavy menstrual bleeding" or "abnormally long or heavy menses" or "metropathia h*emorrhagica" or "increased menstrual loss" or "cycle related changes" or "pre*menstrual" AND "CAM" or "complementary medicine" or "complementary therapy" or "alternative medicine" or "alternative therapy" or "herbal medicine" or "herbal therapy" or "acupuncture" or "natural medicine" or "naturopathy" or "homeopathy" or "traditional Chinese medicine" or "osteopathy" or "nutritional therapy" or "nutritional medicine" or "Ayurvedic medicine" or "massage therapy" or "aromatherapy" or "chiropractic" or "Reiki" or "hypnotherapy" or "spiritual therapy" or "integrative medicine" or "unorthodox medicine" or "unconventional medicine" or "nutritional supplement" or "herb".

The search was confined to papers in English published in peer-reviewed journals and which reported new, empirical data regarding CAM use amongst adult female populations with any form of CPPD. In line with the aim and focus of the review, manuscripts which reported results from clinical trials (including randomised controlled trials) or case histories as well as those papers constituting reviews, letters or commentaries were excluded from the search. An additional hand search was undertaken in a selection of international peer-reviewed journals (*Acta Obstetrica et Gynecologica Scandinavica*, *BMC Women's Health*, *American Journal of Obstetrics and Gynecology* and *Journal of Clinical Nursing*) which were considered leading journals in this area of health care to add confidence that all relevant international publications meeting the search inclusion criteria were identified. Finally, Google Scholar was searched utilising a number of keywords from the extensive list above as an additional check.

To appraise the quality of papers identified for review, a quality scoring system based on previously described parameters used to assess prevalence studies of CAM use was employed (35). Details of quality scoring are provided in Table 1. Two authors employed the quality appraisal scoring system to assign a systematic, quantitative value to the studies separately, compared their results and resolved any discrepancies by discussion. The quality scores of papers are provided in Table 2.

Results

The initial search identified 7,006 records of which 113 papers were screened and from these 44 empirical studies met the selection criteria for inclusion in the review. Thirty-six of the included papers report cross-sectional studies that specifically relate to the use of CAM for CPPD treatment and eight other papers relate to cross-sectional surveys reporting CAM use results from more general populations (including and/or beyond women) which have reported on women with CPPD as one of a number of many other research interests. General information from each of the 44 articles is presented in Table 3.

Analyses of the extensive time period of our search (1986 to 2014) reveals the exponential growth in empirical research focusing upon this topic over recent years - indeed the last seven years has produced as many papers reporting research on women's use of CAM for CPPD symptoms as all research on this topic over the previous 22 years (1986-2007). Papers included in this review that are specific for CAM use in CPPD were conducted in Australia (3), U.K. (4), U.S. (9), Ethiopia (1), New Zealand (1), South Korea (1), Hong Kong (1), Japan (2), Turkey (2), Pakistan(1), Taiwan (3), Jordan (2), Egypt (1), South Africa (1), Nigeria (1), Brazil (1), India (1) and one tri-nation study involving UK, US and France.

Prevalence, patterns and applications of CAM use

Amongst all review papers, 32 focussed specifically on CPPD symptom(s) which included CAM use prevalence (7-17,24-30,36-49). The CAM use timeframes surveyed were variously reported as current/most recent cycle (7-9,11,41,44), last three months (15,17,29), last 6 months (14), last 12 months (10,28,37,39,48); a 5-year period (36); and 'ever use' (8,15,24-26, 44,48). However as shown in Table 3, 13 of the studies reviewed, failed to specify the time frame in their empirical work. Excluding data for 'ever use', 29 studies reported prevalence of CAM use between 0.9-98.4 % (mean=32.8%, median = 32.0%) (7-17,27-30,36-49) when applying the broadest definition of CAM including self-treatments and home remedies. By comparison CAM use prevalence rates for all surveys post-2008 had a mean=34.4% and median=34.3% and pre-2008 these were mean=30.4%, median=21.0%. Reported prevalence rates for CAM 'ever users' ranged from 22.4-92.0% (mean=63.0%, median=74.0%) (8,15,24-26,44,48).

Reported prevalence of use of vitamin/mineral supplements, including vitamin B_6, ranged from 9-34% (mean=23.1%, median=24.7%) (8,9,26,39) in large studies (n > 499), from 4.3-62.5% (mean=22.2%, median=17.0%) current use (14,15,44,47,48) and 34.0-92.0% "ever use" (15,24,44,48) in those of smaller sample size (n< 500). Other CAM in this category reportedly used by PMS sufferers included Evening Primrose Oil (EPO) (8,11,15,24,44,48), calcium (39), magnesium (24,39) and zinc (24).

From surveys targeting CAM use and CPPD, we grouped those reporting herbs, traditional medicine, Chinese herbal medicine (CHM) or traditional Chinese medicine (TCM) together as herbal medicine. In large sample-sized studies, prevalence of use ranged between 0.5-69.7% (mean= 31.1%, median=35.0%) (10,25-28,36,38,39,41) and in small sample studies from 7.0-37.3% (mean=20.6%, median=20.7%) (14,16,29,30,43-45,47). User-prevalence for CHM/TCM had mean and median values of 28.8% and 22.4% respectively (14,25,27-29,36,41). Herbs identified were *Si-Wu-Tang* (41), *Zhong-Jing Tang* (41), *Dang-Qui-Shao-Ya-San* (28,36,50), St. John's wort (39,44), ginger (28,41) and cinnamon (47). Herbal medicine may be part of treatment described as hot drinks/tea and home remedies but were not included in our herbal medicine calculations.

Other CAM modalities reported for CPPD use in reviewed papers (not all with prevalence of use data) were homeopathy (range 0.9-14%) (12,27,38,44) , acupuncture (range 0.1-31.0%) (8,26,27,43,44), massage (range 1.4-61.0%) (9,13,15,16,27,39,42,43,47), mind/body therapies

e.g. yoga and meditation (range 0-9.5%) (8,9,27,39,44), aromatherapy (44), special/hot drinks/tea/coffee (10,13,14,47), faith healing (8) and Ayurvedic medicine (17).

CAM practitioners in countries where conventional medicine predominates were consulted by 4.0-12% of women in reviewed surveys (8,15,46) and a 2002 U.S. study reported premenstrual dysphoric disorder sufferers were more likely to consult CAM practitioners than those with less severe PMS (51). However, the 1991 PMS U.K. survey found 22.0% of women consulted both medical and "non-medical" providers (8) and 7.1% of Taiwanese women recorded simultaneously using conventional and CAM for CPPD (41).

Two PMS surveys of 'ever use' reported that at least 20% of respondents had tried five or more treatments (15,46) and attendees at PMS clinics recorded they had tried one to 12 CAM (mean=3.2) (44) and a median of four self-help remedies (including CAM) (24). Meanwhile, a comparative survey across the U.S., U.K. and France, of all non-prescription medicines used (CAM and non-CAM) to treat PMS reported only U.K. women mentioned CAM (11). In four population-based studies examining broad CAM use (beyond CPPD) and included in the review, irregular bleeding and dysmenorrhea are identified as among the five most common reasons for CAM use (36,50,52,53).

The reviewed literature identified various CPPD symptoms in which women used CAM. As shown in Table 3 two papers specifically surveyed general CPPD and CAM, most of those remaining referred to dysmenorrhea and PMS. Of all reviewed papers 21, (see Table 3), represent data from countries retaining a strong culture/reliance on traditional medicine. Papers surveying dysmenorrhea included six small studies (n=23-616) with age range 16 – 28 years (12,14,16,28,30,55) , the remaining seven spanned menarche-55 years of age (7,25,29,36,38,41,42) of which all but one was based on sample sizes of 500 or more (n= 274-23118). In the very large sample of dysmenorrheic, Taiwanese women 53.4% used mostly practitioner-prescribed CHM (36). However, a Japanese prospective study noted CAM was used equally by all women whether or not they experienced dysmenorrhea (7). Chia et al. (2013) found pain in the middle of menstruation increased the likelihood that young Hong Kong women would resort to 'non-pharmacological' self-treatments than if pain occurred premenstrually or at either end of the period (14).

CAM treatment of PMS was reported in fifteen reviewed papers, three failed to define symptoms (24,44,46), and the remaining surveys, (see Table 3), referred to both affective and physical symptoms. Age ranges for the majority of these surveys, irrespective of sample size, fell between 18-43 years (range 15–64 years). Data collected by Gold et al. suggested women with physical PMS symptoms were more likely to use CAM than not (37). However, two studies surveying premenstrual dysphoric disorder sufferers reported these women's higher use of CAM therapies (39) and visits to CAM practitioners (51) compared to those with milder PMS symptoms.

Additionally our review identified papers in which CAM use was associated with endometriosis (29,49) and its associated leg pain (43); pelvic problems (pain, pressure and dysfunctional uterine bleeding) (26), fibroids (29,40,45,58), menstrual problems including irregular cycles in younger women (17), menorrhagia (59) and mastalgia (mostly, but not exclusively, cyclical) (10). With increased symptom severity, women's reported use of medication, including CAM increased (14,15,38,39). Tariq et al. (2009) found CAM use was more likely if symptoms resulted in prolonged time off work (38) and greater symptom frequency in Cheng and Lin's sample increased CAM use (28). Meanwhile newer patients attending a conventional PMS clinic in the U.K. continued CAM use but after more than five years attendance were likely to cease its regular use (44).

Data is scant and inconsistent in the reviewed papers, regarding age, CAM use and CPPD. From the large Taiwanese database women aged 21-30 years were more likely to use TCM than older or younger age groups (36) but the survey of 15-39 year old South Korean women suggested age was irrelevant with just over 20% of all women choosing to use CHM (25). In the U.S., Sternfeld et al. (2002) reported, CAM use was higher amongst older women with PMS (39) but for women with fibroids younger women were greater CAM users according to Borah et al. (40). Age did not determine how many CAM therapies women attending a PMS clinic reported trying (44).

Further reported profile details of women using CAM for CPPD was limited in reviewed papers, providing only brief information with regards to ethnicity, lifestyle factors, socio-economic and health status. The Taiwanese dysmenorrhea study by Pan et al. (2014) of 23,118 women found CAM use was higher amongst lower income women (36). Of 12 tertiary students studies (majority aged 18-30 years) into medication in CPPD, three indicated CAM (including non-pharmacological treatments) were those most used (10,14,41), eight indicated that they were amongst those most commonly used (13,16,17,28,30,38,42,47) with only the 1991 South Africa survey reporting very low CAM usage (12). Race/ethnic-specific data was limited to U.S. surveys where the highest CAM use for CPPD was found amongst white women (37,39,58). Sternfeld et al. (2002) in U.S. reported CAM use for PMS was associated with women having a comorbidity and those who undertook regular, exertional exercise (39) whilst Australian research identified non-vegetarians who experienced lower levels of CPPD were also less likely than vegetarians and semi-vegetarians to have consulted a CAM practitioner (60).

Self Perceived Efficacy, Risk and Safety

There was variation of reported efficacy measured across different CAM modalities within studies but maximum self-perceived efficacy ratings (including registering effectiveness, satisfaction or improvement) for CAM in treating CPPD symptoms were generally high. Ratings reported were 33% -97% for PMS sufferers (8,9,24,27,44,48), 93-99% for dysmenorrhea (14,28) , 79% for endometriosis (43) and 27.7% for pelvic discomfort (26). However the reported number of side-effects experienced or symptom-worsening which women associated with CAM use was considerably less than for conventional medicine (24,26). Dissatisfaction with or finding CAM 'unhelpful', ranged from 14-69% where reported (8,44,48). Meanwhile, women's rating of CAM practitioners were limited to two PMS-focused studies where of those women who consulted a particular modality the recorded maximum satisfaction was 74.6% with regards to homeopaths (8) and 50% for osteopaths (46).

In each of a number of studies reviewed, over 50% of participating women with CPPD believed their use of CAM was satisfactory or very satisfactory specifically for vitamins/supplements for pelvic discomfort (26), dysmenorrhea (14) and PMS (9,15,44) (vitamin B_6 especially for affective symptoms (9)); herbs for pelvic discomfort (26) and dysmenorrhea (14,28); acupuncture for pelvic discomfort (26), PMS (44) and endometriosis leg-pain (43); homeopathy for PMS (27,44); mind-body/yoga for PMS (9,27); and massage for endometriosis leg-pain (43) and PMS (9,15). A New Zealand survey reported that the severity of symptoms did not appear to influence PMS sufferers' perceived treatment efficacy regarding their CAM use (9).

In the U.S. study on treating pelvic problems, Kupperman et al. (2007) found women with a lower income and educational status and those of African-American origin reported greater satisfaction levels, than either white or Asian women, for CAM and that self-rated satisfaction increased with the fewer conventional medicines and more CAM treatments used, the more effectively symptoms resolved, and with better mental well-being (26). Within a focus group conducted in Australia, participants felt CAM's effectiveness for endometriosis ranged from helping temporarily to providing a "radical improvement" (49).

Communication and information seeking of CAM users

Detailed information/advice about CAM use for PMS as reported by Domoney et al. (2003) came from a number of sources including friends and/or family, media, internet and medical personnel (44). Interestingly, 29% of women in this study reported their CAM information as sourced from medical practitioners (44). The focus group consisting of 16 to 19 year-old Taiwanese women from Kaohsiung who used self-care strategies to manage dysmenorrhea indicated their mothers' directed their use of Chinese herbs to correct energy deficiencies, "regulate the uterus" and "cleanse the body" (55).

Motivations for using/not using CAM

Whilst motivation for not using conventional medicine to treat CPPD symptoms was indicated in eight studies included in the review (11,16,29,40,45,49,54,59), none reported on women's reasons for choosing CAM. Four focus group studies, two from Australia and one each from UK and Taiwan, canvassed the experiences and thoughts of women across a range of ages and mainly suffering one aspect of CPPD to provide more detailed attitudinal data for CAM use in their treatment (49,54,55,59). Motivations for using CAM expressed by participants of an Australian focus group where 60 of 61 had adopted CAM in treating endometriosis were to enable them to gain control of their situation, be drug free, avoid surgery and 'get off the medical roundabout' (49). Cost was however cited as a difficulty by this group in using CAM (49). Whilst the other Australian focus group of sixteen 30-50 year old women with menstrual problems expressed "widespread acceptance of alternative natural remedies", taking pills "for pain relief weren't the only answer" and a preference for a "natural remedy" (54). Some Taiwanese young women believed medicinal herbs would reduce dysmenorrhea next menstrual period (55).

Discussion

This article provides the first review of international studies of CAM use by women with CPPD problems. The analyses of the last 29 years of empirical study on this topic reveals a number of significant findings that impact on and have implications for future practice and policy.

Data from 14 out of 21 (9-17,25,27,28,30,37-39,41,42,46-48) of our reviewed papers, irrespective of cultural background, recorded prevalence rates of CPPD of 80% or more, supporting its very high prevalence generally reported in the literature (1,4,5). Variation in these rates is likely to be exacerbated by the lack of consistent definitions and questioning regarding frequency and severity of symptoms. There are many general studies of CAM use confirming its uptake has increased throughout the world, especially amongst women (22,23). That this increase can be related also to the treatment of CPPD in high income countries, is supported by the fall, in both the US and UK, of medical prescriptions for CPPD identified in the 1990s (18,19). Indeed as far back as 2002, Wyatt et al., reported the unexpected prescription-rate drop even as there was increasing acceptance of PMS in the UK, leading them to speculate this may be because women increasingly turned to CAM (19). The fact that in our review the last seven years has seen as much study into this subject as was reported in previous decades tends to add support to this interpretation. However, since 2008 interest in CAM for CPPD has largely been explored in countries where traditional medicine practices have been maintained, the majority of the recent surveys (18 out of 21) having been conducted in African, Far and Middle Eastern countries. We nonetheless found studies supporting CAM use in Western countries where "ever use" of CAM by women with PMS shows high user prevalence of 74%-92%.

Whilst reported strategies in the review papers reflect some cultural nuances they show considerable use is being made of CAM to treat CPPD problems. Not only are a large range of CAM treatments used, but multiple CAM appear to be used concurrently (8-10,14-17,24,26,28,41,43,44,46-48,57). Possible explanations for increasing adoption of CAM are suggested by focus group members who emphasised preferences for 'natural' treatments and to help them wrest back control of their own health. The investigation into increased CAM use remains woefully unexplored, but much needed, to ensure its safe and effective use in the future. The established high need for effective treatment coupled with a lack of reliable current information highlights the difficulty for informed guidance in future health policy and practice worldwide in treating CPPD.

Our review also provides good evidence that a large proportion of women with CPPD choose not to consult any health professional for help. Lack of consultation has been noted by other authors, with suggested reasons ranging from not wishing to 'medicalise' a natural process, acceptance of CPPD as 'normal' or because of the perception of ineffective available treatments(1,3,18,19). Therefore, it is extremely likely there will continue to be increasing use of CAM for CPPD through self-prescription. The motivation for not seeking professional CAM help remains unexplored but higher levels of self-prescribed CAM compared to professional CAM consultation is not new (22,61) and may be an economic measure or the perception that CAM is natural and therefore safe (57). Indeed reviewed studies reported that from a third to more than 90% of participating woman rated CAM effective in treating many symptoms, with few reporting adverse effects from CAM use. Self-prescription of CAM and conventional medicine for CPPD appears widespread, probably reflecting not only symptom prevalence throughout women's reproductive lives, but also lack of effective treatment. Additionally there are reports of a relatively high placebo effect, from 10-50%, across both conventional and CAM treatments for CPPD (1,3,9,19), leading to uncertainty regarding general efficacy. This situation should raise concerns for healthcare providers across the board regarding both efficacy and safety and because concomitant use of conventional medicine and CAM has potential for adverse interactions but is often undisclosed to health professionals (35,52,56).

The reviewed papers clearly show that women use CAM to treat a wide range of CPPD symptoms from the most common dysmenorrhea and PMS to premenstrual dysphoric disorder, fibroids, mastalgia, pelvic discomfort and endometriosis, with lower prevalence. However the level of CPPD symptoms and adopted treatments, other than PMS, has not been well explored in large samples of women below the age of 28 years. Our data whilst suggesting that CAM modalities are differentially preferred for particular aspects of CPPD is less clear if this is related to efficacy or simply reflects their official endorsement by medical practitioners amongst others.

Difficulties arise when comparing findings from the reviewed papers with reported studies varying greatly in sampling methodology (convenience, self-selection, random), sources (half arose from tertiary and conventional medical settings) and quality of survey instruments, only some of which were pre-tested and/or validated. Prevalence calculations of CAM use were made from varying baselines - whole mixed gender populations/women in selected age range/only women with CPPD of survey's interest. Levels of recall bias are likely to vary – five reviewed studies were prospective (7,16,39,42,51) compared to 39 which were retrospective questionnaires. In addition where supplied there was considerable variation in response rates (11%-100%), time frames for measuring CAM usage (last monthly cycle – ever) and detail of CAM lists, if supplied, which would alter levels of data capture. Indeed CAM was unspecified in 28 out of 45 of these studies. Finally as most reviewed papers did not include geographical location data the extent to which differential access to CAM therapies, particularly in rural communities, may have altered measured prevalence of CAM use is unknown. Importantly

prevalence of total CAM use for CPPD is likely understated by our data as this was reported on individual modalities/treatments and many surveys reported women using more than one CAM entity. On the other hand the broad interpretation of CAM to include home remedies may have led to some overstatement of user prevalence.

An important limitation of this review is that only English language papers were included. In addition, the inclusion of papers over this long time frame, whilst highlighting changing trends in CAM use for women with CPPD, makes comparisons difficult as attitudes, acceptance and scope of CAM has changed markedly over the last three decades. Nevertheless, the papers reviewed do provide important confirmation of the substantial use of different CAM for a variety of CPPD and that CAM attracts high levels of perceived efficacy amongst users with CPPD. Review of the contemporary empirical literature also highlights the dearth of knowledge around a number of issues relating to CPPD and CAM use. Indeed, future empirical study is needed to help investigate the CPPD issues for which women are using particular CAM, the profile of these women, reasons for their CAM choice and whether indeed the CAM has been a beneficial treatment. The simultaneous use of conventional medicine and CAM raises unknown safety concerns regarding interactions and adverse reactions (62) generally and is unexplored for this group of women. Arising from the practice of self-prescribing CAM are issues of suitability, levels for safe and/or effective dosage and treatment duration. Past concern over potential neurotoxicity with high-dose vitamin B_6 (19) should serve as a reminder that although CAM is natural with misuse it has the potential to cause harm. Finally, although cross-sectional studies may indicate prevalence of CPPD and CAM use they do not unequivocally establish causality. Clear, safe, reliable information on effective treatments, and most importantly the profile of users, would help inform both providers and women with CPPD towards evidence-based, coordinated care and treatment choices.

Conclusion

CPPD problems are widespread and treatment is likely to be either poor and/or professionally unsupervised. To contribute to more effective strategies to remedy this situation large-scale, national studies, including prospective, placebo-controlled studies on women with similar CPPD symptoms are much needed to determine CAM efficacy and safety. Further, future studies are also required, which addresses the characteristics of women who choose to use CAM, their motivation for doing so and their reasons for preferring self-treatment It is important for health providers at all levels to have a solid evidence base for prescribing treatments for CPPD and this requires the provision of good quality, reliable data.

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Table 1. Description of quality scoring system for the Complementary and Alternative Medicine (CAM) surveys reviewed.

Dimensions of Quality Assessment	Points Awarded[a]
Methodolgy	
A. Representative sampling strategy	1
B. Sample size >500	1
C. Response rate > 75%	1
D. Low recall bias – prospective or retrospective data collection within the past 12months	1
Reporting of participants' characteristics	
E. Status of CPPD assessed	1
F. Age	1
G. Ethnicity	1
H. Indicator of socio-economic status (e.g. income, education)	1
Reporting of CAM use	
I. Definition of CAM or modalities provided to participants	1
J. Participants can name CAM therapies/modalities used (open question)	1
K. Use of CAM modalities assessed	1

Data adapted from Adams et al. (35).

[a] Maximum score is 11 points.

Quality of studies was assessed based on representativeness of women in the sample through methodology and participant characteristics (A,B,C,D,F,G,H) validity of diagnosis to assess CPPD (E) and CAM use (I,J,K). CAM, complementary and alternative medicine; CPPD, cyclic perimenstrual pain and discomfort.

Table 2. Quality assessment of reviewed articles.

First Author	Methodology				Participant characteristics				CAM reporting			Total
	Sampling A	Size> 500 B	Response rate 75% C	Recall bias D	Status of CPPD E	Age F	Ethnicity G	SES H	Defined to participants I	Participant can name (open) J	Use assessed K	
1. Kupperman (26)	1	1	1	1	1	1	1	1	0	0	1	9
2. Sternfeld (39)	1	1	0	1	1	1	1	1	1	0	1	9
3. Pan (36)	1	1	1	1	1	1	1	1	0	0	1	9
4. Hsieh (50)	1	1	1	2	1	1	0	0	1	0	1	9
5. Kronenberg (58)	1	1	1	1	0	1	1	1	1	0	1	9
6. Gold (37)	1	1	1	1	0	1	1	1	1	0	0	8
7. Ohde (7)	1	1	1	1	1	1	0	1	1	0	0	8
8. Chawla (51)	1	1	1	1	1	1	1	1	0	0	0	8
9. Singh (27)	1	1	0	0	0	1	1	0	1	1	1	7
10. Cheng (41)	0	1	1	1	1	1	0	0	1	0	1	7
11. Cheng & Lin (28)	0	1	1	1	1	1	0	0	1	0	1	7
12. Hylan (11)	1	1	0	1	1	1	0	1	0	1	0	7
13. Kraemer (48)	0	0	0	1	1	1	1	1	0	1	1	7
14. Baines (60)	1	1	1	1	0	1	0	1	1	0	0	7
15. Awad (53)	1	1	1	0	0	1	0	1	0	1	1	7
16. Campbell (15)	0	0	0	1	1	1	0	1	1	0	1	6
17. Pullon (9)	0	1	1	1	0	0	0	1	1	0	1	6
18. Corney (8)	0	1	0	1	1	1	0	1	0	0	1	6
19. Borah (40)	1	1	0	0	1	1	1	1	0	0	0	6
20. Tariq (38)	0	1	0	0	1	1	0	1	0	1	1	6
21. Tanaka (29)	0	0	0	1	1	1	0	1	1	0	1	6
22. Hamaideh (47)	0	0	0	0	1	1	0	1	1	1	1	6
23. Critchley (56)	0	0	0	1	0	1	1	1	1	1	0	6
24. Lee (25)	1	1	0	0	0	1	0	0	0	1	1	5
25. Chia (14)	0	0	1	1	0	1	0	0	1	0	1	5
26. Eladawi (10)	0	1	1	1	1	1	0	0	0	0	0	5

CAM, complementary and alternative medicine; CPPD, cyclic perimenstrual pain and discomfort; SES, Socioeconomic status.

First Author	Methodology				Participant characteristics				CAM reporting			Total
	Sampling A	Size> 500 B	Response rate 75% C	Recall bias D	Status of CPPD E	Age F	Ethnicity G	SES H	Defined to participants I	Participant can name (open) J	Use assessed K	
27. Cronje (12)	0	0	1	0	0	1	1	0	0	1	1	5
28. Adegbesan (45)	0	0	0	0	1	1	0	1	0	1	1	5
29. Seven (16)	0	0	1	0	1	1	0	0	0	1	1	5
30. Sharma (17)	0	0	1	1	1	1	0	0	0	1	0	5
31. Cox (49)	1	0	1	0	1	1	0	0	0	1	0	5
32. Nicholson (61)	0	1	1	0	0	1	1	0	0	1	0	5
33. Tolossa (13)	0	0	1	0	1	1	0	0	0	0	1	4
34. Missmer (43)	0	0	0	0	1	1	1	0	0	0	1	4
35. Leather (24)	0	0	0	0	1	1	0	0	0	1	1	4
36. Brito (42)	0	1	0	0	0	1	0	0	0	1	1	4
37. Sawalha (52)	0	1	1	0	0	1	0	0	0	1	0	4
38. Byles (54)	1	0	1	0	0	1	0	0	0	1	0	4
39. AlBraik (57)	0	0	0	1	0	1	0	1	0	0	1	4
40. Chapple (59)	0	0	0	0	0	1	1	1	0	1	0	4
41. Domoney (44)	0	0	0	0	1	1	0	0	0	0	1	3
42. Abdul-Razzaq (30)	0	0	0	0	0	1	0	0	1	0	1	3
43. Brown (46)	0	0	0	0	0	1	0	0	0	1	1	3
44. Chen (55)	0	0	0	0	0	1	1	0	0	1	0	3

TABLE 3 General Information on research articles into complementary and alternative medicine (CAM) and cyclic perimenstrual pain and discomfort (CPPD).

First Author/ Country	**Year / Resp. rate**	**Design/ Sample**	**Max. CAM Prevalence/ Baseline**	**CAM Therapies used/ List supplied?**	**Sample size/ Age range**	**CAM Time frame reported / CAM self-prescribed**	**Symptoms treated/ Validated diagnostic assessment**
1. Campbell (15) Australia	1997 69%	SCQ Multiple GP clinics	Ever - 34% 3 mo -21% Whole sample	Vitamins, massage, EPO Yes	310 18-45y	Ever and last 3 months Unspecified	Premenstrual Syndrome – physical and affective Yes
2. Domoney (44) U.K.	2003 N/A	SCQ 1 site- PMS clinic	Ever – 91% Current–35% Sufferers	Supplements, herbs, EPO acupuncture, homeopathy, Unspecified	100 25 –54y	Ever and current Unspecified	Premenstrual Syndrome - unspecified GP referred
3. Singh (27) U.S.	1998 11%	Interviewer Commercial database (telephone)	1.5% Whole sample	Mind/body, massage, homeopathy, chiropractic, herbs, acupuncture Yes	1052 21 – 64y	Unspecified Unspecified	Premenstrual Syndrome – physical and affective Unspecified
4. Tolossa (13) Ethiopia[ɬ]	2014 86.4%	SCQ Tertiary students, 1 site	7.5% Whole sample	Hot drinks, massage Unspecified	173 18 – 25y	Unspecified Unspecified	Premenstrual Syndrome – physical and affective Yes
5. Pullon (9) New Zealand	1989 96%	Interviewer Multiple GP clinics	33% Sufferers	Massage, yoga, vitamin B_6 Yes	1456 15 – 54y	Last cycle Yes	Premenstrual Syndrome – physical and affective Unspecified
6. Lee (25) South Korea[ɬ]	2010 11.6%	SCQ Commercial database (on-line)	22.4% Sufferers	Chinese herbal medicine Yes- limited	500 15- 39y	Used at least once (Ever use) Unspecified	Dysmenorrhea Unspecified
7. Corney (8) U.K.	1991 68 - 77%	SCQ Response to advert in two written media	Ever – 74% Last month -9% Sufferers	Vitamins, homeopathic, EPO Unspecified	658 16 – 45y	Ever and last month Unspecified	Premenstrual Syndrome – physical and affective Yes
8. Missmer (43) U.S.	2011 33%	SCQ Support group	61% Sufferers	Massage, herbs, acupuncture, chiropractic Unspecified	94 16 – 58y	Unspecified Unspecified	Endometriosis leg pain Yes
9. Kupperman (26) U.S.	2007 75%*	Interviewer Multiple clinics	36.4% Sufferers	Acupuncture, herbs, dietary supplements Yes - limited	1493 31 – 54y	Current or prior (Ever use) Unspecified	Pelvic problems –physical and affective Yes

TABLE 3 Continued

First Author Country	Year / Resp. rate	Design/ Sample	Max. CAM Prevalence/ Baseline	CAM Therapies used/ List supplied?	Sample size/ Age range	CAM Time frame reported / CAM self-prescribed	Symptoms treated/ Validated diagnostic assessment
10. Chia (14) Hong Kong[I]	2013 94%*	SCQ 1 site- tertiary students	62% 7% Sufferers	Warm beverage Dietary supplements, TCM Yes	240 18 -22y	Last 6 months Yes	Dysmenorrhea Unspecified
11.Sternfeld (39) U.S.	2002 26%	SCQ Prospective CPPD HMO (telephone)	20.1% Sufferers	Dietary supplements, massage, mind-body, herbs Yes – limited?	1194 21 – 45y	Last 12 months Unspecified	Premenstrual Syndrome – physical and affective Yes
12. Borah (40) U.S.	2013 23%*	SCQ Commercial database (on-line)	26% Self carers	"Herbs, supplements or other CAM" Unspecified	968 29 -59y	Unspecified Yes	Fibroids Yes
13.Gold (37) U.S.	2007 100%	SCQ & interviewer SWAN cohort	48.7% Whole sample	General CAM Yes- limited	3013 42 – 52y	Last 12 months Unspecified	Premenstrual Syndrome – physical and affective Unspecified
14. Ohde (7) Japan[I]	2008 97.4%	Prospective CPPD NationaI database	7.7% Sufferers	Dietary CAM Yes - limited	823 18 – 51y	Last month Unspecified	Dysmenorrhea Yes
15. Tariq (38) Pakistan[I]	2009 N/A	SCQ & Interviewer Multiple sites – hospital students, staff/patients	32% Sufferers	Household remedies, herbs, homeopathic Unspecified	1236 16 – 50y	Unspecified Unspecified	Dysmenorrhea Unspecified
16. Abdul-Razzak (30) Jordan[I]	2010 N/A	SCQ 1 site- tertiary students	21.3% Sufferers?	Herbs (supplement-users excluded) ? limited if yes	127 19 – 24y	Unspecified Yes	Dysmenorrhea Unspecified
17. Cheng (41) Taiwan[I]	2011 95.4%	SCQ 1 site- nursing students	69.7% Treatment users	TCM, herb tea Yes	2758 18 – 55y	Last cycle Unspecified	Dysmenorrhea Yes (by author)
18. Cheng & Lin (28) Taiwan[I]	2011 98%	SCQ 2 sites - tertiary students	35% freq Sx 23.9%* all Sx Sufferers	TCM, herb tea Yes	616 18 – 28y	Last 12 months Yes	Dysmenorrhea Yes
19. Pan (36) Taiwan[I]	2014 N/A	Data from national health database	53.4% Sufferers	TCM , herbs, acupuncture N/A	23118 menarche-50y	5 year use No	Dysmenorrhea Yes

TABLE 3 Continued

First Author Country	Year / Resp. rate	Design/ Sample	Max. CAM Prevalence/ Baseline	CAM Therapies used/ List supplied?	Sample size/ Age range	CAM Time frame reported / CAM self-prescribed	Symptoms treated/ Validated diagnostic assessment
20. Eladawi (10) Egypt[ɪ]	2014 93.7%	SCQ 1 site - tertiary students	43.7% Sufferers	Hot drinks, herbs, massage Unspecified	797 17 – 31y	Last year Unspecified	Mastalgia Yes
21. Tanaka (29) Japan[ɪ]	2014 75%*	SCQ Commercial DB (on-line)	13.9% Outpatients	TCM Unspecified	274 15 – 49y	Last 3 months No	Dysmenorrhea, fibroids, PMS -physical & affective, endometriosis Yes
22. Cronje (12) South Africa	1991 78.5%	SCQ 1 site -tertiary students	1.0%* Whole sample	Homeopathy Unspecified	102 19 – 21y	Unspecified Unspecified	Dysmenorrhea No
23. Leather (24) U.K.	1993 N/A	SCQ 1 site - PMS clinic	92% Sufferers	Vit. B6, EPO, zinc,magnesium Unspecified	100 18 – 45y	Ever used Yes	Premenstrual syndrome unspecified
24. Adegbesan (45) Nigeria[ɪ]	2014 N/A	Interviewer 2 sites - hospital clinics	37.3% Sufferers	Herbs, cod liver oil Unspecified	300 20 – 49y	Unspecified Unspecified	Fibroids Yes
25. Brito (42) Brazil	2012 N/A	Prospective CPPD 1 site -tertiary students	16% Sufferers	Teas,massage Unspecified	634 18 – 53y	Unspecified Unspecified	Dysmenorrhea No
26. Hylan (11) U.K., U.S., France	1999 N/A	Interviewer by telephone Commercial database	23% Sufferers	Non-prescription medicines included EPO & OTC drugs Unspecified	1045 18 – 49y	Current Unspecified	Premenstrual Syndrome - physical and affective Yes
27. Kraemer (48) U.S.	1998 70**%?**	SCQ Recipients of pharmacy newsletter	Ever -91.4 Last yr -62.5% Sufferers	Vitamin/mineral Vitamins, minerals, EPO Unspecified	220 26 – 56y	Ever and Last 12 months Unspecified	Premenstrual Syndrome - physical and affective Yes
28. Brown (46) U.S.	1986 N/A	SCQ Attendees at talk on PMS	12% Sufferers	Chiropractor, nutritionist, osteopath, clergy Unspecified	83 18 – 43y	Unspecified No	Premenstrual Syndrome No
29. Hamaideh (47) Jordan[ɪ]	2014 73%	SCQ 1 site - tertiary students and employees	24.4% 53.5% Whole sample	Cinnamon tea/supplements hot fluids? Yes	254 18 – 45y	Unspecified - "usually used" Yes	Premenstrual Syndrome PMDD-physical and affective Yes

TABLE 3 Continued

First Author Country	Year / Resp. rate	Design/ Sample	Max. CAM Prevalence/ Baseline	CAM Therapies used/ List supplied?	Sample size/ Age range	CAM Time frame reported / CAM self- prescribed	Symptoms/ Validated diagnostic assessment
30.Seven (16) Turkey[ɨ]	2014 94%*	SCQ Prospective CPPD 1 site - Volunteer tertiary students	34.3% Sufferers	Massage, herb tea Unspecified	371 18 – 23y	Unspecified Unspecified	Dysmenorrhea Yes
31. Sharma (17) India[ɨ]	2008 89.3%	Interviewer 1 site- tertiary students	40%/?	Home remedies, Ayurvedic or homeopathic medicine Unspecified	100 17 – 23y	Last 3 months Unspecified	Cyclic Perimenstrual Pain and Discomfort No
32. Chawla (51) U.S.	2002 51.6%	SCQ Prospective CPPD HMO- Randomly selected	?Likelihood Sufferers	General alternative medicine provider Unspecified	1194 21 - 45y	Last 12 months Practitioner	Premenstrual Syndrome and PMDD – physical and affective Yes
33. Cox (49) Australia	2003 65%	Focus group National sufferers	98.4%* Sufferers	Various Unspecified	61 20 - 64 y	Unspecified Unspecified	Endometriosis Yes
34. Sawalha (52) Palestine[ɨ]	2008 98.6%	SCQ 1 site- tertiary students	33.9% Mixed gender	Herbal medicine Unspecified	1581 17 – 24 y	Unspecified Yes	General health issues included dysmenorrhea No
35. Nicholson(61) New Zealand	2006 97.2%	SCQ 1 hospital site	38.1% ED patients	General excl. Vitamin/mineral supplements Unspecified	1043 14 – 97 y	Unspecified Mixed	General health issues included dysmenorrhea No
36. Critchley (56) Hong Kong[ɨ]	2005 N/A	Interviewer 1 hospital site Preoperative patients	90% 44% Mixed gender	Chinese herbs in soup/tea Practitioner prescribed Yes	259 14 – 96 y	Last 12 months Mixed	General and gynecology Included fibroids No
37. Byles (54) Australia	1997 60%	Focus group Survey sample of sufferers from 1 state	N/A Sufferers	General alternative medicine Unspecified	31 33 – 50 y	Unspecified Unspecified	Cyclic Perimenstrual Pain and Discomfort Unspecified
38. Baines (60) Australia	2007 68%	SCQ Longitudinal study on dietary habits	26.2% Whole sample	Alternative health practitioner Unspecified	9113 22 - 27 y	Last 12 months No	Premenstrual syndrome, irregular periods, heavy periods, dysmenorrhea No

TABLE 3 Continued

First Author Country	Year / Resp. rate	Design/ Sample	Max. CAM Prevalence/ Baseline	CAM Therapies used/ List supplied?	Sample size/ Age range	CAM Time frame reported / CAM self-prescribed	Symptoms treated/ Validated diagnostic assessment
39. Chen (55) Taiwan[ɨ]	2006 N/A	Focus group 1 site –Medical school	N/A Sufferers	Various CAM therapies Unspecified	23 16 – 19 y	Unspecified Yes	Dysmenorrhea Unspecified
40. AlBraik (57) United Arab Emirates[ɨ]	2008 N/A	Interviewer and SCQ 1 site health clinic	76% 38% 34% Mixed gender	Herbal medicine ever Herbal medicine current Herbal practitioner ever Unspecified	330 15 – 55+ y	Last 6 months and current Mixed	General health issues included dysmenorrhea No
41. Awad (53) Sudan[ɨ]	2006 83.3%	SCQ 3 cities random stratified	53.5% Mixed gender	Herbal medicine Unspecified	1000 20 – 60+ y	Last 2 months Yes	General health issues including dysmenorrhea No
42. Hsieh (50) Taiwan[ɨ]	2008 N/A	2004 records National Health database	28.1% Mixed gender	Chinese Medicine Yes	166929 0 – 76+ y	Last 12 months No	All health issues including menstrual disorders Yes
43. Chapple (59) UK	1999 N/A	Focus group Local interest groups with snowball sampling	10%? Sufferers	EPO and homeopathy Unspecified	30 15 – 53 y	Unspecified Unspecified	Menorrhagia No
44. Kronenberg (58) US	2006 69 – 79%	Interviewer by telephone Commercial database	64.4% All women	Variety of CAMs and CAM practitioner used Yes	3068 18 – 50+ y	Last 12 months Unspecified level incl. practitioner use	General health issues including fibroids No

N/A – Not Available ; SCQ – Self-completed Questionnaire; EPO- Evening Primrose Oil; *Calculated; [ɨ]Strong cultural/reliance on traditional medicine; GP – General Practitioner; HMO – Health Maintenance Organization ; Sx – Symptoms ; OTC – Over the Counter; ED – Emergency Department; PMS, premenstrual syndrome; GP, general practitioner; N/A, Not Available; SCQ, self-completed questionnaire ; EPO, Evening Primrose Oil; PMDD, premenstrual dysphoric disorder; TCM, traditional Chinese medicine.